Your Body

A complete guide to fitness, health and beauty

By Alex Moisescu

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Pull - ups

Squats

Dips

Strength training for beginners

Strength training breathing techniques

About joint locking

Strength training for fitness

Strength training for bodybuilding

Training for maximal strength

Unleash the power – training for explosive strength

The anatomy of a rep

Strength training exercises

Top ten exercises

The squat

The bench press

The deadlift

The pull up

The dip

The back row

The upright row

The shoulder press

The biceps curl

The Gorilla crunch

Free weights versus machines

Example of strength training programs

Kettlebell training

Kettlebell introduction

Kettlebell swing

Kettlebell standing press

Kettlebell windmill

Kettlebell snatch

Kettlebell clean and jerk

Kettlebell Turkish get up

Kettlebell side press

Kettlebell two hands anyhow

Kettlebell squat

Kettlebell floor press

Kettlebell bent over row

Kettlebell gladiator row

Kettlebell passes between the legs

Kettlebell side bridge side press

Kettlebell single leg deadlift

Kettlebell crunch

Kettlebell training safety rules

What size kettlebell should I start with?

Kettlebell training programs

Kettlebell FAQ

Gym rings training

Strength training made simple

Other effective ways of training for superior physical conditioning

Track and field training

Stair training

Vegetal Fibers

Water

Vitamins and minerals

Fat soluble vitamins

Water soluble vitamins

Major Minerals

Trace minerals

Basic groups of foods

When to eat?

Training and eating

Dietary guidelines

How to make your own diet plan

How to calculate your body fat percentage?

Ideal weight

Waist/hip ratio

Lose fat

Fat loss fallacies

After how long time after I begin to exercise, I will start to see the results?

How should you train if you are really time crunched?

Whom should I trust?

The best home gym

Alcohol abuse

Smoking is bad

About the author

My complete name is Alexandru Mihnea Moisescu. I was born in Romania in 1976.

Compared with many “fitness gurus” who wrote books or started programs, fitness did not came to me through a revelation. I was never fat or out of shape, nor had a life changing experience when I discovered fitness. I started to be involved in sports since I was 5 years old and by 12, I was exercising and training on a regular basis at least 4 times a week. Until today I have never skipped training more than a week and this on seldom occasions.

So fitness is a part of my living.

I graduated Physical University Faculty in Iasi, Romania and in 2000 I also attended 2 years post graduate studies in Health Preservation and Rehabilitation at Beijing Physical and Sports University.

For more than 8 years I started and managed fitness clubs. During this period I have trained from scratch more than 100 personal trainers, provided various training to more than 1000 personal trainers and I offered training advice and instructions to more than 10000 clients.

Along the road I also got involved and trained professional athletes: first league football players, MMA fighters and national teams (tennis, tae kwon do, boxing).

At present I live in Shanghai and I run a Physical Education, Fitness and Sports program for children between 3 and 12 years of age and I also take care of the physical conditioning programs for MMA fighters.

Myself I train every week strength and conditioning about 3 times, I do 2 MMA training sessions and play rugby almost every Saturday.

I am 188 cm tall, weighing 93 kg at 10 % body fat. I can deadlift 240 kg, squat 200 kg, bench press 160 kg, snatch a 28 kg kettlebell 100 times in 5 minutes, run 3 km in little over 12 minutes, sprint 50 m in 6 seconds and jump 290 cm for standing long jump.

Q&A with Alex Moisescu

Q: What do you think is the most important ingredient when it comes to maintaining and improving health, fitness and beauty?

A: The most important thing should be your discipline. Discipline means to work out 2-3 times a week all your life starting when you are 3 years old and until the last days of your life even when

you are busy, even when you are exhausted even when you think you have reasons to skip training. Discipline means to have a correct nutrition at least 90% of all your meals in virtually every week and to make it up after and overfeeding like during a holiday week. Discipline means to absolutely refrain from smoking and drink with responsibility in spite of your entourage and social connections.

Q: Could you think of why these days especially in developed countries there are so many people who are unfit in spite of all the informations and in spite of all health and fitness facilities we see everywhere?

A: The main reason for why so many people (I can easily say the majority of people) are so unfit is that they accept the situation. They think is no big deal, that they are fit and healthy "enough", they look at the people around them and came to accept living without fitness. As I said before, they lack the most important ingredient, the discipline needed to achieve health, fitness and beauty.

Q: Talking about fitness knowledge which kind of knowledge do you see as most important?

A: I consider that the essence of fitness knowledge is the Principles of Physical Training.

Q: Why and how you decided to write and publish this book?

A: I have started to write for this book when I was 22 years of age, 13 years ago (as today is February 2011). I wrote a little on a frequent basis and than I put everything together and this book came out. I think that compared with every other book I red on this topic, that I have some words to say.

Q: What is different about your book, compared with all those hundreds, maybe thousands of books on this topic out there?

A: Well, frankly saying most of the books I saw are of very little substance, quite superficial. Of course that are also a lot of good books out there.

I will make a list with what I see as special about my book:

- It explains in detail the science of fitness, but is written for the normal folks who do not like to read scientific text books.
- Combines equally theory with practice. Most of the other books lack one of these two features.
- It is very complete. By reading and learning it the reader will have more useful knowledge than at least 50% of all personal trainers who work in commercial gyms.
- It is basic and plain common sense knowledge. Most of the books out there want to be seen as revolutionary, cutting edge systems or "hocus-pocus-abracadabra" magic programs who work with little effort and give you "the results you want" in very short time

Q: What kind of books have been taught you the most knowledge?

A: For me the most important knowledge comes from "Exercise physiology" which is and should be behind every principle and theory on fitness and conditioning training.

Q: What else is important to know about your book on fitness?

A: I personally tried, retried and tested everything what is written in this book on me and on my 10 000 clients I gave practical and theoretical advice, for more than 10 years.

Q: Do you really think that everybody could get a healthy, fit and beautiful body?

A: Yes, I do. With discipline and persistence everyone can achieve goals who never thought were possible.

Q: Why did you include chapters about nutrition and lifestyle in the book?

A: You can not achieve good health, fitness and beauty without taking into consideration all these factors. These factors are interconnected and influence each other at a great extent.

About this book

This book is not a revelation, it is not a breakthrough system, it does not contain secret information, it will not allow you to "achieve your dream body in a cutting edge revolutionary 6 weeks program", it is not "3 minutes every day for a tropical beach body".
This book is pure common sense. The problem is that as Voltaire said "Common sense is not so common".

This book is a 400+ normal pages book, which contains almost all informations you need to achieve a healthy, well conditioned and good looking body. Please refer to the Book Content for details.

Physical exercise, nutrition and lifestyle are the three main pillars of health, fitness and beauty, therefore this book contains chapters relevant for each of these three pillars.

I wrote this book to be red by everybody. I know that it is not good for marketing to have a product which tries to appeal to everybody, but I imagine that every person in this world wants to be healthy, to posses superior fitness and to look good. So men, women, adults, youngsters, athletes and sedentaries all can profit by applying the informations written in this book.

Inside the book you will find 500+ clear photos to show explicitly exercise techniques.

If you would train with a good personal trainer, he or she should let you know all information present inside this book. You might need more than 200 personal training classes until the trainer could present you will all information contained in this book,

I highly recommend this book to all personal trainers; as I wrote above, it contains all the information you have to teach, tell and show to your clients.

This is the book I wished to have when I began to systematically train physical conditioning 15 years ago. This is the book I needed when I began to train my first Personal Training clients 8 years ago.

This is the book I needed when my progress was staling many times during my 15 years of continuous strength training.

If I would have had this book I could have achieved the results I achieved within over 15 years of training in just 3 or 4 years.

This book explains in detail the science behind every successful training program. By learning all the information presented in this book you will understand not just how to train, but at a much deeper level why you have to train like you chose to.

Training well means getting the results you want and you can possibly achieve, in the shortest time, in the most efficient manner.

I strongly believe that every individual should and has to exercise regularly; therefore this book suits every individual who wants to posses a healthy and good looking body, which also performs well.

If you practice any athletic discipline, you must know that physical conditioning is paramount for succeeding at a high level. Inside this book you will find the information you need to know in order to train well for improving your physical abilities: speed, strength, endurance, flexibility and motor skills.

What this book will help you to do? (If you read it and practice what you read)

Lose fat – healthy, surely and permanently

Improve your overall fitness

- Increase your cardiovascular ability
- Increase your muscular strength
- Increase your power
- Increase your flexibility

Improve you specific fitness

- Increase your physical conditioning level you need for performing sports and athletic disciplines at a higher level
- Correct your physical deficiencies
- Reach your maximal strength capabilities

Train wherever you like, and train like a pro

- Train in a gym
- Train outside
- Train at home

This book will answer almost any of your questions related to fitness and bodybuilding:

How to get rid of your belly fat?

How can you achieve 4, 6 or 8 packs abs?

How to change your body appearance? How to get sexy buttocks, nice legs and an appealing upper body?

How can you improve your appearance within shortest time possible?

How to maintain your fitness level if you are very busy?

How to achieve 100% success rate with your fat loss and physical conditioning program?

How to avoid pitfalls and break through plateaus?

Why did I write this book and published it?

- To persuade you make fitness a part of your life
- To let you reach your health and fitness goals in the shortest time possible

Health and fitness to you!

"Every man knows a lot about women, cars and soccer"; I will add also the word "fitness" to this saying. Ask anyone and he will tell you how to exercise, how to eat healthy, how to lose fat and so on. Ask 10 people and you will get 7 different answers about the topics I just mentioned.

Many times I was amazed about how little know about fitness and physical conditioning even highly educated people.

It is time to learn correctly almost everything you need to know about fitness and physical conditioning.

Do you brush your teeth daily?

I am sure that with an offended expression you will answer. “Of course I do! How about your friends and relatives? Do you think they brush their teeth daily?” “Of course they do!” you will answer clearly offended.

“Why?” This question will make you wonder for a few seconds, and than you will answer. “To maintain my dental health, nice looking smile and clean breath. Everybody brushes their teeth.”

How about 100,200 years ago? That time there were not any tooth brushes, nor toothpaste. That time, people did not brush their teeth. But today, in our modern cities it is unconceivable that someone would not brush teeth daily. It is common sense. If you do not brush your teeth you will get cavities, lose your teeth at an early age, not to speak about the socially unacceptable bad breath.

Do you exercise regularly?

This question for sure it will not make you upset because you have a lot of excuses:

“I am a very busy person”

“I am healthy enough”

“I do not need to lose weight”

“I am too exhausted every day”

“I am too old to begin exercising”

“I am not fat”

“My friends also do not exercise”

“I have no place to exercise”

“I have no money to exercise”

“It takes too much time”

“I do not want big muscles”

“I do not want to get fat after I quit”

“I feel that I am in good shape”

“I feel that my shape is not too bad”

“I do not need to exercise”

“I am thinking about this for long time, but I haven’t started out yet”

“I think that athletes do not look good. They do not look natural to me.”

Or some sincere

“I am too lazy.”

“I do not like to exercise.”

“I do not have the discipline required.”

You can find a thousand reasons for not doing exercise; What you need to do is to find one good reason to exercise.

You brush your teeth because you want to have strong and white teeth, because you feel bad if you skip or forget doing it and because you start to stink after less than a day without teeth brush.

How about your heart, your arteries, your lungs, your bones, muscles and joints? How about your strength, stamina and flexibility? How about your overall athleticism? How about your look?

What good and regular dental care does for your teeth, the same will physical exercise do for all of the above.

The thing is that you can not see inside your body and your body does not decay so fast as a tooth. And also it is socially acceptable to be out of shape and carrying around a lot more than a few extra pounds of fat.

Do not regard health simply just as absence of disease. When you are healthy you should be able to perform your best in everything: at work, at home, in the gym, or when you are in a holiday. You should be the best you can be: the best leader, husband, father, son, friend and citizen. Perform your best, do not just be another guy around, another mouth to be fed and another one to be taken care of. Be in the center of the action, lead the action and reap the rewards. Health is when the others around you fall down because of exertion or illness you are still high up there and still performing well.

Physical exercise is basic hygiene, just the same as washing, brushing your teeth and keeping clean.

Physical exercise is plain common sense.

20 or more years from now, you will feel offended by this question: "Do you exercise regularly?"

The reason I wrote this book is to persuade people to exercise. If you do not exercise regularly, than you'd better start out within 3 days. If you do some, you better do it seriously. If you are already serious about physical training, you should get and maintain good results.

People often ask: "What should I do to maintain my health?" The answer is simple and straightforward: "Do not get sick!". I have been a few times inside hospitals with friends or family (In China). At the hospital there were thousands of people waiting in line for receiving a consultation, for having an analysis, for making payments and for buying medicines. At least

80 % of the patients are there just because of themselves. They are literally guilty of self inflicted illness.

Preventive medicine is the simplest, the most effective, and the cheapest way to maintain good health.

Nutrition, lifestyle and physical fitness are the main pillars of preventive medicine.

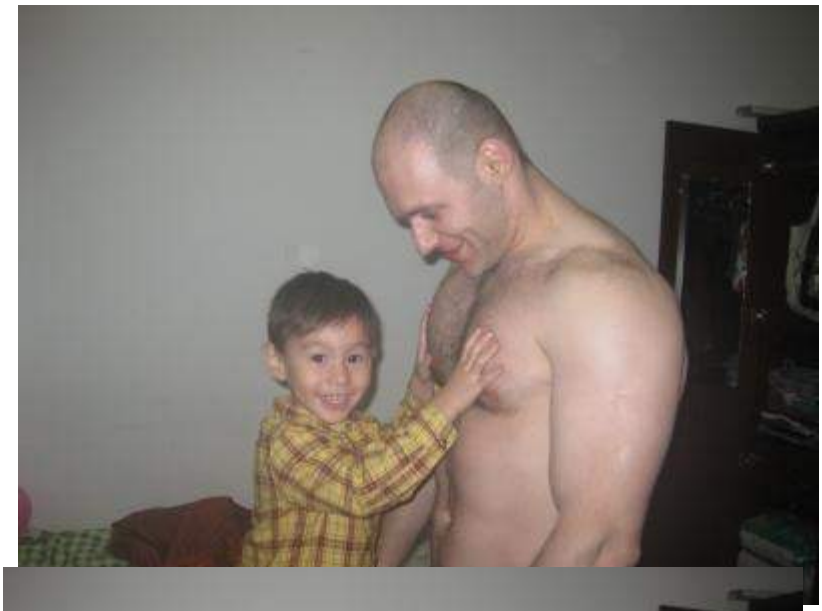
Inside this book you will find almost everything you need to know about the subjects above.

What do you want to achieve?

Do you want to be wealthy? Good health and good physical condition will help you earn more money. What is more important, good health and good conditioning will help you enjoy your wealth longer and better.

Your first wealth is health.

Do you want to have a happy family? In order to take good care of your family, you need to be healthy. You also need to be restless and be able to offer 100% every time. Let your spouse enjoy your fit body. Let your family be proud of you. Set a good example. Let your kids tell to other kids at school:"My dad can swim across the Nile, faster than a crocodile. My dad can fight a lion just with his left hand. And my mom is even better than my dad".



My father is strong!

Be proud with your physique and physical conditioning! Be there for them when needed!

This is a book about fitness, nutrition, lifestyle and health. Of course that fitness might not be the most important thing in your life, but I wish that you make fitness a part of your life's solid foundation. I wish that fitness and health will help you accomplish great things.

Family is important, education is important, social life is important, work is important, money is important. You want to be recognized, famous and popular at least in some circles. You want to succeed and be happy. You want to get most out of your life and influence the others around you to be successful too.

Fitness and health should not be final goals, but means by which you will achieve success and happiness.

Fitness is important. Training is not something that you want to put away and look for excuses to avoid it.

Physical exercise is good. Good for your body, good for your health, good for your mind.

If you exercise regularly you will reap a lot of benefits. You can look, feel and perform better than sedentary people in their 30's when you are in your 60's. You can successfully prevent most of the worst and widest spread diseases – heart diseases, vascular diseases, high blood pressure, many different types of cancer, diabetes, osteoporosis, obesity, etc. You can have an attractive, desired and envied body. You will sleep better, feel more energetic, have a better attitude towards life, and be more productive. You will increase your sex drive and performance.

And this is certain. Every health organization, every physician, almost everyone knows that physical exercise is good.

Do not look for excuses

No excuses!

If you do not have time, arrange that you have – at least 3 times per week, 45 min each time. This means less than 3% of your weekly time.

If you do not have enough money, find a club you can afford, or train outside in the park or at home.

If you feel too exhausted because of your work, think that through training you will increase your physical and mental working capacity; you also want to have a progressive start as you begin exercising, so your body can adapt properly.

If you have some disabilities or special conditions, find the type, frequency and intensity which are right for you.

If you feel old, think that after you will be engaged in a physical exercise regimen, you will feel younger.

If you feel that you are healthy and in good shape, think that physical exercise will help you get in better shape and maintain your good health throughout your entire life span.

If you are engaged in physical work, think that exercise will help you do it better and prevent you from getting a work specific ailment.

There are no excuses. You do not look for excuses when you have to brush your teeth, to wash, or earn your daily money. Also do not look for excuses when it is about exercise.

If you are already exercising – congratulations, I hope that this book will guide you on the right path for reaping the results you are waiting for; if you are not exercising yet, I hope that reading this book will urge you to start exercising to improve your health and body appearance.

You have always admired athletic heroes, you have admired in the past your school colleagues who had the best physique and you still pay attention to beautiful bodies.

You might think that just some people can have very good physical qualities and a beautiful body and that they are under inhuman training regimens and living a Spartan life. This is not quite true. What matters most is consistence, discipline and commitment. If you will adopt a fitness way of living not only that you will radically change your body, but you will improve your health and capabilities over your whole life span.

There is nothing, which can influence your well being so much as exercise, proper nutrition and a good style of living.

Good things do not come cheap; you also have to invest your part of time and effort, but I promise you it is worthy.

There is no way that you can find a quick fix approach to fitness and beauty. You know it is not working for your dental hygiene, for your education and for your financial well being. Why would it work for fitness? Use your objective reasoning and common sense when making decisions about your well being.

"Nothing great was achieved without perseverance" - Emerson.

Do not procrastinate

Procrastination is the main killer of success. Procrastination is the main attribute of losers. Procrastination simply means delaying action. You know how it goes: "Next Monday, I will start exercising", "Next month I will stop smoking", "I will think about", "I will check this with my friends", "If XXX will exercise, I will do it too". You know you've said it before. If you would have started that time, by now you would have been a better person. But, most of the time you didn't.

You know that if you do not exercise you will gain fat. You know that your muscles will melt away slowly. You know that your strength and stamina will go down the toilet. You know that you will start to lose your sex appeal. You know that you will get old and frail. You know that out there are a lot of ugly diseases waiting for you around the corner.

The time for action is now. Get off the sofa and give me 20 pushups. Now!! Start to climb stairs. Search for a fitness club near your home. Go to the sport store, buy two kettlebells and start swinging them. If you have enough space also get a Power Rack with an Olympic barbell. Run in the park. Read this book as fast as you can in the beginning; you will sort the details latter. Start right now being a better man (or woman). Do not look for excuses.

Start now!!!

About laziness

'Lazy' = averse or disinclined to work, activity or exertion. (Webster definition)

Just see the definition: averse to work, activity or exertion.

With work you pursue your career, success and wealth. Work provides you with means for living and makes your life better. Without work we would not be humans; we would be lower on the evolution scale than beavers, ants and many other animals.

With activity you make changes. Without it everything stays the same. Activity is characteristic to all living things. With death activity ceases.

Exertion is needed to pass over any obstacle. Exertion is needed to accomplish those special things which make you different than the ordinary. Exertion is up there together with admiration and recognition. Without exertion we could not accomplish anything special and extraordinary.

You know that you detest laziness on every other person you know. You should also detest it on yourself.

Do not look for reasons to be lazy. Do not fool yourself with thoughts like "I am so busy", "I have worked enough", "I am so exhausted today", "This is my reward". Check what are you busy with. Could it be that you often are in the office doing nothing, reading the newspaper or

surfing the web? Are you watching TV? Are you socializing with your friends too often and too long? Taking much more time than needed doing certain activities as cooking, cleaning, and talking on the phone? Are you sleeping too much? Do you lie in the bed for hours without sleeping?

It is OK to be too exhausted sometimes, but if you are exhausted almost daily, you should ask yourself if you are not physically weak. You should ask yourself how would you cope with it tomorrow when you will be even more exhausted and how will you do as the years go by and you grow older.

"Physical weakness and heaviness enter your soul through laziness and negligence and bring faintness of soul. When one is in this state, one is in a state of living death". - Sun Ning Chu

Delaying of gratification

In his book "Emotional intelligence – Why it matters more than IQ?", Daniel Golleman refers to delaying of gratification as "the master aptitude" . Delaying of gratification is when you study hard for 20 years to become a doctor, an engineer or an architect and finally start to earn money for a gratifying living. Of course that you will earn five to ten times better than what you would have earned if you started to work at age of 19 without going to study at university. Delaying of gratification is when you work your butt off for six years from nine to nine on your own business with just three employees until you can pass on the next level of doing business and your life becomes rich and happy.

Delaying of gratification is when you go to the gym day after day, 4 times a week for 6 or 8 months, even if it rains, even if it is cold or hot, if you are exhausted or upset and train hard until you start to see visible results.

Most people are eager for instant gratification almost every time. Instant gratification is present within our everyday lives: when you lay on the sofa and watch your favorite soap opera, when you eat the last half of the chocolate from the fridge, when you go out with your friends, and when you just do nothing.

I am not against instant gratification. It is human to be lazy on the couch, it is normal to go out and have fun with your friends, it is normal to eat a cheese pie. I am against excess instant gratification, when everyday you do what you like to do and not do what you need to do.

Why is delaying of gratification "the master aptitude" needed for achieving success? Well, life is not easy and if you want to achieve great things you have to work hard and make sacrifices.

What you can obtain after persistent hard work, it is ten times better than what you can obtain instantly. A high level of education, a terrific body, a vast fortune all require you to work hard, diligently and persistent for long periods of time.

What do you live for?

What do you want to do with your life? What activities do you mostly enjoy? What do you like to do?

Just think about.

Allow me to take a guess:

You like to travel and see new places, people and things.

You like to go shopping and buy new stuff; especially clothing and what makes you look better.

You like to go fishing, hiking or golfing.

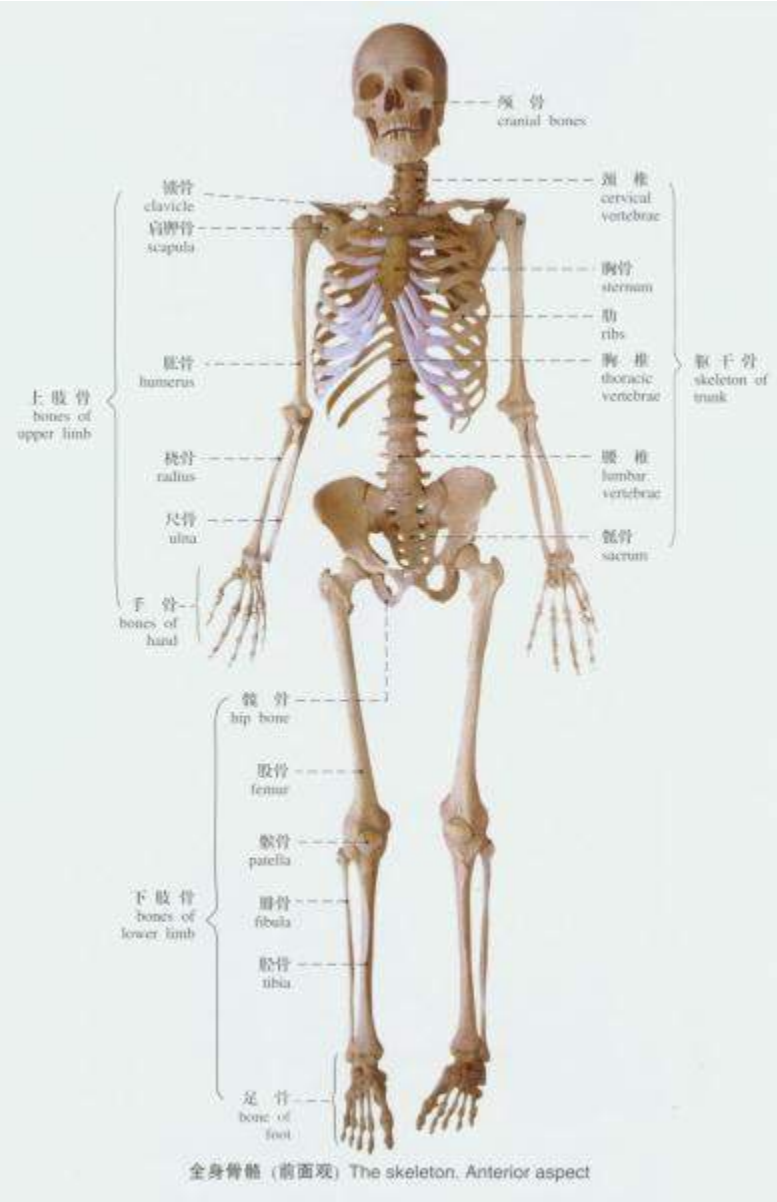
You like to play badminton, tennis, basketball, soccer, or some other sport.

You like to be sexy and you enjoy sex. You would like to be a sex champion.

You want to spend time with your kids, your friends and family and do the things I mentioned before.

To do what you like, you need to be healthy and fit.

Basic anatomy and physiology



全身骨骼（前面观）The skeleton. Anterior aspect

It is possible that you may find this chapter a little more difficult to read and comprehend. However understanding the basics of anatomy and exercise physiology will help you fully understand the science of physical exercise.

The locomotor system

The human locomotor system comprises the skeletal system and the muscular system.

The skeletal system

The skeletal system is formed by the bones. The bones protect the body's vital organs (the skull encases the brain, the thorax protects the heart and the lungs, and the spine protects the spinal cord), give shape to the body, offer leverage for the muscles, and produce red blood cells in the

marrow. So for the body movements the bones serve as levers, pulled by the skeletal muscles. The bones connect to each other in the joints and are tied together by ligaments.

The skeletal muscles insert on the bones through tendons and pull the bone levers around the joint in order to produce movement. The muscles can just pull the bones; they can not push the bone.

Muscles are bundles of muscle fibers held together by a fascia, organized in neuromuscular units. Muscles can produce more types of actions:

- Dynamic concentrical action, when the muscle fibers shorten, producing a greater strength than the resistance, as in lifting a weight;
- Dynamic ecccentrical action, when the muscle fibers elongate, producing a smaller strength than the resistance, as in lowering a weight under control;
- Isometric action, without movement, when the muscle produces a strength equal with the resistance, as in supporting a weight or pushing against a wall;
- Isokinetic when the muscle strength is equal with the resistance while the contraction produces movement; this happens when pushing against a variable resistance like some special type of fitness equipment, water or air pistons.

Every movement in the real life is a combination of these types of muscle actions. When you walk, your leg muscles concentrically contract when you push in the ground and lift your leg; the eccentricall action takes place when you land your foot on the ground. Isometrical action is needed in the transition phase from concentrical to eccentrical. Your trunk muscles act isometrically in order to maintain your body erect.

The muscle is made from **muscle fibers**. There are three basic types of muscle fibers, with many subtypes of fibers:

- fast twitch muscle fibers, also called type II or white. Fast twitch muscle fibers have a great potential for explosive strength and are loaded with ATP
- slow twitch fibers, also known as type I or red. Slow twitch muscle fibers have a greater endurance capacity, with a high number of mitochondria (cell's component responsible with oxidation)
- intermediate fibers

The number of muscle fibers and their types are predetermined genetically and can not be altered. However, as a result of continuous training, the various subtypes of muscle fibers will show specific training adaptations. This means that even if you are not born to win the Olympic marathon, through endurance training all of your muscle fibers would show a better endurance capacity.

Front view

Legend:

1 Trapezius

2 Deltoideus

3 Pectoralis major

4 Serratus anterior

5 External oblique

6 Adductor magnus

7 Quadriceps femoralis

8 Sternocleidomastoideus

9 Biceps brachialis

10 Brachialis

11 Forearm flexors

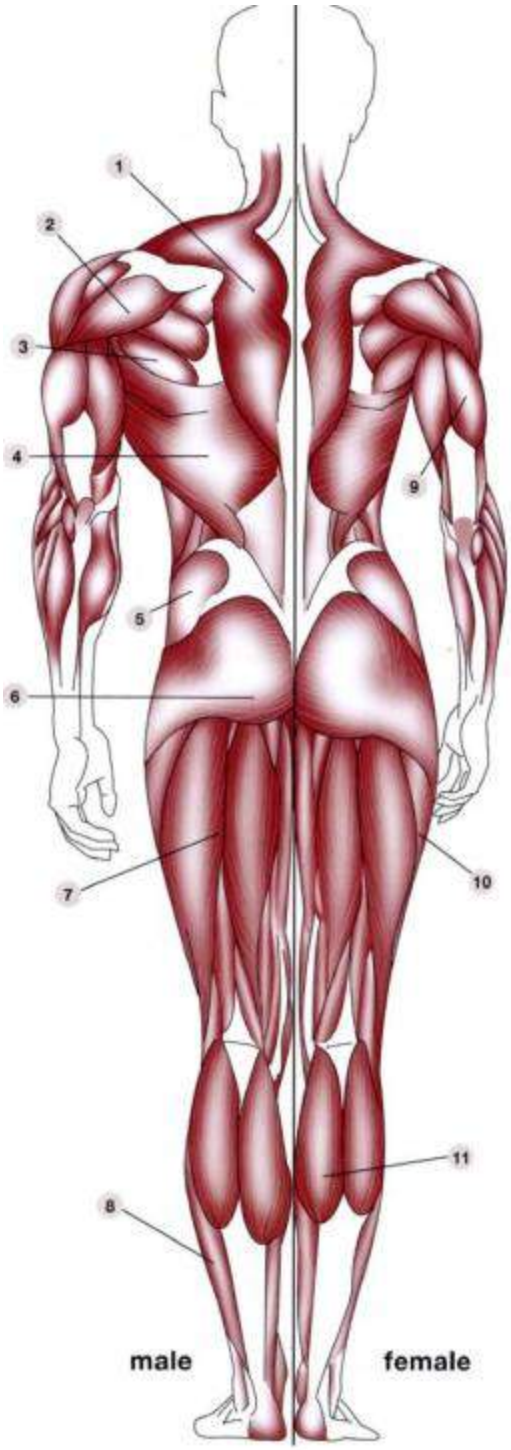
12 Brachioradialis

13 Rectus abdominis

14 Forearm extensors

15 Gastrocnemius

16 Soleus



Back view

Legend:

1 Trapezius

2 Deltoideus (rear head)

3 Teres major

4 Latisimus major

5 Gluteus medius

6 Gluteus maximus

7 Hamstrings
- biceps femoris
- semimembranosus
- semitendinosus

8 Soleus

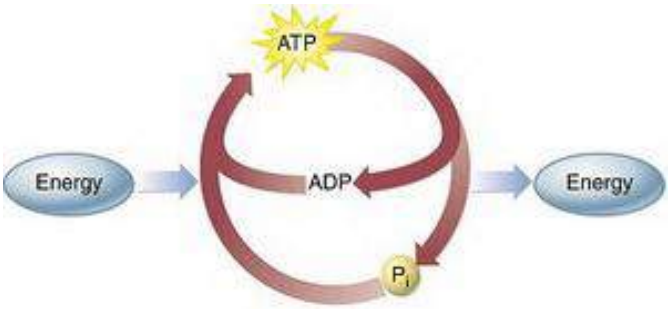
9 Triceps brachialis

10 Iliotibial band

11 Gastrocnemius

Energy delivery systems

Your muscles have at their disposition 2 energy systems: the anaerobic energy system and the aerobic energy system. The muscles are able to use just ATP for energy. This is the only energetic currency accepted by the muscles. All the other energy systems resynthesize ATP.



ATP = ADP + P + Energy

The anaerobic energy system – (anaerobic, means without oxygen). This energy system delivers energy for any power movement and for any sudden action. Any intense movement draws its energy from three sources:

- **ATP** source (adenosine-tri-phosphate) from the muscles, enough for delivering 5-6 seconds of all-in-out effort energy as for 30-50 m rush, maximal lifts, jumps, throws, punches.

- **CP** source (creatine-phosphate), also in the muscles, the CP almost instantly resynthesize ATP; it powers about 30-50 seconds of near maximal effort as 200 and 400 m race, repeated heavy lifting, basketball, soccer, volleyball, rugby fast attack or defense, etc.

These 2 energetic sources do not produce lactic acid as a by-product.

- **glycogen and glucose** – forms of carbohydrates in the human body, present in muscle, blood and liver are the only long period anaerobic energy resource. They fuel all kinds of athletic events (basketball, soccer, rugby, boxing, martial arts, etc) of relative high intensity. Usually a

normal person stores between 200 and 500 g of carbohydrates able to yield 800-2000 cal. 2000 Cal is almost enough to run an Olympic marathon (42.195 km).

The glycogen-glucose source yields lactic acid as a metabolic by-product; the high rate production of lactic acid leads to increased levels of acidity in muscles and blood, which limits the anaerobic effort, because it hinders the muscular contraction. This is the reason why in a high intensity muscular effort you feel your muscles sore and you have to stop the activity or reduce the intensity.

The aerobic energy system – provides the most of your energy throughout your life and utilizes oxygen during its metabolic activity. It has 2 energy substrates:

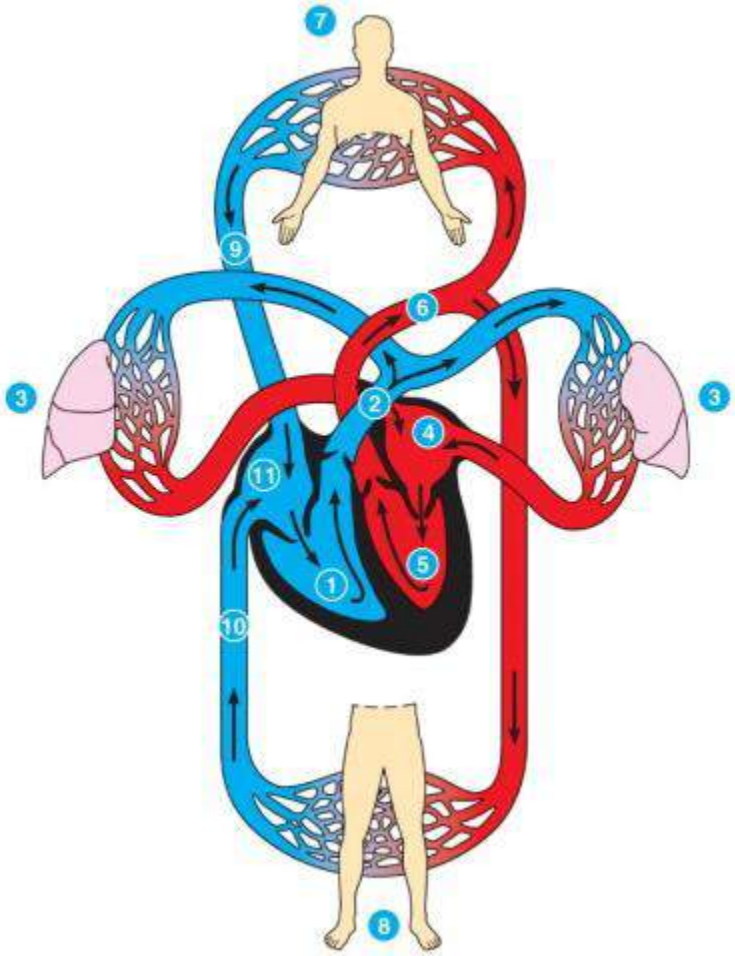
- **glycogen-glucose** system can also produce energy through the aerobic pathways, but at a lower rate than anaerobic energy production. It also produces lactic acid, but at a rate equal with the lactic acid removal rate, therefore the muscle cell and blood acidity remains constant.

- **fat** system – the triglycerides from the blood, muscle and body adipose tissue can provide a huge amount of energy. A normal 70 kg male, which has 10 kg of fat could use 70 000 kcal out of them, enough to run 1000 km!!

Another difference between aerobic and anaerobic effort is that the O2 assimilation equals demands in aerobic effort, while during the anaerobic effort the O2 requirements are higher than O2 assimilation. Because of this the anaerobic effort requires an O2 debt, which will be paid after the effort (EPOC – Excess post effort oxygen consumption). You pay your O2 debts by panting with fast pulmonary ventilation.

Life and sports are a blend of aerobic and anaerobic effort. Almost all the day duration you are in aerobic state, but with every sudden move (standing up, stair climbing, and lifting objects) you bring into play your anaerobic system. Most of sports are also a blend between aerobic and anaerobic effort with a predominant type of effort.

The oxygen delivery system



The oxygen delivery system comprises the respiratory system and the cardiovascular system. I will follow the oxygen course from when it enters the body until it leaves the body.

The oxygen present in proportion of 20% in the air enters the body during inspiration through the nose or mouth, travels down the trachea and then it reaches the lungs (3). In the lungs alveoli the oxygen passes into the blood at the capillary level. The blood hemoglobin binds 20 ml of oxygen for each 100 ml of blood in healthy persons. The blood travels to the heart's left

atria(4), passes in the left ventricle (5) and is ejected in the arterial system made of arteries (6), arterioles and capillaries, which feed every cell of the body (7,8).

When the oxygenated blood reaches the tissues' cells, part of it is removed from the hemoglobin bind for the cell's use and replaced by carbon dioxide (CO_2). At rest 5-6 ml of oxygen out of the 20 ml per 100 ml of blood gets extracted, while in effort the extraction can reach 15-16 ml.

The blood returns to the right atria (11) of the heart through venous system (capillaries, venules and veins (9, 10)), passes in to the right ventricle (1), then is ejected to the lungs again where the hemoglobin releases the carbon dioxide and binds oxygen for a new cycle.

Expressed in numbers, the body consumes at rest 3.5 ml O_2/kg/min (3.5 ml of oxygen for every kg of your body for every minute) or 200-350 mlO_2 for the whole body. During intense physical effort the VO_2 max reaches between 35-45 ml O_2/kg/min (3-4 L) for healthy men and 25-35 ml O_2/kg/min for healthy women (2-3 L). Elite endurance athletes (long distance skiing, running and cycling) can reach up to 93 ml O_2/kg/min, for men, respectively 78 ml O_2/kg/min, for women, or 5-6 liters of consumed oxygen for each minute for the whole body.

The benefits of regular physical exercise

Here's a list of long- and short-term benefits from exercising and participating in physical activity.

Physical Activity and Exercise

Both regular exercise and increased physical activity add years to your life and life to your years. Health benefits are obtained from increasing the amount of any physical activity you do. The more you do, the greater the benefits, up to a limit, of course. Physical activity is any movement that uses energy. Exercise is physical activity that is structured and is done at a certain intensity for a certain length of time. We engage in physical activity for health benefits if we wish to avoid disease and delay death. We engage in physical exercise for fitness benefits in order to improve the components of physical fitness (cardiorespiratory endurance, muscle strength, muscle endurance, flexibility, and body composition).

Long-Term Benefits of Physical Exercise

- Decreases Risk of Heart Disease. Inactive people are twice more likely to develop coronary artery disease (the arteries surrounding the heart) then active people.

More than a third of modern world deaths are because of CVD (cardiovascular disease). Three out of ten random friends or people you know will die because of a CVD.

- Decreases High Blood Pressure. High blood pressure increases the risk of heart disease, stroke and kidney disease. Inactive people are twice more likely to develop high blood pressure then active people.

Almost every inactive person will develop high blood pressure during the course of his life. The normal blood pressure is 120/80 mmHg. Over 140/90 mmHg it is considered high blood pressure.

- Decreases Body Fat. Regular physical activity helps maintain optimal body weight and composition.

- Decreases Cholesterol Level. A high blood cholesterol level increases the risk of heart disease. Regular exercise raises the level of "good" HDL cholesterol and lowers the level of the "bad" LDL cholesterol.

Cholesterol is a kind of fat which tends to deposit inside your arteries, narrowing them and eventually obstructing them completely. When a heart blood vessel is clogged completely, a heart attack happens. Within 3-5 minutes of obstructed blood flow the unfed heart cells will die. The owner of the heart might not die that moment, but a “piece of his heart” will remain useless forever.

If the obstructed vessel irrigates the brain, than a stroke will happen. Most of the times the affected part of the brain will lose function and together with it the owner will lose the functions controlled in that part of the brain: speech, limb control, etc.

- Decreases Risk of Diabetes or help in controlling this condition. Physical activity lowers the risk of type 2 diabetes and increases glucose uptake for those who already have diabetes. Fit persons get diabetes 66% less often than unfit persons.

There are two types of diabetes: type I, inborn and type II. 90% of the diabetics have type II diabetic disease. Because of diabetes, the body cells can not properly use the glucose from the

blood and high blood sugar becomes the norm for the patient. The cell can not use the blood sugar because of some of the reasons: the pancreas does not produce insulin at all or as needed, the insulin quality is not optimal, or the cells do not accept the insulin produced by the pancreas. Insulin is needed by the cell to receive the sugar as you need a key to enter your house.

Regular physical exercise increases the cell's insulin sensitivity allowing the glucose to enter the cell, just like oil greasing your door lock allows the key to unlock it.

- Decreases Risk of Cancer. Physical activity lowers the risk of colon and breast cancer.

It is completely understood what are the mechanisms through which physical exercise protects against cancer, but after extensive studies on similar populations (10000 nurses and doctors who do not engage in regular physical exercise vs 10000 nurses and doctors who exercise regularly), there is no doubt that are significant differences in numbers of cancer patients.

- Increases the life span. The physically active people live longer then their counterparts and benefit from a better quality of life.

It was proven by numerous studies that regular physical exercise significantly increases especially the healthy life expectation (healthy life means, living without major impairment, being physically able to have a normal life and take care of yourself).

- Decreases Risk of Osteoporosis. Regular exercise delays bone loss and promote bone formation.

Osteoporosis means having a bone density under the "Safe" standard.

Exercising deposits bone tissue in your own bone bank, so you will have enough left for your whole life span. After the menopause kicks in, every woman will start to lose bone tissue at an accelerated rate. Exercise will increase your bone mass when young and delay the bone loss as you grow old.

About 50 % of the women will develop osteoporosis; 5-7 % will develop serious osteoporosis and many men will develop the disease too. The bones will become frail and fractures can occur

easily even walking downstairs. Almost all the osteoporosis patients lack optimal muscle strength, therefore lack athleticism and good balance, being continuously under falling fractures danger.

The worst that can happen is femur head fracture (thigh bone). This type of fracture has a very bad prognostic, with most of the patients never recovering well.

- Decreases Arthritis Symptoms. Regular exercise helps keep joints flexible and helps build muscle to support the joint.

Healthy joints and their supporting structure are maintained through structured exercise. Just do it and you will feel it.

- Decreases Number of Sick Days. Exercisers feel sick almost 30% less often than non-exercisers.

Beside less sick days, athletes get over sickness faster and with less bad feeling than sedentary people. You know that you feel week when you are ill; think that this weakness is in relation with your overall physical capacity; so being strong and fit when you are healthy means still having a better work capacity than unfit people even when you are ill. Major diseases take a serious toll on everybody's physical prowess, so your baseline level is very important for your recovery.

- Decreases Chance of Premature Death. Fit people live longer than unfit people. Physical exercise helps you maintains a desirable physical condition throughout your life.

Do not say that you do not want to live 100 years. I know that you are scared about looking 100 years old and not being able to care of yourself; If you exercise regularly, eat consciously and refrain from bad habits like smoking and drinking, you might be in better shape than non exercisers when they are in their 50's. Just look at Jack Lalanne who lived until 96 years old and it change your thoughts about "old weaklings". If you are train seriously you will look, feel and perform like 20 when you are 50, like 40 when you are 70 and like 50 when you are 90. Jack Lalanne could still perform 1000 pushups well in his 90's!!

- Increases the overall physical capacity (muscular strength, muscular power, muscular endurance, cardiovascular endurance, joints flexibility, motor skills) therefore your working capacity

I know that you like a Ferrari, or a Hummer; if you do not, for sure you like a BMW or a Mercedes. Why not become one? Physical performance is important to make you ready and able to take on and enjoy "life to the max".

- Improves body posture and body shape over your whole life span

Do not lie and say that looks does not matter and what is inside someone's heart it is more important. Looks does matter! You know that you want to look good and you also wish the same for your partner. Little fat, showing a sexy middle body, well shaped buns, nice thighs and shoulders are paramount to a good looking physique.

Every person can change its appearance tremendously, no matter how he or she naturally looks. Just take a look at "Body for life" participants and you will see it. (go to www.google.com and type in the search box "body for life").

Let me add one more thing. Except maybe in your early 20's and this just for some few selected people there is no way you will have a beautiful body without regular exercise. Even with cosmetic surgery, expensive cosmetics and other things and fancy clothes, forget about fooling others that you look good. You look god for real, just if you train well on a regular basis.

- Improves your sex life

How you look, how sexy is your partner's body it is very important when you have sex. Good muscle endurance (abs, lower back, chest, glutes) is important for the quality of the sexual act. Your cardiovascular system's optimal performance is also required (only if you want to get over the 5 minutes barrier).

Short-Term Benefits of Physical Exercise

- Relaxes and Revitalizes. Physical activity reduces mental and muscular tension, and at the same time, increases concentration and energy level.

- A Break from Daily Routine and Worries. Physical activity is like mini-vacation - you're allowed to have fun.

- Helps You Feel Good About Yourself. Physical activity increases your self-esteem and self-confidence.

- Improves the quality of your sleep

While many people start a physical activity program because of long-term benefits, it's the short-term benefits that keep them motivated to continue the habit.

Different types of exercise offer different benefits. Therefore, combining these 2 types yields the best results. There are 2 basic types of exercises:

Aerobic, meaning *with oxygen*, also known as cardiovascular, cardio or endurance exercise.

Anaerobic, meaning *without oxygen*, usually sports or exercises requiring short bursts of intense energy.

Benefits of Aerobic Exercise:

Aerobic exercise

- **Muscular endurance increases.** Basically this means that you can do more physical activity for a longer length of time. When you come back home from a long day work, you will not feel whipped off.

- **VO2 maximal (maximal oxygen consumption) increases.** The VO2 max is the most important factor which determines the cardiovascular endurance

- **The functional capacity of the lungs increases**

- **The heart actually becomes functionally larger.** The size of the left ventricle or the pumping size of the heart increases.

- **The stroke volume of the heart increases.** More fluid is pumped per heartbeat at work or at rest.

- **The cardiac ejection fraction improves.** A higher percentage of your total blood volume from your left ventricle will be ejected with every heart beat

- **The heart will beat slower at rest.** One of the beneficial side effects of exercise is that your heart rate is lower at rest. Even though your heart rate increases during exercise, the beats saved at rest result in less total work by the heart. The number of beats saved during the 23 hours when you are not exercising are far greater than the extra beats used during exercising. This means that if you are training regularly, when you reach the age of 60 you could have a 40 years old heart

- **The body uses oxygen more efficiently.** This is true not only at a physical level but also at biological or cellular level. Your body will be able to perform vital tasks easier.

- **The hemoglobin concentration in blood increases.** Hemoglobin binds O2 and delivers it to every cell of the body

- **The lactic acid tolerance and buffering capacity improves.** This means that you will be able to perform a more strenuous effort for longer time than before

- **Increase in the number of capillaries.** You can transfer more oxygen to the body's muscles. The capillaries are also where the body exchanges nutrients and toxins, hence, you get a boost for your immune system.

- **Decreases the stores of fat in the body.** Physical exercise burns a lot of calories. Also trained people have a greater ability for burning fat than untrained persons.

- **The body burns calories more efficiently.** You can do more work with less energy expense.

- **Psychological and emotional stress relief.** Exercise helps take your mind off your problems. The body also releases hormones like endorphin that give you a light high.

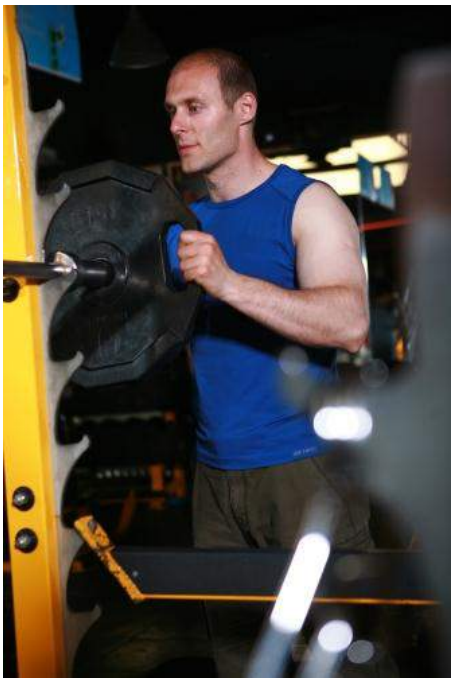
- **Increase in lean muscle to fat ratio in obese people.** Aerobic exercises generally only result in moderate muscle gain, however, they can significantly decrease total body fat.

- **The active muscles enzymatic bed improves.** This means that your muscles will be able to use more oxygen while performing an intense effort

- **Specifically improves your athletic performance**

The best types of aerobic exercising are: walking, jogging, running, swimming, cycling, stair climbing, cross country skiing, rope jumping, kettlebell swinging, punching bag training, etc

Benefits of Anaerobic Exercises:



Strength training

- **Muscular strength increases.** You become physically stronger. You can work harder, lift more weight and do tough tasks easier. Muscular strength and power is an expression of youth. Usually old age is associated with lack of strength and power.

- **Muscular power increases.** Power is defined as the amount of work done over a period of time. There is an amount of power in every move we make (lifting an object, climbing a flight of stairs, rushing after the bus).

- **Muscular hypertrophy (increase in size).** There is an increase in individual muscle fibers, enlarging the size of the muscles or muscle groups. This size increase is strongly related to the nutrition status. Most of the people, even the fat ones, lack enough muscle mass, therefore a common fat loss program goal should be actually increasing or at least maintaining the muscle mass.

- **Your bones, joints, tendons, ligaments, articular capsulae become stronger and more resistant to injuries**

- **The heart muscle will become stronger.** As you lift more weight or work harder, the heart muscles respond by enlarging. The volume of the heart does not increase as much as through aerobic exercise, but the heart muscle become thicker (similar to the skeletal muscle being exercised).

- **Muscular toning and body shaping.** Anaerobic exercises help change the body shape building muscles and muscle groups, resulting in more pronounced body shapes. Hence, the V shaped upper body, square shoulders, peaked biceps, thick neck in males and nice curves and hard flesh in females.

- **Increase in lean muscle to fat ratio.** Anaerobic exercises generally can result in major muscle gain in males due to their increased levels of testosterone, and light muscle gains in females, because of the specific hormonal characteristics. Although the actual anaerobic exercise does not burn much fat, it burns a lot of calories; there is an increase in metabolism over the next 24 to 48 hours which helps burn even more fat after the exercise session and on the long run.

- **Increases in metabolic rate.** The more muscle mass you have, the more energy is required to maintain them. **The muscle tissue burns 8 times more energy than the fat tissue, at rest.** During exercise this energy need increases even more. Thus, if you

develop your muscles, your body burns more calories even when resting. Developing your muscles is the key for burning the fat.

The best types of anaerobic exercise are: strength training, power training, sprints, throws, and sports – martial arts, badminton, tennis, soccer, basketball, volleyball, rugby, etc

First do no harm

How can you reap all this training benefits? Get involved in a regular, intense physical exercise program.

I feel that is imperious that before starting any exercise program you should be aware of the risks associated with performing strenuous physical exercise.

A properly conducted and scientifically designed exercise program should present no health risks for vast majority of people. However for people presenting some medical conditions, engaging in physical exercise might pose some health safety problems. You should consult your physician and a fitness professional if you have any of these conditions:

- Any cardiovascular disease or abnormal heart condition
- History of heart disease or sudden death in your family (first degree relative)
- Diabetes
- High Blood pressure (Systolic > 140, Diastolic > 90)
- High Blood Cholesterol (total > 200 mg/ dl or HDL < 35 mg/dl)
- Cigarette smoking (more than 10 cigarettes a day)
- Obesity (BMI > 30 and body fat higher than 30% for men and 35% for women)
- Arthritis or other joint disease
- Any lung disease (asthma, emphysema, fibrosis)
- Pregnant
- Completely sedentary man older than 40, woman past 50
- Any other special medical condition

While just for very few individuals the physical exercise is totally contraindicated, most of the people presenting special medical conditions could greatly benefit from participating in a specially designed and individualized physical training program.

The basics of physical training

Fitness training terminology

Exercise or “drill” = a specific single body action or complex of actions, executed simultaneous or chained, having a specific direction, amplitude, execution speed, acceleration, load, time, tempo, rhythm and execution style involving the whole body or body segments, with or without an object; examples – running, bench press, free throws – basketball, etc.;

Repetition (rep) = a complete single movement of a specific exercise;

Set = a series of repetitions executed without break;

Joint movements

- flexion = the two segments of the joint decrease the angle between them (ex – elbow, knee flexion);
- extension = movement opposed to flexion, when the angle between joint segments increases (ex – elbow, knee extension);
- abduction = movement of a body segment away from the body midline (leg, arm abduction);
- adduction = movement opposed to abduction, when the segment moves toward the body midline (arm , leg abduction);
- rotation = movement of a body segment around its axis (arm, leg, trunk rotation);
- circumduction = a combination of flexion, extension, abduction, adduction movements (neck, arm, leg circumduction);
- supination = forearm movement when the thumb twists out and towards down (as when elbows are on the side of the trunk and flexed and the palms are facing up);
- pronation = movement opposed to supination.

The principles of athletic training

The athletic training has its roots in antiquity, since the athletes of ancient Greek lands were preparing for the games held on the top of the mountain Olympus - The Olympic Games.

Until 1950-60 and even now many trainers are guiding their students training through trial and error.

Once the Olympic Games received great interest and with the continuous raise of the health and fitness trainees number, many scientists started to specialize on the sciences of physical exercise: exercise physiology, kinesiology, athletic training.

By researching the influence of physical exercise on the human body and the way that the human organs chronically adapt to exercise stimuli and by intensively experimenting on humans and animals, the scientists reached conclusions that ultimately led to formulating the principles for athletic training.

Principles are laws that must be respected in order to get the expected outcome after practicing physical exercise.

You may have seen many people going to the gym and not getting the results they were looking for. Why? Because they didn't respect all the principles of training. Overlooking any principle will lead to failure to get the results you deserve.

Training according with the principles will bring guaranteed results.

Summary of training principles:

1. Your training should be intense and challenging.
2. Your training should be progressive. Train harder as you get better.

3. Your training program should be created and directed according to your goals. Every variable of your training should have a meaning and a specific purpose.
4. You should allow your body to recover enough time in order to achieve a peak adaptation level, then train again.
5. You should maintain you progress and not allow detraining to occur.
6. You should plan your fitness program on periods, each period with a specific goal in mind.
7. You should choose the fitness program which is right for you according with your factors, conditions and goals.
8. You should see the complete picture. Proper nutrition, sleep, life style, alcohol and cigarettes avoidance are a must in order to accomplish your health and fitness goals.

The overload principle "Go hard or go home"

Physical training should be challenging. Overloading your body systems and organs means exposing them to working intensities and stimuli to which they are unaccustomed. During training, overload is achieved through proper intensity and by learning new skills, movements or using different training variables (load, number of sets, reps and rest periods).

For the aerobic training the intensity can be measured as a percentage of the maximum heart rate, or percentage of maximum oxygen consumption. For running, the heart rate is related to the running speed. The training intensity depends also on duration of the effort and on the rest periods duration. For healthy people the minimum intensity for aerobic effort should be above **60 %** of the maximum heart rate. As you would see later in this book your aerobic training intensity should be up to **60 – 95%** of your maximal heart rate, depending on your goals. The aerobic training should lead to more than average perspiration at normal air temperatures.

For the anaerobic training the intensity is measured as a percentage of the maximum voluntary effort level. This means speed for running, weight for strength training. The intensity also depends on the complexity of exercises, number of exercises, sets and repetitions and type and duration of the rest periods. For strength training, in order to achieve an increase in muscular strength and hypertrophy, the minimum weight used for any exercise should be above **60%** of the maximum weight which can be used for that specific movement. According to your training goals the load you use should be between **60 – 100%** of your maximal weight you can handle for any given exercise. The load should bring exhaustion, while performing the last repetitions. Usually for strength training less than 15 reps per set should be used.

I see many people in the gym who walk on the treadmill as their main activity. While walking is beneficial for health, it will not bring you any special fitness improvements, because of its normality and low level of intensity. For highly unconditioned people walking might be a good beginning for a fitness program, but for average folks walking is just physical activity and not physical exercise.

While training with weights, using kindergarten dumbbells will not bring any visible results for an adult woman.

Physical training should impose a stress on your body, forcing it to adapt to a superior level. There is no need for "No pain, no gain", but physical exercise should not be a relaxing activity (if you want results, of course).

"What doesn't kill you makes you stronger" is one of the Navy SEALs belief; the greater the stimulus, the higher the adaptation. This is true until a point where the stimulus becomes harmful.

Train hard.

The progressivity principle "Surpass yourself every day"

After the body adapts to a training stimulus, a greater stimulation should be provided for obtaining a superior adaptation. Therefore the overall training intensity should be higher and higher, or another type of training should be initiated.

Example of aerobic training progression

Training no	1	2	3	4	5	6	7	8	9	10
Duration (min)	10	15	20	25	30	10	15	20	25	30
Speed (km/h)	7	7	7	7	7	8.5	8.5	8.5	8.5	8.5

Example of strength training progression

Full body training

Training	1	2	3	4	5	6	7	8	9	10	11	12
Reps #	8	9	10	8	10	8	10	8	10	10	8	10
Sets #	2	2	2	3	3	2	3	2	3	3	2	2
Load(Kg)	60	60	60	60	60	65	65	70	70	70	75	75

- 10 RM means a load which you can perform ten good form repetitions with

The specificity principle "You get what you ask for"

This principle is also called SAID (Specific Adaptations to the Imposed Demands) and refers to the fact that in order to achieve a superior adaptation for a body system, the content of

the training should be oriented to stress that specific system in basically the same way as needed for the activity or competition.

That is why the sprinters exercise starts, accelerated running, maximal sprints, power exercises for the legs and upper body muscles. The marathoners will mostly run for long distances at a constant pace, or with changes of pacing and also perform leg muscular endurance exercises. The weight lifters are all exercising squats, deadlifts, power cleans using loads and speeds of executions directed to increase the maximal strength and the maximal power output.

You won't see very often elite swimmers cycling extensively for improving the maximal cardiovascular endurance, nor football players playing tennis every day.

According to this principle you should review and organize every variable of your training program:

- time duration
- content
- number of sets and reps
- loads
- overall intensity
- rest between series
- velocity.

You should assess the value for each of this variable according with your training goals. Ask yourself "What adaptation response do I expect to obtain and what adaptation response I might obtain according to my program design?"

Analyze your needs.

What physical qualities do you need for your athletic discipline or for your general wellness?

How long your effort does take place?

10-12 min with stoppage time, like in basketball, rounds of 3-5 minutes, for combat sports, or continuous for long time like long running.

Are you allowed recovery periods?

How long last the rest periods?

Which are the dominant physical qualities?

For speed you should consider starting speed, execution speed, repetition speed, running speed, speed endurance.

For strength you need to assess your needs for absolute strength, relative strength, power (the amount of work per time unit), strength endurance, and power endurance.

For endurance you have pure aerobic endurance, anaerobic endurance, repetition endurance, recovery time.

How could physical training negatively influence your performance?

Some common negative aspects of physical training are:

- excessive aerobic training for anaerobic sports (continuous running at the same speed for 20 – 40 min for martial artists, basketball players, etc). This type of training, will reduce your peak anaerobic power needed for these type of disciplines.

- excessive flexibility training without developing the specific strength for gymnasts, divers, swimmers, etc;
- too much emphasis on technique, not enough strength and conditioning training (basketball, boxing, soccer, etc);

Example of training guidelines:

Basketball

Needs analysis

- The effort is mainly anaerobic (sprints, jumps, sudden acceleration and deceleration movements, sudden changes of direction);
- There is a need for fast recovery after intense movements, repeated jumping;
- Leg power is dominant; muscle mass is also needed to increase the efficiency of one on one actions;
- For defense actions and good body control and balance, core strength is an important asset.

Endurance training

You need aerobic endurance for fast recovery and to maintain your energy levels high over 40 or 48 minutes of game. The best way to develop it is with Fartlek training and circuit training.

Example of Fartlek for basketball:

- Warm up with 4-5 min of jogging and 3-4 min of light stretching.
- 6 x 20 m sprint with 20 seconds of light jogging in between;
- 6 x 20 m of zigzag running with 20 second in between;
- 6 x 20 m pace change running (sudden accelerations and decelerations) with 20 seconds of light jogging in between;
- 6 x 20 m backward straight line running with 20 seconds of light jogging in between;
- 6 x 20 m defense backward running with 20 seconds of light jogging in between;
- 6 x 20 m fast ankle jog with 20 seconds of light jogging in between;
- 6 x 20 m heels to buttocks fast pace jog with 20 seconds of light jogging in between;
- 6 x 20 m high knees running with 20 seconds of light jogging in between;

Example of circuit training for basketball:

4 – 8 stations 30 seconds each with about 10 second rest in between

- First station: repeated jumping touching a mark on the basket board
- Second station: 3 points fast shooing;
- Third station: 4 x 20 m sprint beside the court;
- Fourth station: free throws and rebound;
- Fifth station: Burpees with a high jump;
- Sixth station: Sit ups with medicine ball;
- Seventh station: relay running between 3 or 4 cones;
- Eighth station: push ups with hands clapping

Strength training

For strength training choose basic movements. Perform most of the exercises within a 4 - 6 reps range

- squat and semi squat
- deadlift
- shoulder press
- pull ups
- bench press
- dips
- Janda sit up
- dips
- kettlebell basic movements
- snatch
- clean
- jerk

For power training

- All kinds of plyometric jumps (leap frog, one leg, depth jumps, hurdle jumps, etc)
- Uphill running
- 10 – 20 m sprints piggy backing a partner
- Explosive lifts (20 – 30% x 1RM) : weighted semi squat jumps, clapping push ups, shot put throw, medicine ball throw

Flexibility training

- Stretch the hamstrings, glutes, iliopsoas, calves, chest, shoulders using the PNF method or relaxation method.

The recovery and super compensation principle "Waiting for the high tide "

After overloading the body through training, some conditions should be met for a positive adaptation response to occur. Adequate rest (active and passive-sleep) and nutrition (calorie amount, macronutrients proportion - protein, lipids, carbohydrates, micronutrients – vitamins and minerals and water) requirements should be met.

The Canadian physiologist Hans Selye was the first who formulated the stress – adaptation response theory.

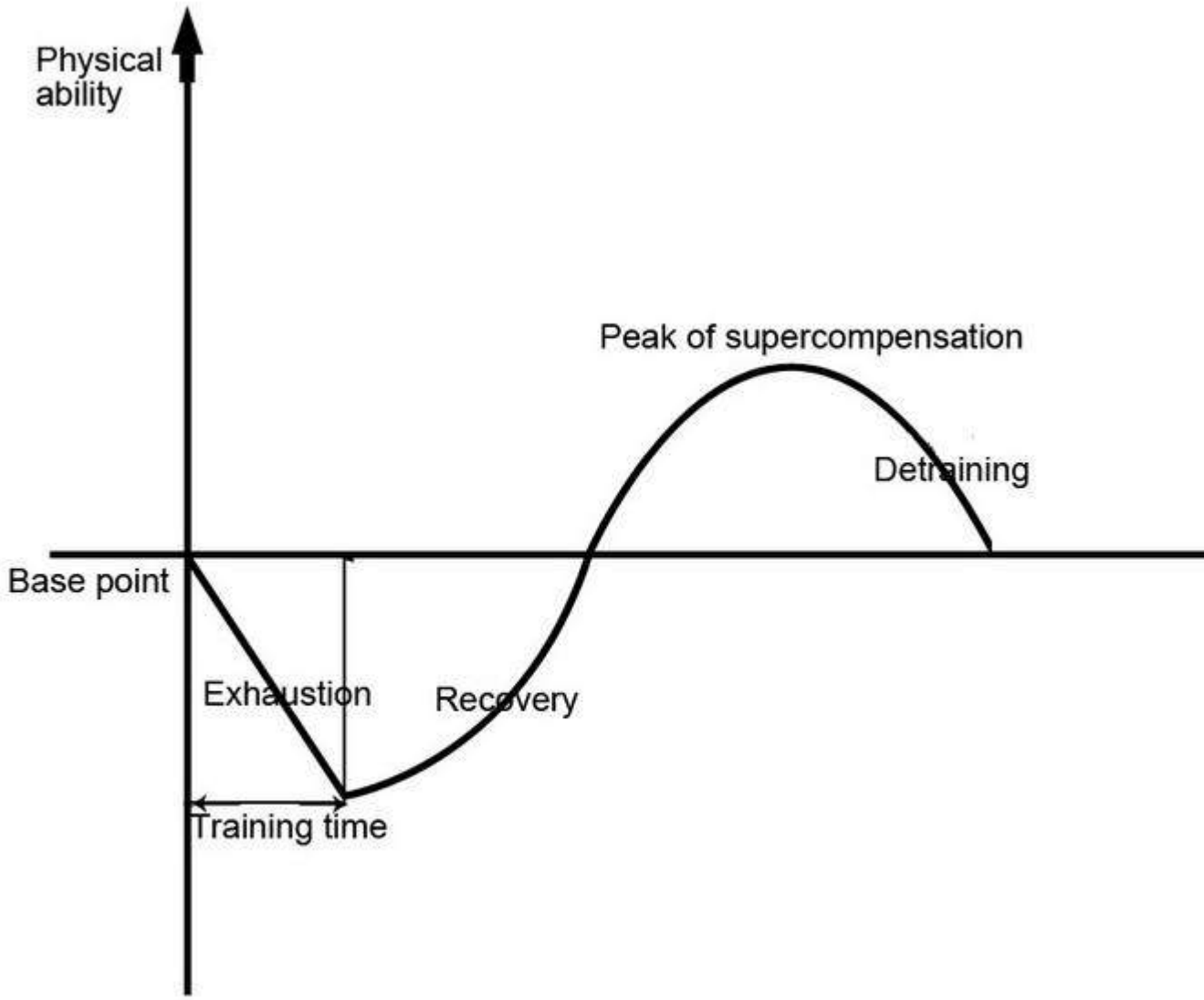
The graphic representation of this theory shows that after an alarm stage and a decrease of that specific system capabilities (due to training) and reaching a lowest level, the body elaborates an adaptation response which brings back the capabilities to the previous level and even higher – super compensation, when the stimulated system is capable of superior performance.

As a practical discussion, when training the chest muscles for example, you get more and more exhausted during training, because of the ATP, CP and glycogen depletion, lactic acid accumulation and muscle fibers micro trauma. After you finish the training session you fuel yourself with carbohydrates for replenishing your muscle glycogen and proteins necessary for the muscle fibers protein synthesis and you also rest. You might also experience some mild muscle soreness the second and sometimes the third day after the training. After the muscle soreness reside, your chest muscles should be stronger than before. Accumulating few such sessions you should be objectively stronger than before.

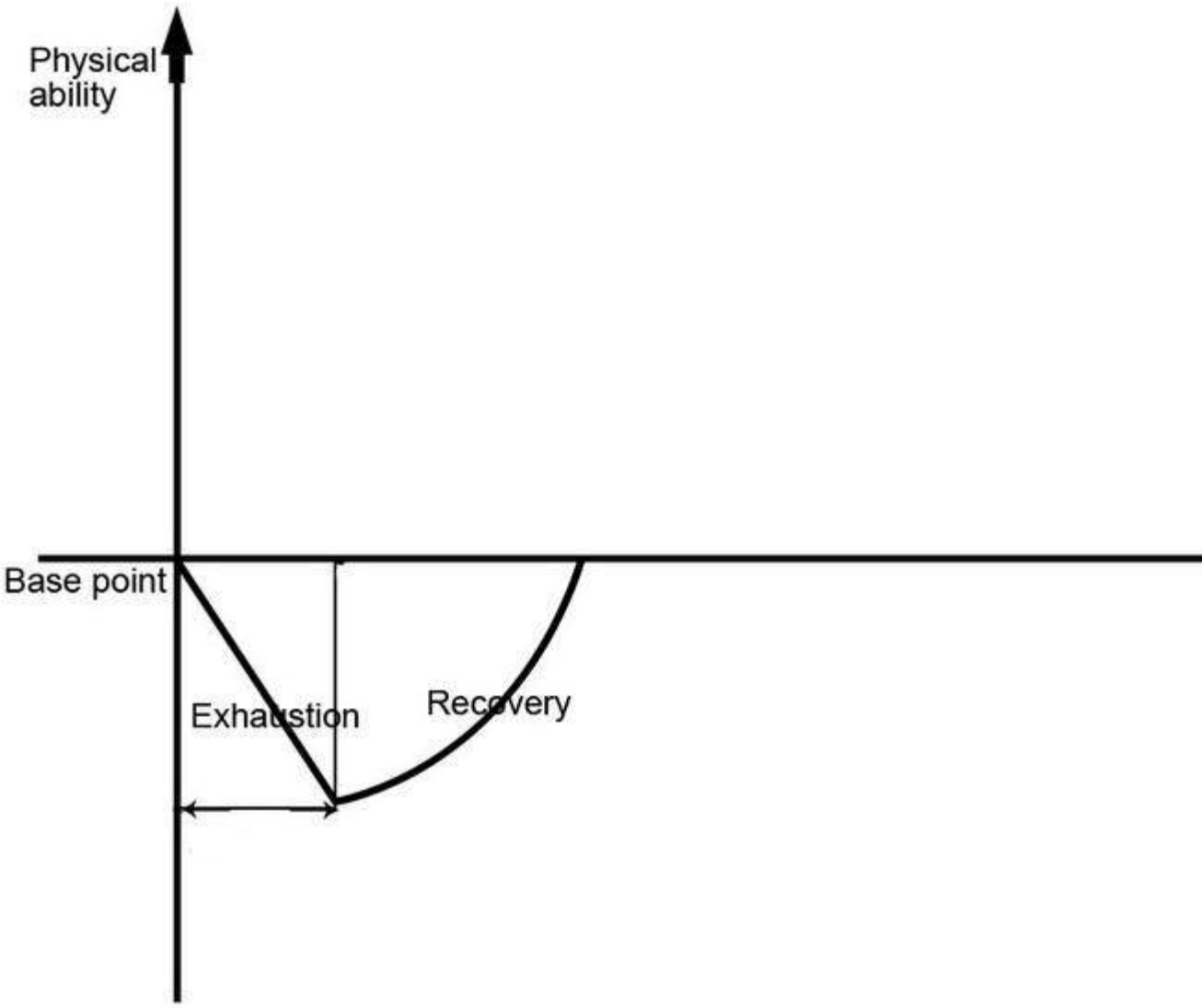
When you reach your maximum super compensation state, you should stimulate again – repeat the training - the same system in order to obtain chronic superior adaptation, hence progress.

What is important to understand is that first you need overload, than you need to allow your body enough rest until it recovers and supercompensate (progress), but not too much rest to detrain.

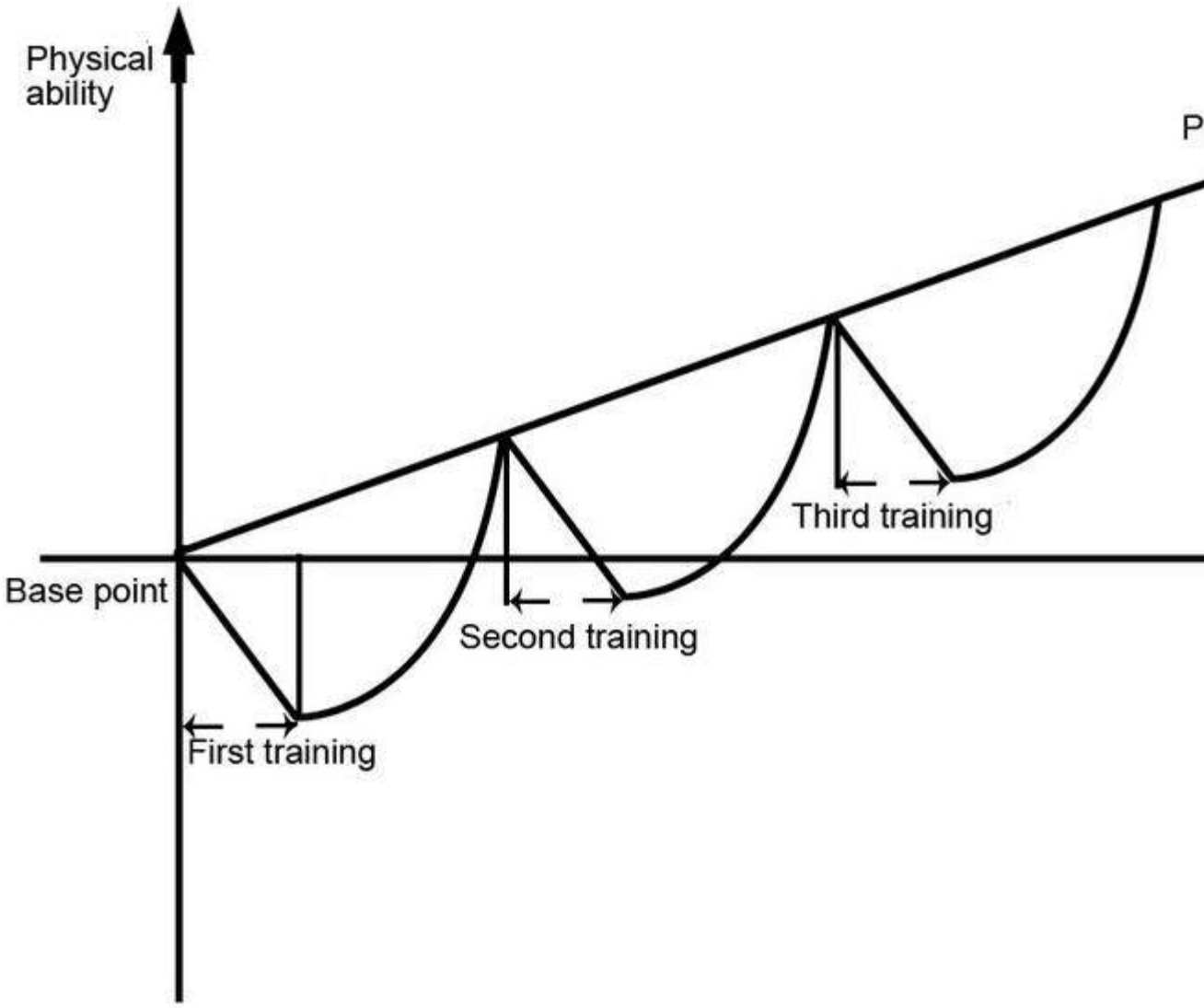
If your training does not provide enough overload, you will get no supercompensation adaptation response. If you allow too much rest after a specific training, detraining will occur.



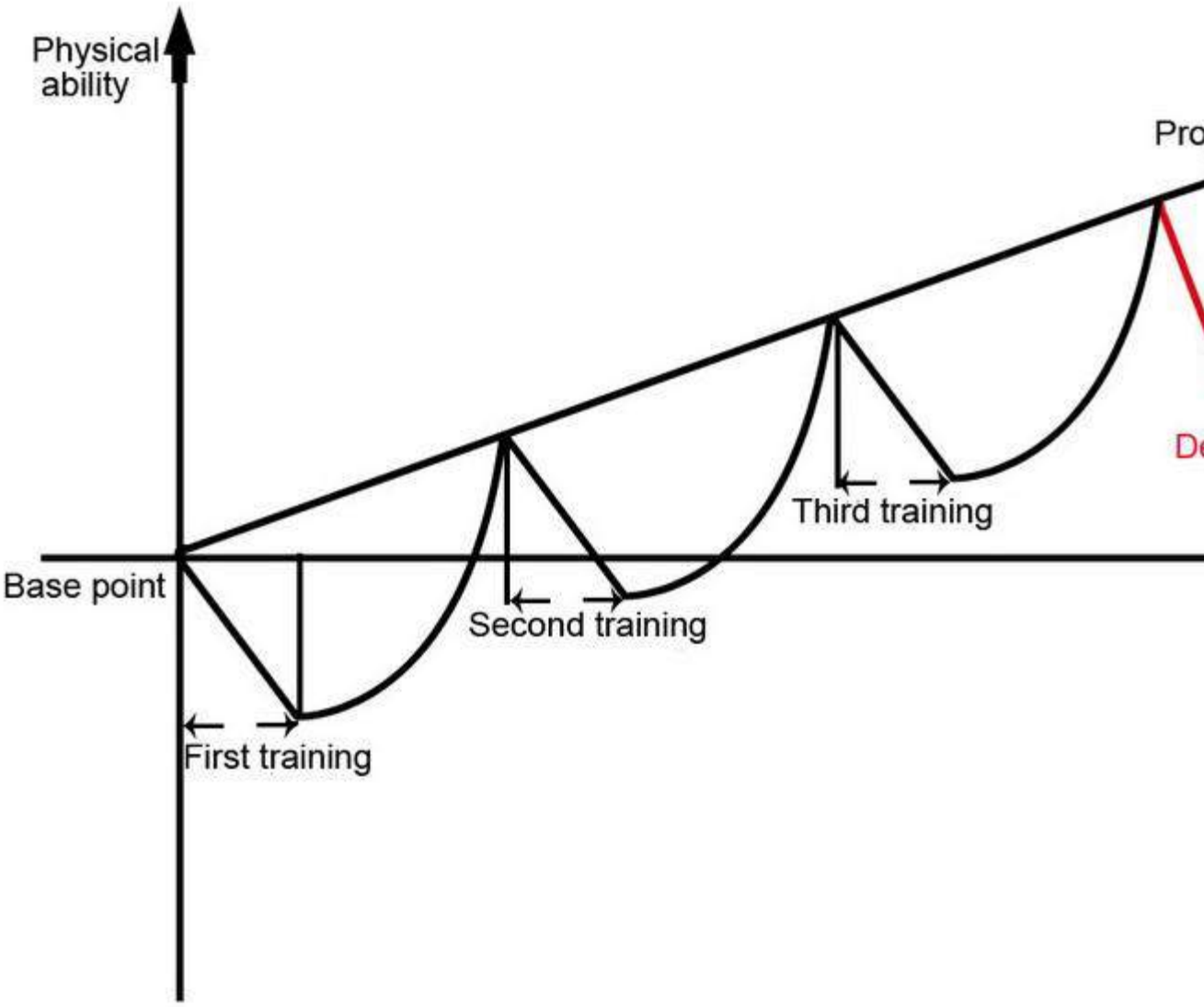
Adaptation graph (vertical axis – physical capacity, horizontal axis - time)



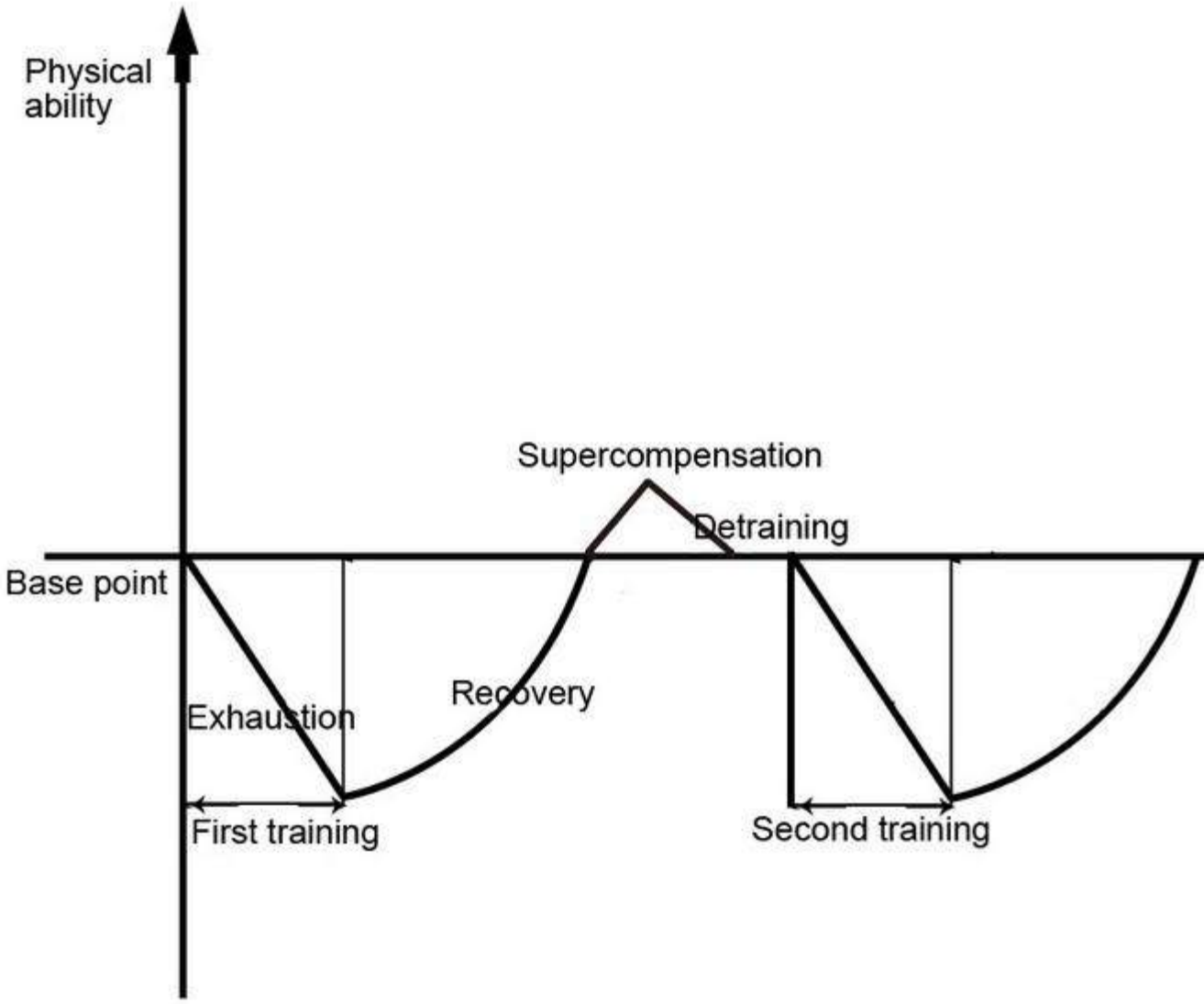
No overload, no progress


Physical ability
P
Third training
Base point
Second training
First training

Progress



If you quit training you detrain rapidly



If you do not have proper planning, you get no results. Most of the trainees' evolution is as this graph shows

How do you now that you have achieved a peak of supercompensation ?

Well, you can not calculate the exact peak, but you can approximate it. The more knowledgeable you get and the more training experience you have you will be able to see better when you or your athletes get their peak of adaptation.

The supercompensation time is calculated separately:

- for every trained part when performing body building training – chest, back, biceps;
- for every movement when doing sport specific strength and power training – squat, snatch, jumping;
- for the aerobic energy system when doing aerobic training (long distance running) and anaerobic energy system when training for anaerobic endurance (400 m running, grappling, boxing).

As you will read in most articles about training, "the usual" recovery time for every muscle group is between 48 and 72 hours. Actually, the supercompensation can be achieved waiting for any period between 24 hours to 7 days after the training. For example if you are doing pushups regularly, you can do them every day; if you train 30 heavy sets for chest you might need a week to recover well.

For cardio training, you can do it every day.

You should adjust the training frequency according with the training volume. The training volume is Sets x Reps x Load adding every exercise for strength training and the running distance for running.

Ex: Chest training

Horizontal barbell press 4 sets x 10 reps x 80 kg = 3200 kg

Incline dumbbell press 4 sets x 8 reps x 60 kg = 1920 kg

Cable crossover flies 3 sets x 12 reps x 40 kg = 1440 kg

Total chest training volume 3200+1920+1440 = 6560 kg

Chest training volume and frequency for bodybuilding training - may vary for different individuals

Training Volume	Training Frequency
Body weight (push-ups, pull-ups, squats)	Daily
3 – 4 sets per body part	3 times a week
10-15 sets per body part	twice a week
16 – 24 sets per body part	Every 4 – 5 days
25 – 30 sets per body part	Every 6-7 days

Factors which directly influence your recovery time:

- the more intense the training, the higher the training volume, the longer the recovery time;
- basic movements training (squat, deadlift, bench press) need more recovery time; big muscle groups (legs, chest, back) also need more recovery time;
- a new kind of training needs longer recovery time;
- the more experience you have in training, the faster you will recover;
- the younger adult you are, the faster you will recover.

There is not necessary to recover completely every time. You can perform 3-4 consecutive training sessions without complete recovery; after these sessions you just have to allow more time to achieve supercompensation.

The detraining principle "Hold the enemy! Not even an inch backward!"

Do not allow your body to detrain.

This concept is also described as the reversibility principle. If after reaching the super compensation state the training stimulus is not repeated, or if the training intensity decreases, the body starts to lose the superior adaptation and returns to the baseline level of capabilities. Detraining means regress. The speed of this process is related to the training experience. The longer was the training period, the higher the adaptation stability, therefore the slower the detraining process.

In order to maintain your aerobic fitness, 3 sessions, 15 minutes each, per week are a minimum requirement. Strength can be maintained for long periods of time if you train at least once every 7-10 days; of course you need to train every muscle major movement.

Detraining is a major reason for not getting any training results even after a long period of training. If the training frequency is not adequate, the detraining which occurs between the training sessions will hamper the reaching of a superior adaptation state.

In plain words, if you train hard for 3-4 weeks and take a 10 days break, again train for 5-6 weeks and rest for 2 weeks, you might end up at the same level you were before the training sessions started in the first place. If you exercise hard for one year and you are pleased with the results you have gotten and you stop your training sessions, after about 6 months you will reach the same level of conditioning as before starting to exercise.

Because of this, the professional athletes strive to come back to training as soon as possible after an injury.

Detraining occurs especially when you have special problems.

What to do to prevent detraining?

- very busy schedule – Increase the training intensity and reduce the time for each session. Even sessions as short as ten minutes can successfully prevent detraining. Many people

overlook the usefulness of very short training sessions. Even 2-3 minutes of exercise using a high load can prevent detraining. As analogy, if you do not eat food at all you should die within 30-60 days, but if you eat 3 biscuits every day you can live for years.

Just do one or two sets of pull-ups, a set or two of heavy squats, deadlifts or bench presses.

- you go to another city for a short period of 3-6days – exercise heavily before you leave in order to increase the time you need for recovery; if you go for longer time, you can find a gym there, you can exercise outdoor, or in your room. Train using different squat variations, pushups and pull-ups. For cardio training, climb 20-40 floors or jump in place.
- partial injury – for example if you suffered a mechanical injury you can still train, but without stressing the affected part.
- illness – try to get back on track as fast as possible; ask your doctor about when are you fit to restart exercising. Go progressively and start with lower intensities and isolation exercises .
- laziness – if sometimes you feel lazy this means that you are human; but because you are educated and knowledgeable about the effects of regular exercising and you understand how important it is in your life, you will overcome your laziness and do what you need to do: exercise regularly.
- no place to train – bodyweight training will bring you good results. Read the chapter on bodyweight training. Get 2 or more kettlebells at home and you can train like a professional athlete if you wish so.

The periodicity principle "Conquer every peak one by one"

It would be ideal if you could have continuous improvement. But, due to many factors like natural genetical endowment, individual system response to the training stimulus, anaerobic and

aerobic training interference, living conditions, and other factors, the superior adaptation can not be achieved continuously.

For example it is unreal to expect to lose fat and to increase muscle mass simultaneously at a high rate, because the first one requires a negative calorie balance, while the second requires a positive calorie balance. It is also impossible to develop simultaneously at a high rate maximal anaerobic power and aerobic power. Beside this, even with the best training program in the world you will reach a performance plateau.

For this reasons the training should be periodized according to the main goals of training. You have fat loss period, muscular hypertrophy period, maximal strength period, maximal power period, maximal cardiorespiratory power period, general conditioning period.

Every period, also called training cycle should be 4, 6 or 8 weeks long.

Every period has a main training goal. While training for your main goal, you should maintain your overall fitness.

As a professional athlete there are off-season period, pre-season period and competition period.

Between these periods there are transition periods.

For the majority of fitness trainees there are three distinct periods:

1. Adaptation period – get accustomed with physical exercise (2-4 weeks)

- avoid injuries and excessive muscle soreness – low intensity

- correct form and frequency

- emphasize exercise adherence

- learn the movements

- make the physical exercise likable

2. Increase the physical fitness (6 months – 2 years). Plan cycles of 4 to 8 weeks for fat loss, muscle gain, strength gain, cardiovascular endurance.

Apply the training principles and you will get major improvements.

Almost everybody can reach his/her fitness goals training seriously for 6 to 24 months. In this time period you can build 10 – 25 kilos of muscles, you can lose 15 – 50 kilos of fat; you can improve your appearance and increase your strength and stamina to a level which would allow you to participate in city or district level competitions.

3. Maintain the results

- avoid detraining

- emphasize adherence

- maintain interest

- experiment with new forms of physical exercise

If you train for bodybuilding you should plan different periods:

- Maximal strength period. The stronger you get, the heavier the weights you can use for your bodybuilding type training. The heavier the weights you are able to use, the bigger muscles you will get.

- Weakness training period. You are as strong as your weakest part, so improve your weaknesses.
- Fat loss period. Many trainees will never see their big muscles nicely if they are covered with fat. Do not let other people ask if you are fat or you are muscular.
- Transition period. Sometimes you feel exhausted, and sometimes nothing seems to work well. You should take a week or two off, but not by doing anything; decrease your training intensity and volume and do some light training sessions. Plan for a new training cycle after the transition period.

The individual differences principle "You are one of a kind"

As you have different finger prints compared to others, the same will be your training response: different. People differ in age, gender, genetical physical endowment, body type, level of physical development, health status, life environment, life style, conditions of life (nutrition, rest), habits, motivation, goals, personality and temperament. No two individuals will respond to the same training stimulus exactly the same way; not even twins.

Many people try to copy the training programs of famous professional athletes or fashion and fitness models believing that will yield the best results for them. The competitive athletes training programs are suitable for them, not for you. You should find the exercise program that works best for you.

Factors influencing your training response and fitness potential:

- Genetical endowment:

- Speed is an inborn physical quality – fast white muscle fibers, the speed of processing and sending the nervous signal to muscles and also the muscle feedback speed, body segments length and muscle insertion for optimal leverage are all talent factors. The

amazing Usain Bolt the 2008 Beijing Oympics 100, 200 m new world record holder, ran an astonishing 9.78 s for 100 m and later in Berlin 2009 ran 9.59 s. If he would not train especially for sprinting, for sure he would still run easily under 10.3 s for 100 m rush. An ungifted athlete may train his speed for many years, but he would hardly break under 13 seconds for 100 m sprint.

- Strength – strength can increase even 2-3 times from the natural untrained level, but regarding top performance, genes are also responsible for success. Leverage is important: when moving a weight the muscle torque is what you get to use and not directly the strength of the muscle. Similar biceps development with similar neural control, but shorter forearms would result in higher force output for the elbow curl. Similar biceps development and forearms length with the same neural control, but the biceps tendon insertion point closer toward the hand would also result in higher force output. Broad shoulders and short arms are an asset for the bench press.

  The white - red muscle fibers proportion in favor of white would offer greater strength to their owner.

- Endurance – red muscle fibers, and a favorable enzyme density are inborn qualities for the African long distance runners who dominate all the world long distance running competitions
- Flexibility, motor skills （balance, coordination, precision, special sense, etc）are highly improvable physical abilities.

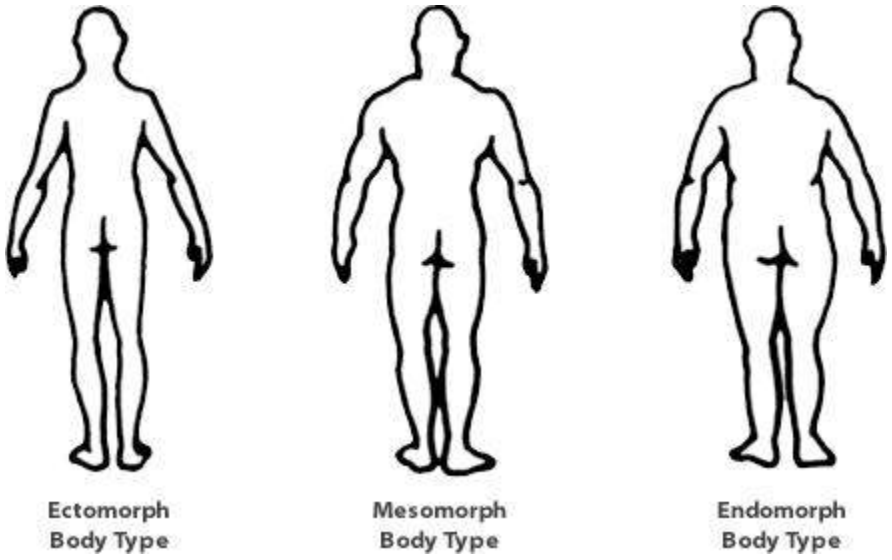
- Body type (body type)

There are three types of bodies. Most individuals are somewhere in between two body types.

  - Endomorph – broad shoulders, wide hips, tends to be overweight; easily deposits fat but also can easily grow muscles. In order to lose fat the endomorph needs higher training volume and frequency and more control over the food intake. The

endomorph gets strong easily, but he is not so light on his feet for high performance distance running.

- Ectomorph - the opposite of endomorph; narrow shoulders and hips, long and thin looking body. Most ectomorphs are "hardgainers" – they build muscle very slow, but also usually with little fat. The light and thin body is suitable for good performance in endurance type sports.
- Mesomorph – this is the athletic type; broad shoulders, narrow waist, naturally muscular looking. He easily gains muscle and fat. The mesomorph is gifted to excel in many different athletic disciplines.



Body types

What is important to understand with regard to body type?

- Even if someone has a tendency to get fat, this doesn't mean that they are doomed to be fat. Out there are a lot of endomorphs with lower body fat and a lot fitter than a lot of ectomorphs and mesomorphs
- Some people have to work harder than others to get similar results; this will give them even a more rewarding feeling of accomplishment

- Many gifted athletes are left behind by many hardworking and smart training not so gifted athletes
- Set your training expectations regarding to your body type; it is unrealistic for a big boned endomorph woman to expect to reach a model body. But anyone can make huge gains and can improve significantly; anyone can look sexy and fit.

Age

Early age – it is never too early. Physical activity is important for children. It improves all physical qualities, mostly because of improved motor neuron control. The different body tissues do not respond to training as well as during adulthood, because of the insufficiency of needed hormones, which will begin to be secreted during puberty.

Very high loads (higher than body weight) and excessive training volumes are not beneficial for optimal body development. Also early athletic specialization is not beneficial to future competition good results.

The best for children involved in physical exercises and sport is variety which will establish a solid athletic foundation for the years to come. Essential skills are best to be learned at early ages starting before 2 years old age: cycling, swimming, skiing, roller-blading, basic gymnastics (balance, climbing, hanging, crawling, etc), basic athletics (running, jumping, throwing, etc).

Old age – it is never too late. After menopause and andropause, anabolic hormone production starts to rapidly decline; this means that organized physical activity is paramount for slowing the aging process.

I have heard many people saying: “I am too old to exercise”. My first advice is to get involved in physical exercise since early childhood and maintain this habit until the last breath. If you missed the early train it is never too late to hop in. Numerous practical experiments have shown that is never too late to begin exercising.

One extreme study had women between 93 – 96 years old BEGIN a structured strength training program. After 8 weeks all the experiment subjects had shown massive improvements: upper body strength increased 190%, lower body strength increased 210%, and comfortable walking speed went up to 5.5 km/h from 3 km/h. This means a great improvement for the quality of living.

The older you get, the less you can afford to NOT be involved in a regular physical exercise program.

"Use it or lose it!"

The active participation principle "Everything counts".

If you want to reap the total exercise benefits there are no shortcuts. You have to train hard, continuously; you should have proper rest, nutrition and life style. You should give up smoking if you smoke, and drink alcohol with moderation. Being healthy and fit requires commitment 24 hours a day, 7 days a week, and 12 months a year. This requires discipline and passion.

- Nutrition – eat the right amount of calories, with a proper nutrients balance
- Rest – sleep regularly, 8-10 hours every day
- Smoking – DO NOT
- Alcohol – limited
- "Don't worry, be happy!"

If you come to the club to exercise, do not lose your time chatting around and watching TV. You are here to train and that you should do so.

Good things do not come cheap.

I promise you, you will never regret embracing a healthy life style.

Training for fitness and health

Physical fitness components

So you have decided that you want to be healthy and fit, that you want to have a better physical shape than a 25 years old youngster when you are 55 years old, that you want to become a better person.

Your physical exercise program should address all physical fitness components:

1. **Muscular strength** – is the ability of overcome a physical resistance (gravitational attraction, friction, inertia, fluid or air resistance, opponent strength); the resistance could be external (opponent, machines, objects, water, air) or internal (own body weight, limbs weight and inertia, interarticular friction). A certain amount of strength is required for every human movement from writing with a pen or carrying heavy luggage to lifting a maximal weight for one time. Increasing your strength enables you to carry out your daily tasks, ordinary or extraordinary, easier, faster with less perceived exertion. Attaining a high level of strength during your younger life will help you maintain a greater level of strength throughout your senior life.

Strength means youth. What defines old people is lack of strength.

2. **Muscular endurance** – the capacity to sustain a higher than average muscular effort over a long period of time without undue fatigue. Muscular endurance is predominant in activities like luggage carrying, wood chopping, hiking, rowing, and swimming. If you would be able to climb a mountain for 5 hours, backpacking half your body weight and you won't feel like is the end of the world this means you could get through any day in the city without any kind of problem. You are physically able to live your life to the max.

3. **Cardiovascular endurance** – is the combined ability of your heart, lungs, vascular system and blood to supply your tissues with optimal levels of oxygenated blood and to remove the tissue metabolic wastes, together with the capacity of your tissues (skeletal muscles, organs) to absorb and utilize oxygen efficiently.

Cardiovascular endurance is primordial in activities like walking, running, cycling, swimming and any type of continuous physical activity of certain intensity.

Cardiovascular endurance is best assessed by the VO2 max (maximal oxygen consumption).

Young people (20 years old) have a VO2 max about twice higher as old people (70 years old), while highly trained endurance athletes posses a VO2 max twice higher than sedentary people (approx. 80 ml O2/kg/min versus 40 ml O2/kg/min).

4. **Flexibility** – is the quality that enables us to execute joint movements with optimal amplitude and without undue strain. Depends mostly on muscular tissue elasticity (capacity for elongation and recovery), and just a little on tendons, ligaments, articular capsulae and skin elastic stretch. Optimally developed, helps you to maintain a good body posture, partially protects you from muscular and joint injuries and allows you to excel in many sport skills (gymnastics, martial arts, swimming, etc). Developed at high degree and unsupported by strength over complete range of motion, may invite injuries.

5. **Body composition** – refers to the proportion of fat tissue and active body mass (muscles, bones, organs, blood, etc). Excess body fat brings great health risks and it is also inaesthetic. The optimal fat percentage is below 20% for men and 25% for women.

Without being relevant to health, the speed, and the motor skills (spatial orientation, balance, body coordination, hand-eye coordination, movement precision, ambidexterity) are paramount in sports and in different jobs. They also could improve the quality of your life through sport participation and different life situations superiority.

Physical training

A typical physical exercise session consists of three parts: warming up, main part and cool down.

The warming up

Warming up is essential for having a safe and smooth training session; here are some of the benefits:

- slowly elevates your heart rate – beside allowing the heart muscle to progressively adapt for higher intensities of effort, also gives time for symptoms to arise until is not too late, should any cardiac events occur; **The heart rate at the end of the warming up should reach between 100 and 140 bpm (beats per minute) depending on the trainee's age, training level and the intended activity – average 120 bpm;**
- progressively raises your respiratory rate;
- allows your blood flow to properly adjust demands; during physical effort the active muscles' blood flow is much higher than at rest, because of their exceeding need for oxygen and waste removal;
- increases the muscle temperature allowing higher contraction speed, strength and power and greater fiber elongation;
- allows the active joints to extra lubricate for the higher friction forces present during effort;
- allows a shift of attention, concentration and motor neuron control .

The warm up usually consists of two parts:

- general warm up – increases heart and respiratory rate, overall blood flow. Fast walking, jogging, cycling, easy jumping, kettlebell swinging, ample movements for all the joints plus light stretching of major muscles are all suitable.
- specific warm up – promote blood flow to the muscles which are most used during the effort, lubricate the needed joints, prepares the motor neuron mechanisms for the training effort.

The specific warm up is very much according to the exercise session main activities and movements. The aerobic training usually consisting of running, walking, cycling, swimming; the general warm up contains the same activity at just 30-50% of top intensity. For the anaerobic training and for different sports training, the specific warming up consists of the exercise itself with a low intensity or sport specific drills.

A standard warming up for a general fitness training session should be like this:

- 5-10 min of any of the following activities - fast walking, jogging, kettlebell swinging, easy jumping ,etc;

- joint movements - flexion, extension, abduction, adduction, rotation, circumduction in the following joints order: neck, shoulders, hips, elbows, knees, wrists, ankles, lower spine for 3-5 min;

- light stretching for the hamstrings, lower back, glutes, calves, chest muscles, shoulders, triceps for 2-3 min;

- as a specific warming up, before you lift 10RM or heavier loads, perform the intended movement for 1-3 sets with a load between 30-50%x 1RM for 5-10 reps progressively heavier (1-2 sets for the small muscle groups, upper arm muscles, deltoids, calves muscles and 2-3 sets for the big ones, back muscles, chest, hips and thighs).

The cooling down

The cooling down part at the end of the training serves more purposes:-

- prevents the blood pooling in the lower extremities – during training, especially during aerobic exercise like running or cycling, a much higher volume of blood is redirected to the muscles of the legs to supply the working muscle cells with enough O2.

  While running, the venous return of the blood to the heart is greatly supported by the pumping like muscle action which elicit pressure on the veins walls, so the heart muscle can accomplish its work much easier. If the effort is suddenly interrupted, the workload of the heart becomes considerably more strenuous, the blood return is compromised, so the brain doesn't receive enough oxygen (the reason behind the lightheaded sensation), which can lead to fainting. If the heart has an abnormal condition, the aforementioned situation can even end with a heart muscle failure (myocardial infarct);

- removes most of the lactic acid from the active muscles, which fastens the recovery process and removes the muscles sensation of stiffness; 10 minutes of cooling down will remove more than 66% of the lactic acid present in muscles.

The cooling down is especially important after the aerobic activities. The time length of the cooling down is related to the duration of the effort, about 1/5 of the duration of the aerobic effort, up to 15 minutes. (Ex. If you ran for 20 minutes use 4 minutes to cool down, if you ran 2 hours, use 15 minutes).

For the aerobic activities the intensity should be progressively reduced until the **heart rate falls under 120 bpm for young people and 100-110 bpm for the elderly.** For the anaerobic training a good cooling down comprises jogging, walking, swimming if convenient, or another continuous activity.

Aerobic training

Aerobic training

Aerobic means “with oxygen”. Virtually almost all your life you are in an aerobic state, when the consumed oxygen equals the body demand for oxygen. The body assimilates at rest about 3.5 ml O2/kg/min (3.5 ml O2 for every kg of body weight for one minute). The maximal oxygen consumption (VO2max) reported values are 94mlO2/kg/min for men and 78mlO2/kg/min for women, both being long distance skiing high performers. The normal values for sedentary men range between 35-45 mlO2/kg/min and 25-35 mlO2/kg/min for sedentary women.

VO2 max is significant because it evaluates the health status and the performance of the heart, lungs, blood vessels, and muscles cells. A high VO2 max, predicts good endurance performance

(long distance running, skiing, cycling, swimming, long time physical work). For average sedentary persons the VO2 max at the age of 70 equals about half as their VO2 max at age 20. Endurance trained athletes exhibit VO2 max double than their sedentary counterparts. If you exercise, when you reach the age of 70 years old you could have the same VO2 max as 25 years old sedentary persons and similar endurance performance.

On the low end are people suffering from cardiovascular diseases (coronary heart disease, arteriosclerosis, myocardial infarction), or chronic pulmonary diseases (emphysema, cystic fibrosis) with VO2 max as low as 10-15 ml O2/kg/min, meaning that even mild physical effort as slow walking or cooking presents a real challenge for them.

A trained heart will not fail even at an advanced age, so considering that heart disease is the leading death cause contributing to more than 1/3 of the deaths for all modern cities population, you can keep yourself out of this 1/3 if you exercise regularly.

A well performing oxygen delivery system enhances the quality of your life allowing you to work as you need, go traveling, hiking and to confidently participate in sports (basketball, soccer, rugby, tennis, skiing, badminton) even at an advanced age.

Aerobic exercise means whole body, or "big muscles" exercise, involving more than 2/3 of your total muscle mass, practiced continuously for a period exceeding 4-6 minutes, at intensity high enough to raise the heart rate above 120 bpm (beats per minute) and usually under 180 bpm. People at a highly advanced age or with poor fitness level could find exercising at around 100 bpm challenging. The concept of exercising for health was developed by Dr. Kenneth Cooper, American cardiologist, in 1970s'. Initially he used walking and jogging programs for a faster and more complete heart rehabilitation following heart surgery.

As you start training, the improvements in aerobic fitness will come quickly. There have been reported even 10 % VO2 max improvements after just ten days of continuous aerobic training (20-40 min/day). The magnitude of the results you can expect depend on your starting

level and on your biologic upper limit of your adaptation; the poorer your starting level, the greater the magnitude of your improvements. As you progress toward your limits for aerobic power the progress will be slower and slower. For example if you are a normal adult male with a VO2 max 40 mlO2/kg/min, you can reach after just a few months of training a VO2 max of 50-55 mlO2/kg/min, but you need a few more years until you might reach a 65 mlO2/kg/min upper limit of your VO2 max.

Why practice aerobic exercise?

The aerobic training promotes long term adaptations favorable to health:

- Decreases your resting heart rate – the lowest resting heart rate reading for a highly adapted endurance athlete is 29 beats/min; endurance events athletes usually have resting heart rates of 30-40 bpm (beats per minute). Other athletes and people frequently involved in endurance training have resting heart rates ranging between 40-55 bpm. A low heart rate is called bradycardia. One reason for this is an increase in the heart stroke volume (the amount of blood ejected during a single heart beat).

The athlete's bradycardia should not be mistaken for pathological bradycardia, a medical conditions which needs assistance.

Consider that your natural heart rate is 70 bpm. Think that through training your heart rate becomes 50 bpm. Every minute your heart will save 20 extra beats, every hour 1200 beats, every day 28800 beats, every year 10512000 beats. Even if during your aerobic exercise session your heart rate is between 140-180 bpm, over 60-70 years of your lifetime the heart rate economy is huge. When you reach 65 years old, your heart could just be in its 40's. There is a theory in Chinese medicine which says that every heart has a limited amount of beats during a life time. Mice with RHR (resting heart rate) as high as 200 bpm, live a full life in three years, the mighty elephant with RHR around 40 bpm can live up to 50-60 years and the tortoise with a RHR as low

as 30 bpm can live 150 or even more years. According to this theory, the lowest your RHR the longer you will live.

- The submaximal effort heart rate is also lower for the same given effort intensity. This means that an adapted heart will allow a higher intensity effort for a longer duration and also a faster recovery; this translates into improved athletic performance. This also means that after a hard working day at the office and outside you will not be very exhausted. After effort a trained heart should recover to 120 bpm before 3 minutes have passed.
- Normalizes your blood pressure and prevents the age related hypertension. Because during effort the maximal cardiac output can reach as high as 40 liters of blood per minute the circulatory system chronically adapts and becomes more performant; the arteries increase their diameter (there have been reported, for highly trained endurance athletes, arteries with a double diameter compared with their sedentary counterparts – this allows a blood flow volume 16 times higher !!!). The larger the arteries, the lower the pressure exerted against their walls.

Also one of the benefits of the long term aerobic training is the increase of HDL (good) blood cholesterol, which protects the arterial walls against LDL (bad) cholesterol build up. These are the main mechanisms that normalize the blood pressure.

- Improves the insulin sensitivity, so the cell's glucose uptake is facilitated; this normalizes the pancreatic insulin secretion, preventing diabetes, or helps control the diabetic condition for the persons who already suffers of diabetes;
- Burns calories and helps in a fat loss program, or maintains a desirable body fat; burning 1700 extra Cal/week helps you burn two kg of fat in a month. Even burning as less as 700 extra Cal/week, equivalent of walking or running 10 kilometers for a 70 kg male prevents the gain of five kg of unwanted fat each year;
- Impact aerobic activities like running, rope jumping, some forms of group exercise, etc, promote new bone formation , increasing the bone density especially for the femur and spinal column, preventing osteoporosis; at high risk are especially underweight females after menopause, but also males are affected by this condition.

Guidelines for aerobic training

Frequency

The recommended frequency for the aerobic training sessions is 3 to 5 sessions every week. Studies show that the results obtained are similar either performing the training sessions 3 days in a row or with a day break in between sessions. However with a day break in between sessions the body will tolerate better the effort.

Training 3 days every week will produce a positive adaptation. This is also the minimum frequency that will promote weight loss. If you want to lose fat at a faster rate or if you want to reach a high endurance performance you might consider training 5-7 times a week or even twice a day.

Duration

Usually the aerobic training duration ranges between 20-60 min. In the beginning of the program you may start with 10 minutes of aerobic exercise. For rapid weight loss or competitive long endurance events, the duration can extend even up to 120 minutes. Even shorter sessions of 10 minutes each during one day could have a beneficial cumulative effect.

Intensity

Abbreviations:

- HR=heart rate;

- MHR=maximal heart rate;

- RHR=resting heart rate;

- HRR=heart rate reserve;

- THR=target heart rate or training heart rate.

How to measure your heart rate?

- RHR –the RHR can be measured through palpation of the radial artery(wrist on the thumb side), temporal artery or sternum(chest bone)- immediately after waking up while still lying in the bed. For an accurate result you should have a normal sleep, not an after party sleep.

- THR – the most accurate way to measure your HR while exercising is to use a heart rate monitor, consisting of a chest strap with an electrode and a wrist watch receiver (Polar, Acumen).

Another way is to count your heart beats exactly after you stop the effort during the first 10 or 15 seconds (through palpation) and multiplying the result by 6, respectively 4, in order to obtain your HR (bpm). Later you can correlate the measured HR with the speed and in case of hill running or cycling also with the degree of inclination or resistance. You can also correlate your measured THR with your perception of the effort exertion. Measure your THR and also RHR periodically, because as aerobic training adaptation they will decrease (THR will decrease for the same absolute intensity of the effort).

- MHR- the predicted maximal heart rate can be calculated using the formula **MHR=220–Age (years)**. For a 20 years old youngster the result is MHR=220-20=200 bpm, for a 60 years old senior it is MHR=220-60=160 bpm. However, being predicted, the result is average. This means that having 100 people of the same age practically measured for MHR, most of the results will come close to the formula result. The rate of error falls between +- 12 bpm, so for healthy people 40 years of age MHR can range between 168-182 bpm. For seniors who regularly trained aerobically throughout their life, using this formula will underpredict their MHR.

The MHR can be practically measured through a maximal effort test, not recommended for people presenting any of the risks for cardiovascular disease, or for the people who do not usually exert maximal aerobic efforts.

There are more ways of measuring the intensity of the aerobic exercise:

- As a percentage of the maximal heart rate (predicted or real);

The recommended intensity for aerobic exercise using the target heart rate as a percentage of MHR is:

THR=MHR x 60-90%, where MHR=220-Age (years)

EX: For a 30 years old person

THR= (220-30) x 60-90%=190 x 60-90%=114-171

- as a percentage of the heart rate reserve (HRR) above the resting heart rate ;

Knowing that the RHR is a mark of aerobic conditioning level, this formula will better appreciate your optimal THR. Also it closely mirrors your O2 consumption – if you exercise at 70% of your HRR above your RHR, your O2 consumption will be about 70% of your VO2 max.

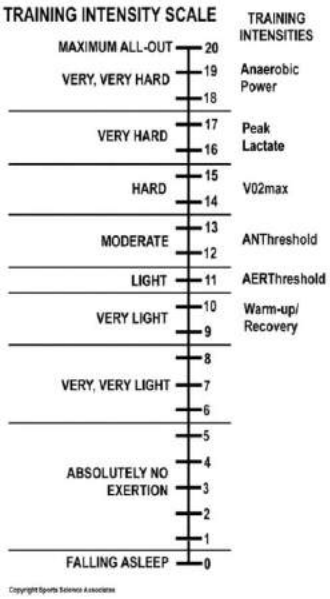
THR=RHR + (MHR-RHR) x 50-85% (Karvonen formula)

Ex: For a 30 years old person, with a RHR of 60 bpm

THR=60 + (190-60) x 50-85%=60+130 x 50-85%=125-170 bpm.

- Using the rate of perceived exertion RPE; developed by the Swedish exercise physiologist Borg, the RPE expresses the effort intensity according with the trainee's feelings of exertion; it is highly individual, even the people at the same age and fitness level may express different feelings about the perceived intensity of the effort.

The Borg scale ranges from 6 to 20, 6 meaning complete rest, 20 maximal effort;



- Using a preferred exertion rate - PER, when the individual chooses by himself the intensity of the training. For running you can choose yourself the speed and the incline as you wish; usually a scale ranging from 1 (complete rest) to 10 (maximal exertion) can be used;

- Using the metabolic exertion – MET's (multiples of the resting metabolic rate); 1MET=3.5mlO2/kg/min – this represents the minimal O2 consumption at rest. This means about 1 Cal/min, or 0.9 Cal/min for a 60 kg man, respectively woman. 10 METs means a caloric consumption 10 times higher than during complete rest. An 80 kg male

watching TV for one hour will burn about 80 Cal, while exercising one hour at 10 METs will burn 800 Cal. Many professional fitness cardio equipment have the option of displaying the MET's.

You can calculate your MET's for running using these facts:

1. Running 1km you will burn as many Calories as your body weight kg.
2. At rest over 60 minutes the Calorie consumption equals body weight in kg.

If one 60 kg person runs at 10 km/h speed he will run 1 km in 6 minutes and will burn 60 Cal. So for one minute he will burn 10 Cal, 10 times the 1Cal/min his 1 MET. (He is 60 kg). The result will be 10 MET's rate of metabolic consumption for 10 km/speed running.

For every individual, for running the MET number roughly equals the speed km/h.

Read further in this chapter how to choose the intensity right for your goal.

Methods of aerobic training

The method of continuous constant effort

After warming up, the trainee chooses a constant intensity for exercising and maintains it for the whole duration of the session.

For example you can choose a speed of 8 km/h for running 30 minutes. This effort intensity might yield an average HR of 140 bpm.

This method is used for any fitness level and various training goals. It will improve the VO2 max and the pure aerobic endurance. It is also easy to control the exercise intensity.

The interval training method

This method consists of periods of time (intervals) of exercise at different intensities.

The lower intensity interval follows the high intensity interval, allowing the practitioner to recover. This short duration recovery enables the trainee to exercise at a high intensity without feelings of extreme fatigue.

The high intensity interval training allows the body to adapt to a superior level of aerobic capacity, yielding superior performances. High intensity training at the anaerobic-aerobic threshold adapts the body for a better lactic acid metabolism.

This type of training improves significantly your recovery ability, paramount in high intensity sports (free combat, badminton, basketball, rugby, soccer, football, etc)

OBLA

Beside the VO2 maxim there is another important factor which influence the aerobic exercise performance: **OBLA – onset blood lactate accumulation.** This is the intensity of effort which promotes the lactic acid imbalance (the lactic acid is produced at a higher rate than can be removed from the blood and muscles); the level of lactic acid in the working muscles and in the blood will begin to rise and after short time (1-3 min) the effort should be stopped or the intensity reduced. OBLA represents the border between anaerobic and aerobic effort.

The OBLA intensity is below the intensity needed to obtain maximal oxygen consumption. Having a high OBLA threshold enables you to exercise or to compete aerobically at a higher intensity of effort. Endurance trained athletes with high performances, besides having a high VO2 max, also have a high OBLA threshold, close to the VO2 max limit. The OBLA is

expressed as a percentage of VO2 max (one trainee's OBLA could be at 80 % of VO2 max intensity).

The effort intensity needed to improve the lactic acid metabolism should be above the actual OBLA and the exercise duration should be long enough to raise the lactic acid concentration in the blood and muscles.

I explained here the meaning and the importance of OBLA, because one of the best methods for raising the OBLA threshold is the interval training.

There are more patterns for interval training with different **effort/recovery ratios: 3:3, 3:2, 3:1.**

The effort periods should be between 3 minutes and 1 minute.

The whole training session duration should be between 12 to 60 minutes.

The Fartlek method

The Swedish “fartlek” stands for “speed play”. This type of training uses an infinite combination of running and jumping exercises:

- accelerated running;
- sprint;
- knees up;
- zig-zag running;
- accelerated-decelerated running;
- sliding - lateral running;
- scissors running;
- ankle drill;
- forward-backward lower legs drills;
- knee up lateral running;
- backward running;

- leaping (jumping with one foot and landing on the different foot);
- skipping (jumping and landing on the same foot alternately)
- etc.

All of the above specific drills are intercalated with easy jogging allowing partial recovery.

This method of training is excellent for preparing the endurance quality for athletes involved in different sports (soccer, rugby, basketball, tennis, etc) because it can be designed very specifically following the same actions, effort intensity and duration as in the actual sport.

The Fartlek training promotes a VO2 max increase, also accelerates the recovery, improving the OBLA threshold.

The usual duration of the training session ranges between 20-60 minutes.

An outdoor track, football field, or plane field (grass, sand) it is more appropriated for this type of training.

The circuit training

Circuit training consists in exercise bouts on different stations executed without rest in between. The usual number of stations is between 4 and 12. The duration and content of intervals should be created specifically for every athletic discipline. Usually the duration of exercise at different station is between 30 seconds and 2 minutes.

Example of circuit stations:

- Running between cones
- Push-ups, pull-ups, jumping jacks, burpees, etc
- Different kinds of jumping

- Sport specific actions

The cross training

The cross training is used especially by the triathletes, professionals and amateurs, and by fitness enthusiasts.

This method consists in combining different types of endurance exercise in the same exercise session, often without break. The classic triathlon consists in swimming, cycling and running. In a fitness club, different types of cardio equipment can be combined for a cross training session: treadmill, stationary bike, elliptical runner, stepper, rope jumping.

Due to the specific adaptation to different types of exercise, the cross training yields a more complete adaptation result. Also, for the fitness enthusiast training in a health club, this type of training could mean more fun and challenge.

The cross training could also be understood as a competition running event usually held outdoor on a route passing through woods, over hills and valleys. In the health club environment this type of cross training is simulated using different programs on the cardio equipment.

Aerobic group exercise

Almost every health club offers some forms of group exercising like Aerobics, Step, Tae Bo, Spinning, Kick boxing, Dancing, Latin, Hip-hop, Aqua aerobics, and many, many other forms of group exercise. According to the level of intensity and complexity, participating in group exercise will bring positive adaptations on the body's aerobic system. Usually the group exercise offers the most benefits to beginners. Once the body adapts to the exercise effort intensity, further fitness improvements are improbable. If the club offers programs challenging enough, the practitioner can reap more benefits.

The group exercise will offer modest results for cardiovascular improvements, but it will also develop other physical qualities – strength, skill, flexibility;

One more important thing – the group exercise can be a lot of fun.

Designing an aerobic training program

The first step is to **choose your main goal** you expect to obtain from aerobic training. People who engage in aerobic type of training will expect the following outcomes:

- health benefits (protection against cardiovascular diseases, against diabetes and different types of cancers – colon, breast, prostate, rectal, etc);
- fat loss or weight loss;
- cardiovascular system improvements;
- improved competitive performance.

The main difference between training for different goals is the training intensity.

The second step is to **choose a form of aerobic exercising** that we wish to use in our training. We can choose from walking, jogging, running, cycling, swimming, cross country skiing, hiking, stair climbing, rope jumping, kettlebell swinging, arm cranker exercising, dancing or an aerobic group exercise, etc.

The third step is to **decide a frequency for training**. You can train with a frequency starting from 3 times a week, up to 2-3 times every day.

The forth step should **establish a duration** for the training session. Usually 20-60 minutes are enough, for promoting physiological benefits. Even sessions as short as 10 minutes can prove

beneficial. Ultraendurance specialists often undergo aerobic training sessions lasting 2-3 hours and even more.

The fifth step is to **choose a training intensity**. Basically the training intensity separates professionals from novice and dictates what type and the magnitude of the physiological benefits obtained. The relative intensity also depends on the training duration. 60 minutes ran at 12 km/h will definitely tax your organism more than 10 minutes ran at the same speed. I will describe the recommended exercise intensity according with the training goal.

Exercising for a better health and disease prevention

As we have learned before, the physical exercise offers protection against cardiovascular diseases, different types of cancers, type II diabetes, high blood pressure, obesity, etc.

The intensity required for this can be achieved even in some daily physical activities as gardening, walking and even shopping.

Introducing more physical activity in your daily life could mean a lot along your life; you can walk or ride a bike instead driving a car, you can climb a few flights of stairs instead taking the elevator, and so on. Try being creative and live a physically active life. Accumulating at least 100 minutes of physical exercise every week could make a big impact in your life over the years.

The exercise intensity can be around 50-60 % of the MHR, 40-50 % of the HRR above the RHR, a RPE of 10-12 (fairly light), 4-6 MET's, or use the PER, choosing the intensity you think that suits you best. This level of intensity poses no problems for almost all healthy individuals and also for most people with a controlled disease situation.

All forms of aerobic exercise are suitable. The Fartlek type of training and circuit training impose bigger demands on your cardiovascular system and muscles therefore should be practiced especially for sport athletic conditioning.

Exercising for fat loss

When fat loss is the main goal of the exercise program, the focus should be toward burning as many calories as possible. Therefore longer, more frequent exercise sessions appear suitable to accomplish this goal. Whole body, weight supported exercises, like walking, jogging, running, stair climbing, elliptical trainer should be the first choice. Cycling, rowing, and swimming are also appropriate. Swimming presumes an appropriate technique in order to be able to train for the required amount of time.

If possible, every day physical activity and/or exercise conducted for 30 to 90 minutes will deliver the expected results, given enough time.

The intensity of aerobic exercise, when fat loss is the goal, should be as high as possible with respect to your effort capacity and your motivation. The exercise intensity shouldn't be punitive; the sessions should not result in excessive exhaustion and muscular soreness in order to promote long time exercise adherence. 55-65% of the HRR above RHR, 70-75% of the MHR, 6-8 MET's, 12-13 on the RPE scale (a little exhausting) are appropriate ranges for the exercise intensity. Even lower training intensity is recommended if the described above intensity range is perceived as too exhausting.

Continuous training, moderate intensity interval training, cross training and aerobic group exercise are the most suitable forms of exercise for fat loss.

Example of training sessions for fat loss:

A - warm up than jog 20-30 min at 60-70% of HRR; cool down;

B - warm up than jog 30-40 min at 60-70% of HRR; cool down;

C - warm up for 1500 m at 60%; jog for 3-4000 m changing the speed or the incline in order to bring your THR up to 75%, than back to 60% and so on; cool down;

D - warm up than jog 45-60 min at 60-70%; cool down.

Training pattern

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
A	B	Rest	C	Rest	D	Rest
A	Rest	B	Rest	C	Rest	Rest
A	Rest	B	Rest	D	Rest	Rest
A	B	A	C	A	D	Rest

Exercising for cardiovascular improvements

Through cardiovascular improvements the following adaptation responses are expected:

- increased heart stroke volume;
- improved ejection fraction;
- left ventricular adaptation hypertrophy;
- lower RHR and effort heart rate (for the same given intensity);
- better O2 transport capacity of the blood;
- wider arteries;
- denser capillaries;
- better O2 assimilation by the cell;
- etc.

Higher exercise intensity is required in order to elicit favorable adaptation responses: 75-85% of HRR above the RHR, 80-90% of the MHR, 13-16 on the RPE scale (somewhat hard), 8-12 MET's.

A minimum 3 exercise sessions of 20 minutes each are required each week.

I will describe few types of training for improving the cardiovascular system using a percentage of HRR above the RHR. The exercise mode is running or uphill walking.

A - 20-40 min continuous running at 60-65% HRR- cool down gradually decreasing the running speed or the uphill inclination degree 4-5 minutes until the HR lowers under 120 bpm;

B - Warm up 1000-1500 m at 60% HRR, than 3-4000 m increase speed until your HR reaches 85% of HRR; decrease it until 70% of HRR. Repeat changing the speed or inclination for your HR to reach from 70% to 85% until you finish running 3-4000 m; cool down;

C - Warm up a few minutes at 60%; run for 20-30 min at a steady pace – THR 75-80% of the HRR; cool down;

D - Run at a steady pace 45-60 min at a THR between 60-70% of the HRR; cool down.

Training patterns

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
A	B	Rest	C	Rest	D	Rest
A	Rest	B	Rest	C	Rest	Rest
A	B	A	C	A	D	A
A	B	A	C	A	D	Rest
A	B	C	A	D	Rest	Rest

Exercise for improving your athletic performance

When endurance performance is the main goal, more things are to be considered:

-VO2 max which represents the maximal amount of O2 which can be assimilated by the cell per minute. It is measured as L/minute or ml/kg/min;

-lactate threshold (OBLA) which represents the maximal lactic acid accumulation which allows the continuity of the effort; OBLA is calculated as a percentage of VO2 max. Normal people have an OBLA about 70% of VO2 max, elite athletes can reach 90% of VO2 max or more.

-the effort economy meaning a lower amount of energy consumed for running a distance at a certain velocity; this means a lower VO2 for the same speed;

- the percentage of slow twitch muscle fibers from the muscle.

The VO2 max is strongly genetically related. The adaptation window is between 25 -50%. This means that you can expect maximal improvements inside this range. Naturally, different people exhibit different VO2 max.

High volume of aerobic training at intensities above 70% of HRR will increase the VO2 max.

The lactate threshold physiologically represents the border between anaerobic and aerobic effort. This is a level of effort intensity above which the lactic acid production overcomes the lactic acid removal capacity, so the blood and muscle acidity starts to grow, leading to ceasing or reducing the effort. No matter how high your VO2 max, you will not be able to sustain a continuous high intensity effort (required in any high level endurance race) without a high lactate threshold. The lactic acid accumulation will force you to stop or to lower the effort intensity. The lactic acid threshold depends on the lactic acid buffering capacity and on the capacity to bear a high level of blood acidity. A high lactate threshold comes due to an optimal enzymatic bed (which helps you metabolize the lactic acid) and high capillary density (which helps you to flush the lactic acid from the muscle).

For raising the lactic acid threshold the training effort intensity should be at the lactate threshold (continuous training) or above (Fartlek and interval training). The lactate threshold intensity is about a race pace level for a 10 min race. The interval training recovery interval should not allow complete recovery in order to challenge the muscles to adapt to high levels of acidity.

The effort economy comes from a low body weight, low adipose tissue (a futile burden for an endurance race), a good running technique (optimal stride length comes almost naturally for every runner), proper upper body posture (shoulders relaxed, head slightly forward) etc. The running economy improves after many years of continuous, high volume endurance training.

A high percentage of slow twitch muscle fibers (type I or red fibers), definitely offers a high advantage for an endurance athlete. While calf muscle for the average people comprises about 50-60% type I fibers, the elite endurance athlete can have even 90% or higher red muscle fibers. The percentage of muscle fibers for each type (I, IIA, IIB) is genetically predetermined. The fibers can not change their type, but their specific performance can be altered. So, as a long time training adaptation, the intermediate fibers (IIA) can have endurance capacity almost similar with the slow twitch fibers (I) and even the fast twitch fibers (IIB) will enhance their endurance capabilities. Again a high volume of specific intense training is needed for promoting adaptations favorable to endurance performance.

Example of amateur training running program for improving your racing performance

A - Run 30-45 min at 60-65% of HRR;

B - Warm up 800-1500m at 60%, than stretch (hamstrings, quads, glutes, calves); run 10-12 intervals at 90-95% effort; 200 of jogging between intervals should allow recovery at least down to 65% HRR; cool down;

C - Warm up 1000-1500 m at 60% HRR; for 3-4000 m increase speed until your HR reaches 85% of HRR; decrease it until 70% of HRR; repeat changing the speed or inclination for your HR to reach from 70% to 85% until you finish running 3-4000 m; cool down;

D - Warm up 1500 m at 60%; run 15-20 min at 85% HRR; cool down;

E - Run 30-60 min at 60-65%.

Training pattern

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
B	A	D	A	C	A	E
A	B	A	C	A	D	OFF

FAQ

What if I do not like cardio training? How can I get specific benefits?

If you do not like to do cardio training you do have a few choices:

1. Limit your cardio training to three sessions every week with 20 minutes effort for each session. Watch TV or listen to music and get through them.
2. Be physically active: climb stairs, walk where you need to, ride a bike.
3. Find a more manly way of doing endurance training: swing a kettlebell, do punching bag continuous work, play with a clubbell, etc.
4. Engage in amator sports: soccer, basketball, rugby, badminton, tennis, MMA, or other sports with continuous effort.
5. Go hiking.
6. Engage in a variety of activities throughout the week as described above.

It is true that just cardio burns fat? I must do cardio if I want to lose fat?

What is most important is your daily calorie balance (eat less than you spend) and resistance training to maintain or increase you fat free body mass.

Cardio training is a very good **supplement** for a fat loss program. If you do it you can lose fat at a faster rate.

Can I get very skinny like a marathon runner if I do a lot of running? I just want to get skinny.

Marathoners have and ectomorph body type (skinny and long). You can get much skinnier than at present, but for this you need a very extensive and regular running program. Marathoners run about 20-40 km every day. In order to get visible skinny from a running program you need to run at least 7-8 km almost every day.

As long as you can maintain this kind of training program you can maintain a lean body.

My knees or my back hurts. Can I do cardio?

If you have back or knees problems, most of the cardio training will not feel too good to you.

Swimming might be your answer for cardio training. You can also find and try an arm cranker, which is like pedaling on a bike, but using your arms.

I am a power athlete (MMA, rugby, track and field, etc). Should I do cardio?

You need to do Fartlek and circuit training, designed specifically according with your sport. Do explosive cardio like kettlebell training with swings and snatches, punching bag training, sledge pulling, etc.

If you plan on doing constant intensity cardio, you can do some, but not too much and not intense and prolonged cardio training. 3 sessions of 20 minutes at 60-70% HRR should be enough for you. You should stay away from long duration at high intensity cardio.

High intensity prolonged cardio training will hinder your maximal strength and power performance.

Aerobic training made simple

If you do not like too much theory here is a shortcut for helping you understand how you should do aerobic training.

- Chose running, swimming, cycling, stair climbing, rope skipping, kettlebell swinging or punching bag work as forms of aerobic exercise
- Train 3-5 times per week, 20 – 40 minutes every time
- Chose a challenging training intensity

Strength training

Around 1950’s the physicians were recommending that one should refrain from exerting heavy effort, because it would be detrimental for health. The professional coaches were banning their athletes from weight training because they thought it would make them slow and “muscle bound”.

In 1970’s came “the aerobic craze” initiated by Dr. Cooper's studies. The weight training was again neglected.

Starting with the “muscle beach” era, with Arnold Schwarzenegger as the main star, the weight training became more and more popular. Since that time exercise physiologists started to study in depth how body responds and adapts to the weight training.

Today we are in “the weight training craze”. Starting with USA and Western Europe, more and more people include weight training in their weekly regimen of life. Considered for long time “for men”, the women are catching up very quickly. The times when weakness, frailty and need for protection were “values” of women are long gone. Today the women are searching for equality and independence. Being weak and powerless is something that the modern women wish to overcome.

The strength training is also called resistance training, or weight training.

Going back in time more than 3000 years ago, men were already doing strength training, preparing for war or for athletic meetings, like the ancient Olympic Games. The first strength hero was Milo of Crotona, who won the Olympic pancrase (no hold barred combat) five times in 20 years. He once carried a bull around the arena without stopping.

Closer to our times starting from the dawn of the 20^{th} century, Eugene Sandow, Arthur Saxon, George Hakenschmidt, Louis Cyr, Thomas Inch, Sigmund Klein and many others were performing feats of strength impossible to almost all strength athletes of today.

Why should I regularly do strength training?

Consider some of the benefits offered by regular, structured strength training:

- increases or maintains the fat free mass - what you can actually see about the human body are three of its major components: bones, muscles and fat. The bone tissue’s visual appearance can not be normally altered. So what we have left to be seen is muscle and fat. If you do not want to be just “skin and bones” a substantial quantity of muscle tissue

is required. Having a healthy weight assumes a limited amount of fat (less than 20% for men, 25% for women) with the most of the body weight constituted of muscle mass. Living a sedentary life and under utilizing your muscles, leads to muscle wasting or atrophy. Because of muscle loss, your BMR (Basal metabolic rate) lowers and the chance of getting extra fat increases. Because of this reason untrained people age prematurely. As you grow old you lose your muscle mass (you will lose between 2 and 5 kg for every decade after the age of 25) and increase the fat deposits in your body. Training for strength is like drinking water from "the fountain of youth".

- increases your muscle strength, power and endurance – the stronger you are, the easier you will feel the effort from your daily life and less exhausted you will feel. When you are ill or injured you feel powerless. The stronger you are the better you will be able to handle things during hard times. The stronger you are when you are young, the stronger you will be at an advanced age. Young people are strong, old people are weak. Strength is youth.

Some health problems, like lower back pain, upper back and neck pain, faulty spine posture are strongly related to the performance of the muscles involved in maintaining a proper upper body posture (quadratus lombaris, spinal erectors, rectus abdominis, trapezius). Lacking enough strength and endurance, these muscles will fail accomplishing their task during long hours of office work at the desk or at the computer. The most common treatment for these posture related health problems is strengthening these antigravity muscles and restoring optimal muscle balance;

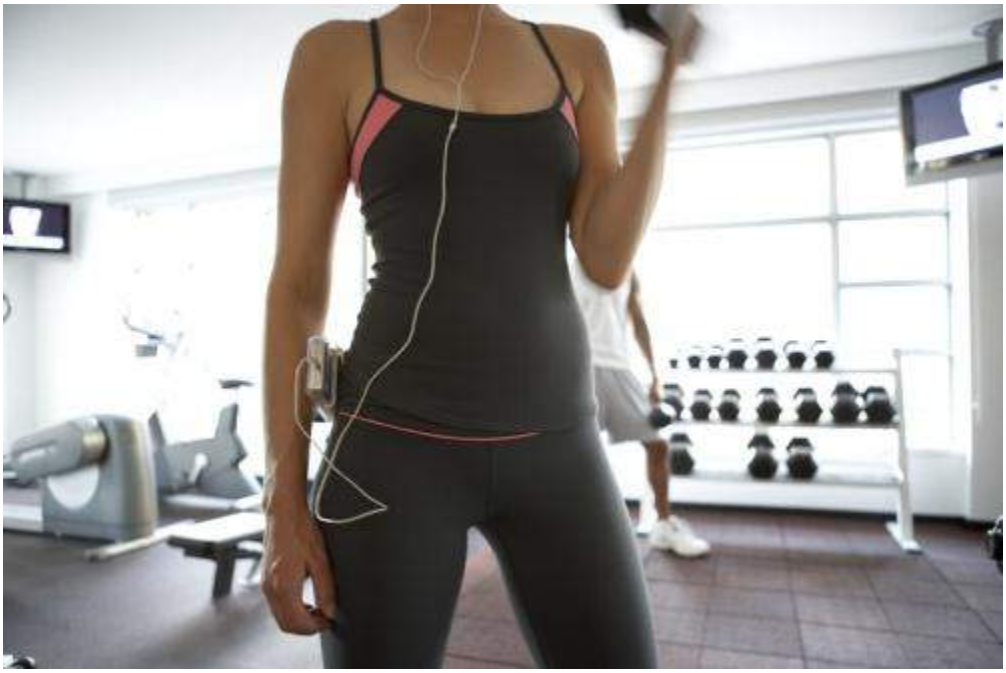
- increases the strength of your bones, ligaments, tendons and articular capsulae – this will protect you against osteoporosis (excess frailty of the bones); A strong body structure can make the difference between being injured or not, between life and peril;
- fat burning – strength training consumes calories and protects your lean body mass while on a negative calorie diet, therefore should be considered as a main part of any fat burning program; increasing your lean body weight with two kg of muscle mass will raise your daily basal metabolism by approx. 100 Cal. These extra 100 Cal will help you burn more than five kg of fat in one year of time;
- thinner and leaner looking body – at the same body weight you look much thinner if you have larger muscle mass;

- improves your athletic performance – try to compare nowadays athletes physique with athletes 30 years ago; you can not conceive any Olympic level athlete in any event not being involved in strength training. No matter what the discipline – gymnastics, diving, soccer, basketball, rugby, athletics, table tennis, etc – strength is required for achieving a high level of performance;
- increases your cardiovascular endurance – performing high intensity strength training in bouts of two to five minutes results in significant improvements for your cardiovascular endurance with direct performance transfer for aerobic activities. For example: do long sets of kettlebell swings and snatches, squats in sets of 20 reps, strong man training,etc;
- better look, sexier body – being muscular, having nice curves displays health and virility; Hollywood stars spend many hours in the gym, pumping iron. Training in a club already is a style of life in USA and Europe.

Guidelines for strength training

There are more specific goals which you might aim with a resistance training program. If you train like a bodybuilder you will also increase your strength and if you train for strength you can also increase your muscle mass (if you eat more than you burn). Training specifically will deliver the results you wish faster.

Fitness benefits – maintain a pleasant looking physique, lose fat, maintain good physical work capacity, prevent osteoporosis, etc



Fitness body shape

Bodybuilding - increase your muscle mass as much as your genetic potential allows you, bring your fat levels as low as possible, and take part in competitions

Bodybuilding body shape

Strength development – increase you overall and specific body strength for powerlifting competitions or different athletic events

Athletes body shape

Frequency

A minimum of 2 sessions per week are needed for getting strength training specific results.

Every muscle group or muscle chain should be stimulated through strength training 2 to 3 times per week. Muscle chain means more muscle groups which act together during a specific effort. Ex. Posterior muscle chain - muscles you use when you deadlift, do kettlebell swings and snatches.

For weight training the following muscle groups should receive consideration:

- legs and hips (quadriceps, hamstrings – biceps femoris, semitendinosus, semimembranosus – ,gluteus – maximus, medius, minor);
- chest (pectoralis major);
- upper back (latisimus dorsi, trapezius, teres major, teres minor, suprascapularis, subscapularis, rhomboideus);
- shoulders (deltoideus – anterior, medius, posterior-);
- arms (triceps brachialis, biceps brachialis, brachioradialis, brachialis), forearms (flexors and extensors of the hand and fingers);
- calves (gastrocnemius, soleus);
- abdomen – abs (rectus femoris, external obliques, internal obliques, transverse abdominis, iliopsoas);
- lower back (quadratus lombaris, sacrospinals – the muscles of the posterior spine).

Front view

Legend:

1 Trapezius

2 Deltoideus

3 Pectoralis major

4 Serratus anterior

5 External oblique

6 Adductor magnus

7 Quadriceps femoralis

8 Sternocleidomastoideus

9 Biceps brachialis

10 Brachialis

11 Forearm flexors

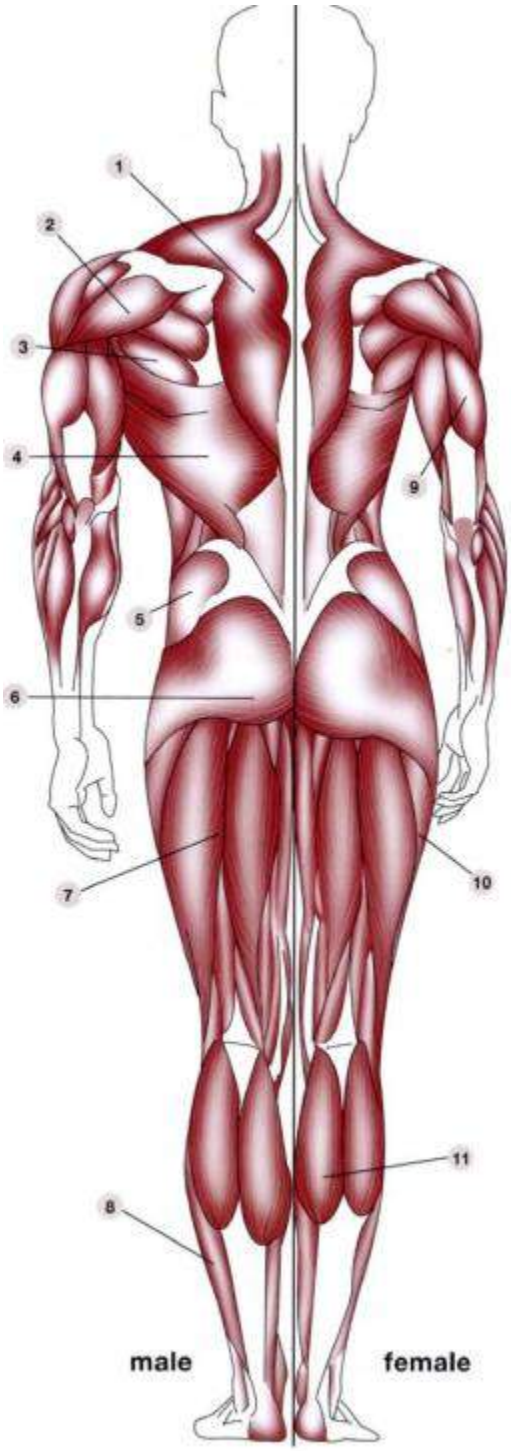
12 Brachioradialis

13 Rectus abdominis

14 Forearm extensors

15 Gastrocnemius

16 Soleus



Back view

Legend:

1 Trapezius

2 Deltoideus (rear head)

3 Teres major

4 Latisimus major

5 Gluteus medius

6 Gluteus maximus

7 Hamstrings
- biceps femoris
- semimembranosus
- semitendinosus

8 Soleus

9 Triceps brachialis

10 Iliotibial band

11 Gastrocnemius

Some athletes exercise every muscle or muscle chain once a week. This can also be effective, but the training intensity and volume should be very high for each session, in order to allow a delayed recovery with a peak of supercompensation after one week of exercising a particular muscle group. Most novice trainees will not get good results from once a week strength training cycle.

Many professional athletes, as well as some fitness trainees strength train 2 or even more times every day.

There are, practically, unlimited combinations possibilities for the training frequency pattern. Here are some examples:

Frequency pattern

Sessions per week	Circuits per week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
2	2		Full body			Full body	
2	1		Lower back, Chest, Shoulders, Abs			Legs, Upper back, Arms, Calves	
3	3	Full body		Full body		Full body	
3	3	Full body			Full body		Full body
3	2	Full body		Legs, Lower Back, Arms, Calves		Chest, Upper Back, Shoulders, Abs	
3	1	Legs, Upper back Calves		Chest, Shoulders, Triceps		Lower back, Biceps, Abs	

4	2	Legs, Lower Back, Arms, Calves	Chest, Upper Back, Shoulders, Abs		Legs, Lower Back, Arms, Calves	Chest, Upper Back, Shoulders, Abs	
4	1	Legs, Calves	Back, Triceps, Abs		Lower back, Biceps	Chest, Shoulders	
5	1	Legs, Calves	Back, Abs	Shoulders, Triceps	Lower back, Biceps	Chest	

6	3	Legs, Lower Back, Arms, Calves	Chest, Upper Back, Shoulders, Abs	Legs, Lower Back, Arms, Calves	Chest, Upper Back, Shoulders, Abs	Legs, Lower Back, Arms, Calves	Chest, Upper Back, Shoulder Abs
6	2	Chest, Shoulders, Triceps	Back, Biceps, Abs	Legs, Lower back Calves	Chest, Shoulders, Triceps	Back, Biceps, Abs	Legs, Lower back Calves
6	2	Legs, Upper back Calves	Chest, Shoulders, Triceps	Lower back, Biceps, Abs	Legs, Upper back Calves	Chest, Shoulders, Triceps	Lower back, Biceps, Abs
6	1	Legs, Biceps	Back	Chest, Abs	Shoulders	Lower back Triceps,	Calves, Abs

2-5	2 days on 1-3 days off	Legs, Lower Back, Arms, Calves	Chest, Upper Back, Shoulders, Abs		Legs, Lower Back, Arms, Calves	Chest, Upper Back, Shoulders, Abs	
3-6	3 days on 1-3 days off	Legs, Upper back Calves	Chest, Shoulders, Triceps	Lower back, Biceps, Abs		Legs, Upper back Calves	Chest, Shoulder Triceps
3-6	4 days on 1-4 days off	Legs, Calves	Back, Triceps, Abs	Lower back, Biceps	Chest, Shoulders		Legs, Calves
2-6	5 days on 1-5 days off	Legs, Calves	Back, Abs	Shoulders, Triceps	Lower back, Biceps	Chest	

Volume of training

The volume of strength training sessions can be measured in more ways.

One formula is the number of exercises multiplied by number of sets, multiplied by number of repetitions, multiplied by the load used.

Volume = Exercises x Sets x Repetitions x Load

Exercises

Every session, for every muscle group, should be chosen usually between 1 to 6 exercises.

The beginners use 1-2 exercises, advanced trainees 2-6 exercises per muscle group.

The shorter your training session, less exercises to be chosen; if achieving an impressive muscle mass is the main goal of the program, more exercises per muscle group are to be chosen; if the power and strength are the main goals, less exercises are to be employed.

Choosing the right exercises

The strength training exercises can be classified in two categories: basic exercises and auxiliary exercises.

Basic exercises – also called compound, multijoint , some called structural – because they load the spine and the legs, functional – because they are related to the movements needed in daily life, work or athletic activities.

As the name says the basic exercises are the "bread and butter" of weight training. This type of exercises should be considered first when designing a strength training program. Also the largest part of the program should contain basic exercises. The less time you have to allocate for strength training, the higher the importance of basic movements. Fitness enthusiasts who allocate just 2-3 times of 30-40 min per week for strength training should use almost exclusively basic exercises.

The reasons why basic movements are so good are:

- more muscles can be trained simultaneously, so the use of this type of exercises is time efficient – for example the squat movement stresses at a large extent the quadriceps, the hamstrings, the adductors, the glutes, the quadratus lombaris, sacrospinals and all abdominal muscles;
- replicate more accurately the movements present in the daily life and sport actions – again, the squat shows the same muscle actions required in standing up, stair climbing, jumping, pushing a car or an opponent ;
- the force torque (the result of the muscle produced force considering the joint leverage) allows the use of heavy loadings – leading to superior muscular and skeletal adaptation;

Example of basic movements – squat, bench press, deadlift, pull-ups, dips, military press and most of kettlebell drills. I will show almost all the basic strength training exercises at the end of the chapter.

Auxiliary exercises – also called single joint exercises, isolation movements, secondary exercises.

This type of exercises should be considered after basic movements when designing a strength training program. They should be used accordingly with the goal of the program. As the time dedicated for weight training is longer, more secondary exercises can be performed during the program. Usually, if time allows, the isolation movements are used for training a muscle, after one or two basic exercises for the respective muscle.

The single joint movements stress just few muscles groups at the same time.

On some special situations like rehabilitation after injury, specific sport purpose, strength training for people with special needs, the auxiliary exercises can become basic and receive priority when designing a program. As an example in case of wrist or elbow injury, the peck deck fly becomes, maybe the only exercise possible to execute for training the chest muscle. Skating extensively uses the thigh adductors, so thigh adductions become a basic exercise for skaters.

Example of auxiliary exercises – lying dumbbell flies, concentrated biceps curls, knee curls, knee extensions, etc.

I can not emphasize enough the importance of choosing the right exercises for your training program. Always dedicate the most part of your training to basic exercises. A major reason for failure is using mostly isolation exercises.

Many trainees do a lot of flies, cable extensions and concentration curls and see almost no progress after many months of training. Especially girls who think they need “specific training” for “problem zones”, end up simulating resistance training with kindergarten dumbbells doing

triceps kickbacks, adductor training and glute isolation extensions and of course a lot of ab work for the “upper” and the “lower” tummy.

Think of bodybuilding as like carving in stone and basic exercises as a big pick and small exercises as a small one. If you have a block of stone and you want to carve a human statue, first you need to take off big chops of stone using the big picks, to give it a human shape, with head, shoulders, arms and legs. Just in the end you need to give it the last touch for facial expression and skin wrinkles using the small pick. If you use the small pick from the beginning, you will probably give up after some time of not making any visible transformations to the stone block.

The order of exercises – there are more ways for choosing the right exercise order in a strength training session:

Big muscles first - Bodybuilding, Strength, Fitness

- you can choose to exercise the big muscle groups first – legs, chest, back (basic exercises first) followed by the smaller ones – shoulders, triceps, biceps, abs. The reason for this is that the basic exercises involving the big muscles, like squats, deadlifts, bench presses, bent over row, require a high concentration and a great amount of energy, so it is better to do them while you are fresh;

Priority order - Bodybuilding, Strength, Fitness

- you can choose to exercise your weak points first; you can train them better in the beginning ;

Favorite order - Bodybuilding, Strength, Fitness

- you can choose to train your favorite muscle groups and your favorite movements first – many trainees choose to start their training sessions with bench presses or squats;

Pre exhausting order - Bodybuilding

- you can choose to exercise the muscles which assist a basic movement first and than work the basic movement; this will stress more the targeted muscle group.

  Ex. – first train your front shoulders with front dumbbells raises, than your triceps with standing cable elbows extensions and in the end go for horizontal bench press – this will solicit your chest muscles more, even using a lighter load ;

- another variation of the pre exhausting method is to train a muscle first using an isolation movement and than a basic movement. Ex. Training the quadriceps, first train leg extensions, followed by barbell squats – the benefit offered by this method is that you can achieve a high training intensity with a smaller load;

Discussing the order of exercises with respect to the muscle groups, you have the following choices:

Classical order Bodybuilding, Strength, Fitness

- you can exercise each muscle separately and consecutively – ex. first train your chest, followed by your back and then shoulders (you do all the exercises with all the sets for the chest, than you continue with the back); this is the classical way of training;

Supersets - Bodybuilding, Fitness

- you can exercise two muscle groups one after another, without rest in between. One set for a muscle group + another set for its antagonist muscle count as a superset. Between supersets you have normal rest periods.

  Ex: biceps and triceps (do one set for biceps, followed immediately by a set for triceps and so on), hamstrings and quadriceps, chest and back, abs and lower back. The

advantage offered by this type of training is a shorter duration of the training session, a better blood irrigation for the trained area and better muscle relaxation (when you contract an agonist muscle, the antagonist relaxes automatically);

Mini circuit - Bodybuilding, Fitness

- you can exercise 3-4 muscle groups together, executing one set for each muscle without rest in between. Ex: shoulders, legs and abs, with standing presses, squats and abs crunches. The main advantage of such a training choice is a shorter training session, but with a higher density;

Circuit - Fitness

- you can train your main muscle groups in a *circuit*.

  Ex. of circuit training:

1. squat;
2. chest press;
3. lat pull down;
4. shoulder press;
5. biceps curls;
6. triceps extension;
7. abs crunch;
8. heel raises.

When you design a circuit training you should generally select between 6 to 12 exercises for all major muscle groups. The usual number of repetitions varies between 8 and 15. Because of the brief rest periods between sets (usually just the amount of time required to change the exercise stations) the load can not be very heavy, but it still should be challenging, about 12 – 20 RM. The order of exercises in a circuit usually places the most exhausting ones in the beginning and alternates the agonist muscles with the antagonists.

One of the major advantages of the circuit training is that a complete training session requires very short time – three circuits with 3-5 minutes rest periods in between, should last 15-25 minutes. Also, because the HR is maintained elevated during this type of continuous training, the cardiovascular system also gets its share of effort. VO2max improvements up to 4-8% were reported after a training period based on circuit training.;

Compound sets - Bodybuilding

- you can group more exercises stressing the same muscle group without rest between sets in a **compound set** (2 exercises), **triset** (when grouping 3 exercises) or in a **giant set** (4-6 exercises); Between the compound sets you can rest for 2-4 minutes.

  Ex:

  Chest press barbell

  Incline dumbbell flies

  Horizontal dumbbell press

  Crossover cables

Number of sets

Usually 1-6 sets are performed for each exercise.

In a single training session for each muscle group beginners usually do 1-3 sets (1 exercise x 1-3 sets each), intermediate level trainees between 4-8 sets (1-2 exercises x 2-4 sets each), while advanced athletes usually employ 6-12 sets (1-4 exercises x 3-8 sets each). Some bodybuilders perform even 20-30 sets per muscle group in a single training session.

- Beginners - 1-3 sets (1 exercise x 1-3 sets each);
- Intermediate level trainees - 4-8 sets (1-2 exercises x 2-4 sets each);
- Advanced athletes - 6-12 sets (1-4 exercises x 3-8 sets each)

Rest period between sets

Usually 30 – 90 seconds are recommended for bodybuilding training. For heavy training emphasizing strength or power use 2-3 minutes of rest, with shorter periods of 15 – 30 seconds for muscle endurance type of training.

- Bodybuilding - 30 – 90 seconds;
- Strength or power - 2-3 minutes;
- Muscle endurance -15 – 30 seconds.

Number of repetitions

The number of repetitions used for every set varies with the used loading. An optimal range of repetitions it is very important for achieving the desired training outcomes.

Beginners usually use 5-15 repetitions.

According to the training goal use:

- 1-5 repetitions for maximal strength development;
- 8-12 repetitions for muscular hypertrophy;
- 15-25 > for emphasizing muscular endurance.

Strength increase, muscular hypertrophy, muscular endurance should be normal outcomes no matter what number of repetitions you will use during your strength training sessions. But choosing the right number of repetitions will offer you a more specific adaptation response.

Without considering the loading, the number of repetitions isn't meaningful to a positive outcome. Using a load you which can allow you to perform 30 repetitions, for a set with just 10 repetitions will waste your time and keep you away from positive results.

Training Load

There are two methods widely used for determining the right loading for resistance training exercises:

- 1 RM (repetition maximal) – the maximum amount of weight you can use to perform a single repetition, using correct form, of any given exercise at one moment; the loading for a particular exercise is expressed as a percentage of 1 RM. For example your barbell horizontal bench press 1 RM is 80 kg; if you aim to use 75% x 1RM for one set x 8 reps, your load will be 60 kg;

  Your 1 RM performance will differ at different moments in time – when you begin training for the first time you might be able to bench press just 40 kg, but after 3 months of correct training, your new bench press 1 RM might become 55 kg.

  The 1 RM method for determining the training load can be quite precise, but has its draw backs. For example one conditioning training program might contain 3 sets x 10 reps at

70 % X 1 RM. One trainee can find it impossible, because at 70% x 1 RM load he can execute just 8 reps in correct form, while another one would find it quite unchallenging, because he can press 15 reps for 70% x 1 RM. The reasons behind this fact are genetic muscle architecture (fast twitch fibers vs. slow twitch fibers), different training methods previously used, and the momentarily level of neuromuscular condition. This means that people genetically predisposed toward muscle endurance, trainees who base their training on high reps methods (12-20 reps/set),or simply trainees just having "a good day" will be able to perform a higher number of repetitions at any given 1 RM percentage. Moreover choosing compound exercises vs. isolation exercises will allow you to perform more submaximal repetitions at the same given percentage. (this means that you will be able to perform more bench press reps for 75% x 1 RM , than lying chest flies for the same 75% x 1RM).

The same is valid for lower body exercises vs. upper body exercises. You can generally perform more squats with 80% x 1RM than bench presses with 80% x 1RM.

- Multiple RM (repetition maximal) – 10 RM is the maximum amount of weight you can use for a specific exercise to complete 10 reps with a correct form, at a given moment. This means that the load doesn't allow you to perform the 11^{th} repetition. You can use any number of repetitions to determine a submaximal loading – 3 RM, 6 RM, 12 RM, 20 RM.

Using this method to choose the optimal loading allows for a high degree of individuality with respect to the muscle architecture, frequently used training methods and daily ability .

I recommend using the multiple RM formula for designing you training plan.

Percentage of 1 RM or multiple RMs translate into kilograms or pounds.

Choosing the right load is very important for reaching your goals. The minimal loading used for resistance training should be 50 – 60% x 1 RM or 15-20 RM, regarding your goals.

Some fitness trainees, especially women, often use a very light load (and sometimes high reps), hoping that this will help them just "tone the muscle" without adding bulk, or would emphasize the fat reduction. The muscle tone is the natural light contraction of the muscles. For example your facial muscles tone maintains an awakening facial expression and your abdominal and spinal muscles maintain an upright position of the upper body during the day. So, every muscle naturally has tone and you do not need to train it. What trainees really mean by better muscle tone is that they want to have less body fat, so the flesh appears to be more elastic, "with more tone". When you train think that your muscles just can grow bigger, or get smaller, you can have less fat tissue or more. You can increase your strength, power and muscle endurance. Define exactly what you expect and train accordingly.

Repetitions number and load

- Minimal – 50-60% x 1 RM or 15-20 RM
- Strength – 85-100% x 1 RM + or 1-5 RM
- Muscle mass – 70-85 % x 1 RM or 8-12 RM
- Endurance – 40-70%x 1 RM or 15-25 + RM
- Explosive power – 20 – 60% x 1 RM but using the highest acceleration possible

There are more types of load variations in a training session:

Constant load - Bodybuilding, Strength, Fitness

After you warm up, you maintain the same loading for about the same number of repetitions. You can choose the weight and the number of repetitions according with your training goal – strength, muscle mass, endurance.

Ex. Barbell Horizontal Bench press 4 sets x 8 reps / 10 RM

Pyramid load - Bodybuilding, Strength, Fitness

Set after set, you increase the load and decrease the number of repetitions.

Ex. 1st set 12 reps / 60 kg

2nd set 10 reps / 70 kg

3rd set 8 reps / 80 kg

4th set 6 reps / 90 kg.

The benefit of this method is that the muscle can adapt to a full range of repetitions, for stimulating both fast twitch and slow twitch muscle fibers. Another benefit is that lighter weights for the first sets allow you better form and teach you success (because you can complete the sets more easily).

For bodybuilding and fitness you pyramid between 15 and 6 reps, for strength and power you pyramid between 6 and 1 reps.

Reverse pyramid method - Bodybuilding, Strength, Fitness

After warm up, for the first set, you choose a heavy load and a low number of repetitions. Set after set, you decrease the weight and increase the number of repetitions.

By choosing this method you will stimulate more your strength increase because you are able to lift a heavier weight in the first set.

Ex. 1st set 6 reps / 90 kg

2nd set 8 reps / 80 kg

3rd set 10 reps / 70 kg

4th set 12 reps / 60 kg.

Double pyramid method - Bodybuilding, Strength, Fitness

Start the same as the pyramid method, but after you reach the highest weight you decrease the load the same way you've increased it.

Ex 1st set 12 reps / 60 kg

2nd set 10 reps / 70 kg

3rd set 8 reps / 80 kg

4th set 6 reps / 90 kg.

5th set 8reps / 80 kg

6th set 10 reps / 70 kg

7th set 12 reps / 60 kg

This method offers you a higher volume of training. Volume is necessary for making gains and achieving stable results.

Step loading method - **Bodybuilding, Strength, Fitness**

The same as the pyramid but doing 2 sets for each load and number of repetitions

Ex 1st set 12 reps / 60 kg

2nd set 12 reps / 60 kg

3rd set 10 reps / 70 kg

4th set 10 reps / 70 kg.

5th set 8 reps / 80 kg

6th set 8 reps/ 80 kg

Again a higher training volume achieved.

Wave loading - Bodybuilding, Strength, Fitness

Ex 1st set 12 reps / 60 kg

2nd set 10 reps / 70 kg

3rd set 10 reps / 65 kg

4th set 8 reps / 75 kg

This method of loading allows better recovery between sets for more challenging loads.

Drop sets - Bodybuilding

The load is decreased the same as in the reverse pyramid method but without rest in between – performed like a single set. It can be performed with a barbell (you need one or two partners to help you unload it fast), with a set of fixed barbells, with dumbbells ("run the rack"), or using a selectorized equipment.

It is a very intense method for training. The muscle accumulates high levels of lactic acid, more muscle fibers are engaged, providing a great stimulus for superior adaptation. It is not a method for beginners; it can also be used to break through plateaus. (Plateau = a longer period of time of training without noticeable improvement).

Negative repetitions - Strength

You use between 100% - 130% x 1 RM as load; this means more than you can lift by yourself. You need one or two strong spotters to help you lift the weight for the concentric part of the movement and you lower it by yourself. This method is best best used for bench press, biceps curls, triceps pressdowns, pull ups, etc. Do not perform drills with a greater injury potential using this method (squats, deadlifts, lying triceps extension, etc).

Your strength is higher when performing negative contractions, so this method makes sense from a physiological point of view. This method of training is extremely intense, resulting in serious DOMS (delayed onset muscular soreness) . It can help you achieve strength increase and break through plateaus.

" Go heavy or go home."

How to adjust the load over a cycle of training?

A training cycle usually takes 4-8 weeks. A mini cycle takes one week and a micro cycle, one session.

I have described above how to vary your training load over one session.

Here is an example for a cycle for bodybuilding training.

I will use just one muscle group as example: chest for an A, B/A, B split training.

Monday – Barbell bench press, Incline dumbbell press and Dips (BW = Body Weight) - 4 sets each a total of 12 sets for chest

Thursday – Dumbbell bench press, Incline barbell press, Cable crossovers - 4 sets each a total of 12 sets

The weight in kg is an example.

Week No	Monday	Thursday
Week 1	Barbell bench press 8 Reps x 10 RM (50kg)	Dumbbell bench press 10 R
	Incline dumbbell press 8 Reps x 10 RM (20 kg)	Incline barbell press 8 Reps
	Dips 10 Reps x 10 RM (BW)	Cable crossover 12 Reps x
Week 2	Barbell bench press 10 Reps x 10 RM (50kg)	Dumbbell bench press 10 R
	Incline dumbbell press 10 Reps x 10 RM (20 kg)	Incline barbell press 8 Reps
	Dips 10 Reps x 10 RM (BW)	Cable crossover 12 Reps x
Week 3	Barbell bench press 8 Reps x 10 RM (55kg)	Dumbbell bench press 10 R
	Incline dumbbell press 8 Reps x 10 RM (22 kg)	Incline barbell press 8 Reps
	Dips 10 Reps x 10 RM (BW+5 kg)	Cable crossover 12 Reps x
Week 4	Barbell bench press 10 Reps x 10 RM (55kg)	Dumbbell bench press 10 R
	Incline dumbbell press 8 Reps x 10 RM (22 kg)	Incline barbell press 8 Reps
	Dips 10 Reps x 10 RM (BW+5Kg)	Cable crossover 12 Reps x
Week 5	Barbell bench press 8 Reps x 10 RM (60kg)	Dumbbell bench press 10 R
	Incline dumbbell press 8 Reps x 10 RM (24 kg)	Incline barbell press 8 Reps
	Dips 10 Reps x 10 RM (BW+10Kg)	Cable crossover 12 Reps x
Week 6	Barbell bench press 10 Reps x 10 RM (60kg)	Dumbbell bench press 10 R
	Incline dumbbell press 8 Reps x 10 RM (24 kg)	Incline barbell press 8 Reps
	Dips 10 Reps x 10 RM (BW+10Kg)	Cable crossover 12 Reps x
Week 7	Barbell bench press 8 Reps x 10 RM (65kg)	Dumbbell bench press 10 R
	Incline dumbbell press 8 Reps x 10 RM (26 kg)	Incline barbell press 8 Reps
	Dips 10 Reps x 10 RM (BW+15Kg)	Cable crossover 12 Reps x
Week 8	Barbell bench press 10 Reps x 10 RM (65kg)	Dumbbell bench press 10 R
	Incline dumbbell press 8 Reps x 10 RM (26 kg)	Incline barbell press 8 Reps
	Dips 10 Reps x 10 RM (BW+15Kg)	Cable crossover 12 Reps x

Do not go to the max every session. If you planned 2 sessions for the same muscle group one week, the first will be very difficult at about 95-100% and the other one will be more for volume at about 75-80% overall intensity. By overall intensity I mean the perceived exertion with respect to your work capacity for a muscle group. Overall intensity also depends on the total volume of training.

Ex: Training one

Horizontal barbell bench press 3 sets x 10 reps x 10 RM

Training two

Horizontal barbell bench press 4 sets x 10 reps x 10 RM

Weighted dips 4 sets x 10 reps x 12 RM

Incline dumbbell press 4 sets x 12 reps x 15 RM

Cable crossover 4 sets x 12 reps x 12 RM

It is logically that even if the training load was similar for both training sessions, the Training no two has a much higher “overall intensity”, feels much more exhausting and needs more days for recovery and supercompensation.

If for example Monday and Thursday you train Chest and Back, go heavy on Monday for Chest and 75-80% for Back; Thursday make it the Back heavy day while slowing down to 75-80% for Chest.

Methods for training

Various methods of training come from manipulating the different variables of exercise:

- The exercise choice
- The number of repetitions and sets
- The used load
- The time for rest between repetitions, sets and exercises
- The speed, acceleration and amplitude of the movement

The reason for using different training methods is that every method brings a different kind of stress on the body, therefore different adaptation response, resulting in continuous gains for your muscular fitness.

These methods can be applied for a full training program; they can also be used just for some specific muscle groups, exercises, sets, or can be combined.

Usually you have to change just one variable at one time. Do not try to increase everything at the same time: reps, sets, load. First increase your number of reps for a specific drill, than increase the number of sets, than the load.

Ex:

Training	1	2	3	4	5	6	7	8	9	10	11	12
Reps #	8	9	10	8	10	8	10	8	10	10	8	10
Sets #	2	2	2	3	3	2	3	2	3	3	2	2
Load(Kg)	60	60	60	60	60	65	65	70	70	70	75	75

*This table is just an example to let you understand how to vary your sets, reps and load and not an actual training program.

It is recommended that in the beginning you stick with a training method for a longer period of time (1-3 months) in order to see your body's adaptation response to the particular method.

Methods of training for beginners

Full body training - Bodybuilding, Strength, Fitness

- Every muscle group – 2-3 times a week (usually one or two days rest between training sessions)
- Each muscle group – one exercise x 1-3 sets x 5-15 reps (load 8-20RM)
- Approx. 1 minute rest between sets, 2 minutes rest between exercises
- Moderate, controlled speed (1 sec up, 2 sec down)

Super slow speed - Bodybuilding, Fitness

- The same as full body training
- Super slow movement speed (3-5sec up, 5-10sec down)
- Perform 3-5 reps per set

The slower speed uses more muscle fibers than a normal speed contraction.

Peak contraction - Bodybuilding

This means that on the end of the movement you maintain the weight for a longer time (1-2 sec) while intentionally contracting the muscle, to involve more muscle fibers in contraction.

Functional isometric training - Strength

Every movement has a "weak point" which offers the weakest leverage and the lowest force torque (the result of the muscle strength combined with the bones and joints leverage). For example when performing squats the "weak point" is when your thighs are parallel to the ground. At this point you can handle the lowest load.

There are more methods of isometric training:

- You can stop the movement at its "weak point" and maintain it for 2-4 seconds.
- You can just maintain the weight for 6-10 seconds.
- You can contract against a fixed resistance like a heavy loaded bar (you can use a Smith machine or a Power Rack) for 5-8 seconds using 80-100% of your strength.

As a beginner you can also use the mini circuit and the circuit training method.

Methods of training for trainees on intermediate level

Multiple sets - Bodybuilding, Strength, Fitness

- Full body training 3 times a week
- 3-6 sets for each muscle group (1-2 exercises)

Split training - Bodybuilding, Strength, Fitness

Using this method you split your muscle groups to different training sessions.

Check the frequency pattern table from the beginning of the chapter.

Popular split methods:

Push – pull – train pushing movements in one session, pulling in another.

Push = squat, chest press, shoulders, triceps extensions, calves

Pull = deadlift, back row and chin up, biceps flexions, abs

Limbs – **trunk** – train your legs, calves, arms and forearms in one session and chest, back, shoulders, abs in another session.

Many professional athletes use a double or a triple split system, training two or three times a day or even more times.

When you are at this level you can use almost all of the methods described before: preexhausting, super sets, double sets, trisets, giant sets.

Other methods of training:

Complete exhaustion method - Bodybuilding, Strength

According with the Law of Adaptation, the greater is the stress, the greater the adaptation. Complete the maximum number of repetitions you can do with CORRECT FORM.

For maximal strength development go to **almost** complete exhaustion, but end your sets **before** you can not complete another rep. Do not go to failure for strength. Strength needs success, not failure.

Forced repetitions method - Bodybuilding

You need a training partner or a trainer to help you correctly complete **the last 1- 4 repetitions** of one set. This will bring extra intensity to your training; it will stimulate more muscle fibers to a greater degree, allowing you to improve.

Cheating method - Bodybuilding, Strength

When you do not have a training partner to help you complete a set you can use some inertia or another arm to complete the set.

Ex. While doing standing barbell curls, you can use your pelvis to push the barbell on the way up. Do never hyperextend backward while standing with a load.

You can use one hand to help the other while performing concentrated dumbbell curls.

Always remember that this method is designed to help you increase your training intensity and not to decrease it.

Partial reps method - Bodybuilding, Strength

Bodybuilding partials

When finishing a set you can perform the last repetitions just on the last half of the movement.

You can perform half reps on every part of the movement, beginning or end.

Another variation of this method is the "21 method" – 7 reps on the first half of the movement's amplitude + 7 reps on the other half of the movement + 7 reps full amplitude. This one is used just for bodybuilding training.

"One and a half" is when you perform a full amplitude movement followed by a half rep and so on until you finish the set.

Strength partials

You can also perform partial reps with a heavy weight which does not allow performing a set using full amplitude. This partial reps training, will let your CNS (Central Nervous System), tendons and muscles get accustomed to heavy loads.

Progressive partials

You can start with partials for a quarter amplitude and then build up to a full amplitude repetition over time (4 – 8 weeks). This method is very good to help you break through plateaus. It is excellent to help you reach your maximum potential in squats and bench presses.

Ex: How to increase your bench press?

Use a power rack to train using this method.

Start with a weight heavier than your personal best about 10-20 kg and perform a quarter of a rep (the upper quarter). Do a few sets, 3 to 5, using as many reps as you can complete with good form.

Each week ad a board 1-2 cm thick under the bench, or lower the safety bars of the rack. This way your bench press amplitude will increase 1-2 cm. Continue this way until you can do a full amplitude repetition.

You can also place wooden boards on your chest for bench presses. Start with more boards 5 or 6 stacked one on top of the other. In the beginning the stack of boards should stop the bar on its way down just above your sticking point; use less boards as you improve. The boards are 15 – 20 cm wide and 40-60 cm long, non slippery.

20 squats or 20 deadlifts method - Bodybuilding

Choose a load about 12 - 15 RM and perform just one set of 20 squats or 20 deadlifts. You ask yourself if 12 -15 RM it is not a typing mistake. It is not. Take your time between reps as you approach the end of the set. Rest for 5, 10, 30 second and grind the full set of 20 reps. You must do the squats with full amplitude inside a Rack.

Squats and deadlifts are called structural basic exercises. Almost all your big muscles are working; your spine, femur and tibia, the biggest bones in your body are loaded during this exercise. Your brain knows that you are working out, it feels your pain and will. Your Growth Hormone and Testosterone levels will go through the roof and you will grow bigger and stronger. You will see that this method is also very good for conditioning: increases your lactic acid buffering ability, increases your muscle endurance and your anaerobic endurance.

This method of training will take you “from scrawny to brawny”. This if you are man enough to do it. (or woman enough;))

Burning method - Bodybuilding

"No pain, no gain". Some dedicated trainees sometimes use this method.

For example, you want to do 10 reps for standing dumbbell curls. Choose about 60% x 1 RM as your load and start your set. When you start to feel pain in your muscle because of the high lactic acid accumulation, you can start to count your 10 reps.

You can try this method if you trained for long time as a training variation.

10 reps x 10 sets method - Bodybuilding, Strength, Fitness

Train 10 sets x 10 reps x using the same load of about 15 RM (15 RM for the first set) for the same movement for a muscle group. If you choose 15 RM load for the first set and maintain the weight, as you advance in your session you will feel the weight heavier and heavier. Do not train another movement targeting the same muscle as primary or secondary muscle. The next day or after two days you will know for sure how good is that particular movement for you, which muscle groups it targets and which part of the muscle.

I recommend this method of training for every trainee, for every particular movement, for any machine or angle. This way you will be able to choose the exercises which work best for you, to combine them efficiently, for getting the desired results.

For example I used this method for Chest Dumbbells Flies twice. This was 4 or 5 years ago. As a result I gave up completely doing Chest Dumbbell Flies, because this is an unproductive exercise for me and I do not want to waste my time doing it. For chest I just train all kinds of presses and dips.

You will never know how some exercises work for you if you perform more exercises stressing the same body part in the same session.

Partner training method - Bodybuilding

You have to choose a training partner at a strength level very close to yours. You choose a 60 – 70 % x 1RM load. You do one set, and the partner does one immediately after, continuously for many sets (5 – 15 sets). As your exhaustion feeling increases and you will be able to do less and less reps, also the resting time will be shorter and shorter. If you do not have a training partner, you can imagine that you have one.

Rest – pause method - Strength

Normally with a load 95 % - 100 % x 1 RM you are able to perform just one or two reps in a set. With this method you will perform 4 – 6 reps with a 95 – 100 % x 1 RM. After each repetition, rest for about 10 seconds without leaving the station.

The ladder method - Fitness

This method is especially good for pull ups, dips, or any other drill which requires a lot of training volume and good quality.

First set do 1 rep, the second 2 reps, the third 3 reps, and so on until you reach your top number of sets. This way you can achieve a much higher volume for the respective drill, but also with good form reps.

Ex: I perform 1 – 15 pull ups ladder, this equals 1+2+ +15 = 120 pull ups. If I try to do sets of 10 pull ups, I will not achieve 120 pull ups in the same training session and my form will go bad after 6^{th}, 7^{th} set.

Abbreviated training method - Strength, Fitness

The adepts of this training method use just a limited number of exercises.

Select just the best exercises and stick to them.

Example of abbreviated training using a Power Rack:

- Barbell squat;
- Barbell deadlift;
- Barbell horizontal bench press;
- Weighted pull ups;
- Barbell military press.

Abbreviated training using just your body weight:

- One leg pistol squats;
- Dips;
- Pull Ups.

This is a very productive way of training. You do not waste your time doing unproductive movements and complicated methods of training. You just choose the moves that will give you "the most bang for your buck".

It is essential to choose the right movements; there are many trainees, especially women who stick to abdominal sit ups, and lying hip extensions, adductions and abductions. Training like this is a waste of time.

I am a big supporter of this way of training. If all trainees would use this method, for sure you will see much more strong men and sexy gals walking around.

Some people use just one or two exercises like squats, bench press or deadlift. This is a little bit extreme, but none of the less it will give you good specific results.

Bodyweight training

Bodyweight training can fit in every trainee or athlete's training regimen

By changing the leverage and the number of supporting points you can make it from very easy to extremely difficult, enabling you to progress the same way as training with weights.

You can increase you muscle mass, your explosive power or your maximal strength. Just choose the same level of difficulty and the number of reps, as you would do when training with weights depending on your goals.

Do not underestimate the power of bodyweight training. If you are training seriously and continuously you can achieve better results than at least 95% of any fitness club members.

Here are the best body weight exercises. I present them in progression from the easiest, which may be a good start for your grandmother, to the most difficult, which can be used by any serious athlete no mater his or her level.

Push-ups

With push-up you will train your chest, anterior delts, triceps, abs and hip flexors. Full upper body pushing strength will be improved with push-up.

Important points:

- keep your abs tensed and lower back very slightly curved in for better stability. Your body is like a wooden plank from shoulders to toes.
- hands are placed on the same level with the chest not at the same level with shoulders
- go down slowly, opposing the gravity atraction
- maintain head aligned to upper body

You can train push ups on your open palms, on your fists, on your fingers, or you can use a set of push up handles for optimal hand and forearm alignament.

Incline push-up (vary the level of difficulty according with the inclination degree)

Kneeling push-up

Flat push-up

Uneven push-up

Decline push-up

Explosive push-up (clapping hands)

Kneeling one arm push-up

One arm push-up

One arm, one leg push-up

Pull - ups

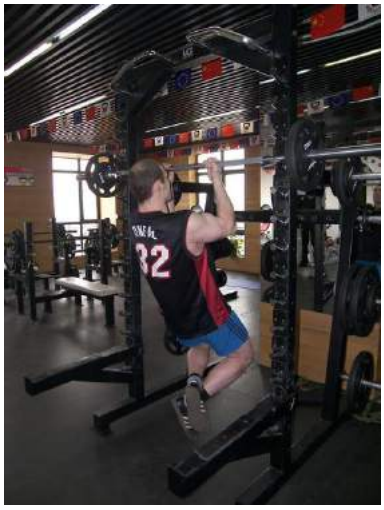
Pull ups will develop your lats, biceps, brachioradials, forearm flexors, lower traps, rear delts, lower chest and abs.

See "The big 10 strength training drills - The pull up" for details on execution.

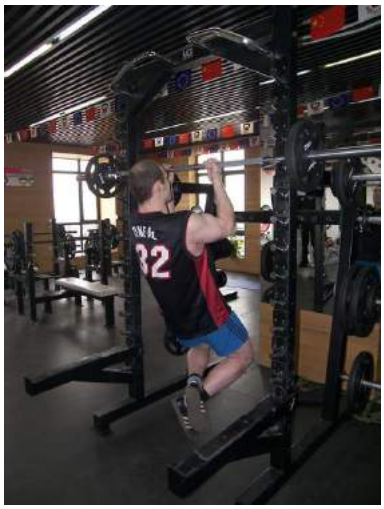
This is a capital exercise for increasing upper body pulling strength.

Incline pull-ups (vary the level of difficulty according with the inclination degree)

Vertical pull-ups with feet on the ground



Isometric pull-ups (hang on the bar and maintain the elbow angle constant)

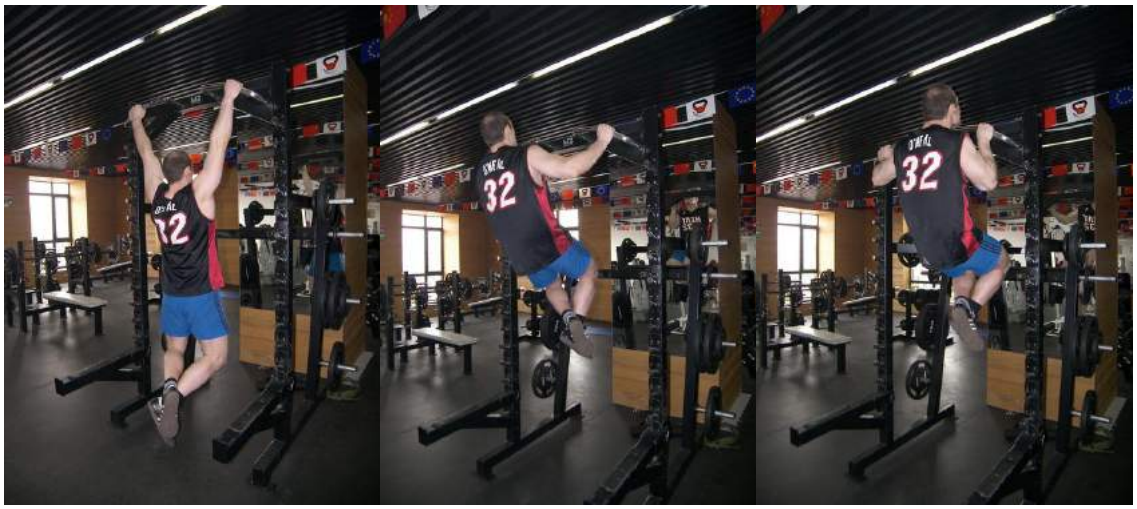


Negative pull-ups (help yourself up and than slowly lower your body)

Classic supine grip pull-ups (palms toward your face)

Neutral grip pull-ups

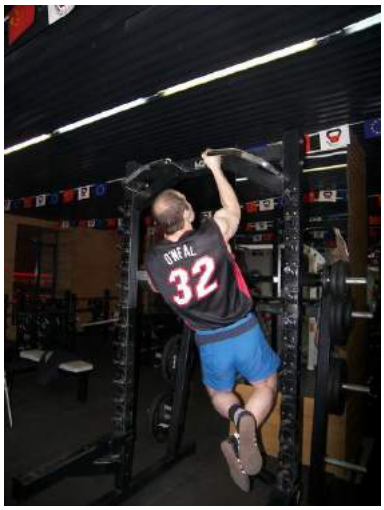
Prone grip pull-ups (palms outward)



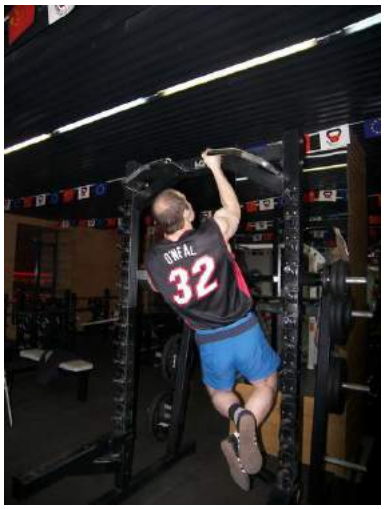
Left-right pull-ups

One hand grip, one hand wrist grip pull-ups

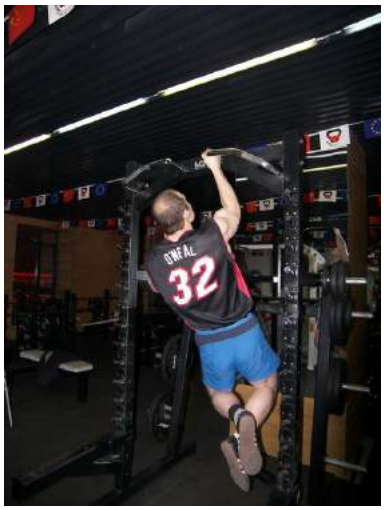
Uneven grip pull ups



Eccentric one hand pull-ups (go up using both arms, come down using just one arm)



Isometric one hand pull-ups (you just hold the position)



One hand pull-ups

Squats

The same as weighted squats this exercise will engage every major muscle of your legs. As a difference, body weight squats will be very easy on your back and upper body.

See "The big 10 strength training drills - The squat" for details on execution.

Two legs semi squat

Two legs full squat

Uneven squat

Squat lunge

One leg squat with self help

One leg squat

One leg pistol squat

One leg pistol squat with isometric stops (stop 2-3 times for 2-3 seconds at a certain height on your way down or up)

One leg pistol squat with weight

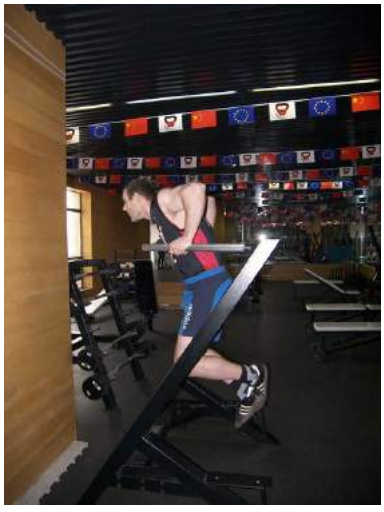
Dips

See "The big 10 strength training drills - The dip" for details on execution and benefits.

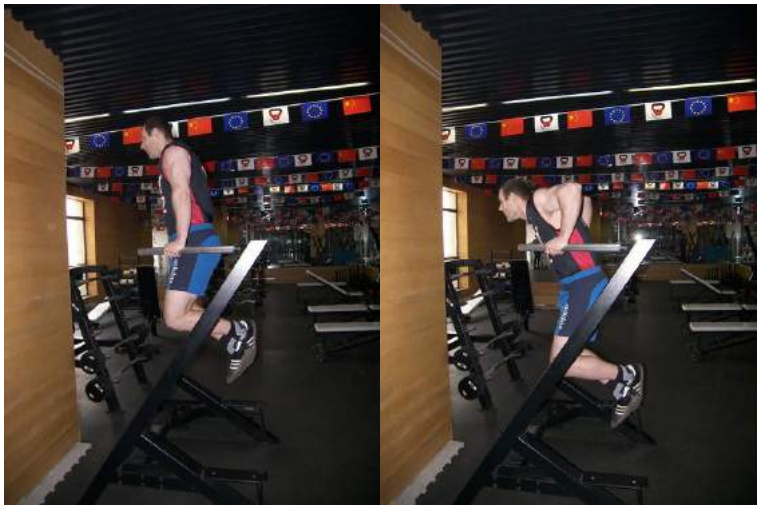
Bench incline dip

Bench horizontal dip

Eccentric dip (jump up and lower yourself under control)



Isometric dip (maintain a certain angle of your elbow for 6 – 10 seconds)



Classic Dip

Dip with isometric stops

Explosive dip

Weighted dip (jump a few centimeters into the air when going up)

If you complain that you do not have time and a place to train, with bodyweight training you have no excuses. You always have your body weight with you. Just use it!

All the special methods used for strength training are designed to increase the intensity of your training, to bring a new and different type of stress on your muscle, in order to obtain a progressive positive adaptation response.

Use them as you progress with your training and according to your current level of physical development. When you start to use a new method of strength training, use just one at a time and wait to see how your body adapts to this specific type of training. It should take many years until you might have tried almost all methods or training. If your current way of training it is working do not change it for the sake of the change.

As an advanced trainee you can use more high intensity methods complimentary in your training. Try them and after a while you will be able to choose the methods which deliver the best specific results for you; after you have chosen the right ones for you, stick with them.

Strength training for beginners

Here is some important information which should be remembered:

- Focus on correct form for each drill – correct form can drastically influence your results and will keep you free of injury; Strength training exercises are quite easy to master. If you put in some effort, read, study, ask and pay attention to details you should master almost all basic drill perfectly in less than a month.
- Chose almost just basic movements for your routine;
- Stay away from training programs which stress your muscles just once a week; this kind of program doesn't work well for beginners; (Ex Chest on Monday, Back on Tuesday, Legs on Thursday, etc)
- Do not be hurried to try advanced training programs. They will work very good for you later when you will find difficult to improve on standard programs.
- Be dedicated - maintain an optimal frequency and timing for your training sessions;

- Be patient – you will not see big improvements overnight; after 3 – 4 months you will be able to see changes in your appearance and physical condition. After 5 – 6 months the people who know you will see the difference; after 9 – 12 months everybody should see clearly what a stud you've become: " This guy is exercising ! ".

What does beginner means? You will not be considered a beginner when you will obtain clear improvements:

	Men	Women
Barbell bench press	80 – 90 kg	35 – 40 kg
Squat	120 kg	70 – 80 kg
Deadlift	130 kg	80 kg

You might be a beginner for cardio training while being advanced for strength training, or the other way around.

Many people, even if they go to the gym or exercise outside for many years, can stay at the beginner level all their life. This means that it is right to use continuously training programs for beginners.

If you work out hard and diligently, you may see impressive results just after 3 – 6 months of training.

Do not rush and start to use advanced training techniques too early.

The beginners training methods work better for beginners.

If you choose advanced training methods you might get quick progress, but almost surely you will fail achieving your maximum potential.

You might know stories about athletes who broke world records for juniors at age of 16 and ended up in third league. This happens because "premature specialization".

Strength training breathing techniques

Many people argue that breathing technique is very important while exercising with weights. It is important, but fortunately most of us will do it naturally.

Inspiring and expiring with right timing is especially important in order to maintain a stable torso when exercising; some exercises require more upper body stability than others: squat, deadlift, bench press, upright row, standing curl, etc.

Think of your torso as a cylindrical air balloon. If you inflate it, it will be hard and resistant to bending, when you deflate it, it will become softer and easier to bend. You need your torso to be most stable on the most difficult part of the movement, and when you have the most pressure on it: when squatting this will be on the concentrical (ascending) part of the movement when your knees are bent around 90 degrees, when bench pressing the sticking point is on the concentrical (ascending) part of the movement, when your elbows are bent about 90 degrees.

For most of the movements you need to expire while lifting the weight and inspire when lowering the weight. For upright rows and dumbbell shoulder flies is the other way around.

When exercising with very heavy loads (1-6 RM) you will find that performing the Valsalva technique (expiring against a closed glottis) – will increase your performance significantly. This is when you breath in and do not let the air go out your lungs or jut let a bit of it go out. That is why you naturally grunt when exerting a heavy effort. You should have some training experience before trying it. If you have high blood pressure or other health problem do not perform this maneuver, as it drastically alters your blood pressure – sometimes the systolic blood pressure can reach 300 mm Hg. For healthy individuals this should not pose a problem, considering that this situation lasts just a few seconds.

If your load is not very heavy (about 10 RM or less), expire slowly as you lift the weight, inspire when lowering it.

Example - Heavy squat breathing pattern

Inspire before beginning to bend your knees, about a two thirds of your maximal lung volume. As you reverse the lowering movement, when you begin to ascend, expire against a closed glottis, without letting the air to go out your lungs; this will increase your intra-thoracic pressure helping you to maintain an erect torso and a stable spine. After you pass the sticking point, you can start to let the air out like through a valve (tssst!!), when your knees are passing by 140 degrees, allow the air to escape faster.

About joint locking

Almost every trainer says not to lock your joints when doing squats, presses or other moves. If your bones are loaded longitudinally like your femur and your tibia on the top of the squat for example, your knees will be heavily overloaded.

There are two kinds of joint locking: passive lock and active lock.

The passive lock it is done just by extending your knee or your elbow completely at the top of the press, without contracting your muscles with force. In this case the ends of your bones (and the menisci for the knee) will be in danger or injury if the weight is very heavy. The passive lock is bad and it should be avoided while weight training.

The active lock it is done also by extending completely your knee or elbow, but also accompanied by a strong muscle contraction (quads and hams for the knee, triceps and biceps for the elbow). In this case your joint it is actually protected from injury.

Weight lifters practice this lock all the time and they do not have related problems. Actually the rules of competition weight lifting require that an athlete must lock all joints at the top of the lift to make the lift count.

The active lock is good and should be learned and done when training.

Strength training for fitness

When you main goal is general fitness you should emphasize a good frequency and prevent detraining by all means.

Full body training，abbreviated training, bodyweight training are most suitable to help you reach a good fitness level.

Frequency: 2 – 4 times a week

Number of sets: every session 2-4 sets per muscle group for full body training and 4-10 sets for split training A,B/A,B

Number of repetitions: 5 – 15 reps per set

Intensity: 5 – 20 RM

Strength training for bodybuilding

If muscle mass is your goal you should be committed and disciplined, and control your nutritional intake as careful as possible.

It is important to understand that muscle growth is related to adequate food intake and proper rest.

No matter how you train, if you are not on a positive calorie balance (eat more calories than you spend and eat some extra protein), you will not grow bigger muscles. You should at least be on an even calorie balance, when you are able to slowly build muscles while losing fat.

For women with a good body weight, but high fat percentage, training like a bodybuilder, while maintaining an even calorie balance is the fastest way to a sexy and fit body.

Use all the training methods suitable for bodybuilding and find out which ones work best for you.

Keep a complete training, nutrition and lifestyle log.

Every year insert one 6-8 weeks cycle for maximal strength gains. Higher strength means heavier weights. Heavier weights means bigger muscles.

It is imperative to include in your workout big structural movements like squats and deadlifts. These exercises bring into action a lot of muscle mass, load your spine, your femur and tibia. These exercises trigger the release of extra growth hormone and of the powerful testosterone and also stimulate your CNS (central nervous system) to command your muscles, like a witch above her melting pot: “Grow, grow! You, muscles are needed. Your master is really training, so grooow!” . Even your chest and biceps will grow from squats and deadlifts.

Assess you muscle fibers type and train accordingly

How to assess what type of muscle fibers (fat or slow twitch) you have more?

The most accurate way of knowing your muscle fibers composition is through biopsy. Biopsy is done by taking a sample from your muscle using a special needle. This hurts.

There is another way of approximating the muscle composition; even if it is not very accurate, it will help you decide wisely how to train.

Use 80% x 1RM and perform a set to complete exhaustion.

Number of reps performed with 80% x 1RM	Predominant type of muscle fibers
2-4	70-90% white, 10-30% red
5-8	50-70% white, 30-50% red
9-12	40-50% white, 50-60% red
12 or more	20-40 % white, 60-80% red

If you have predominantly white fibers:

Frequency: 4 -6 times a week

Number of sets: every session 6 -8 sets per muscle group for A,B,C/A,B,C (three mini cycles per week) and 8 - 12 sets for double split training A,B/A,B

Number of repetitions: 4 - 8 reps per set

Intensity: 4 - 10 RM

If you have predominantly red fibers:

Frequency: 4 -6 times a week

Number of sets: every session 10 - 12 sets per muscle group for A,B,C/A,B,C (three mini cycles per week) and 16 - 20 sets for double split training A,B/A,B

Number of repetitions: 8 - 15 reps per set

Intensity: 8 - 20 RM

The key to building muscles is to continuously increase the load you use for training; make this load increase one of your main goals while training and you will 100% grow impressive muscles.

Add wore weight, when you can easily complete the planned number of repetitions for two consecutive training sessions.

The Pump – it is a good idea and also a rewarded feeling to go for "the pump" almost every session.

You get "the pump" when your working muscles are overflowed with blood; you feel it when you can not touch your shoulders with your fingers, when you can not get your T-shirt off by yourself after the chest and back training.

More blood to your muscles will bring extra nutrients and more oxygen to help you grow like a weed.

Training for maximal strength

First let's see which are the factors behind real strength：

- Larger cross sectional muscle area – you knew this it for sure, by gut: Bigger muscles bring more strength to the table.
- The percentage of motor units within a muscle which can contract simultaneously. A motor unit is a motoneuron together with the muscle fibers it controls. In bigger muscles, like quads, glutes, lats and so on, a neuron controls more muscle fibers, not necessarily one next to the other. For smaller muscles, like the eye and hands muscles, needed for precise movements, a nerve controls fewer muscle fibers.

When a nerve receives an electric signal from the brain, all the fibers controlled by it contract("all or nothing"). Every fiber contracts maximally every time; the muscle fibers do not have different degrees of contraction.

As an analogy imagine that you have a big hall with 1000 lights (muscle fibers), controlled by 20 switches (motoneurons). When you turn on a switch, all the 50 lights controlled by it lighten up at maximum power. Depending on the luminosity you need you turn on more or less switches.

When you voluntarily contract a muscle for a movement you fire up just some motor units, depending on the needed strength. When you pick up a fork you use just a few motor units, when you pick a 50 kg kettlebell you have to fire up much more units at once.

It is the summation of all motor units which can be contracted at once, the most important asset of physical strength. Untrained people can contract at will just 30-40% of muscle fibers within a muscle at once. Trained people can go up to 50-60%, while exceptional strength athletes can go up to 70-80% contracted muscle fibers at once.

Why this? The marvelous human body comes with safety devices built in.

Inside your tendons you have Golgi sensors, which command relaxation of the muscle fibers when the tendon is pulled with a certain force. This is to avoid the damage of muscle, tendons and bone because of over stress. The Golgi system is set to a limit way under the tearing limit of the tendon or the muscle. This means it is good for couch potatoes, but too conservatory for top athletes.

You have heard stories about mentally deranged people bending steel bars in hospitals and about loving grannies that lifted a tree off the endangered nieces. It is because they managed to contract 100% percent of their needed muscle fibers at the time. Because of nervous derangement or because of super excitation under clear danger they were able to pass over the Golgi supervision.

There is also another way to get over this sensors, by using electricity to command your muscles. If you have ever been electrocuted, you know what I am talking about; if not, do not try it at home.

- The frequency and the stability of the electric signals which commands the motor neuron units.

- The coordination of different muscles involved in a movement – optimal muscle synergy. Agonists should work like horses, the assistor muscles should pull like sledge dogs, stabilizers should be like trees and antagonists should be relaxed like bears during the winter sleep. I took you through the fauna and flora, but I guess you got my point.

- The percentage of fast twitch muscle fibers; the more Type II white fibers, the more strength your muscles will show.

- The leverage offered by your structure. Wide hips, broad shoulders and short limbs favor the strength. Beside this the insertion of your muscles on your bones, will have a great impact on your strength.

Strength it is a highly trainable skill. It can be increased even 300% from your natural level.

How to train for maximal strength?

- **Build as much muscle mass as you need for your performance** and for your physique. Every athlete has an optimal muscle mass at which he will perform best. This is depending on the discipline and field position. Many athletes who need to make a certain weight category and others who need relative strength can not afford to grow too big.

This should be fairly easy for most people and should take just a few years. For building muscle you should have good training frequency and good nutrition. Increase the weights you use for training continuously. Practice the basic drills. (See the top 10 exercises chapter).

- **Improve you CNS control**. In the beginning practicing any kind of strength training will bring great progress. You might have seen girls who got their bench press up 200% from 15 kg to 30 kg in just two months.

It is like with a sport car. You can increase the size of the engine, but up to a limit. The most important thing is to learn how to drive it.

You will improve your CNS control by training with very heavy loads (1-5 RM) and practicing the optimal form for every major drill.

Smart training for amazing strength

Use heavy weights – train with loads between 1RM and 5RM to recruit at once as many motor units as possible.

Be obsessed with increasing your training loads – it is not simpler than this. Aim to surpass yourself over and over and over again. For example you can do five sets of five reps with 100 kg for the Barbell Bench Press. Add 2.5 kg and keep training until you can also do 5 x 5. Then go up to 105 kg; then 107.5.

Use almost exclusively just basic moves – squats, deadlifts, bench presses, shoulder presses, chins, rows, dips, and grip strength drills.

Train eccentrically – use weights over 1RM, to recruit most of the fibers and reset your Golgi break to a higher limit

Work explosively – some sessions do explosive work, moving the bar as fast as possible, and practice throws, to train your white fibers and learn to contract fast and intensely

Do partial repetitions – work the upper or the bottom part of your lift to train your tendons and get your CNS and your Golgi used to heavy loads

Study muscle synchronization – even when doing bench presses or squats contract your abs, glutes, and squeeze the bar with your hands as you would try to squash a baked potato. This will give you extra stability and extra strength by irradiation.

What is irradiation? Training your right biceps only, will also increase your strength of your left one. This is because your right biceps is controlled by a brain area which is interconnected with the left biceps control area.

When forcefully gripping an object, your biceps, triceps and even chest and lats will contract, even if just your forearm muscles control your fingers. This is irradiation.

Bring your antagonists into play – when bench pressing bring the bar down using your lats, when squatting pull the weight down with your hip flexors. This takes practice, but it will improve your movement control and also your strength.

Perfect your lifting technique –Find your optimal groove for every drill. Using the bench press for example, you can use a wider or a narrower grip. You can bring the bar down to your nipples, or a few centimeters higher. You can have your elbows further or closer to your body when you bring the bar down. Sort out the details which work best for you.

Pay attention to every detail for every drill.

Take more rest in between sets – when training for maximal strength, you should aim to recover completely between sets. 2 – 5 minutes break between sets are appropriate.

Do not overtrain – start with little volume. Increase it little by little and find out how much works the best for you. Not every session should be very difficult. Go to 90%, 70% and once or twice a month to 100% (I mean overall possibility of training, not load)

Learn how to concentrate – before lifting heavy, see the set succeeding in your mind. Think that your life depends on it, that the girl you like will accept your invitation if you can make the lift. Find something which really fires you up.

A trick to fool the Golgi muscle break – use 3 – 10RM loads, but imagine that you are lifting your max; act like you truly lift your max.

Do not practice failure – every time you do a set to complete exhaustion and fail at the last rep you cement your limit; every time you fail with 1RM you reinforce your limit. Do not try a 1RM rep in training if you are not 95% sure that you will make it.

Add some abs work – do some weighted abs exercises for extra abdominal strength. This will increase your stability during heavy weights training and add some extra strength also.

Train your forearms – do not let your forearms be your weak link when deadlifting and doing bench press. Strengthen your forearms and you will improve your strength for all the other drills which require forearm strength.

Learn how to breathe – inspire through your nose with your belly and not with your chest before the lift, about 50-60% of your complete breath. Keep the air low by bracing your abs, contracting your butt and closing your anus (like holding off not going to the toilet). Keep the air inside you through the hardest part of the movement and let it out like through a small valve toward the end of the move.

Limit or give up on training accessories – here I mean bandages, grip bands, bench press shirt or belt. Even if you might use some in competitions or when trying your max, do not abuse.

Avoid injuries – train correctly, pay attention every time. If you get injured, it will keep you behind for long time and sometimes forever from reaching you maximum potential

Take your time – it might take even 15 – 20 years of perseverant practice until you will finally reach your maximum in strength. Be patient and enjoy the moment.

Unleash the power – training for explosive strength

What is power? From the physics manual we see P = L/t Power is Mechanical Work divided to Time.

This means the higher the load you lift and the shorter the time the higher your power.

You need power in every action, but especially for performing well in sprinting, jumping, throwing, punching, kicking, lifting. You need power to accelerate and decelerate.

How to train for power?

Maximal strength it is the foundation of power. All the NBA evil dunkers, all good sprinters, throwers and jumpers, display very good maximal strength. Michael Jordan, for example could squat with a 250 kg barbell on his back; you remember for sure he was not a bulky player. Top weightlifters can sprint head to head with top sprinters for 20-30 m distance; they can easily stand jump over 1 meter high and 3 meters long.

You should start by first improving your maximal strength.

Maximal strength is just one number in the power equation. You should learn how to apply your strength for obtaining maximal acceleration and deceleration.

For this you should train plyometrics – or stretch shortening cycle exercises. They are called like this, because when you jump for example, you first prepare, by dipping (bending at the knees and hips) and stretch your active muscles (quads, glutes, hamstrings) accumulating elastic energy; after this you reverse the direction as fast as possible releasing the elastic energy accumulated. If you do not reverse the dipping movement very fast you lose the elastic energy of the muscle. So, plyometric training teaches you how to reverse the movement within shortest time.

To feel the difference between using or no using the elastic recoil stored by your muscles try to throw a small rock by extending the arm behind and holding it there for a few seconds and the second time with a whip like action of the throwing arm like when you normally throw.

Plyometric training contains:

- All kinds of jumping, hoping, skipping and leaping drills using just your body weight or bearing light weights
- All kinds of throws
- Sprinting with maximal acceleration

Leaping

The anatomy of a rep

As your body is made up of cells, your training is made up of repetitions, simply said “reps”.

It is tremendously important to do every rep with correct form. Every rep is important. It is like writing an essay; every word is important, in order to have a good essay the words in the beginning, middle and the end, all should be chosen carefully.

That is correct that the last 2 or 3 reps will bring you the overload you need to improve, but without the first reps, you would not have the last 2 -3 reps. The few first reps in a set feel easy, so you should do them with perfect form. This will create the habit of perfect form and also give

you the confidence you need to handle heavy loads for the last reps. When training with very heavy loads for just 1 – 3 reps, you just have the last reps.

Never sacrifice form for finishing a rep you can not perform. It is better to stop before you fail. Many times it is very important to use a Power Rack and/or trustworthy spotters when performing heavy squats or bench presses. Do not be stupid to try what you are not 100% confident that you can perform without a Power Rack or spotters.

If you do exactly the same amount of training, exercises and load, but fail at form, you might get just 25 – 50 % of the results you would have gotten if you would have done every rep with good form.

What is good form for a rep?

Starting position

- Grip the load well.
- Maintain optimal body segments alignment. Check your joints: spine (neck, upper back, chest, lower back), shoulders, elbows, wrists, hips, knees and ankles.
- Stabilize the movement properly using you stabilizing muscles for the respective drill.
- Where do you look? Do you look forward a little down for squats and deadlifts?

Ending position

- Do you still maintain proper alignment?
- Is the load where it is supposed to be?

The tempo of the move

It is paramount to control the weight on the way down. Many trainees use their muscles just on the concentric (lifting) part of the rep. This leads to much less gains compared with using both concentric and eccentric muscle actions.

For bodybuilding a slower tempo is better: 1 – 1.5 seconds up and 2 – 3 seconds down.

When training for explosive power, try to lift the load as fast as possible; lower it also faster, but with control.

The groove of a rep

The groove of a rep means the way which the load takes from the start to finish. The shortest distance between two points is a straight line. You should aim for this, but you also should take advantage of improved leverage. For example when bench pressing the straight line would be from straight above the shoulders down to the shoulders; but you get much better leverage when lowering the bar just above the nipples, so the optimal groove for bench press is a curved line from the nipples to above the shoulders.

When training for strength you want to take advantage of the best leverage possible.

When training for bodybuilding you will sometimes perform isolation exercises with poor leverage, just to hit a muscle from different angles. (Ex bent over dumbbell flies, triceps kick back).

The feel of a rep

When you are training for strength you should aim to feel the move as light as possible. Of course that you will use heavy loads, but try to feel it easier and easier, even if in the beginning this happens only in your mind.

Training for muscle mass, require to feel the muscle contracting and extending under the load. Feel the pump and be able to contract every muscle on command. When doing supine grip pull ups for example, pull with your lats or with your biceps as you wish.

When training for power aim to accelerate the load as fast as possible; faster each time. Stop when you can not accelerate the load fast.

Strength training exercises

Legs, glutes, lower back :

Basic exercises:

The best: Squat with barbell, one leg squat, dumbbell squat, pistol squat, front squat, sumo squat, deadlift, straight legs deadlift, Romanian deadlift, lunges, hip extension on the hip stand;

Other: hack squat, leg press (45, horizontal, or vertical), lunges, squat machine squat, squat machine one leg squat, Smith machine squat, Smith Machine one leg squat.

Isolation exercises:

Glutes

- hip extension – standing, kneeling, lying – Gluteus Maximus

– hip abduction - seated, standing, machine or cable – Gluteus Medius

Quadriceps

- knees extension, Sissy Squat

Hamstrings

- knee flexion – lying, seated, standing

Adductors

- hip adduction – seated, standing

Lower back

- back extensions – Roman chair, machine, lying

Chest exercises (upper chest, middle chest, lower chest)

Basic exercises :

The best: Barbell bench press (incline, horizontal, decline), dumbbell bench press (incline, horizontal, decline), Dips.

Other:

Machine chest press, Smith machine bench press (incline, horizontal, decline).

Isolation exercises:

Dumbbell flies (incline, horizontal, decline), cable crossover flies (incline, horizontal, decline), cable crossover (standing, bent), Peck deck, Pullover

Back exercises

Basic exercises:

The best: Pull-up (pronation - wide grip, middle grip; supination – middle grip; parallel grip; V – handles), Pull down, Bent over row with barbell, One arm bent over row, Seated row (using different types of handles).

Other:

seated row chest supported, T bar row, T bar row chest supported, barbell (unilateral loaded), high pulley pullover, low pulley one arm row

Shoulder exercises (anterior deltoid, middle deltoid, and posterior deltoid)

Basic exercises:

The best:

Standing barbell press – in front or behind the head, Standing dumbbell press standing), Upright row, Arnold dumbbell press;

Other:

Machine shoulder press, Seated press, Smith machine press

Isolation exercises – anterior shoulder raise (barbell, dumbbell, and cable), seated incline anterior shoulder raise, lateral raise-flies-(dumbbell, cable, machine), one arm lateral raise (dumbbell, cable), lying side dumbbell raise, seated bent over rear shoulder raise, rear shoulder machine

Traps exercises

Basic exercises:

The best: upright row, shoulder shrug (barbell, dumbbells, cable), in front or behind the back.

Other: shoulder blades retroduction (barbell, dumbbells, cable, machine)

Triceps exercises

Basic exercises:

The best: dips, barbell bench press (shoulder width grip);

Other: standing cable elbow extension (using different handles and the V rope)

Isolation – lying elbow extension (barbell, dumbbells), triceps machine, above the head triceps extension (barbell, dumbbells, cable), cable bent over triceps extension above the head, bent over one arm kick- back (dumbbell, cable), cable standing one arm extension (pronation, supination, neutral grip)

Biceps exercises

Basic exercises:

The best: chin-up or pull-down (shoulder width supine grip), standing barbell curls, and standing dumbbell curls

Other:

Isolation – biceps machine, seated barbell curls, seated dumbbell curls, seated incline dumbbell curls, seated concentration curls, bent concentration curls, standing cable curl (low pulley or high pulley), Scott bench (barbell, dumbbells)， crossover cable double biceps posing

Forearm exercises

Extensors – hammer curls, reverse grip standing barbell curls, wrist extension (on the bench or standing)

Flexors – wrist flexion (on the bench, or standing behind the back) with barbell or dumbbells, grippers, grip machine

Calf exercises

Standing toe raises (calf machine, Smith machine), one leg standing toe raise with dumbbell, donkey raise, seated calf machine – (straight knees – gastrocnemius), (bent knees – soleus)

Tibialis anterior – ankle dorsiflexion (machine or standing on the heels)

Neck exercises

Head flexion (anterior, left and right), head extension

Abdominal exercises

Janda sit-up, Crunch (lying on the mat, bench), crunch and twist, lateral crunch, pulley abs flexion, leg raise (stand or hanging), balanced crunch, standing twist (barbell, dumbbell), high pulley swing, stomach vacuum

Types of bar grips

Supine grip

Prone grip

Mixed grip

Top ten strength training exercises

I will describe and explain ten exercises which will offer you the best training results. They are also the most popular and used exercises for strength training.

These exercises are very valuable; even if you choose to perform just these ten exercises over and over again, you will get very good and evident results.

All these exercises are basic exercises. They are also functional because the strength gains can be easily translated into your daily usual and athletic activities.

The big 10 – 10 exercises which should be the basis of your training program

1. **The squat**

For many athletes this is the first choice when it comes to strength training. As Dr Frederic Hatfield – "Dr Squat" said – "This movement should be performed by everybody from housewife to Olympic weightlifter".

If you want good looking and strong legs and hips you do squats. If you do not want good looking and strong legs and hips do not train squats.

The squat trains your glutei muscles, quadriceps, hamstrings, lower back and abdominal muscles, spinal erectors and trapezius muscle. It increases your spinal column, femur and tibia bone density.

It is specific to sports and activities involving running, jumping and lifting movements. Training squats will improve your vertical jump, your running speed, your lifting strength and your standing pushing ability.

Squat increases whole body strength; usually it is performed with relatively heavy loads, loading large amounts of muscle mass and the biggest bones in your body, therefore it really lets your brain know that you are training. Because of these reasons the squat provides an excellent training stimulus leading to superior adaptation; training heavy squats will elevate your testosterone and growth hormone production levels.

The most basic execution is the standing barbell squat. Squat has very many variations: sumo squat, one leg squat, one leg pistol squat, barbell front squat, walking lunges, body weight squat, weight lifting squats, hand held dumbbell squat, Smith machine squat, Squat machine squat, Hack machine squat, jump squat, squat leaning against a fitness ball, kettlebell squat, etc.

The correct competitive and training squat is when the crease of your hips descends below your knee cap. The hip crease is where it folds when you lift your thigh. Above this depth, the drill is called a partial squat; for the weightlifting squat you descend with the buttocks very close to the ground (this type of squat requires awesome hamstrings flexibility).

Correct execution

- Shoulder width or a little wider stance, toes out about 35 degrees.
- Place the bar on the middle of your traps (high bar or training squats), or on the lower traps (powerlifting squats). Pay attention to center the bar perfectly on your back. Grip the bar with the thumb over and keep your wrists straight. Lift your chest while pressing down with your hands in order to stabilize the bar on your back. Do not keep the bar on your neck or too low on your back.
- Precontract your abdominal muscles at about 50 % of their strength. This will help you maintain a correct torso posture.
- Step back from the rack. Do not go forward while having the rack behind you. If you do this you will not be able to see the rack when you want to rack the bar back when you finish.
- The lower back should maintain its normal physiological curvature. Never flex your spine when under high loads. Also do not hyperextend it.

- Keep your head in line with your spine and push your chest forward. Keep your eyes forward and down throughout the squat.
- Sit back with your hips and try not to bend forward excessively from your hips.
- The knees move on the same direction as your toes are. When you are on the bottom part of the movement, the knees can go over your toes in the frontal plan, but no more than a few centimeters; actively lock your knees by contracting your quads and your hamstrings when you stand.
- Go as low as you can while maintaining your back straight, chest forward and upper buttock up. This depends on your hamstrings flexibility; if you have good hamstrings flexibility you will be able to go with your hips crease lower than your knees for a full and correct squat. When you descend past a certain angle, your pelvis will start to curl down. Stop the descent before this happens. If you can not descend bellow parallel, try to keep your heels on a wooden board (2-3 cm thick); this will shift the weight more on your quads, while reducing the stretch of the hamstrings allowing you to squat lower.

  The full squats down to or bellow parallel are way better than partial squats for more reasons:

  - Full squats are better and safer for the knees. With partial squats, mostly the quads do the work and the knee cap is just pulled up from above. The hamstrings are greatly involved just when you descend to or bellow the parallel and pull from under the knee, balancing the pull on the knee cap.
  - Full squats are safer for your spine. With partial squats, because of the good leverage, you can use more weight than your back can safely support. When performing full squats you get to see your true strength.
  - Full squats are very good for increasing hamstrings flexibility.

- Inhale as you lower the bar, keep the air inside your lungs as you get through the most difficult part of the squat and exhale on the upper part of the ascending movement; do not inhale too forcefully.
- Do not bounce at the bottom of the squat. You also do not need to fully stop. You just need to touch and go.

- Use a bar lock to avoid sliding plates.
- It is best to use a Power Rack or a Squat Rack with safety bars to avoid being buried under the bar if you can not complete the lift.

Tips:

- How to find your best feet stance? Stand with a shoulder with stance, toes out about 35 degrees. Squat down bellow parallel without any weight and maintain the position. On the bottom position slightly move your feet in and out. Find the stance you are most comfortable with, which should be a stance that allows you to maintain the position for a few minutes.
- Drive with your hips up while keeping the chest up. Raise your chest as you raise your hips, do not allow your upper back to lag behind the hip extension.
- The bar should be exactly above your middle foot at all times.
- When racking the bar back find the upright posts of the rack first; do not try to set the bar on the hooks. Sometimes you might miss the hooks.
- Do never lift your heels or any part of your foot off the ground.
- Use hard sole shoes or weight lifting shoes when training squats. Bare foot is good also, but pay attention that you do not sleep.
- Keep your back straight. Straight back is not the same as upright back. You need to keep you back straight, but you can not maintain it upright, because you would fall behind. The back is straight (normally curved as when standing) and it is bend forward from the hips at about 45 degrees angle.

Spotting

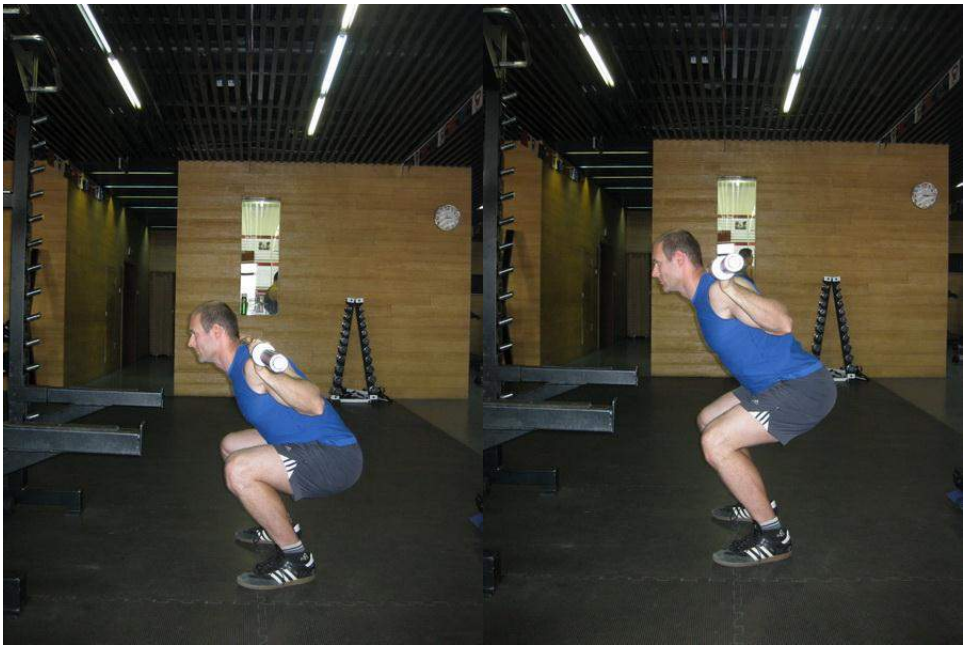
- Bar spotting – you need a very strong spotter at least 5 cm taller then you. He can pull the bar from above to help you complete the movement. This kind of spotting is used for lighter weights.

- For very heavy lifts use a power rack with safety bars or find at least 2 reliable spotters.
- Never help anybody on just one side of the bar.

Full squat

Half squat

Starting the descent the knees come forwards a little, from here on just the hips will sit back, the knees do not advance more



At the bottom position the bar is straight above the middle of the feet, hip crease at the same level or lower than the knees.

Reverse the move; initiate the ascend with your hips

Stand in a natural position

Squat side rear view 1

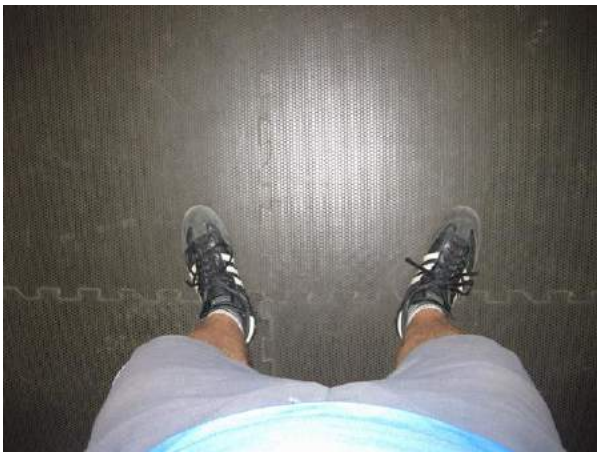
Squat side rear view 2

Squat side rear view 3

Squat side rear view 4

Squat - bottom position side rear view

Before starting to squat do this drill; push your knees in line with your toes using your elbows



The squat stance

Squat high bar position - open grip, wrists straight, chest forward

Power squats - low bar position

Grip mistake - closed grip with wrists in extension

Bar positioning mistake - the bar is on the neck

Equally excellent for men and women - one of the best drill for ladies

Front squat 1 Front squat 2

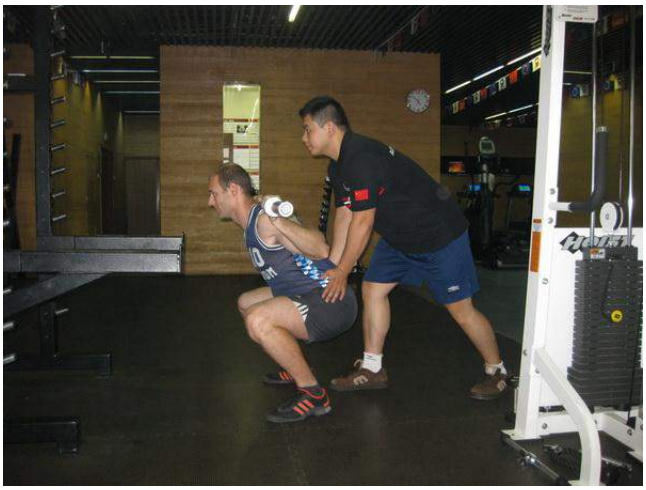
Squat facing a wall for correct body alignment

Bend at the hips

Back straight, chest forward

Learn to sit back

If you have problems maintaining good alignment with full squats, you can use an wooden board under your heels



When standing up learn to initiate the move with your hips

Squat mistake - knees bowing in

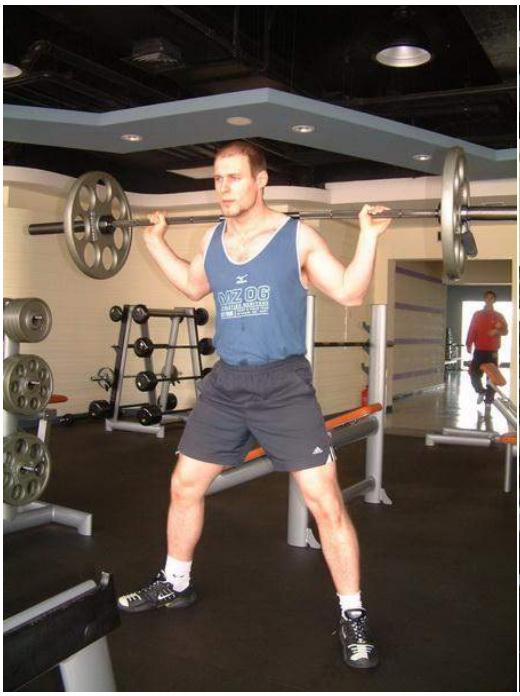
Squat mistake - spine is not straight

Squat mistake - heels are in the air at the bottom of the squat

Squat mistake - the ascend is initiated with the knees instead of hips, so the hip angle narrows too much

Kettebell pistol squat 1 Kettebell pistol squat 2 Kettebell pistol squat 3

Squat bar squat - feels more comfortable for the shoulders and you can assist yourself with the hands on the thighs to initiate the lift

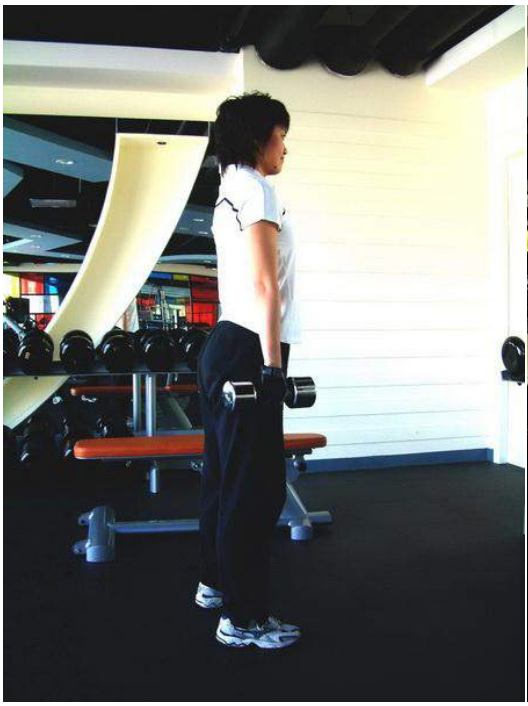


Sumo squat 1

Sumo squat 2

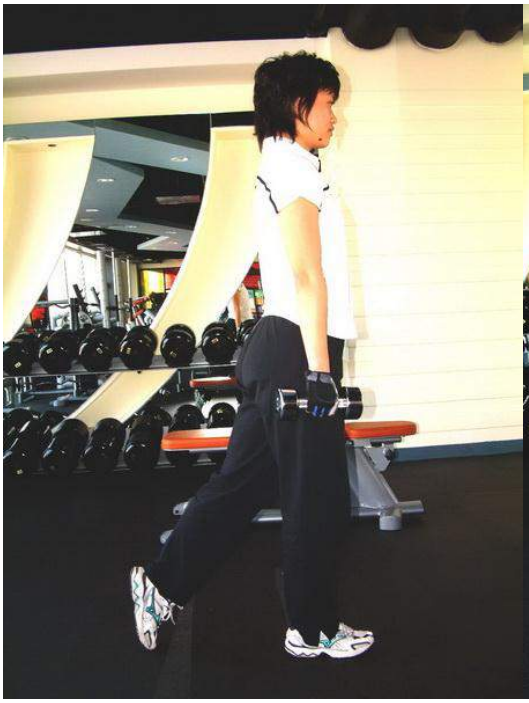
Sumo squat with dumbbells 1

Sumo squat with dumbbells 2

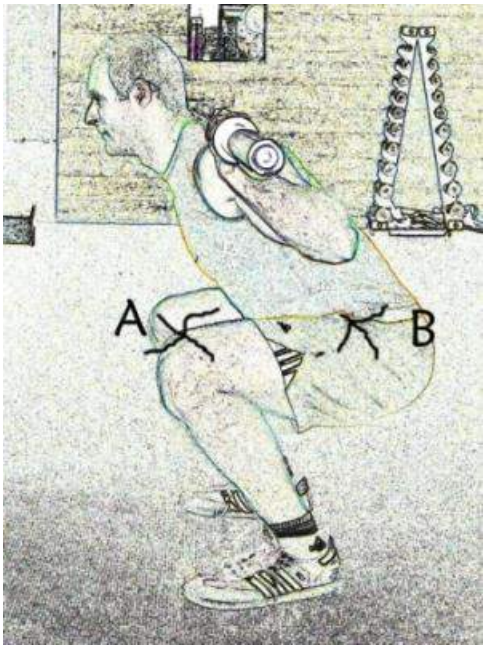


Half squat with dumbbells 1

Half squat with dumbbells 2



Single leg squat with dumbbells 1 Single leg squat with dumbbells 2



Correct squat depth – B (hips crease), should be lower than A (knees)

2. The bench press

"How much can you bench press?" is the most asked question between two people who weight train when meeting for the first time.

This drill is so popular that many clubs have 6-10 benches for this exercise and Monday they are all taken with other people waiting in line.

What squat does for your lower body, the bench press will do for your upper body. This exercise will improve your specific strength necessary for pushing, hitting, throwing, launching. The main muscle activated during this exercise is the pectoralis major; the anterior deltoids, and the triceps are also assisting the lift.

If you want well developed and strong pectorals you do chest presses.

The most popular is the Barbell flat bench press. Other variations are barbell incline and decline bench press, dumbbells flat, incline and decline bench press, Smith machine flat, incline and decline bench press, machine press horizontal and vertical. Push up is a similar movement mostly performed just using own body weight. Narrow grip bench press involves the triceps and the pectoralis major at the same degree.

Correct execution

- Grip the barbell at a wider than shoulders distance (when your elbows are 90 degrees bent, you have gotten a rectangle between your upper arms, forearms and the bar). Slightly different individual preferences are normal.
- Use complete grip (with the thumb around the bar); some trainees use an open grip (the thumb on the fingers side), with the bar exactly above the forearms. Sometimes along the road, you might drop the loaded bar on your chest with an open grip.
- When lying down before you unrack the bar, the head should be positioned with the bar straight above the eyes. This way you avoid hitting the bench press stand pins with the bar on your way up.
- Bring your shoulder blades together for better stability.
- Keep your feet on the ground.
- Keep your elbows exactly under the bar while you lift.
- Lower the bar to your chest level (nipple level) and not shoulders level.
- Lower the bar until it slightly touches your chest; if you are very thin, lower the bar until your elbows are 180-185 degrees.
- Inhale before lowering the bar, keep your breath until you pass the sticking point and exhale on the upper part of the ascending movement; do not inhale too forcefully.
- Lock your elbows actively by forcefully contracting your triceps and biceps.
- Bring your shoulder blades together
- Do not bounce the bar on your chest

- Keep a five points stable base: soles on the ground, buttocks, two shoulder blades, head on the bench
- Keep a normal curvature of the spine; do not lift your pelvis off the bench. Some experienced lifters will arch their back, but without lifting the pelvis.
- When racking the bar back find the upright posts of the rack first; do not try to set the bar on the hooks. Sometimes you might miss the hooks.
- If you can not handle the weight, instead of lifting your feet, pelvis or head when pressing, better use a lighter weight or find a spotter to help you.
- Use a bar lock to avoid sliding plates.

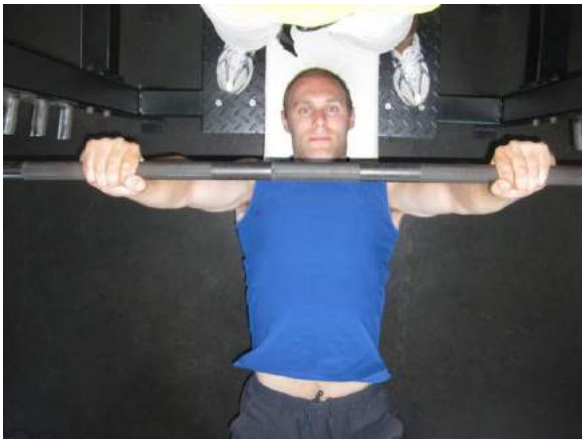
Spotting

- The spotter should stand behind the bar and grasp the bar with a mixed grip (one hand supinated, one hand pronated); it is very important to maintain the bar balance.
- The spotter should bring his body close to the bar in order to safely apply strength.
- The spotter should apply the least force necessary for you to complete the lift.
- Never help anybody on just one side of the bar.

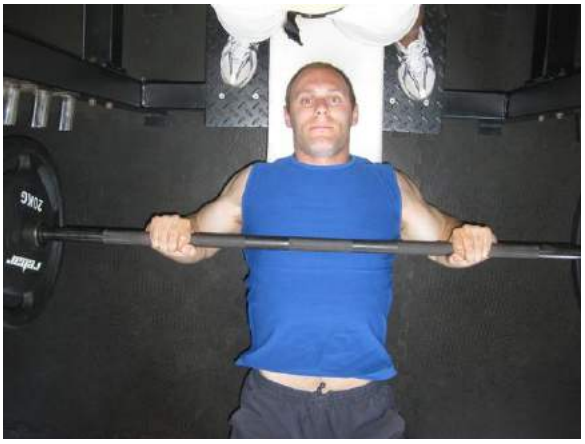
Horizontal bench barbell press 1

Horizontal bench barbell press 2

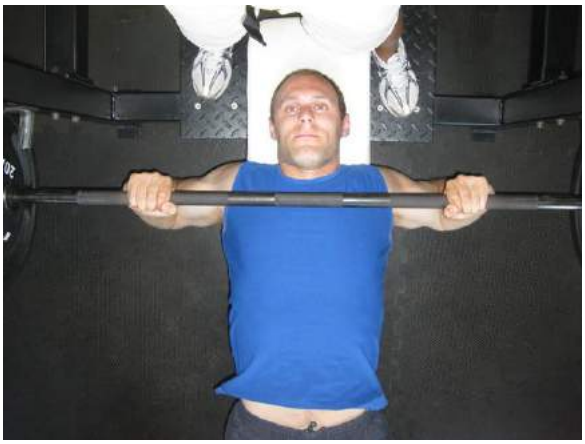
Before the beginning of the press the eyes are vertically under the bar



The press begins from straight above the shoulders

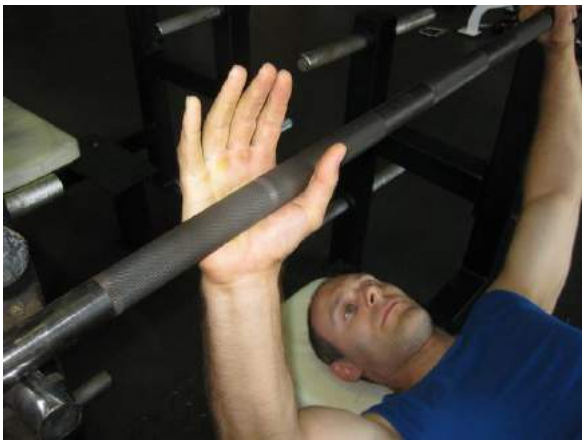


On the bottom position the bar is straight above the nipples



Mistake - the bar is lowered at the shoulders level

The open grip is not a safe choice



The bar is straight above the forearms

The elbows are straight under the bar

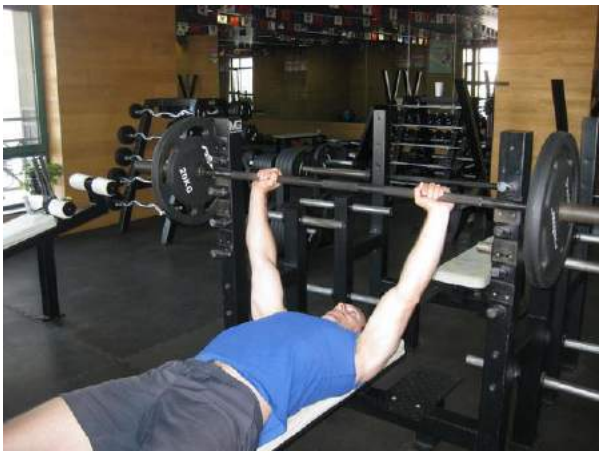
The right way to grip the bar for bench press with a full grip

Keep your wrists straight

Mistake - the wrists are not straight !

The lower back is slightly arched

The feet help you with a stable base



When you rack the bar back first look for the vertical posts, than let the bar slide

Mistake - do not look to place the bar directly on the hooks (you might not find

Narrow grip Middle grip Wide grip

Assisting the bench press - use two hands for better balance

Horizontal dumbbell press1

Horizontal dumbbell press2

Incline dumbbell press 1

Incline dumbbell press 2

Incline barbell press – 1

Incline barbell press – 2

Decline barbell press – 1

Decline barbell press – 2

Horizontal barbell press 1

Horizontal barbell press 2

Horizontal barbell press 3

Push up 1

Push up 2

3. **The deadlift**

The deadlift is called like this because the drill starts with the barbell "dead" on the ground. Even if the name sounds scary, this movement should be a part in every serious trainee's routine.

If you want full body strength you do deadlifts.

There are more styles of deadlifts: the classic deadlift, the Romanian deadlift, the straight knees deadlift, the sumo deadlift, etc.

This exercise involves a very large muscle mass, mainly activating the spinal erectors, the quadratis lombaris (low back muscle), femoral quadriceps, gluteus maximus, hamstrings, quadriceps, trapezius, latissimus dorsi, forearm flexors; the hamstrings are prime movers in the straight legs and Romanian deadlift variations. The abdominals are also intensely activated in order to maintain a high inter abdominal pressure.

I will explain here the classic deadlift execution requirements.

Correct execution

- Position your feet at shoulder level or slightly wider as like for a vertical jump; it is also possible to have a very wide stance – sumo deadlift.
    - Keep the bar very close to your body while lifting almost touching your shins and thighs

- Keep your head aligned with your spine looking forward down and push your chest forward.
- Bring your shoulder blades together.
- Look ahead high all the time throughout the lift.
- Precontract your abdominals in the beginning at about 50 % of their max strength
- Maintain a normal spinal curvature; do never bend your spine at the waist level or hyperextend it at the end of the movement.
- Grip the bar with a mixed grip to avoid bar rotation. The grip width should be with your hands just outside the feet. Press with the thumb on the index and middle fingers' nails for extra grip strength. The strongest grip is a locked grip, when the thumb is under the index and middle fingers, used by weightlifters.
- If your grip doesn't have enough strength you can use lifting straps; but it would be better if you bring your gripping strength up for heavy deadlifts.
- Throughout the lift do not bend your elbows; keep them straight, but contract your biceps and triceps.
- At the start, the bar is above the center of your feet.
- Keep the bar very close to your shins, legs and hips through the lift.

Tips

- The deadlift is not a squat with the bar positioned in your hands. The squat is more a knee drill, while the deadlift is more like a hip drill. So the knees most to about 130 degrees and not more. The hip can bend close to 90 degrees.
- Use the big 20 kg plates on the bar to start with the bar at a proper height.
- At the start of the drill, first extend the knees, while maintaining the hip angle. When the bar passes the knees, extend your back opening the hip angle to complete the lift.
- Never hyperextend your back on the top of the deadlift.
- **The best way to do your deadlift sets is to do every rep one by one; each time lift the barbell, put it again on the floor, than go for the next rep.**

These first 3 movements, the barbell squat, the horizontal barbell bench press and the deadlift are part of the discipline of powerlifting. A powerlifting contest consists of these three movements; the maximum weight lifted for each movement is recorded, the category winner being the one who accumulates the most weight on these 3 lifts combined.

Deadlift 1

Deadlift 2

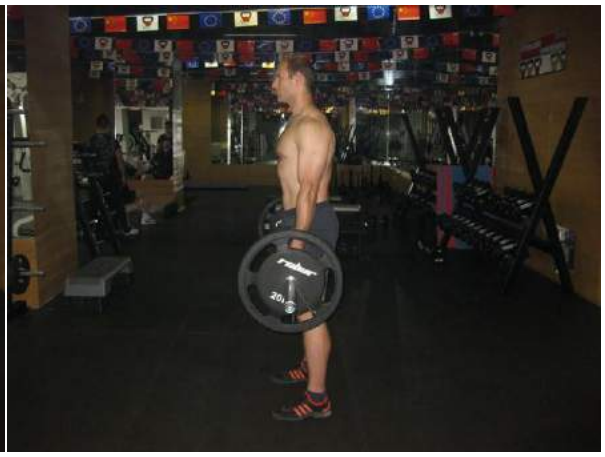
Deadlift 3

Deadlift 4

Deadlift - side view 1

Deadlift - side view 2

Deadlift - side view 3



Deadlift - side view 4

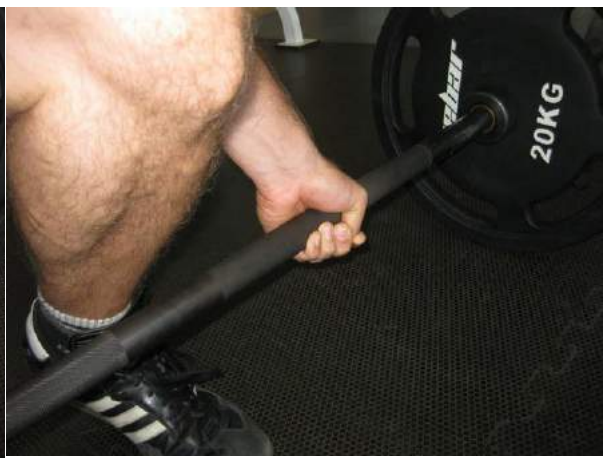
Before the lift place your feet under the bar

Mixed grip (prone - supine), feet jumping like width, arms just outside the knees

Training closed grip 1

Training closed grip 2

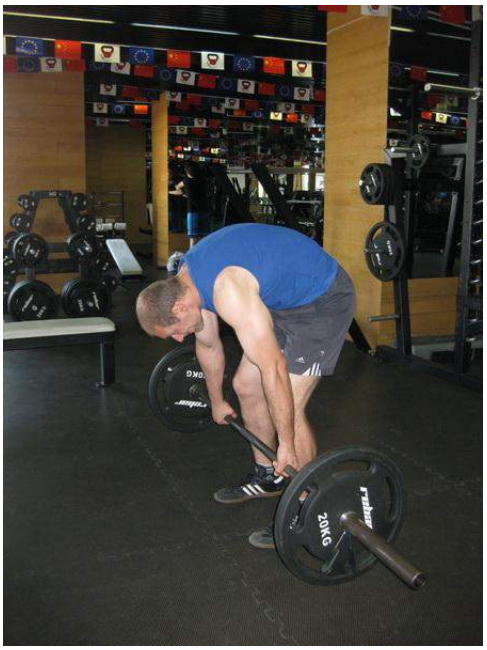
Grip mistake - the bar is too high on the palm and it will roll down and pinch your hand pads



Weightlifting - locked grip 1

Weightlifting - locked grip 2

Deadlift mistake - the bar is too far away from the shins



Deadlift mistake - the lower back is flexed

Deadlift mistake - the chest is not extended

Deadlift mistake - the center of gravity is too much backward

Deadlift mistake - hyperextension of the hips

Sumo deadlift

Learn to bend at the hips Be aware of your posture

How to use deadlifting straps correctly?

Deadlifting straps

how to use lifting straps - 1 -

how to use lifting straps – 2

how to use lifting straps - 3

how to use lifting straps – 4 how to use lifting straps – 5

4. **The pull up**

This drill involves your latissimus dorsi, biceps brachialis, rear delts, lower pectorals, lower part of the trapezius and the forearm flexors. The abs are also contracting strongly to stabilize your lower body. It improves your upper body pulling strength and the upper spine stability.

The most popular form is the supine shoulder width grip pull up. Other variations are with neutral (hands are parallel) grip, wide pronation grip – in front or behind the head, narrow pronation grip, V handles grip. The lat pull down, cable exercise or a leverage machine is similar with the pull up, but instead of pulling yourself up, you pull a stack of weights down.

The difference between these exercises with several grip variations is that you activate your muscles in a different synergy – the degree of involvement of each muscle to produce the total movement strength.

Correct execution

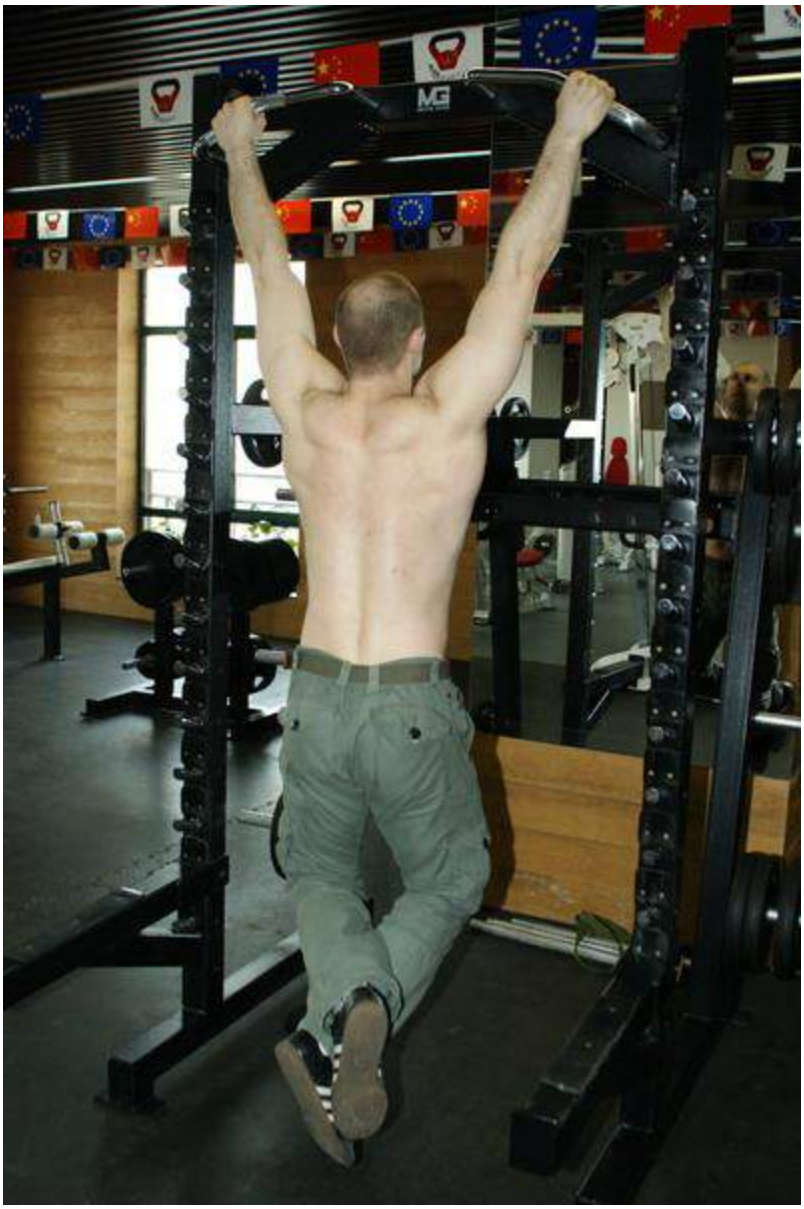
- You can use a closed grip or an open grip; make sure your grip has enough strength and the handles are not slippery
- Pull yourself up until your chin is at the grip level
- Control your descending movement; go as low as your elbows are extended to almost 180 degrees
- If you can not complete at least 3-4 correct repetitions by yourself, start training using a cable or a leverage machine for pull downs until you get stronger; if you can perform

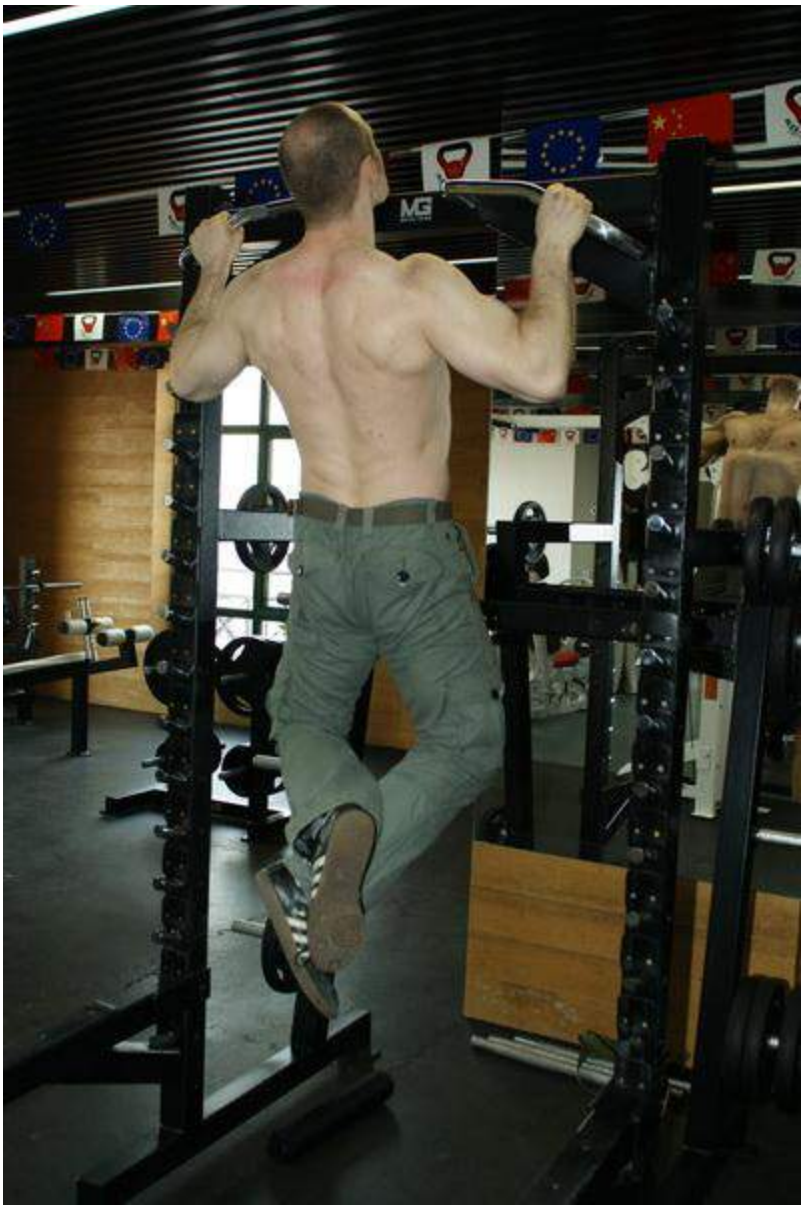
more than 15 correct pull ups, overload yourself hanging a plate from your belt or keeping a dumbbell between your feet

- Keep your head up and push your chest forward
- Precontract your abdominals in the beginning at about 30-40 % of their max strength

Spotting

- Just for forced reps – you can help someone by providing support with your hands under his feet, so he can help himself; you can also lift the trainee by his waist.





Pull up 1 Pull up 2

Pull ups 1

Pull ups 2

Pull ups

5. **The dip**

You just need two parallel bars to perform this exercise. Variations include bench dip, machine dip. The classic dip has two forms of execution: with the elbows outward exercising more the lower pectoralis major, and the elbows near the body involving more the triceps brachialis.

Correct execution

- Grip the bars with a closed grip; keep your wrists straight, with the forearms straightly above the bars
- Slowly bend your elbows until about 70 - 90 degrees
- In order to involve the pectoralis major more keep your elbows outward, your chest slightly oriented downward and your knees bent; to involve more the triceps brachialis, keep your elbows close to your sides, push your chest forward and keep your knees straight or slightly bent
- At the top of the drill lock your elbows actively. Do not lock your elbows passively.
- If you can perform more than 15 reps, you can load yourself using a plate hanging from your belt or keeping a dumbbell between your feet

Dip 1 Dip 2

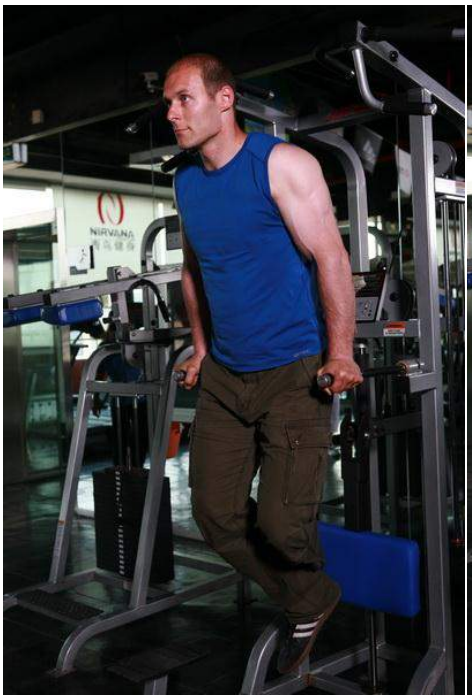
Dips - to place more stress on the chest muscles bend your knees, bring your head forward

In order to place more stress on the chest muscles - keep your elbows wide and bring your head forward

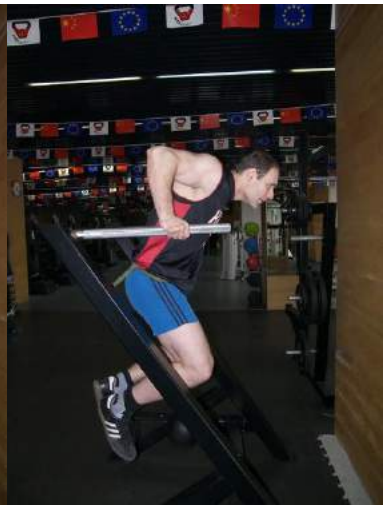
In order to place more stress on the triceps muscles, keep you elbows close to your sides, bring your chest forward, head up and extend your knees

Assisted dips 1

Assisted dips 2



Dips 1 Dips 2



Weighted dips 1 Weighted dips 2

6. **The back row**

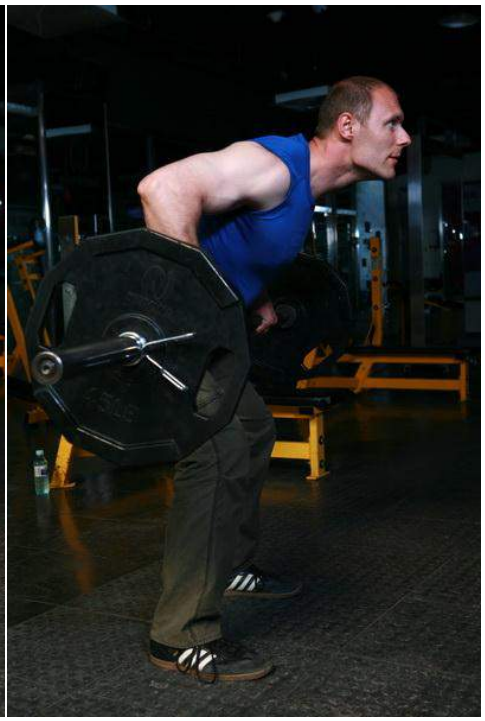
This drill involves almost all your back muscles (latissimus dorsi, trapezius, rear delts, etc). The biceps brachialis, brachialis, brachioradialis, forearm flexors are also strongly involved. If the movement is not chest supported, the quadratis lombaris, spinal erectors, glutes and quadriceps should contract isometricaly to stabilize the body.

There are many variations of this exercise: bent over barbell row, (pronation or supination grip), dumbbell bent over row, dumbbell bent over bench supported row, T bar row, T bar chest supported row, cable row, machine row, one side loaded barbell row, Smith machine row.

Correct execution

- Maintain a normal physiologic spinal curvature and bend at your hips at about 120 degrees angle
- Pull the barbell under the ribs close to your center of gravity
- The groove of the rep should be on a vertical line from under the knees upward under the ribs
- When you lower the weight straighten the elbows, but maintain the back muscle contraction (do not just use your grip strength and let the weight hang)
- Keep the weight closest to your body at all times (when the bar passes your knees, it should be almost touching them and should not be 10-20 cm in front of knees)
- Push your chest forward and keep your head up at all times
- Move mostly your arms and not your lower back
- Precontract your abdominals in the beginning at about 30-40 % of their max strength

Barbell bent over row 1



Barbell bent over row 2

Pulley Row 1

Pulley Row 2

Lat pull down 1

Barbell row - one head loading 2

Bent over one arm row 1

Bent over one arm row 2

Bend over one arm row 1

Bend over one arm row 2

Reverse row 1 Reverse row 2

7. **The shoulder press**

This exercise trains mostly your shoulder muscles (anterior and medial heads), upper chest and triceps. For the standing version the glutes, the abs and the spinal column muscles are contracting isometrically to stabilize the upper body.

The basic execution is standing barbell shoulder front press (military press). Similar exercises are standing barbell behind the head press, standing dumbbells press, seated press – barbell (in front and behind the head), dumbbells, Smith machine press, selectorized or plate loaded machine press, Arnold shoulder press.

Correct execution

- Maintain a normal spinal curvature; do not push your belly forward. To achieve this you should precontract your abdominals and your glutes at about 60-70 % of their max strength

- Maintain your wrists straight, with the weight above the forearm bones; use a close grip with the thumb around the bar
- Bring the weight down slowly at shoulder level
- Keep your elbows under the bar
- Push the weight above your head and not in front of your body
- If you choose to perform this exercise from a seated position lean on the back support of the bench; even if you want to do it vertical, set the bench back support at about 100 degrees and not 90 degrees
- Lock your elbows actively on the top of the movement

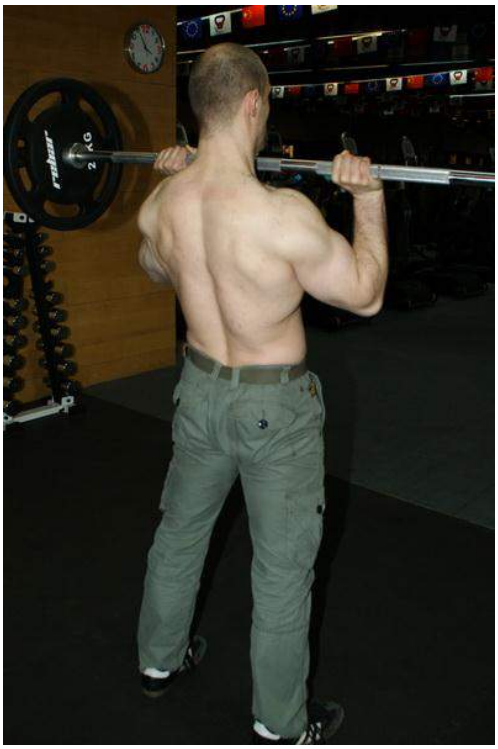
Spotting

- Spot just the seated variation, placing both your hands evenly on the bar from behind; you can also grab the wrists of the trainees
- Do not spot pushing under the elbows

Standing barbell press 1 Standing barbell press 2 Standing barbell press 3

Standing barbell press 1

Standing barbell press 2



Correct posture

8. **The upright row**

This drill involves mostly your deltoids (anterior and medial), trapezius and brachioradials. The biceps and the forearm flexors are participating also. The abdominal and spinal muscles are strongly contracting isometricaly to stabilize the upper body.

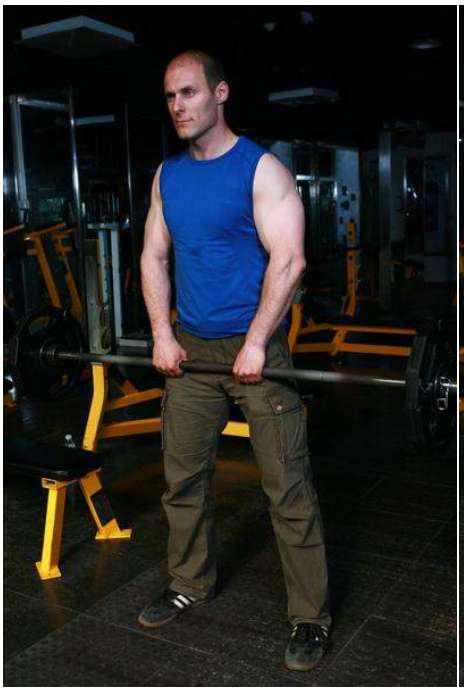
Beside the basic standing barbell upright row, other variations of this drill are standing dumbbell upright row, cable upright row, Smith machine upright row.

Correct execution:

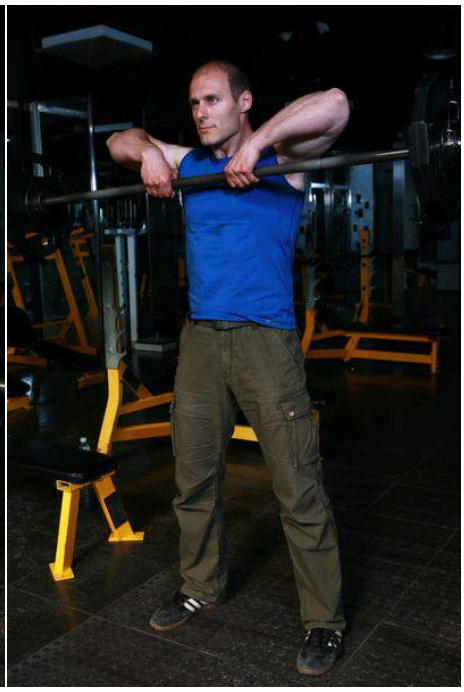
- You can choose between a narrow grip (10-20 cm between your hands) or shoulder width grip
- Slightly bend your knees and lean your torso forward 5-10 degrees
- For all the duration of the exercise keep the barbell very close to your body – even touching your T shirt
- Pull the barbell up to your collar bone and bring your elbows as high as you can
- Breath in as you pull the bar up, breath out as you lower the weight
- When you lower the weight do not relax and slouch your shoulders – extend your elbows to almost 170 – 175 degrees
- Precontract your abdominals in the beginning at about 50 % of their max strength

Standing barbell upringht row 1

Standing barbell upringht row 2



Standing barbell upringht row 1



Standing barbell upringht row 2

Dumbbells upright row

9. **The biceps curl**

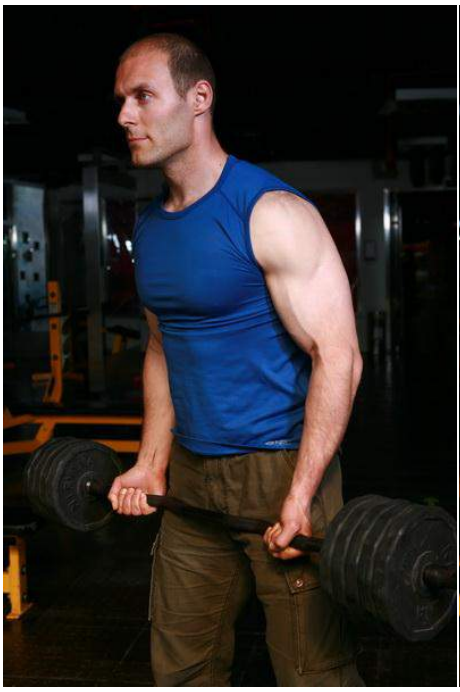
Even if this exercise is a single joint drill by definition, because of the stability needed when executed from a standing position, we can classify it as a basic exercise.

Main muscles activated are the biceps brachialis, coracobarchialis, brachioradialis and the forearm flexors. When standing, the glutes, abs, lower back and spinal erectors are strongly contracting isometrically.

The classic execution of this exercise is standing barbell curls (straight bar or EZ bar) with many variations: standing dumbbell curls, standing barbell reverse grip curls (involving more the brachioradials), standing dumbbell hammer curls, standing Hammer bar curls, standing dumbbell cross curls, standing dumbbell Zottman curls (the dumbbells are lifted with a supine grip and lowered with a prone grip), seated barbell curls, seated dumbbell curls, seated hammer curls, seated incline curls, machine curls, etc.

Correct execution

- Precontract your abdominals in the beginning at about 60 % of their max strength
- Keep your elbows pointing downward and close to your body
- Slightly bend your knees and bring your torso forward just a little; this will help you not to extend backward when you can not do a proper lift
- Push your chest forward, keep your head up
- Keep your wrists straight for all the duration of the drill
- Lower the weight smoothly in a controlled manner; do not swing the load
- Do not move your elbows sideways, do not bring your elbows upward, do not lean your torso backward



Standing barbell curls 1

Standing barbell curls 2

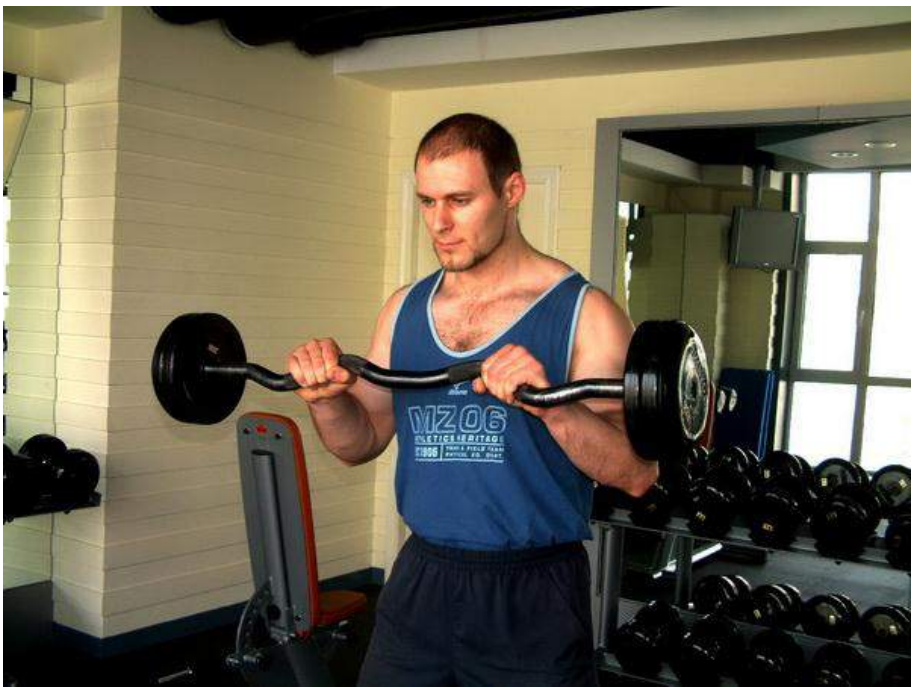
Standing barbell curls 1

Standing barbell curls 2

Standing barbell curls 3

Standing dumbbells curls 1

Standing dumbbells curls 1



Reverse grip curls

10. **The Gorilla crunch**

There are many good drills for abs, but the Gorilla crunch tops most of them.

This kind of crunch will train your abs primarily, but also your hip flexors, lats, chest, biceps, brachioradials and forearm flexors are involved.

Correct execution:

- Hang from a bar, cross your feet and flex your thighs at the hip at an angle of 120-140 degrees
- Your elbows are also bent at about 140-150 degrees
- Bring your knees up under the bar between your hands
- Slowly reverse the move with good control without swinging
- Pay attention not to lose grip and fall

This is a difficult drill and most individuals can not perform it. Start doing it on the floor as a reverse crunch, than do it on an incline bench until you can perform it vertically

Gorilla Crunch 1

Gorilla Crunch 2

Gorilla Crunch variation

Free weights versus machines

Free weights

Weight training machines

Which are the best? Free weights or machines? I will describe the pros and cons of both.

Free weights – on this category we have dumbbells, barbells, kettlebells, clubells, power bags, etc. You may also need some other equipment to facilitate your training: racks, benches, supports, etc. They are user defined – this means that you can move them as you wish on any direction and using any pattern of execution.

The cable machines are also user defined and share many advantages of the free weights.

Pros

- **Functional training**

The meaning of functional training is that you can translate the training performance easily into the real world – your everyday activities or athletic activities. We live into a free weights world – your heavy luggage, the hammer and the anvil, the water barrel, your opponent in soccer, basketball, wrestling, boxing, etc – they all can move and be moved freely, without a fixed pattern.

This is the reason why most athletes mainly use free weights for their strength training program.

- **Complete muscles synergy**

As you learned before, when moving, different muscles act differently: some are prime movers, others are secondary movers; some muscles act as stabilizers for different moves. Because you have to control the movement pattern and stabilize the weight by yourself, more muscles are activated and some are activated stronger while training with free weights.

- **Joint training**

Your muscles contract and move your bones around your joints. Muscles are connected to the bone by tendons, the bones are interconnected by ligaments and movable joints have an articular capsula for its integrity and for keeping the sinovial fluid (oil like liquid for lubricating your

joints) inside your joint. Because of the changes in tension due to the instability of the free weights, all this structures have to adapt and improve the same as muscles do.

- **Versatility**

With a set of dumbbells, a barbell, or a kettlebell, you can train every muscle of your body, and perform hundreds of different exercises

- **Specific training**

With free weights you can choose to do almost every movement you need according with your particular objective or athletic event.

- **Accessibility**

A full set of professional dumbbells, some barbells with plates and all the racks and benches you need cost up to several thousands USD, so every gym and training place and many individuals can afford to own and use them. Two kettlebells cost 60 to 100 and some dollars. For training they are much more valuable than a complete line of 35 pieces of strength training equipment, which may cost as much as a sport car.

- **No limits**

You can load a professional barbell as you wish, up to 500 kg or even more. Most of the machines can be loaded up to about 100 kg.

- **Explosive strength training**

  You can accelerate the free weights as fast as you can, you can even drop them if you have a special flooring or in the sand. Most of the machines are not designed for acceleration training

Cons

I do not find any real cons for the free weights, but I would deal with some of common concerns expressed relatively to the free weights. These cons have been mainly brought up by some high tech equipment producers and by some "chrome and nickel" fitness clubs. It is not difficult to think why.

- **Lack of safety**

Accidents can happen while training with free weights, because you or someone else can not properly control them. This may be true, but accidents can happen in any place. Training with free weights is much safer than playing soccer, basketball, wrestling or driving a car.

All you need is to pay attention.

Free weights (and other machines) safety rules

- **If it hurts – do not do it !** Learn to separate "bad pain" from "good pain". Bad pain is inside your joint, along the tendon, or ligament. If you feel pain change the load, change the amplitude, change the groove or change another drill. The good pain is muscle burn from lactic acid overflow. Get used to it especially when working calves or abs.
- Do not overestimate your strength. Use a load you can handle with good control
- Take time to learn how to do the exercises correctly with perfect from
- Pay attention to the other trainees around you – do not hurt them and do not get hurt by them
- Use collars for barbells with plates at all times
- When training inside 6 RM load zone, call for a spotter, or just for someone to watch you especially for bench press or squat
- Keep clear off other objects or trainees when doing heavy overhead lifts – press, snatch, jerk, etc.
- Warm up properly
- Perform most of your dumbbells and barbell movements using a complete grip (with the thumb around the bar)

- Keep your hands dry; bring a towel with you, use chalk if you need. If you worry about calluses you may wear training gloves
- Wear good shoes and check the flooring. Good weight training shoes are thick leather shoes with hard nonslipery sole with no cushion. Bear footed it is ok, but not in the gym. Slippers are worst – sometimes a weight might fall on your toes.
- Replace the weights to their proper place after you use them
- Do not play or make bad jokes in the gym or while training
- 75% percent of all injuries while weight training happen when beginning or ending a set, so pay special attention to these two parts of your set. Your exercise begins from the moment you touch the bar until the moment you leave it back on the rack and not since you start counting.

- **Time consuming**

Because you need to change the plates you need more time than inserting the pin in the selectorized equipment weight stack.

This is again true, but think that handling the plates is a part of your training too: it will burn extra calories, it will increase your muscle endurance and increase your hand, forearm and shoulder strength. And anyhow you have to rest between sets, so you do not need to increase your training time.

With fixed dumbbells, barbells and kettlebells you do not need to adjust the weight.

- I**t is difficult to train with free weights**

Training it is and should be difficult. If it wouldn't be difficult you would not really see any transformation in your body.

This doesn't mean that it has to be **too** difficult. Choose your own progression pace, chose an exercise load which is convenient for you, but do not forget: "You will reap benefits according to you efforts".

Some people find free weights movements difficult to learn well. Take it easy! Learn how to perform the basic movements one by one. Carefully read this book and other books. Watch some training DVD's, search the web, ask your friends or ask a trainer. Training with weights is much easier than learning a sport, for example. Once you will get the feeling for the free weights exercises it will stay with you for life time.

Machines – this category includes selectorized equipment (most of it with pin insert system), plate loaded equipment, air or fluid resistance equipment, etc. Cable equipment, while it can be considered a machine by design, behaves more like free weights.

Pros

- **Attractive and easy to use**

Many people trust the machines. They believe that if a machine looks good and is very complex it will deliver better results. The truth is, what gives you results it is overloading your body, no matter what you use in order to accomplish this.

Because the machines levers move on a predetermined path, sometimes they offer the right movement direction.

The selectorized equipment offers the possibility to quickly change the load just by pin insertion. This is a good thing for people who are not very well motivated to engage in more strenuous strength training.

- **Better stability and muscle isolation**

This means that because the movement is stabilized by the machine, some muscles are not activated compared with a similar movement performed with free weights

Even if in theory basic free weight movements are more functional, some special populations feel better training on a machine: older people, pregnant women, athletes recovering after injuries and people with different physical disabilities. Many weight training beginners without good movement skills find it easier to train on machines.

- **Varied direction of resistance and loading leverage**

Free weights will always offer resistance only vertically downward because of the gravitational attraction. This means that every drill performed with free weights should be on the vertical direction; movements performed horizontally have no use when training with free weights. Also the leverage will offer the greatest resistance when the lever is horizontally longest. (ex . Standing biceps curl – when the forearms are parallel with the floor and the elbows are bent 90 degrees the resistance is the greatest)

Machines however, according with the design, can offer resistance in any direction: horizontal, upward, incline or circular. The leverage also varies with the machine design.

Cons

- **Muscle isolation**

If you want to see major improvements for your strength and your physique you should not isolate your muscles when working out. The more muscles involved in any particular drill, the more value for your time and effort you will get.

You should consider some muscle isolation when you are quite close to your goals and not before when you are just at the beginning of your journey to strength and might.

With the muscle isolation you get from the machines use, you do not bring into play your stabilizers and synergist muscles; because of this even if you can handle heavy loads with machines, your functional strength might not really improve too much.

- **The feeling is not as good as training with free weights**

Because the machines use pulleys, cams, belts and joints the movement encounters friction in many points; the movement is not 100% smooth. Also the machines arm moves on a predetermined path, sometimes not exactly as you would wish it to move.

- **Not optimal adjustability**

Sometimes machines can not be adjusted to fit every individual (very tall, very short, very strong, very weak, etc)

- **Expensive and with little versatility**

Most of the machines are designed for just one specific movement, so you need a complete line of machines to properly exercise the basic joint movements. Compared to the free weights are much more expensive. A complete line can cost between 15 000 to 40000 USD.

- **Design flaws**

Many commercial equipment brands and models are poorly designed and manufactured, so they are difficult to adjust, offer a poor leverage, a rough movement feeling, break easily or just do not feel good.

The bottom line is : except if you have special pretraining conditions, stay away from machines. Use mostly or only free weights for your resistance training.

Take it easy in the beginning and learn and feel each drill properly. Most of the good stuff you see written about training with machines is written by equipment producers and sellers.

A special note about most of the home use jungle gyms.

Total crap (I am not describing the lady here)

Many ads are like this: 240 moves with this amazing multifunctional home system; safe and efficient. Use less time for training, with better results.

Almost all home use multifunctional machines are pure crap; they are a joke. They are not even worth the recyclable iron price. Almost no one uses them, but a lot of people buy them. They have a bad path of motion, a lot of friction, break easily and occupy much space.

You would be much, much better off just by doing bodyweight training.

Strength training programs

Before choosing a program, check if it would be right for you. Go back to The Principles of Athletic Training and read them again. Write the program on a sheet of paper and ask yourself the following questions:

1. Is there enough overload? Are the loads challenging enough for my level?
2. Did I plan for progression? In the beginning you should increase your loads once every week or once in two weeks.
3. Is the program tailored to my specific goals? How many reps are to be performed for each set? How long should I rest between sets? Did I choose the right drills that suit my goals
4. How many days do I rest before training again the same body parts? Is the frequency good enough to offer me the best super adaptation?
5. Did I plan what should I do in order to avoid detraining, in case that I can not attend every session I planed for?
6. Did I plan my program with cycles with different content in order to allow me to focus better on my specific training goals?
7. Will this program fit my unique individual conditions: schedule, motivation, present level of physical development, body type, lifestyle and nutrition?
8. Did I also arrange a sound nutrition plan and healthy lifestyle? Had I planned to give up on bad habits?

Remember that the best training program it is hard to find in the beginning; you have to adjust it for optimal results. Once you have found a program that works good for you, do not change it for the sake of change. Stick with it until your gains begin to diminish.

Do not just copy and blindly execute programs you see in the magazines, web or your friends would recommend you. Think about and assess every training program you prepare to adopt.

A serious gym for strength training

Example or training programs

Beginners - Bodybuilding and Fitness

Even if your level of physical development advances, you can still maintain this type of program if you feel good and are satisfied with your results.

Program 1 Free weights Fitness, Strength and Bodybuilding

Every week 3 times : Mon, Wed, Fri

Tue, Thu, Sat

Mon, Thu, Sun

Or twice a week with 3 or 4 days in between sessions

Exercise	Sets	Reps	Load
1.Squats (barbell)	2-3	8	12 RM
2.Horizontal chest press (barbell)	2-3	8	12 RM
3.Pull ups – wide grip pronation	2-3	n	BW
4.Shoulder press (barbell standing)	2-3	8	12 RM
5. Deadlifts – (barbell)	2-3	8	12 RM
6. Dips - triceps	2-3	N	BW
7. Biceps curl (barbell standing)	2-3	8	12 RM
8. Gorilla crunch abs	2-3	N	BW
9. Calf raise (one leg)	2-3	15	15 RM

This is a very good program, which will deliver good results for everyone. Keep it at least 2-3 months to get good results. You can stay on this program even a lifetime.

Back in Romania, when I began to strength train in a gym, every new comer got the same training program. You won't believe, but in that gym almost everyone who trained more than 3 months got visible results. Out of 700 trainees, there were at least 30-40 who participated or could participate in a bodybuilding or powerlifting competition, with more than 10 guys who got between 1st and 3rd place for different weight categories. I am talking about National Championships.

Program 2 Full body training Machines. Fitness

This is a basic program for people with poor motor skills or some limitations. The same training routine is performed 3 times per week.

Every week 3 times : Mon, Wed, Fri

Tue, Thu, Sat

Mon, Thu, Sun

Rest period between sets: 60-90 seconds.

Rest period between exercises: 2-3 minutes

This whole routine should take you between 45 – 60 minutes.

Exercise	Sets	Reps	Load
1. Leg press	2-3	10	12-15 RM
2.Chest press (machine)	2-3	10	12-15 RM
3.Back seated row (machine)	2-3	10	12-15 RM
4. Upright rows delts and traps (barbell standing)	2-3	10	12-15 RM
5. Triceps press downs (cable)	2-3	10	12-15 RM
6. Biceps curl (barbell standing)	2-3	10	12-15 RM
7. Back extension (Roman chair)	2-3	10	12-15 RM
8. Abdominal flexions (ab bench)	2-3	10	12-15 RM
9. Calf raises (one leg)	2-3	10	12-15 RM

Program 3 Full body training - Bodybuilding

What differs from the first program is that there are different exercises for each of the three weekly sessions.

3 times per week

Training one

Exercise	Sets	Reps	Load
1. Barbell squat	2-3	10	12-15 RM
2.Horizontal barbell chest press	2-3	10	12-15 RM
3.Lat pull down – cable	2-3	10	12-15 RM
4. Seated barbell press – behind the head	2-3	10	12-15 RM
5. Dips	2-3	10	12-15 RM
6. Biceps curl (barbell standing)	2-3	10	12-15 RM
7. Back extension (Roman chair)	2-3	10	12-15 RM
8. Abdominal flexions (ab bench)	2-3	10	12-15 RM
9. Calf raises (one leg)	2-3	10	12-15 RM

Training two

Exercise	Sets	Reps	Load
1. Front lunge	2-3	10	12-15 RM
2. Deadlift	2-3	10	12-15 RM
3. Incline barbell press	2-3	10	12-15 RM
4. Seated row – pulley	2-3	10	12-15 RM
5. Standing upright barbell rows	2-3	10	12-15 RM
6. Lying arm extension – barbell	2-3	10	12-15 RM
7. Seated incline dumbbell curls	2-3	10	12-15 RM
8. Hanging leg raise	2-3	10	12-15 RM
9.Calf raises – machine, seated	2-3	10	12-15 RM

Training three

Exercise	Sets	Reps	Load
1. Leg press	2-3	10	12-15 RM
2.Romanian deadlift	2-3	10	12-15 RM
3.Decline barbell press	2-3	10	12-15 RM
4.Pull ups – neutral grip	2-3	10	12-15 RM
5.Standing dumbbell press	2-3	10	12-15 RM
6. Triceps press downs (cable)	2-3	10	12-15 RM
7. Scott bench barbell curls	2-3	10	12-15 RM
8. Ab machine	2-3	10	12-15 RM
9. Donkey calf raises	2-3	10	12-15 RM

Intermediate level

Program 1 **General benefits, muscle mass**

3 times a week: Monday, Thursday, Friday

Tuesday, Friday, Sunday etc

First training: Full body

Second training: Half body

Third training: The other half body

Do not forget about warm up; warm up sets do not count in the overall program sets number.

*If you want to make it more strength oriented, cut the number of reps in half (5 RM for most drills) and increase the load to 6 RM

Training 1

Muscle group	Exercise	Sets	Reps	Load
Legs, hips	1. Barbell squat	3	10	12 RM
Chest	2.Horizontal barbell chest press	3	10	12 RM
Upper back	3.Lat pull down – cable	3	10	12 RM
Shoulders	4. Seated barbell press – behind the head	3	10	12 RM
Triceps	5. Dips	3	10	12 RM
Biceps	6. Biceps curl (barbell standing)	3	10	12 RM
Lower back	7. Back extension (Roman chair)	3	10	12 RM
Abs	8.Abdominal flexions (ab bench)	3	10	12 RM
Calves	9. Calf raises (one leg)	3	10	12 RM

Training 2

Muscle group	Exercise	Sets	Reps	Load
Back and hamstrings	1. Deadlift	3	10	12 RM
Quads and glutes	2.Pistol squat	3	10	12 RM
Triceps	3.Dips	3	N	BW
Triceps	4.Lying triceps extension	3	10	12 RM
Biceps	5.Standing barbell curls	3	10	12 RM
Biceps	6.Seated dumbbell concentration curls	3	10	12 RM
Calves	7.Calf raises (standing)	3	15	15 RM
Calves	8.Calf raises (seated)	3	15	15 RM

Training 3

Muscle group	Exercise	Sets	Repetitions	Load
Chest	1.Incline barbell press	3	10	12 RM
Chest	2.Horizontal dumbbell press	3	10	12 RM
Back	3.Pull up (wide grip)	6	N	BW
Shoulders	4.Seated dumbbell press	3	10	12 RM
Shoulders + traps	5.Upright rows (barbell)	3	10	12 RM
Abs	6.Crunch	3	10	15 RM
Abs	7.Side bridge (standing)	3	10 seconds	

Program 2 - Bodybuilding

4 days a week AB/AB Monday, Tuesday, Thursday, Friday

Monday, Wednesday, Friday, Sunday, etc

Do not forget about warm up; warm up sets do not count in the overall program sets number.

Training 1(A)

Muscle group	Exercise	Sets	Repetitions	Load
Legs	1. Barbell squat	6	10	12 RM
Quadriceps	2.Knee extension	3	10	12 RM
Hamstrings	3.Knee flexion	3	10	12 RM
Triceps	4.Dips	4	N	BW
Triceps	5.Lying triceps extension (EZ barbell)	4	10	12 RM
Biceps	6.Standing barbell curls (Straight barbell)	4	10	12 RM
Biceps	7.Seated dumbbell concentration curls	4	10	12 RM
Lower back	8.Back extension (Roman chair)	4	10	15 RM
Calves	9.Calf raises (standing)	5	15	15 RM
Calves	10. Calf raises (seated)	5	15	15 RM

Training 2(B)

Muscle group	Exercise	Sets	Repetitions	Load
Chest	1.Incline barbell press	4	10	12 RM
Chest	2.Horizontal dumbbell press	4	10	12 RM
Chest	3.Standing cable cross over	4	10	12 RM
Back	4.Pull up (wide grip)	6	N	BW
Back	5.Bent over row (one arm, supported)	6	10	12 RM
Shoulders	6.Seated dumbbell press	3	10	12 RM
Shoulders	7.Standing dumbbell flies	3	10	12 RM
Shoulders + traps	8.Upright rows (barbell)	3	10	12 RM
Abs	9.Crunch	4	10	15 RM
Abs	10.Side bridge	4	10 seconds each side	BW

Training 3(A)

Muscle group	Exercise	Sets	Repetitions	Load
Legs	1.45 Leg Press	3	10	12 RM
Lower back	2.Deadlift	3	10	12-15 RM
Quadriceps	3.Sissy squats	3	10	12 RM
Hamstrings + lower back	4.Straight legs dead lift	3	10	12 RM
Triceps	5.Narrow grip horizontal barbell bench press	4	10	12 RM
Triceps	6.Standing cable triceps extension (EZ barbell)	4	10	12 RM
Biceps	7.Standing dumbbell curls	4	10	12 RM
Biceps	8.Scott bench barbell curls	4	10	12 RM
Calves	9.Calf raises (standing, one leg)	5	15	15 RM
Calves	10. Calf raises (seated)	5	15	15 RM

Training 4(B)

Muscle group	Exercise	Sets	Repetitions	Load
Chest	1.Horizontal barbell press	4	10	12 RM
Chest	2.Incline dumbbell press	4	10	12 RM
Chest	3.Standing cable cross over	4	10	12 RM
Back	4.Lat pull down (V grip)	6	10	12 RM
Back	5.Seated row (parallel grip)	6	10	12 RM
Shoulders	6.Seated dumbbell Arnold press	3	10	12 RM
Shoulders	7.Behind neck barbell press (seated)	3	10	12 RM
Shoulders + traps	8.Upright rows (barbell)	3	10	12 RM
Abs	9.Crunch	4	10	15 RM
Abs	10.Side bridge	4	10 seconds each side	BW

Strength developing program

4 days a week, 8 weeks cycle

Every week increase your load, so in the first week you start at 8 RM and in the 8th week you go up to 1 RM.

After you go 5 RM, start to add 2 more sets for each exercise (10 reps/ 12 RM load) after the program sets in order to maintain some training volume. By the end of this cycle your 1 RM should increase.

Training 1 and 2 of every week you go to the max (6 Reps with 6 RM load); training 3 and 4 you hold yourself back a little, up to 80% (6 Reps with 8 RM load).

Do not forget about warm up; warm up sets do not count in the overall program sets number.

When you main goal is strength development, you should rest more between sets (2-3 min) and 3-5 min between exercises.

Eight weeks cycle

Training 1(A)

Muscle group	Exercise	Sets	Repetitions	Load
Legs	Barbell squat	6	8 > 1	8-1 RM
Hamstrings + lower back	Straight legs dead lift	6	6 > 2	8-4 RM
Triceps	Dips	6	8 > 4	8-4 (add weight)
Biceps	Standing barbell curls	6	8 > 4	8-4 RM
Calves	Calf raises (standing)	6	10	10 RM

Training 2(B)

Muscle group	Exercise	Sets	Repetitions	Load
Chest	Horizontal bench press	6	8 > 1	8-1 RM
Back	Pull up (shoulder width supine grip)	6	8 > 1	8-1 RM (add weight)
Shoulders	Standing front barbell press	6	8 > 1	8-1 RM
Abs	Crunch	4	10	10 RM (add weight)
Abs	Side bridge	4	10 seconds each side	BW

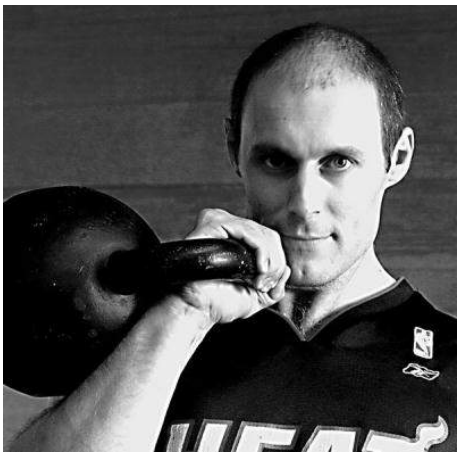
Training 3(A)

Muscle group	Exercise	Sets	Repetitions	Load
Back	Deadlift	6	8 > 1	8-1 RM
Legs	One leg pistol squats with weight	6	6 > 2	8-4 RM
Triceps	Narrow grip horizontal barbell bench press	6	6 > 2	8-4 RM
Biceps	Standing dumbbell hammer curls	6	6 > 2	8-4 RM
Calves	Calf raises (seated)	6	10	12 RM

Training 4(B)

Muscle group	Exercise	Sets	Repetitions	Load
Chest	Incline barbell press	6	6 > 2	8-4 RM
Back	Pull ups wide grip pronation	6	6 > 2	8-4 RM(add weight)
Shoulders + traps	Upright rows (barbell)	6	6 > 2	8-4 RM
Abs	Crunch	4	10	12 RM
Abs	Side bridge	4	10 seconds each side	BW

Kettlebell training - A complete basic guide



Kettlebell training

1. Kettlebell introduction
2. Kettlebell drills
    1. Kettlebell swing
    2. Kettlebell standing press
    3. Kettlebell windmill
    4. Kettlebell snatch
    5. Kettlebell clean and jerk
    6. Kettlebell Turkish get up
    7. Kettlebell side press
    8. Kettlebell two hands anyhow
    9. Kettlebell squat
    10. Kettlebell floor press
    11. Kettlebell bent over row
    12. Kettlebell gladiator row
    13. Kettlebell passes between the legs
    14. Kettlebell side bridge side press
    15. Kettlebell single leg deadlift
    16. Kettlebell crunch
3. Kettlebell training safety rules
4. What size kettlebell should I start with?
5. Kettlebell training programs

Kettlebell introduction

The kettlebell is a big old canon ball with a handle. In this article I will also call the kettlebell, KB.

The kettlebell is one of the first tools for strength training, with a history of more than 300 years. It originates in Russia and also China has a very similar training tool called “Shi Suo” – Stone Lock.

Traditionally it came in 3 weights multiple of one pood（one, one and a half and two poods）: 16 kgs, 24 kgs, and 32 kgs. Now you can find it in any weight multiple of 2 kgs from 2 kgs to 90 kgs.

The kettlebell is a jack of all trades; pure strength, power, strength endurance, cardiovascular endurance, and even flexibility all these qualities can be trained with a kettlebell. You can shred your fat in no time and build impressive muscles as well with a kettlebell.

The kettlebell belongs to the free weights category of training equipment.

What is it special about it, compared with a dumbbell?

Mainly its shape with the **offset center of gravity**. Because of this the kettlebell it is unparalleled for:

1. Ballistic drills like Swing, Snatch and Clean and Jerk which develop full body power and a vice like grip.
2. Grinding drills like Shoulder press, Turkish stand up, Windmill and Bent press for unyielding core strength.
3. High intensity explosive cardio - again with Swing and Snatch

Unlike bodybuilding, with a KB you do not train muscles, but movements, building a solid foundation of functional strength.

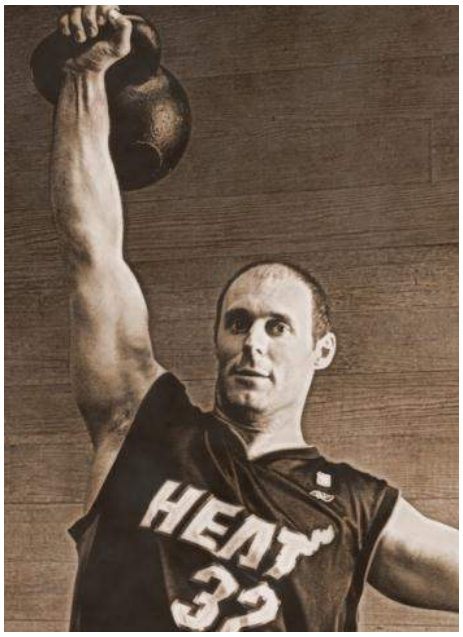
The kettlebell should be the first tool of choice for superior conditioning for combat fighters (judo, wrestling, sambo, boxing, MMA), rugby players, American football players, tennis players, skiers, firefighters and many other athletes competing in different sports.

The kettlebell is the best home gym you will ever find. You can get a very good training in quite short time.

Enough with the talk, let's get to facts:

I will explain most of KB specific moves. Theoretically you can also do them with a dumbbell, but the feel, the balance and the safety are no match compared with KB moves.

Of course with a kettlebell you can also do the traditional exercises you usually do with a dumbbell: flies, curls, extensions, etc. I will skip these drills for now because they are no different than traditional dumbbell training.



Kettlebell swing

This drill mostly involves your hamstrings, but also the glutes, lower back, spinal erectors, upper back postural muscles and the forearm flexors are involved.

The swing is excellent to train your hip power thrust for jumping, throwing, running and punching. Training swings it will also improve the depth and the strength of your squat and deadlift. This drill improves hip flexibility.

It will melt the fat off your body and also give you a back of steel.

You can use this movement as a power and strength drill swinging a big KB for sets of 6-15 Reps or as a stamina exercise using a lighter KB for extended sets between 100 and 1000 reps. You can have a little rest in between if you need.

You can do swings with both hands on one KB, with one hand, or with two hands and two KB's.

Correct execution:

1. Squat stance or a little wider
2. Place a KB 15 cm in front of your feet
3. Reach the KB, push your chest up, look forward
4. Start by swinging the KBl back between your legs
5. With a forceful hip thrust project the KB in front of your chest
6. You can throw it to chest level, head level or as high as possible (be careful on the top not to tip the KB overhead)
7. Let it fall freely between your legs, while bending at the hips; keep your head up all the time
8. Let the bell load your hamstrings and swing it again…and again…and again

Execution tips

1. Look ahead all the time. If you do not look ahead, your back will round.
2. Your arms and shoulders do not use strength at all; they are like 2 ropes hanging from your shoulders. All the power comes from the hips. When you are using your shoulders to lift the KB, the bell will not be in line with your arms
3. Keep your shoulders relaxed; do not bring them up to your ears
4. Do not break the KB fall. Let it fall back and load you hamstrings like pulling an elastic band
5. Push forcefully with your hips forward and up like for a standing long jump. Remember that this drill is an EXPLOSIVE drill.
6. When the bell is high, your knees are straight and hip extended
7. Keep your abs tight
8. Expire on the top as you would be punching
9. Do not grip the bell with strength, just hook it

How to do a perfect swing?

1. First learn to bend at the hips by placing your hands in the hip crease
2. Keep you back straight and head up
3. Straight back means a neutral spinal curvature and not an erect back
4. Your knees do not bend too much, just about 150 degrees like when doing Romanian deadlifts
5. You could also perform this movement bending your knees like in a squat, using your quads; it is not wrong, but this is not how this movement should be done
6. Feel your hamstrings stretching
7. Your shins are vertical all the time
8. Practice some jumps high and forward (without the kettlebell) – get the feel for hip thrust
9. Use a towel to swing the KB

Swing with a towel or a rope to learn how to swing using your hips

Now you are off for a perfect swing

Frequent mistakes:

1. Going forward with your knees when you bend down
2. Using shoulders strength when swinging the bell up
3. Not extending completely your hips and knees when you go up
4. Leaning back when you go up
5. Looking down when on the bottom of the move; this will cause you a round back
6. Not letting the kettlebell swing down freely by slowing it down
7. Gripping the KB handle with a tight grip
8. Projecting the bell forward too much; you will feel that the bell pulls you forward.
9. The hip thrust is not explosive. This drill should have continuity and power. Compare it with rope jump or bag punching. Swing back, load your hamstrings, reverse the move, snap your hips, project the bell forward and up, maintain good posture, let the bell fall down freely, but maintain good posture.

Mistakes pics

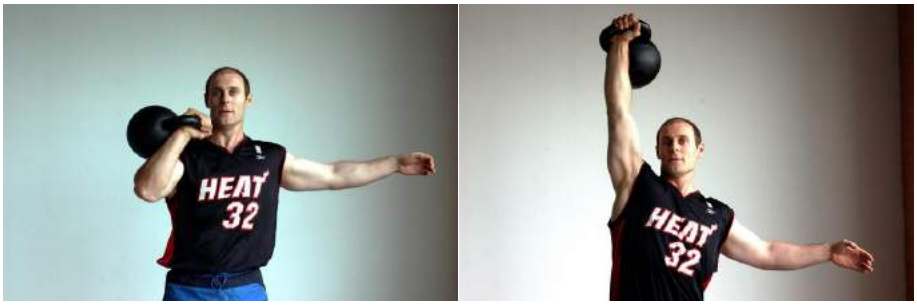
Mistakes pics

You can then practice how to change your hands when swinging the KB. Changing hands will help you perform much more swings at once, compared with not changing hands.

On the top of the move, the KB stops before starting to descend; this is when you switch hands from above.

The KB handle is almost never free; your top hand comes on it immediately as the hand which holds the KB leaves the handle. If you exercise outside on grass or on sand feel free to juggle with the kettlebell as you wish. Do not juggle the KB at home or in the gym.

Kettlebell standing shoulder press



This is one of the best exercises available for training your shoulders and your core strength. Kettlebell standing press it will improve your over head lifting ability.

Correct execution

1. Take a shoulder width stance
2. Clean the KB to your shoulder in the Rack position (check the Rack from the Clean and Jerk). If you can not do a perfect clean, just take it to your shoulder using both hands.
3. Press the KB above your head until your elbow is straight
4. Bring it down to your shoulder slowly

Execution tips

1. Do not lean backward too much when you press
2. If the KB it is very heavy you can bend laterally while twisting your hips

3. Keep your knees straight
4. For optimal leverage, when pressing take the KB outside the shoulder a little and then up; do not take it straight up from the chest

Performance tips

1. You need a rock solid foundation. Legs muscles are contracted.
2. Contract your glutes, as you would pinch a card between your cheeks. Tense your abs as you would brace for a punch. These two muscles will act like a belt for your lower back, stabilizing it.
3. Your torso should be hard, erect and stable.
4. Shift your hips slightly laterally and forward so the kettlebell body is above your center of gravity.
5. Squeeze the handle "to squash the juice out of it".
6. Pull the KB down with your lat like when you do pull ups.
7. Keep your breath as you start pushing; when the KB is above your head, breathe out until you reach the top of the move. Inhale sharply as you lower the KB.

Frequent mistakes

1. You do not maintain a rock solid foundation by contracting your legs, buttock and abs
2. Your wrist is not straight
3. You lean backward too much when pressing
4. Not pressing the KB up using the best path of movement

Mistakes pics

Mistakes pics

This is a strength drill and it should be usually done in sets of 1-6 Reps.

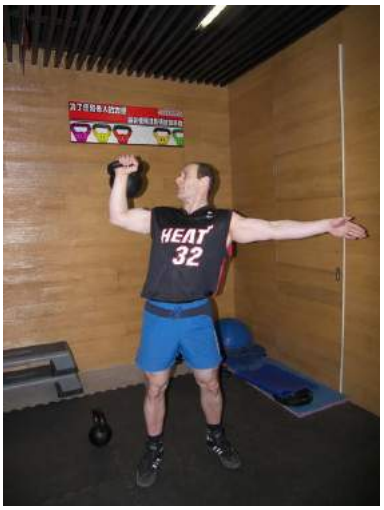
In the beginning do the press with one bell and one arm.

Later do 2 KB, 2 arms presses. You can do it simultaneously or like a seesaw.

You can also press one bell with two hands bottom up.

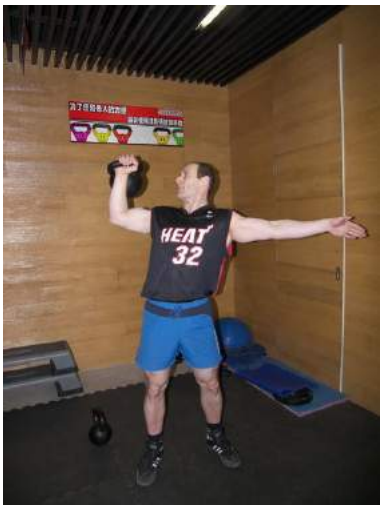
To increase the difficulty you can do:

Yielding press



Choose a heavy KB you can not usually press, lift it with a jerk and bring it down under control.

Pause press



Stop the movement on your way up and on your way down.

Palm press

Keep the kettlebell on your palm and press it overhead. Pay very much attention to the KB balance. This drill is good for your palm muscles and improved balance.

Strange grip presses

Grip the bell by the side of the handle with its bulk on the thumb side. Squeeze the handle hard and lift. Then try to hold the kettlebell with its bulk on your little pinky side.

Another unusual grip is with **the body of the kettlebell inside your forearm**. This grip is very challenging for the thumb.

Bottom up press

Clean a bell bottom up and lift it above the shoulder in a controlled manner. Squeeze the handle as hard as you can. This drill will also strengthen your forearm muscles and it will also improve

your shoulder press technique. Take care and be aware that the KB might flip down.

Kettlebell windmill

A back of steel, T-Rex torso strength with unbreakable shoulders are the normal outcomes of practicing windmills. This exercise involves the hamstrings, glutes, obliques, abs, transversals, quadratis lombaris, spinal erectors, lats and shoulders. It is a functional exercise which will improve your core strength, upper body stability and the shoulder joint structure and strength. Also your balance and coordination will improve along with your flexibility.

Fighters, basketball players, rugby players, swimmers, gymnasts, golfers, weight lifters will get specific benefits from the windmill.

Correct execution

1. Stand with a shoulder width stance
2. When holding the KB in the right hand, turn your right foot 45degrees to the left and the left one almost 90 degrees to the left
3. Lock the ball vertically above your right shoulder
4. Twist your hips toward left

5. Bend from your hips to the left while maintaining the KB locked vertically
6. Go as low as your flexibility allows you, while maintaining a straight torso
7. Get back to the starting position and repeat

Execution tips

1. Keep your wrist straight and your elbow locked from the beginning of the set until the end
2. Keep in mind that this move happens around the hip joint and not in the spine
3. Keep your eyes on the bell, especially as you go down
4. Maintain a controlled tempo of the movement
5. Do not bend the back knee; you can bend the forward knee

Performance tips

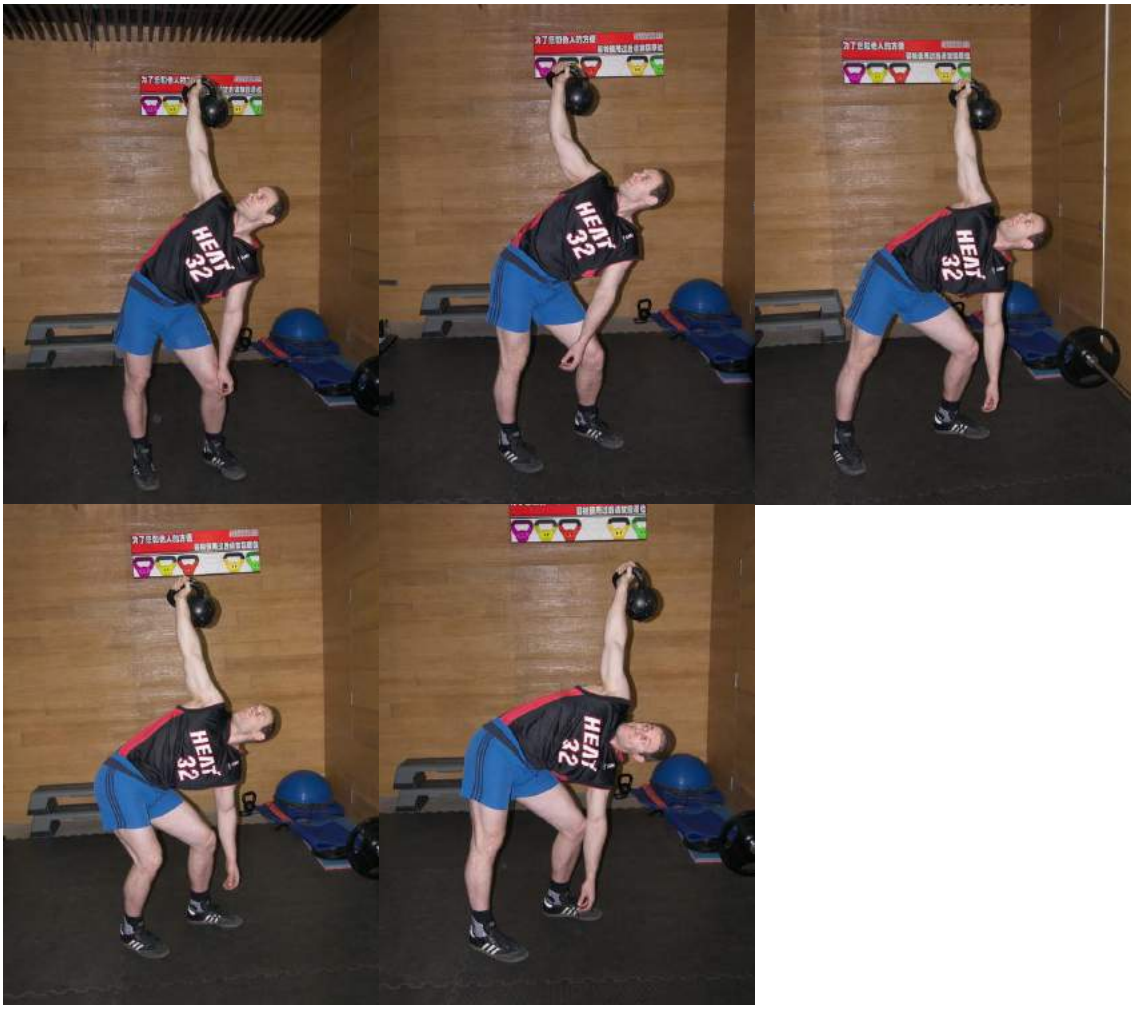
1. Exhale as you go down, keep your breath when you reverse the direction of the movement and exhale as you reach the top
2. Your back leg is about vertical to the ground and your center of gravity falls between your feet
3. As your torso approaches the parallel position with the ground, leave the bell a little behind just above your lower ribs, keeping it above the center of gravity; if you go with the bell above your shoulder, you risk losing it to the side

Frequent mistakes

1. Not maintaining a straight wrist
2. Your feet are oriented forward
3. You lean on your waist and not with your hips
4. Not maintaining the elbow lock throughout the drill

5. Allowing the kettlebell to go too much on a side when going down
6. Not bringing your arm toward your ear when going up

Mistakes pics



Mistakes pics

The windmill should be done with a heavy weight for 1 – 6 repetitions.

The classic version is the one arm windmill. As you progress you can do:

Two KBs windmill with the second KB down between your legs. You should try this version when the biggest kettlebell is not heavy enough for your strength

Kettlebell snatch

The snatch goes beyond the swing. Besides the benefits of the swing, your upper back scapular muscles receive extra training and the elbows and shoulders gets accustomed with shocks and impacts.

Your grip supporting strength will also be challenged to its limits. This aspects makes the snatch a great movement for fighters, tennis players, weight lifters and anyone who needs good body posture and

superior grip strength and endurance.

The snatch is such a great exercise that you can even dedicate whole sessions just for it. It delivers all the Olympic weightlifting benefits, but it is much easier to master and execute.

Correct execution

1. Starting with a swing, finish by locking the KB above your shoulder
2. Do not lean backward
3. On the top of the move, your knees, hips, shoulder and elbow are all locked

Execution tips

1. After you swing the KB on the bottom of the move, start to pull it with your elbow high, closer to your body than when doing the swing
2. Use the strength of your hips and your quads
3. Maintain a normal spinal curvature at all times
4. After you lock the KB above your head stop the move for half to one second

Performance tips

1. With heavy KBs control them by keeping them not too far away from your body

2. Use just enough strength to have the KB reach the top of the movement; there is no use to put in too much power to need to hold the KB back before you reach the top
3. Brace your abs and squeeze your glutes on the top of the movement
4. Do not let the KB hit your forearm; punch obliquely up when the KB turns around and meet it halfway. Another variation is to let the KB go around your hand.
5. After your reach the top of the movement, start to flip the KB down from the top
6. When using a heavy KB you can let it first down to your shoulder and then down between the legs. This way you will avoid too much inertia from the kettlebell which might rip your calluses.
7. When using a very heavy kettlebell you can squat down as you pull the KB up, catching it overhead the same as Olympic barbell snatch.
8. Always keep you head up.

Before starting to practice the snatch, start by doing high pulls. After that practice the kettlebell flip on the top of the move. The high pull can be well used as a drill by itself.

There are two kinds of snatches: the swing snatch and the dead snatch. When doing the dead snatch you do not swing the kettlebell between your legs. The dead snatch loads more your traps and it is more explosive than the swing snatch.

Frequent mistakes

1. When bringing the KB up you flip it with a bent elbow and then press it up. When doing the snatch you should lock your elbow as you flip the bell.
2. Not looking forward.
3. The KB pounds your forearm after the flip.
4. You handle a heavy KB at arm length. A heavy KB should be tamed closer to your body.

5. When you bring the KB down, you do not flip it from the top and flip it at once at waist level. This way you may easily damage your palms' skin.

Mistakes pics

Mistakes pics

You can perform the snatch for explosive strength using heavy weights for 1-6 reps or for explosive stamina.

As an advanced exercise you can try KB double snatch simultaneously with both hands.

For stamina begin with 3-5 sets of 20 reps, then go up to sets of 50, 100, 200, 300 reps.

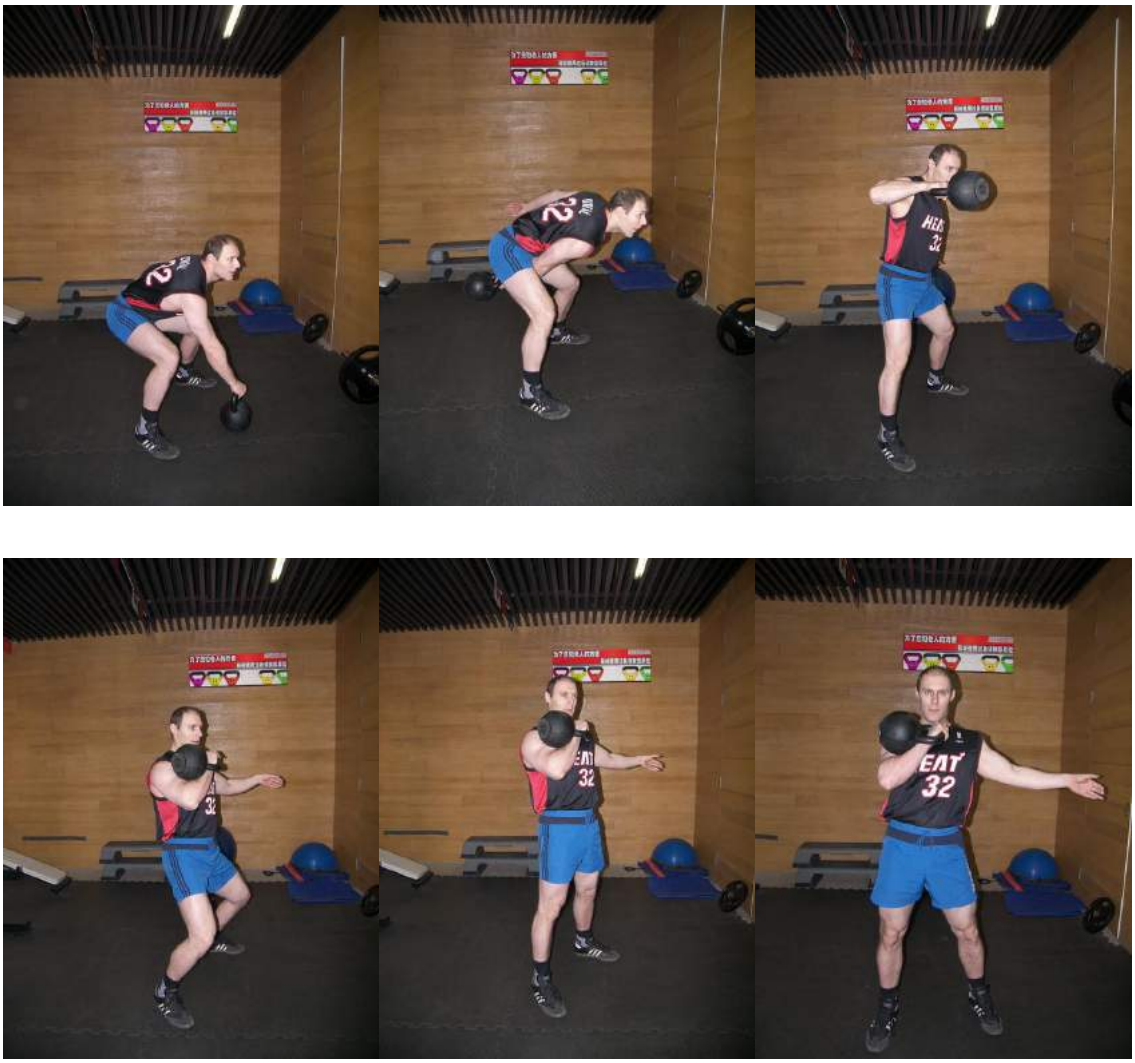
If you train for events with rounds of 5 minutes, you can make your training sessions more specific:

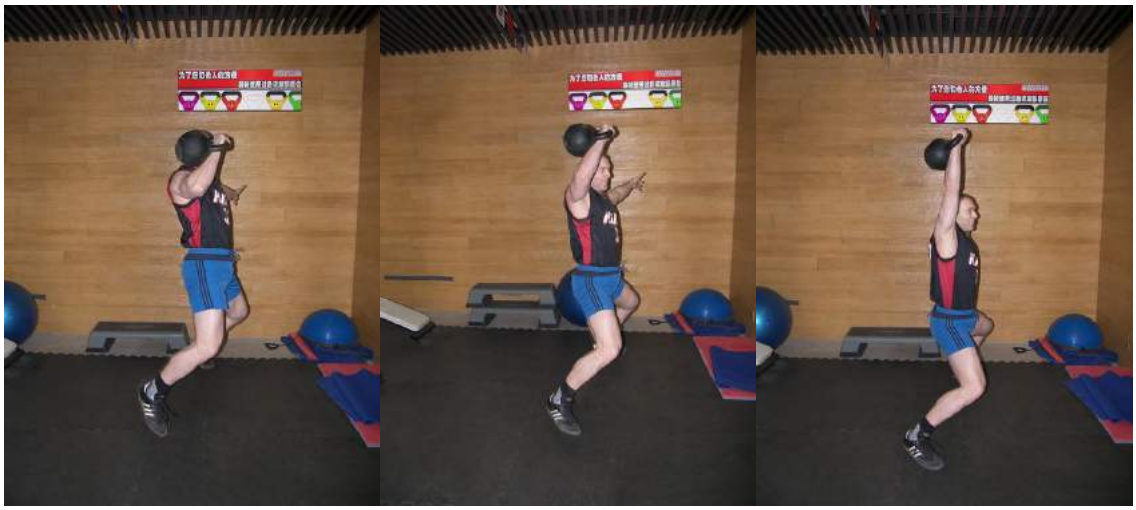
Begin with 3 sets x 1 minute than 5 x 1, 3 x 2, 5 x 2, 3 x 3, 5 x 3, up to 3 sets x 5 minutes. Rest about 1 minute between sets.

You can combine swinging snatches with swings with one or two hands for longer drills.

Take your time when learning the snatch. It is a complex drill and you have a lot to learn and experiment until you get the feeling of a perfect snatch.

Kettlebell clean and jerk





As the name implies this exercise consists of 2 moves done in succession: the clean and the jerk

If you want “the most bang for your buck” you got it with the Clean and jerk: full body strength, explosion, core strength, and joints stability, this exercise delivers them all. Calves, hamstrings, quads, glutes, lower back, spinal erectors, lats, upper back muscles, traps, shoulders, brachioradials, forearms, you name it, all these muscles get their share of effort and the benefits that come with.

You can do sessions just with Cleans and Jerks, go back home and get a good rest, because you trained well and you will soon see the results.

The clean

1. The same starting position like for the swings
2. Start with a swing, but as the KB goes up, pull it close to your body and **rack it** to your shoulder

The rack

1. Shoulder width stance, knees and hips are locked
2. Squeeze you glutes, brace your abs, and do not exhale
3. Let your shoulders relax, with your hand holding the bell next to your chin, and you elbow pointing downward
4. If you are a well equipped lady (you should know what I mean here), bring your elbow and the KB outward a little
5. The KB rests between your upper arm and your forearm, your arm leans on your ribs
6. Your wrist is straight all the time
7. Your hips come slightly forward under the KB

You can start with the KB in front of your feet, with the KB between and behind your feet, or just between for a "dead clean".

Correct execution

1. The clean should be an explosive move; the KB passes your waist and then goes up with the inertia it received from the explosive lift.
2. Extend your knees and your hips, get up on your toes, with the elbow away from your body
3. Look forward and keep your back straight; do not lean backward
4. When the KB lands on your shoulder bend your knees, bring your elbow up to let your upper arm meet the bell and let just a little bit of the air inside your lungs get out like through a valve; this is your natural shock absorption. The KB should not hurt your shoulder at all
5. The KB goes around your hand and not above it
6. Your hand does not grip the KB forcefully, it just hooks it

You can do double cleans with 2 KB's simultaneously or alternately.

The clean can be a very effective drill practiced by itself.

Frequent mistakes

1. The bell comes down striking your shoulder. When the bell lands on your shoulder it should land down smooth and slow
2. You try to muscle up the KB using your arms. The clean uses your legs and back and not your arms.

The jerk

1. Grip the KB deep, with the handle close to your wrist.
2. Almost all the strength of the jerk should come from legs.
3. Dip a few centimeters and then explode up; you can even do it with a jump.
4. Look forward
5. Push the body of the KB with your shoulder and your chest to accelerate it up; do not let the weight of the KB on your arm
6. If the KB is very heavy you can dip again to catch it with your elbow straight
7. Extend the elbow on the top, forcefully contracting your triceps and your biceps
8. Keep the shoulder in its socket
9. When bringing the KB down to your shoulder use the same shock absorption technique as when cleaning

Frequent mistakes

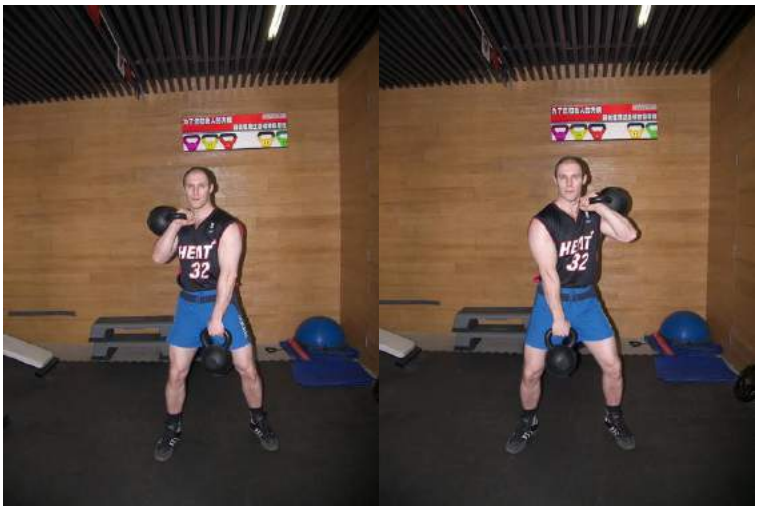
1. You push the kettlebell up, instead of jerking it; the jerk is stronger than the press.
2. You do not rack the KB well and its weight falls more on your arm than on your torso.
3. You do not coordinate well the upper body with your lower body; you should press the bell up when it feels the lightest, after the knees extend completely.

Perform the clean and jerk as a power move with sets of 1 – 6 reps. You can also do more reps, up to 20 – 30, but also with a rather heavy KB and not with a very light one. You can take your time in between reps, keeping the KB in the rack.

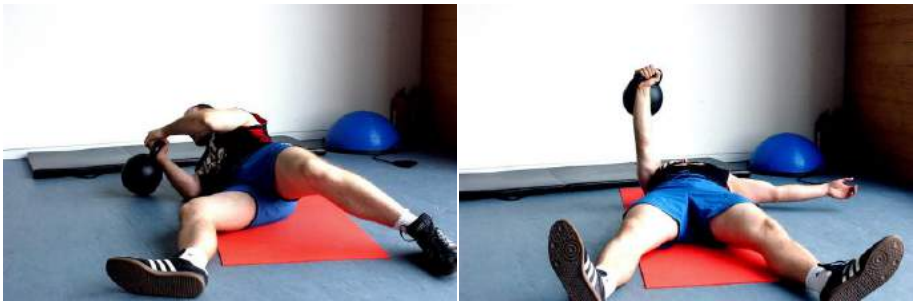
The move is not as fluid as the snatch or the swing and hundreds of reps do not feel as good.

Of course you can perform the Clean and the Jerk as separate moves.

In the picture you see Double Kettlebell Alternate Clean.



Kettlebell Turkish Get Up






If you train to improve your athletic performance and not just to improve your looks, then this drill is for you. The Turkish Get Up will improve your abdominal strength and stability and will toughen up your shoulder joint. Good balance and coordination are also expected outcomes after training this drill.

Correct execution

1. Lie on the floor with one KB next to your shoulder
2. Pick it up and press it
3. Lock the KB above your shoulder
4. Stand up maintaining the KB locked above your shoulder at all times
5. Come down to the starting position

Performance tips

1. When you pick the KB up, rotate your upper body and grip it with both hands

2. When you lock the KB above your head, contract your biceps and your triceps and push with your shoulder at all times
3. Keep the wrist which holds the KB straight
4. Keep your eyes on the KB throughout the drill
5. When starting the lift with the KB on your right hand put your left elbow and forearm on the floor and pivot with your torso around them, while pushing the ground with your right heel with your knee bent
6. Make the transitions from lying to standing and back as smooth as possible
7. If you can not hold the KB up, just divert it from above your head and take it down to the floor

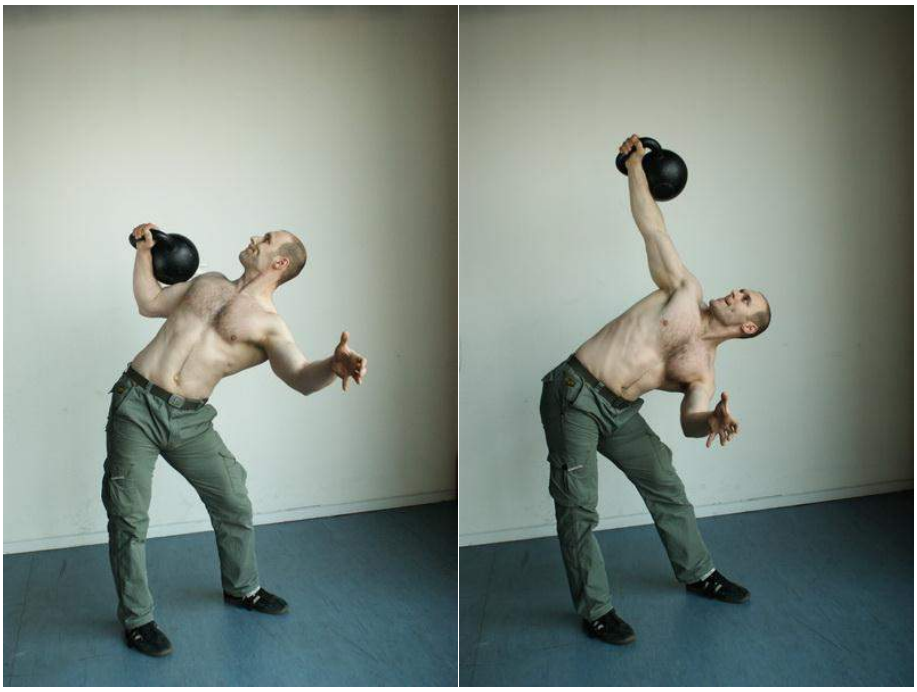
Frequent mistakes

1. You fail to maintain the elbow lock throughout the drill.
2. You do not make the transition from seated to the standing position and back smoothly
3. You fail to keep the arm with the bell vertical

Perform this drill for sets of 1-3 reps for each side, alternately or not.

There are two variations of the TGU: the squatting variation and the lunge variation.

Kettlebell side press



The side press is a combination of a shoulder press and a windmill. This drill delivers good results for your shoulders, lats, abs, obliques, spinal erectors, and also improves hip stability. This was a favorite of old time strongmen, and was often used in public strength shows. This move, as with the windmill, is not for your looks, but for your performance. Before going for the big bent press be sure that you master perfectly both the shoulder press and the windmill.

Correct execution

1. Start with the KB in a rack, like for shoulder press, but with your feet and hips in the same starting position as when doing the windmill
2. As you lean your torso down from your hips, press the KB up
3. This exercise ends in the bottom windmill position

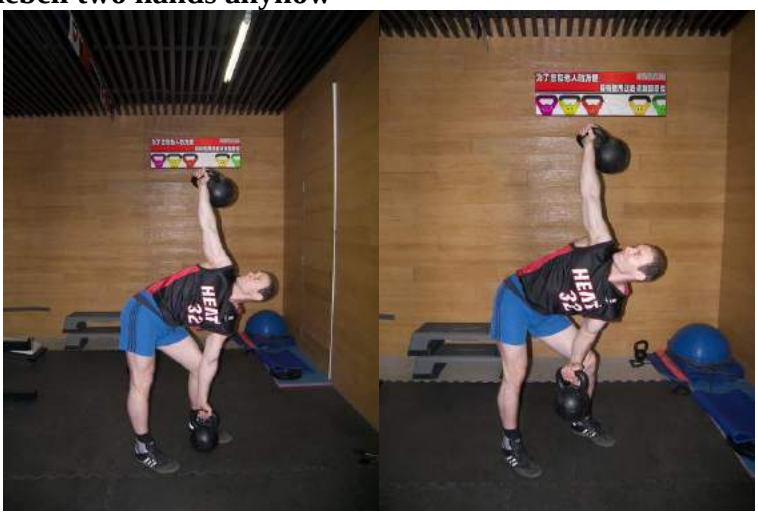
Performance tips

1. Breathe in as you lean your torso down
2. Flare your working arm lat as you go down

3. Keep your eyes on the KB
4. Find the optimal ratio between push and bend
5. As you go down keep the KB above your center of gravity and not above your shoulders

Train this exercise using low reps between 1 and 6. Maintain a slow tempo.

Kettlebell two hands anyhow



This drill was again a favorite of old time strongmen. Arthur Saxon performed this drill using 465 pounds (210 kg) about 100 years ago. His stunt may never be equaled.

Take two kettlebells. The big one should be bent pressed.

Keep a second KB on the floor between your feet. When you reach the bottom position of the bent press, grab the KB from the floor, curl it to your shoulder stand erect and lift it overhead.

Perform this “stunt” for 1-3 reps.

Kettlebell squat

Comparative with the classic barbell behind back squat, the KB squat taps more your core strength and allows for a better functional strength transfer from the weight room to the sport arena.

Double KB squat - with one KB on each shoulder

1. After cleaning the KB's on rack position, bring your elbows outward and rest the KB's on your shoulders
2. Squat as low as you can while keeping your back straight
3. Strongly tense your abs

Perform sets of 3 – 8 reps.

Single KB squat – with the KB on one side on one shoulder. Perform sets of 3 to 8 reps.

This move will challenge your obliques and side spinal muscles

Single KB squat – with the bell between your legs.

This exercise is very easy to perform correctly, much easier than the classic barbell squat. I recommend it for beginners, especially women. For better depth stand on two wooden boxes or aerobic steps.

Perform sets of 1 to 8 reps.

As a more difficult way of training Single KB squat you can hold **one bell in front of your chest with 2 hands**. Perform sets of 3 – 8 reps.

KB single leg squat – this drill is easy on your back, while delivering a killer workout for your legs and glutes. Do sets of 3 – 8 reps.

KB pistol squat

You thought that you can not train your legs properly because the KBs are too light for squats? Well, think again after 5 sets x 5 reps of KB pistols.

If you truly are a world class squatter, double KB pistols squats will tame you too.

Perform this drill for sets of 1 – 5 reps.

Kettlebell floor press

You can train your chest stronger and bigger too using KBs.

You can perform this exercise with one or two KBs.

1. Lie on the floor with the KB's beside your shoulder
2. Twist your torso and grab one KB with 2 hands – take the KB on your week side first
3. Keep the KB close to your chest and take it up for the starting position (fig2)
4. Take the KB from your strong side, keep it close to your chest and bring it up
5. Push the KB's up
6. Lower the KB's until your arms rest on the floor; your forearms are perpendicular on the ground at all times

7. The groove for this move is with elbows closer to the ribs compared to dumbbell press
8. Take care not to twist your shoulders when you take the KB's up or put them down

This is a strength and hypertrophy exercise. Do sets of 1 – 8 reps.

Kettlebell bent over row

This drill is the same as performed with a barbell or dumbbells, except that the KBs are between your legs

1. Do this exercise with a sumo stance
2. To involve more your lower back make the double KB's row, or when performing single KB rows, do not support your upper body with the other arm
3. If you can not make the move right without supporting your upper body, you can do it by placing your empty hand or your elbow above your knee

Perform 1 – 8 reps as a strength and hypertrophy drill.

Kettlebell gladiator row

Train your back, your chest and your core with one drill.

1. Take a push up position with your hand on two KB'ls handles
2. While pushing one KB into the ground, row the other
3. Keep your abs and your hip flexors braced at all times
4. Keep your head in line with your torso

You can do one set on one side and then for the other side, or you can do alternate rows

Pay attention to the balance; do not flip the bell and hurt your wrist

Perform 3 – 6 reps for each side as a core strength and dynamic balance drill.

Kettlebell passes between the legs

1. Take a KB and from a bent over stance, pass it between and around your legs. It is like you would pass a basketball.
2. Your spine is slightly bent, but you are braced at all times

This drill works your spinal erectors and your abs

Perform this drill for time: 10 – 30 seconds.

Kettlebell side bridge side press

1. Place a big kettlebell on the ground. Place your hand on the KB body, inside the handle. While keeping your body straight lay on one side with your arm extended.
2. Take a lighter kettlebell with your free hand and do side press.
3. Contract your abs and your glutes; look forward at all times.
4. Pay attention not to flip over the KB from the floor.

This drill will enhance your balance and improve your core strength and shoulder stability.

Do 3 – 8 reps per set.

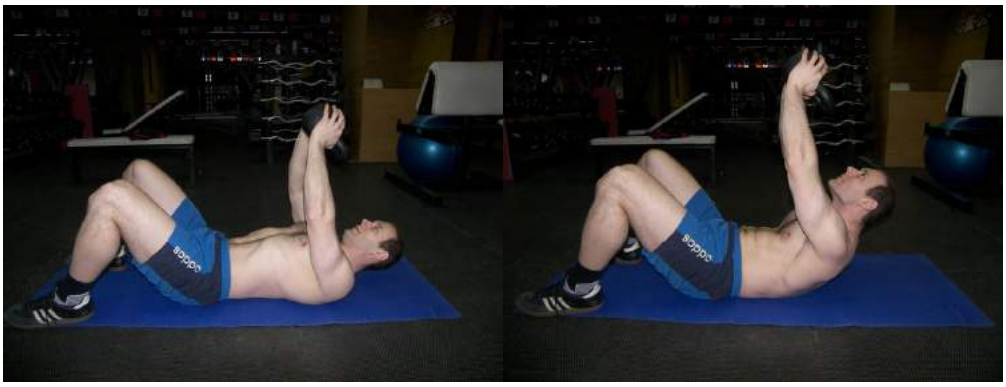
Kettlebell single leg deadlift

1. Take one kettlebell in each hand.
2. While maintaining good posture bend at hips and slide your back leg backward
3. Keep the front knee slightly bent and keep the KB‘s close to your front leg at sides
4. Look forward at all times

With this drill you train your hamstrings, glutes, lower back, spinal erectors, upper back muscles and forearm flexors. It is also good for improving your balance and hamstrings flexibility.

Do 3 – 8 reps per set.

Kettlebell crunch



1. Take one kettlebell with both hands and lie on a mat with knees bent at 90 degrees
2. While keeping your lower back on the mat lift your chest up and bring it closer to your pelvis
3. Keep the KB up above your chest

If you want pronounced abs which also perform well try this drill. Do 3 – 10 reps per set.

Kettlebell training safety rules

1. Training with kettlebells requires more skill than training with dumbbells. Take your time and master every drill perfectly. Details are very important.

Master every move perfectly with a lighter KB before going for the bulldog (the 88lbs, 40 kg KB is called a bulldog).

2. Always be aware of your surroundings; pay attention for objects, people, kids and pets.
3. If the KB got out from the perfect grove and the KB starts to fall on the wrong side of your body, do not fight it; get out of its way and lead it to the ground. It might happen while practicing Snatches, Bent press, Shoulder press, Turkish get up, Windmill. Keep your calm and park it.

4. Do not forget that every drill begins when you touch the KB and ends up when you place it back on the ground.
5. Keep your mind on your training. Do not chatter and laugh around while training.
6. Keep your hands dry at all times. If you sweat while exercising, stop if you feel your grip gets loosen up.
7. Keep your wrist straight at all times when loaded.
8. Maintain a good posture throughout the training; do not slouch and bring your knees forward too much.
9. You should never train until total failure with a kettlebell.

What size kettlebell I should start with?

It would be nice to have a full set of kettlebells 4 – 48 kgs (increments of 2 kgs, every weight 2 KB's). However this is not very easily affordable, so in the beginning you can begin with a set of 2 kettlebells.

Choose a big one for strength drills (shoulder press, floor press, bent over row, one leg squat, windmill, heavy snatches, etc) performed for 1-8 reps and another lighter one for endurance explosive cardio drills (swings, snatches, etc) usually performed for hundreds of reps at once.

Your big one should be as heavy as you can almost press it overhead once. For shoulder press start with yielding press, work your way up to normal presses up to 10 reps per set, than increase the difficulty of the drills with the other presses (pause press, awkward grip, bottom up press, etc).

The smaller kettlebell should be half of the weight of the big one.

Alex pressing the 56 kg KB

"The mother of the beast"

Kettlebell training programs

1. Train 2 – 7 days a week
2. Alternate between very high overall intensity, high intensity and moderate intensity training sessions
3. Train 10 – 45 minutes each session
4. According to your level choose between 1 – 6 sets per exercise

Example of training programs

Training A

1. KB swing 2 sets x 20 reps warm up
2. KB shoulder press 3 sets x 5 reps (left/right) 95 % intensity
3. KB squat 4 sets x 8 rep (two KBs on shoulders) 80% intensity

4. KB windmill 3 sets x 6 reps (left/right) 90 % intensity
5. KB floor press 3 sets x 8 reps 80 % intensity
6. KB swing 6 sets x 25 reps 1 min rest in between sets

Training B

1. KB swing 2 x 20
2. KB side press 3 x 5 (L/R) 95 %
3. KB swing 6 x 8 (L/R) 80 %
4. KB Turkish Get up 3 x 2 (L/R) 70 %
5. Pull ups 5 x n (if you are a stud, hook a KB on your belt)

Training C

1. KB swing 2 x 20

2. KB clean & jerk 4 x 5 (L/R) 95 %

3. KB bent over row 4 x 8 80 % (double KB)

4. Dips 4 x 8 80 % (hook a bell on your belt)

5. KB swing 8 x 25 rest one min between sets

Training D

1.KB swing 8 - 15 min Alternate between right hand swings, left hand swings, two hand swings, right hand snatches and left hand snatches.

Training E

1. KB snatch 10 x 5 90 %

In the beginning I suggest to train just one move on each training session. Perform it 8 sets x 3 – 6 reps. Train like this to get the feeling for each drill.

Kettlebell Questions and Answers

1. I trained with barbells and dumbbells for years and I am satisfied with the results. Should I use kettlebells?

I have also trained very well with barbells and dumbbells for years with very good results and now I combine barbells , dumbbells and kettlebells for my workouts.

What do I train and why?

Barbell squats

Barbell deadlifts

Barbell and dumbbells bench press

Pull ups

Dips

Barbell standing curls

Kettlebell swing

– The swing is very good for warm up;

- It improves squat depth and stability at the bottom, by improving your hips strength and flexibility

- I do my cardio with combined sets of swings and snatches

- Swing is very good for posture and forearm strength and endurance

Kettlebell Snatches, Cleans and Jerks

- These 2 drills are so complete and valuable. They really give you the best bang for your buck. If you train for 10 minutes snatches and/or clean and jerks you really train well with good results.

Kettlebell shoulder press – I find this drill much more comfortable than Barbell or Dumbbells Standing Press, because I have better stability, better groove.

Using a bar, because you have to lower it in front of your head it is a little inconvenient for your spine stability and posture, because the bar falls in front of your center of gravity

With dumbbells is better, but it is almost impossible to pick them from the ground and get them into the starting position; with two kettlebells you just clean them with no problems at all.

Kettlebell windmill

I tried this drill with a dumbbell, but the balance is awkward. This drill is very functional and it will do wonders for your core strength and shoulder stability

Kettlebell squat

I do Barbell Squats in one training and Kettlebell Pistol Squats for the next squat training. The pistols are deeper than Barbell Squats and they do not load the spine as much as Barbell squats do.

Double Kettlebell Front Squat – I feel that Kettlebells are way more comfortable in the Rack than a bar and dumbbells

*Women and squat – along the years I have trained a lot of women and very few of them liked the Barbell Squat. I found that almost all the women accept kettlebell squat with the bell between the legs or in front of the chest.

Kettlebell Turkish Get Up

I use this drill once a week or once in two weeks. I find it fun and challenging. The kettlebell balances much better than a dumbbell. Along with Kettlebell Two Hands Anyhow I found this drill is a proof of your strength; you can perform them like a stunt.

The Kettlebell is best for home, it gives you the best bang for your buck, it is time efficient.

Many drills feel about the same even if you use kettlebells or dumbbells , so I pick either: back rows, triceps extension.

Can I lose fat with kettlebells? Shouldn't I do mostly aerobic training?

Kettlebells are the best tool for fat loss, because they can help you burn a lot of calories, while building muscle.

I estimate that 20 minutes of swings are equivalent to 1 hour of running at 7 – 8 km speed.

I am afraid that my hands will develop calluses if I train with kettebells. What should I do?

Increase the weight and do sets of 4-6 reps. Do more swings instead of snatches; when swinging, use a loose grip on the handle. You can also try to use gloves.

Could I use a dumbbell instead of a kettlebell and do the same drills?

Yes, you could. But the feeling and the safety of the drills are much worse with dumbbells, especially for ballistic drills: snatches, swings, clean & jerk.

Buy a kettlebell; the cost should be about the same as for dumbbells.

Alex Moisescu pressing the "mother of the beast". 56 kg kettlebell

Gym rings

The strength training chapter would have not been complete without describing the gym rings training.

Why? Because training with gym rings is simple, efficient and functional.

Almost all drills described here can be also performed using a TRX suspended training system; the ring are still more versatile because they are separated and because are adjustable over a much greater length.

Gym rings can be used by anyone from 65 years old lady just starting to exercise to a world level MMA fighter.

What you need is a pair of good gym rings (search with Google to buy one) or a TRX.

You will perform almost all drills using your own body weight fully or partially; if you feel that you need more intensity, use a weight vest.

The difference between using gym rings body weight drills vs classic body weight drills is that rings are instable and you need more strength and better balance to perform similar drills.

The drills

Squats

The classic squat performed with gym rings is a little easier that free squat and enables you to maintain better upper body posture.

One leg squat – you can help yourself if you need, by pulling on the rings.

Pistol squat – you can help yourself by pulling on the rings

Pistol squat with weight

Push ups

Classic push up (maintain a tight core throughout the drill)

Pike push up – exceptional drill for upper body pushing strength, core strength and stability.

Adjust the degree of difficulty by changing the inclination of you body (walk forward or backward with small steps)

Dips

Dive bomber push ups – work your shoulders and vertical pushing strength

Rows

Rows - adjust difficulty through changing inclination

Pull ups – rotate the handles for different grips

Flies – chest strength and upper body stability

Reverse flies – upper back challenge

The pike – core and hip flexors strength

Reverse knee flexions (hamstrings and glutes)

Biceps curls

Triceps extensions

Use your imagination and come up with more functional drills.

Strength training made simple

If you feel it is too much theory in this book, here is a shortcut to understanding strength training

- Choose almost just basic drills for your strength training routine: squats, deadlifts, KB swings, chest and shoulder presses, pulls and rows.
- Train each body part 2-3 times per week
- Perform 8-12 reps per set if you are after muscle mass and 3-6 reps per set for increasing your strength
- Perform multiple sets for each drill (2 – 6 sets)
- Continuously increase your training intensity: increase the number of reps for the same weight, increase the number of sets for the same drill, increase the training load for each drill, decrease the rest periods between sets
- Train for 30-60 minutes each time

Other effective ways of training for superior physical conditioning

Track and field training

Training like a track and field athlete can do wonders for your physical conditioning; it will help you perform better in every physical task.

These drills will improve your legs explosive strength, your agility, coordination and speed.

You just need to find a good track; look for a school or a university. A park with an asphalted road is also good or an even grass field. You can also do uphill training.

A 2

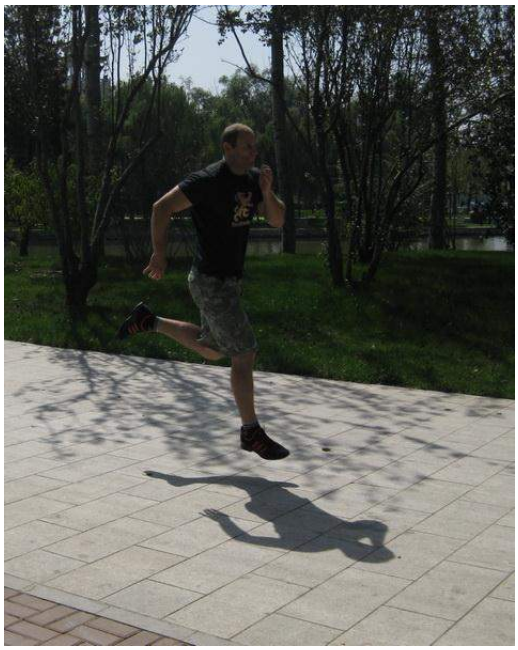
Basic drills

Ankle drill – with short steps, roll your foot from toes to heels; do it with a fast tempo and use your arms too

Heels to buttocks running – keep the palms of your hands behind your buttocks and touch them with your sole of your shoe when running; try to repeat this with the fastest tempo you are able to achieve.

High Knees running – lift your knees as high as possible; do it with the fastest tempo, while actively swinging your arms with elbows bent.

Leaping – a leap is a jump with one foot with landing on the other foot. Lift your forward knee as high as possible.



Accelerated running – accelerate as fast as possible up to your fastest speed, then reduce the speed naturally.

Skipping – a skip is a jump on one foot with landing on the same foot, than the same with the other foot – Left – Left – Right – Right – L-L-R-R... Actively pull your body up with a fast arm movement.

Backward running – lean slightly and run backward.

***All the above drills are done over a 20 – 30 m distance, 3-5 times each.**

Sprints – run as fast as possible, like in a race. You can sprint for distances between 30 – 80 meters 3 – 5 times.

Fast tempo running – run with a tempo fit for a 200 m race. Find your optimal stride. Feel like a deer. Run for 40 – 60 meters 3-5 times.

If you are a stud you can also train **200 and 400 meters with a fast tempo**.

Do track and field training once or twice a week.

Agility ladder drills

Stair training

Optimally find a straight row of stairs with 20 – 50 stairs. You may find them inside a stadium or in a park with hills.

Stair training will improve your legs explosive strength and together with it your jumping ability and muscle mass.

Basic drills

Upstairs sprint – run upstairs as fast you can; come back down slowly.

Hops – jump with one foot; jump 2, 3 or 4 stairs at once. Jump 6 – 10 times for every foot.

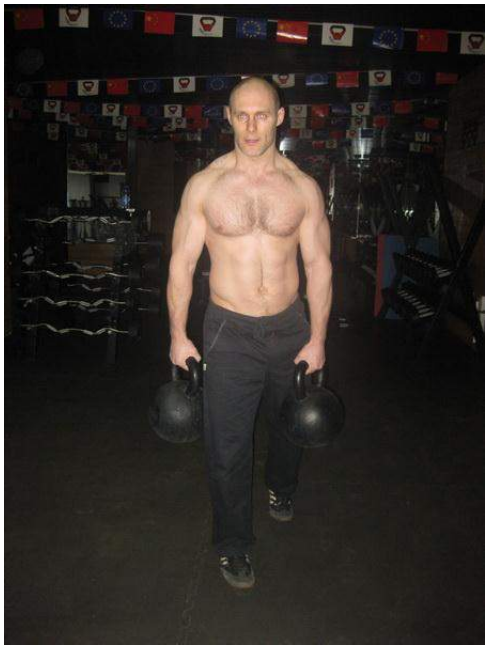
Leaps – jump with the right leg and land on your left; continue with alternate bounds. You can bound over 3, 4, or 5 stairs at once; perform 10 – 16 bounds in a set.

Frog jumps – jump with 2 legs at once, 3,4 or 5 stairs. Do 4 – 8 leaps in a set.

You can also train combinations of leaps and hops.

Do stairs once or twice a week. Perform each drill 3-5 times.

Strongman training



You must have watched World's Strongest Man on TV. You have seen the events. This is how they train. If you want real strength for real world this is one type of training you should

consider. Unyielding core strength, forearms like Thor the God of Thunder, a back of steel and legs to show off, this is what you'll get training like a strongman.

Simply said is like this: If you train like a strongman you'll be one.

Farmer's walk – grab two weights one in each hand and walk for distance (10 – 200 m) or time (10 sec – 2 min). You can also perform this exercise with one sand bag, beer keg or a stone.

Tire flipping – find a huge tire and flip it the park or in your back yard. Flip it 1 – 10 times.

Tire beating – take the same tire you just flipped and hit it with a big hammer. Hit it for reps (20 – 500) or time (20 sec – 5 min)

Sand bag lifting – make a sandbag 40 – 100 kg heavy according to your strength. Fill the bag 70 – 80 % with sand, to make it more challenging to lift. Lift it overhead. Do 1 – 3 reps. With the sandbag you can also train Farmer's walk, you can walk upstairs, you can do squats and one leg squats, and many other drills.

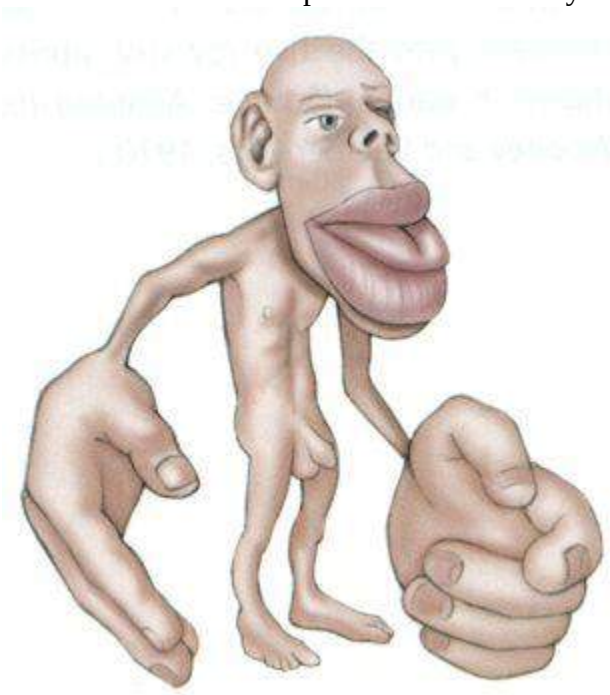
Car pushing or pulling – push your car from behind or tie it with a rope and pull it. If someone would force you to choose just one single drill for your training this one should be it. You will train your calves, legs, hips, abs, spine muscles, chest, shoulders, triceps and hands with this drill. Perform this drill for distance (30 – 1000 m) or for time (1 – 10 min). You can also make a small steel sledge, load it with barbell plates and drag it with a rope while walking forward or backward.

Groom's walk – if the farmer takes heavy bags to walk with, the groom takes his woman. And he takes her upstairs. When for some reasons I skip my squats workout I take my wife on my back or in my arms (as you hold a baby) and I carry her upstairs to the 7^{th} floor where I live.

May strength be with you !

Forearms and hands training

Just take a look at this picture. This is how your brain sees your body.



Homunculus

The reason why your hands are so disproportionately big is because you can do very complicated movements using many degrees of muscle strength: you can pet your baby, you can cut a tree with an axe, you can play the piano or you can stack bags of rice.

Training your hands and forearms will improve your overall strength capacity and athletic performance. You need forearm strength for performing various physical works with tools, and for athletic activities: climbing, judo, wrestling, gymnastics, arm wrestling, tennis, baseball, rugby, hockey, golf, swimming and so on.

If you watch any Strong Man contest you will see that super forearm strength is a must for many events: Farmer's Walk, Hercules' Hold, Atlas Stones, Truck Pulling, Log lifting, Log fighting, Beer keg high throwing, Tire flipping, and others.

There are more kinds of hand strength to be trained:

Crushing strength – you need it when grabbing an opponent, when pulling a very heavy weight, when hand shaking with an "enemy", etc

How to train it?

- Use a Captain of Crush spring device. Train it the same as you train heavy benches or squats: with 3 – 5 sets of 1 to 5 repetitions.
- Crush a ball (like a tennis ball)

"Captain of Crush"

Supporting strength – you need it when carrying heavy weights, when hanging, when training sets of Deadlifts and Bent over rows, etc.

Training

- Do not use supportive gear like straps for deadlifts and for back training

- Perform Farmer Walks – when walking with 2 heavy dumbbells, or kettlebells, or other weights for time (10 sec – 2 min) or for distance (10 m – 400 m)
- Hang on a bar – hang with 2 hands, with or without added weight, or hang with one hand for time (10sec – 5 min)
- Train with a “fat bar” for upper body movements like presses and pulls. A thick bar is 5 cm – 7.5 cm diameter (2-3 inches). A regular bar is 28 mm for the Olympic Weightlifting Bar, or 30 mm, regular training bars.

Fat bar

Pinching strength – when gripping a board or something you can not wrap around with your fingers you need pinching strength which comes mostly from your thumb

Training

- Pinch regular plates stacked together
- Pinch a plate by the hub (the rim around the hole)
- Pinch different objects (stones, iron, wood, etc)

Pinching strength


Lever strength – when using heavy and long objects like an axe, a machine gun, a tennis racket, you need lever strength.

Training

- Clubbells are a fabulous tool for training your forearms, especially the lever strength; check below some basic drills
- Use a lever bar which you can load at one end
- Use a long wooden stick
- Train the leverage strength completely with wrist flexion, extension, radial and ulnar flexion

Clubbell training





How to get a six packs abdominals?

Alex at 10% body fat

I have heard a lot of people saying that their main exercise goal is to get rid of the belly fat and get a flat abdomen.

You can find a lot of articles and even whole books written on this topic.

First let me say it clear: having a nice abdomen shows your whole body fitness condition. You will get nice looking abs when you will have a fit body. If you are severely underweight, you might be satisfied with your tummy even now; but this does not mean that you've got good abs.

You will start to see your abs when your body fat percentage is lower than 12 %. At 8 – 9% you should clearly see your six packs. Below 7% you can shoot photos for fitness magazines.

In order to see the separation lines between the packs you also need some size development for your abs.

Lose body fat and increase your abs muscles size and you will have a 6 pack.

Who has the best abdominals?

Athletes have the best abdominals; track and field athletes, basketball, football, soccer players, bodybuilders, gymnasts, fighters, circus performers almost all of them have awesome six, eight packs strong abs.

How do they train and get such nice abdominals?

They exercise with commitment and discipline; they run, jump, hit and kick; they perform basic and sport specific strength training; they do squats, bench presses, pull ups, dips, etc; they have healthy and balanced eating habits; they sleep well and refrain from smoking and excessive drinking.

Many of them do not do any special abs training or abs exercises.

So what you need to do is to see the whole tree and not just a single leaf. Be committed to training, perform basic strength training and cardio training, pay attention to your nutrition and lifestyle and you will too, have nice abdominals which can be shown at the beach.

Here are some good exercises for the abs

The best exercises for the abs are squats, deadlifts, standing kettlebell presses, standing barbell curls, snatches and clean and jerks.

But because you are looking for some abs exercises here they are:

The Janda sit up – named after the Czech physiologist doctor Janda, this drill really isolates your abs.

Most of abs exercises involve more your iliopsoas than your abs. The iliopsoas is a strong hip flexor running from the lower spine to the femur. In order to isolate your abs, you should relax the iliopsoas muscle.

The Janda sit up does exactly this; by contracting the hamstrings which is antagonist muscle, you get to relax the iliopsoas. So when you sit up, mostly the abs get to do the work.

As you see in the picture the partner offers you a stable resistance to pull with your hamstrings; keep your hamstrings tensed throughout the drill. Perform 2 – 5 reps per set. You will notice it is much more difficult than doing traditional sit ups.

The gorilla crunch – hang on a bar with a comfortable grip. Bend your knees and bring them up between your hands. Go back slowly and do the drill again without swinging.

If the hanging Gorilla crunch is too difficult for you, do the same drill on an incline board, or even on a flat board.

Weighted crunch – you can use a sit up board, or do it on the floor. When doing crunches, the goal is to bring you chest closer to your pelvis, by contracting your abs. The spine should flex and not the hips. Do not flex your neck. Take a plate, a dumbbell, a kettlebell or some other weight in front of your chest, or behind your head or with arms extended overhead.

You can increase the size of your abs like every other muscle. For this you need intensity by using a heavy load.

Do not ever worry that your abs will grow too thick and your waist would look too large. The rectus abdominis is a flat muscle and by developing it, you get to see the six or eight packs of muscle. Of course the rectus abdominis is just one muscle; it appears in packs because of the conjunctive tissue which stabilizes and separates it.

Forget about the lower abs and the upper abs; this is nonsense. A muscle contracts over its whole length; the local muscle soreness you might feel in your “upper abs” or “lower abs” is because different leverage and local lactic acid accumulation.

Abdominal belt stability

What is important about abdominal belt training is to get a reliable lower back support and prevent low back pain. According with scientific studies, what is more important for the abdominal belt muscles, in order to ensure optimal spine support, is to have good endurance and not necessary extreme strength.

I will describe here the big 3 exercises which will enhance your lower back support.

Curl ups

Keep one leg bent and the other leg straight in order to maintain a physiologically correct spine curvature.

Maintain your cervical spine in a neutral position, as you would hold an apple between your chin and upper chest. Do not bend your cervical spine or bring your chin forward.

Perform 8-20 repetitions in a controlled manner for 1-4 sets.

The bridge - main tain this position for 10 - 60 seconds

Side bridge - maintain for 10 - 30 seconds

Train your obliques and the spinal column extensors. Maintain the bridge for 7-12 seconds.

The bird dog

This exercise will improve your balance and your spinal postural awareness. The main muscles worked are the spinal erectors, gluteus maximus, and the traps.

Why should women never be afraid of strength training?

Women should not drive cars. Driving is for men. Women should not run a business. Running a business is for men. Women should not go out and have fun. Fun is reserved just for men. Women should not be involved in sports. Sports are also for men.

Everything I wrote above is true; as true as the fact that the women should not Strength Train. Strength training is just for men.

40 years ago even the doctors were against vigorous physical exercise that could "damage the body". Since then, thousands of unbiased scientific research proved without any doubt that the human body can adapt even to the most challenging efforts and conditions. The result is a healthier, stronger, with better stamina and more flexible human body.

What can a woman expect after a period of practicing a well prescribed strength training program?

1. **Permanent fat loss**

Most of the inactive people, especially women, even at a “normal” body weight have more fat that they should have. The reason is a low Lean Body Mass (LBM – the total body weight minus body fat weight) and a high Fat Percentage. (see the Fat Percentage table).

One extra kilogram of muscle mass will burn 50 extra calories every day. This means 18000 Cal/year, or 2.5 kg of body fat. In ten years this adds up to 25 kg of pure fat.

Strength training burns a lot of calories - about 300-500 Cal/hour, depending on the trainee’s body weight, the intensity and density of the exercise session.

At the same body weight, the person with a higher LBM looks thinner, because fat has a 30% bigger volume than muscle.

If you get involved in strength training you will burn calories during training and you will increase your Basal Metabolism, which will enable you to burn more fat, even at rest. This is crucial if you want to lose fat, because the body burns most of the daily calories when at rest (about 80% at rest and 20% during exercise).

2. **Better body appearance**

With strength training you can thin up the whole body and you can add where needed.

The flesh will be firmer, the skin tighter. You can narrow your waist and uplift your buttocks.

The upper arms and upper legs will have an oval shape instead of a round shape.

3. **Maintain a more youthful body**

What is a major difference between the elderly and youngsters? The elderly are weak and frail and the youngsters are strong and vigorous.

Being strong, means being young. Trained people at 60 years old are stronger than untrained people in their 20’s.

Sedentary people after 25 years old start to lose on average 2-5 Kg of muscle per decade. If you strength train you can maintain a desired muscle mass even at 80 years of age.

If you are stronger you can handle any effort, daily or in special circumstances with more easiness. The result will be that you will feel less exhausted during and after the effort.

Training with weights is by far the most effective antiaging strategy, way more powerful than anything else done to prevent ageing.

4. **Improved athletic ability**

Muscle strength, power, muscle endurance, joint resilience are all important attributes needed to excel in basically any athletic discipline. Back packing, hiking and other recreational activities get a lot better when you are well physically conditioned.

Life is more fun when you get involved in athletic events and recreational activities.

5. **Stronger bones**

Especially after menopause, 50% of women and one in eight men develop osteoporosis, a disease defined as low bone mineral density with risk for fractures even during normal activity.

Along with calcium intake (about 1500 Mg/day for women on menopause), strength training, running and other high impact activities are the most efficient ways for preventing osteoporosis.

A high peak bone density achieved at a younger age is also almost a warranty against osteoporosis.

Fear of muscle?

The only thing that scares the girls away from weight training is the fear of developing big muscles. “I do not want to look like a man!”

Let see why women will never look like a man (under normal circumstances):

1. **Testosterone** - one of the biggest differences between men and women is the testosterone secretion. This hormone is responsible for the development of the skeleton and muscles, for the male body hair and deep voice. Before the testosterone kicks in around the age of 13 years old, girls and boys look very much alike, have similar height, body constitution and strength. Women have normal testosterone concentration levels 10-20 times lower than men. Because of this reason, even if training and eating similarly, there will still be very large differences between men and women in the body adaptation response after continuous strength training.
2. **Exercise – diet connection.**

   Many women begin exercising in order to lose fat and maybe also body weight. Remember that one important part of a weight loss program is a **hipocaloric** diet – this means eat fewer calories than you burn out. While being on a hipocaloric diet, it is practically impossible to increase your muscle mass. Strength training will enable your body to lose body fat instead of muscle tissue when losing weight.

If on a **normocaloric** diet（eating the same amount of calories as you burn out）strength training will help you burn fat and increase your muscle mass – the result will be a thinner and slimmer body, with a higher calorie burning capacity.

Last, if on a **hypercaloric** diet (eat more calories than you burn out) it is sure that you will add on weight. If you do not strength train, guaranteed you will put on just pure, soft fat. If you strength train you will increase your muscle mass, therefore your BM (basal metabolism) and you can still burn the fat off. Of course, if you go in a binge for long time, almost nothing will save you from getting fat.

3. **Natural training**

Many women got scared away from weight training after seeing in a magazine, or on TV a woman, professional bodybuilder, looking like a man with a freaky physique. I agree, this might make a normal girl walk across the street when seeing a gym, but there is some more you should know about this:

- most of the professional competing women bodybuilders (especially those who look like a man) consume different anabolic drugs in order to overdevelop their muscles;
- professional bodybuilders , men and women train at least 3 hours every day, with a program containing an incredible number of exercises and sets at a very high intensity. Most of the fitness club members exercise 3-4 times a week with 30min-1h of strength training each time;

4. **Time**

It takes a very long period of time, years and years, of continuous, hard, systematic training and a very carefully arranged diet in order to reach a special muscle development. Looking like a professional athlete doesn't happen overnight. So, as a beginner trainee you have no reason at all to believe that you will overdevelop your muscles through strength training. You can watch yourself in the mirror every day and stay calm that you still look human.

Every woman can change her body for a more beautiful appearance. It is not very complicated, but it is not easy too.

If you strength train, I promise you will never regret it. I promise you that you will bring good changes to your body and your health.

Being strong means being young.

Strength training myths and legends

Muscle toning

"**I do low intensity training and use small weights, because I do not want to get too big. I just want to tone my muscles"**

Weight training has and should have two main goals: to increase your strength and/or to increase your muscle mass.

Muscle tone is a reflex state of light contraction of your muscles when you are awake. Your facial muscles have tone, that's why your facial expression is different when you are awake compared to when you sleep. Your antigravitational muscles (abdominals, spinals erectors, thigh muscles, etc) which hold your body erect when you sit or stand have tone, otherwise you would not be able to stand without especially concentrating on this.

Muscle tone is natural and there is no need to improve it.

The people who are training for "muscle tone" want to achieve a slender body, without being too bulky, as an endurance athlete compared to a strength and power athlete. What they basically need is to lose fat without adding to much muscle mass. For this you need to concentrate on calorie burning and diet control.

The role of strength training when you are on a fat/weight loss program is to ensure that the body weight you lose is almost 100% fat and not muscle.

If you exercise with low reps, low intensity, you will not get any special benefit from your weight training sessions and you would be better off just doing aerobic training.

The reasons for which I strongly recommend serious weight training, even if your main goal is to lose fat and be thin are:

- after you will achieve your fat loss goal, it will be much easier to maintain it having a proper fat free mass – you basal metabolic rate would increase
- you will delay the aging muscle wasting effect and maintain a more youthful appearance
- you will increase your overall physical qualities
- you will prevent osteoporosis

If you want to get good muscle definition train with small weights and lots of reps

In bodybuilding slang "good muscle definition" is when you can clearly see the muscles and their striations. This will happen when your body fat will be sufficiently low, usually under 7-8%. As we have seen throughout the book, calorie balance together with maintaining or increasing the fat free mass is the key for fat loss.

Training with small weights and many reps will increase your muscle endurance; it will not do too much for increasing strength, or muscle. In terms of calorie expense it is anywhere between classic strength training and cardio training.

If you want to increase your muscle definition, maintain the same loads you usually use (5 – 15 RM), increase the training density, frequency and carefully monitor your diet. Start by slowly decreasing the number of calories by cutting some carbs and fat. Find your ideal pace.

You can also add some more cardio training for extra calorie consumption; do not do excessive long cardio or high intensity cardio, because you might compromise your strength and your muscle mass.

I do not want to get too big

With the risk of repeating myself I also want to charge on this subject.

"I do not want to get too big" comes thought comes probably after seeing huge bodybuilders photos. They have very good genetics, they worked thousands of hours for this; they ate 8-12 meals a day. A lot of professional bodybuilders take large amounts of steroids and other medications improper for healthy individuals.

"I do not want to get too big" sounds to me and to any other athlete who does or did resistance training like "I do not want to get too rich", "I do not want to get too educated".

Muscle gain it is extremely unlikely to happen by chance to any individual, the same as getting rich and achieving a high level of education. There is no such thing as "muscle lottery" where you can pick the winning ticket and see yourself huge overnight.

In all – you will not get too big (because of muscles), if you do not want to. It is very possible to get too big because of fat, if you do not exercise regularly and eat a healthy diet.

Strength training will make you slow

Just look at 100 m sprinters, UFC (Ultimate Fighting Championship) fighters, NBA players and almost all power athletes today. They are bigger and stronger than few decades ago athletes, and also faster. And they do strength train 3 to 7 times every week.

Enough said.

If you strength train you will lose flexibility

You lose your flexibility because you do not train flexibility, not because you strength train.

Weight lifters, gymnasts, fighters are very flexible and they do strength training seriously.

You will never get very good results if you do not take drugs

If you think very good results are looking like a cartoon freak, you are right: you will never be like this just with natural training.

But if your goal is to add 10-20-30 kg of muscle this can be done with systematic and intense training.

Hardgainers, people who gain muscle mass slowly, can expect to gain at least 6 kg of muscles in one year of good training. Even if it is slow, in 3 years you can go from 60 kg up to 80 kg and still get to be a stud when you are young and restless.

Bodybuilders are poor in bed

This myth comes from the times when drug abuse was regular (1970's). The use and abuse of hormone drugs, such as testosterone and some precursors will affect your sexual ability.

Natural bodybuilding will increase your sex appeal and sex performance.

I want to train long and sleek muscles; I do not want big, bulky muscles

Your muscles length is fixed between the origin and the insertion points where the tendons connect with the bone.

A muscle can only grow bigger and get smaller; it will never get longer, higher, or change its predetermined shape. Of course that increasing your muscle size, getting rid of the fat, or maintaining muscle size while losing fat will change your look.

What people mean by not wanting big muscles, but wanting sexy shapes, is losing fat and limiting the muscle hypertrophy.

Watch your calorie balance and you will get the results you desire.

Gym ethics

Here is how to be a gentleman (or a lady) in the gym.

- Always wear a clean and fresh outfit. Forget about your high school most beloved T shirt. Better not try to make the world a cleaner place by saving on the washing powder you use for washing your gym clothes.
- Come in the club with indoor shoes. Never come on the floor wearing slippers or barefooted.
- Bring your own towel (in case that the gym doesn't offer one each time you train). Use it to cover and wipe the equipment upholstery you come in contact with.
- Remember that you are not alone in the gym. Do not grunt like a boar. Allow others to share the same equipment with you while training, cutting in between sets.
- Do not rest on the bench between sets. Others might want to use it, but are shy to tell you. If your load is much bigger than they might use, tell them how many sets you have left.
- Place everything back to their place after use. This includes plates, barbells, dumbbells, kettlebells, mats, handles, etc.
- Do not laugh and talk with loud voice in the gym. Others might need to concentrate on the training.
- Never curse or swear.
- Never help anybody without being asked. Even if you feel that they need help, ask before you help. You might want to be nice, but a serious trainee who was finishing his last rep of his last set BY HYMSELF might be very upset because you spoiled his training.
- Do not drop dumbbells, barbells and kettlebells on the floor while training. Put them down with care.
- Do not bang the machines. Take care of them as they would be your own.
- Never smoke, or eat in a club, except in designated places.

- Bring liquids in closed containers.
- Do not bring your bag or your outer clothes on the training floor and leave them on machines or on the floor in the way.
- Do never come on the floor topless, or with a tank top.
- Do not hit on every girl who comes in the gym. If you can not restrain yourself, do it in a nice manner.
- Do not bring children or pets in the club, except in designated areas.
- Do not come to the club if you have flu, or other transmissible disease.
- If you offer to spot another trainee, ask him how many reps does he wants to do and ask his feedback about the help you offer.

Flexibility training

Articular flexibility allows joints to move with optimal amplitude and easiness. A good flexibility supports a correct body posture. Exceptional flexibility increase specific performance in many sports (gymnastics, martial arts, diving, etc).

The joints range of motion decreases with age so it is important to maintain good flexibility as we grow old.

The joint range of motion (ROM) is limited by the bone joint surfaces, skin, ligaments, tendons, but especially by muscle flexibility. The main reason for not being flexible enough is that your muscles do not want to relax when required. If you would be completely under anesthesia, you could perform a split with no problems, but when you are awake your CNS would not allow you to go into split.

Why this? It is about the same as for maximal strength when the Golgi sensor doesn’t allow the muscle to contract more when the tendon pulling strength goes over a certain limit. Hidden

between your normal muscle fibers you have muscle spindles. Muscle spindles are specialized fibers who detect the degree of stretching and feedback it to your CNS. When you try to go over your natural every day muscle stretch limit, your CNS, announced by your muscle spindles shouts to your stretched muscle "Contract!", and you can not stretch further.

As a baby you used to have awesome flexibility, but as you grow up, because your joints never go beyond a daily required ROM, you muscles forget high amplitudes of ROM and you slowly lose your flexibility.

There is no simpler than that: "Learn how to relax your muscles and you will become more flexible, learn how to contract your muscles and you will become stronger".

It is very important that along with developing your ROM, to develop a good strength level at your newly acquired ROM.

Exercising for flexibility

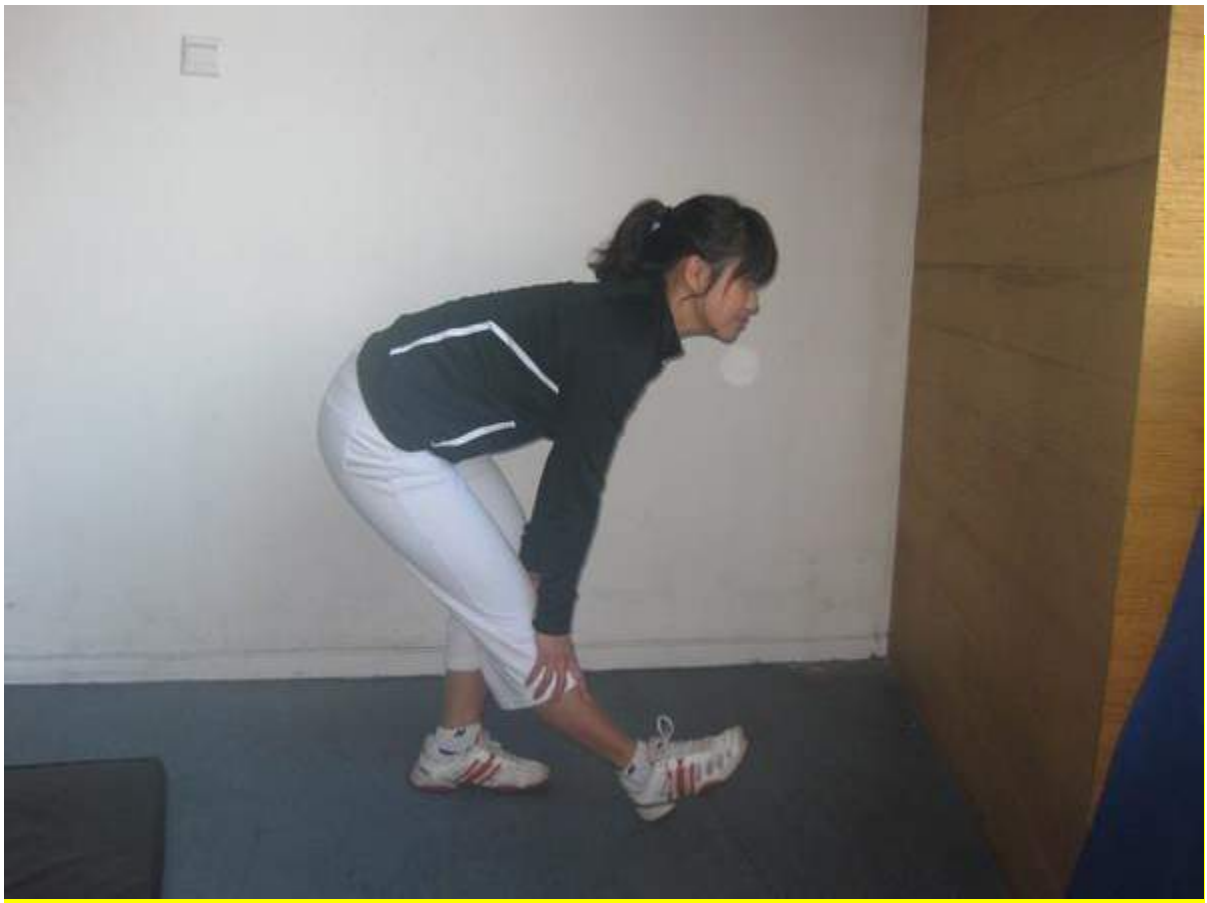
The muscle flexibility can be increased through stretching exercise.

1. Static stretching – when you slowly come into exercise position and maintain it for a few minutes, near the pain threshold. You can use gravity, your own muscle strength, a partner or different objects to help you stretch. This is usually the recommended type of training for most fitness programs, because is very safe and easy to do. Get the stretching position you wish and wait to relax. Most of Yoga postures statically stretch your muscles.

Breathe deeply and exhale long. As you feel relaxed, you can stretch a little more and repeat. This type of stretching requires patience and persistence over time. Maintain the stretch until

you feel that your muscle has relaxed enough. You can pause for 1 min and then repeat the stretch for 2-3 times.

Calf stretch



Hamstrings stretch

Hamstrings stretch

Double hamstrings stretch

Quadriceps stretch

Hip flexor (iliopsoas) stretch

Quadriceps stretch

Double quadriceps stretch

Abs and iliopsoas stretch

Wrists flexors stretch

Chest and shoulders stretch

Adductor muscles stretch

Glute stretch

Glute and hip flexor stretch (glute for the leg in front, hip flexor for the leg behind)

Squat stretch - adductor muscles and glutes stretch

Squat stretch - side view (back is straight)

Side split (partial) - adductor muscles stretch

Forward split (partial) - hamstrings, hip flexors and adductor muscles stretch

Road kill (partial) - hamstrings and lower back muscles stretch

Side lunge - hamstrings, glutes, adductor muscles stretch

Triceps and lat stretch

Rear delt stretch

Forearm flexors stretch

Neck muscles stretch

Chest stretch

Spine decompresion - spinal muscles

Lat and obliques stretch

Chest and shoulders stretch

Lats, chest and abs stretch

Lat and rear delt stretch

2. Ballistic stretching – you stretch using inertia at high speeds (like twisting left and right with your arms extended or swinging a leg back and forth). It is recommended as a part of training, specifically for each type of sport and used less in fitness programs. Many trainers do not recommend ballistic stretching, but try to think for a moment. “How could you become flexible enough and also have good movement control when perform ballistic movements, if you do not practice this type of flexibility when training?” So ballistic training is plain common sense for swimming, martial arts, track and field, gymnastics, etc.

Balistic stretching

3. PNF – Proprioceptive Neuromuscular Facilitation is based on physiological reflexes. A muscle relaxes better after it is contracted and an antagonist muscle relaxes automatically when the agonist is contracted. PNF stretching requires a partner or a helping object, because the muscle will be forcefully stretched. There are more types of PNF stretching:

    - contract - relax
    - contract – relax and contract the antagonist muscle
    - 
      
    - the trainer stretches the target muscle; the trainee relaxes
    - .the trainee contracts the hamstrings, and the trainer keeps the leg in the same position

- 
- 
- the trainer increases the angle of the stretch; the trainee tries to relax. Maintain the new stretch for 20 - 40 seconds. Repeat 2 - 4 times.
- the trainer pushes the leg towards trainee's head stretching the hamstrings. The trainee activelly contracts the hip flexors pulling the toward the head. Maintain 10 - 20 se

Usually the muscle is contracted 60 – 90 % of its maximal strength for a period of 4-6 seconds; the relaxation period lasts for 8- 15 second. Repeat this sequence 3-4 times while stretching further and further.

Training diary

Would you go to study Chinese without a note book?

If you are serious about training and want to get the most out of your time and effort, a training diary is very important.

What is a training diary good for:

- helps you keep track of your progress
- helps you to have a planned training and not just “stroll and play” in the gym
- allows you to systematically focus on your goals step by step
- allows you to learn what works best for you: methods of training, loads, sets, reps, breaks, etc
- it is also a nice way to remember what you have done when you were young.

Write the training plan before doing it and while training just take notes, confirm or make changes. If you do not like taking the note book in the gym with you, it is OK to fill it in immediately after finishing the training session.

Example of training diary:

Start by taking your picture

Before training。。。。。day。。。month year。。

After training。。。。。day month year

Make a self assessment

Body assessment	First	Second	Third	Goal
Item / date				
Body weight				
BMI				
Girth				
Upper arm(L/R)				
Thigh(L/R)				
Calf(L/R)				
Chest				
Waist				
Buttocks				
Waist/Buttocks				
Fat folds (mm)				
Triceps - vertical				
Subscapular – obliquely				
Abdomen – vertical				
Waist – obliquely				
Quadriceps -vertical				
Total(mm)/%				
Fat weight				
Fat free mass				
Aerobic				
Resting HR (bpm)				
Blood pressure				
Submaximal HR				

How to do the measurements?

Body weight – use the same scale, once a week, under similar conditions

BMI – BMI = Body weight (kg) / Height (m)^2

Girth - use a tailor tape, every time measure at same exact site

Upper arm(L/R) - contract the muscle, measure at the highest point

Thigh(L/R) - stand , measure at highest point

Calf(L/R) - stand , measure at highest point

Chest - measure at nipple level, after normal inspiration

Waist - men - measure at navel height, if you do not have a big tummy, measure at largest site if you have beer belly

- women – measure at the narrowest site if you do not have big belly, measure at largest site if you have

Hips - stand, bring your heels together, measure at largest site

Waist/Hips - divide the waist measurement (cm) to hip measurement

Fat folds (mm) – use a fat caliper, pinch the fat fold between your thumb and your index, fold it down to 0 degrees angle (see pic)

Triceps – vertical at mid level (see pic)

Subscapular –obliquely under the scapula (see pic)

Abdomen – vertical , 2.5 cm sideway from the navel (see pic)

Waist – obliquely – on the side of the waist above the hip bone (see pic)

Quadriceps -vertical mid level (see pic)

Total(mm) / % Add all 5 fat folds / watch table and find %

Fat weight Fat weight = BW x Body fat percentage %

Fat free mass Fat free mass = BW – Fat weight

Aerobic

Resting HR (bpm) Take it early in the morning after a good sleep

Blood pressure Use an automatic blood pressure monitor or have a physician measure it

Submaximal HR Take it for fixed parameters (Ex . running . flat, 9 km/h , 10 minutes)； measure it again under the same conditions at an later date

Goal setting

Use the table below. In the “Goals” column write every goal meaningful to you.

I urge you to set goals, even if you just exercise just for the sake of physical activity.

Setting goals will help you to persist, to train seriously and to commit to physical exercise.

The more goals you will choose to set the better. It is possible to fail temporarily on achieving your main goal, as weight loss for example. If you are perseverant enough you can reach any objective fitness goal.

Example of goals: weight loss, weight gain, lower body fat percentage, bigger muscles, smaller waist, bigger arms, thighs, chest, thinner arms, or thighs, smaller fat folds (abdomen, waist, back, thigh, triceps), increased bench press weight, squat, deadlift, kettlebell shoulder press, more kettlebell swings, 10 km run within one hour, run 1 km under 4 minutes, hip flexibility increment by 20 degrees, shoulder flexibility improved by 10 degrees, etc.

Set exact and specific goals; set deadlines for achieving them.

Write your first goal in the end at “Final goal”. Use this table for periods between 4 months and 1 year. Of course you can have higher final goals, but you also need to set intermediate goals.

For example at present you can bench press 50 kg and you want to be able to bench press 150 kg as a final goal. Set an intermediate goal of 90 kg by the end of the first year of training.

After writing your final intermediate goal in “Final Goals” set deadlines. See that the deadline row is split in two. Above you will write your deadline goal when setting them. Bellow you will write the achievement in real time.

Goal setting table

Today’s date	01.01.2009						
Item	Initial record	Date	Date	Date	Date	Date	Final goal and date
		02.01	03.01	04.01	05.01	07.01	08.10
Weight	90 kg	86	83	81	80	79	78 kg
Bench press	50 kg	55	60	65	70	75	75 kg
Ab fat	38 mm	32	28	24	21	19	18 mm
1 h run	5 km	6	7	8	9	9.5	10 km
KB swing 16 kg	20	50	100	150	200	300	300
Waist	93 cm	90	87	84	81	78	78 cm
Arm	34 cm	35	36	37	38	39	40 cm

What can you objectively expect from training?

Appearance

Every able bodied man or woman can expect to reach an amazing physical development and conditioning. Almost everyone can build a physique good enough for entering in the final (6 people) in a local bodybuilding or fitness contest within a certain weight class. This if you do not live in Los Angeles.

Everyone can reach 80% head turn rate on the beach.

Everyone can finish a marathon race.

Not everyone can win bodybuilding or fitness competitions, not everyone can pose for a national fitness magazine, or qualify for the Olympic Games.

But everyone can reach amazing goals, way higher you even dare to dream of. It takes, heart, discipline, commitment and will. It takes hard work and persistence. You have to wish to be healthy, to look good and have a good physical capacity.

If you are fat, you can lose almost all of your fat. If you want to build muscles you can build 20 – 30 kg of muscle if you are a man, or up to 6 – 15 kg if you are a woman.

Fat loss - Aim to lose 0.5 – 1 % of your body weight every week, 1.5 – 2% in the beginning, if you are seriously overweight. According with these numbers you can calculate the body fat percentage reduction. Theoretically you can reduce your body fat levels as you wish. Men should have no problem achieving 10% body fat, while women 15%.

Girth reducing - you can expect to lose a lot of girth especially at the waist and hips, if you have a lot of fat. The thighs and especially the calves it is not easy to train them thinner, if you have little fat on your legs. You can expect to have thinner legs and calves, as your body weight goes down.

Girth increase – if you are talented you can expect to add even 1 cm per month to your arms in the first year. 42 cm arms should be within every men's reach.

- For legs about 1 cm every 2 months is a good achievement. 60 cm thigh circumference should be an attainable final goal for every man.

- Calves can grow 1 cm every 3-4 months. The same as arms, 42 cm is within reach for most men.
- Chest measured at nipple level can increase 1 cm per month; 100 cm should pose no problems for anyone.

If you are a hardgainer you can settle for half of the rate of development. A hardgainer is a person who builds muscles slower than gifted individuals.

There are millions of hardgainers who look much better and are much stronger than extremely talented individuals who did not have the will to harness their gift.

Muscle building – in the beginning men can expect to build even 2-3 kg of muscle per month. Set a goal of 10 – 20 kg for the first year. If you are a pure ectomorph with narrow hips and shoulders do not settle for anything less than 6 kg of pure muscle for the first year. Women build muscle at a slower rate than men, just about 30 – 50 % of men muscle building rate.

Strength – strength it is a highly trainable physical quality

Women have naturally 50 % of men's strength for upper body movements and 66% for lower body movements.

Bench press – in the first 1-3 months you can increase it even with 10 kg per month for men; after that you can expect about 3 – 4 kg a month for another 2 years. The more you advance toward your limit the slower the progress. I believe that every able bodied man can reach at least 120 – 130 kg for maximum load in bench press

Squat – you can expect the same progress as for bench press; 150 kg is an attainable goal for every man.

Deadlift – same as bench press; every man should be able to improve the deadlift up to 180 kg. Some men can squat more than they can deadlift. This is because the leverage of the lower back or because they train better on squats than deadlifts.

Overhead press – 80 kg is an objective goal for every man.

Good and achievable performance: Bench press 1.5 x BW (body weight), squat 2 x BW, deadlift 2.2 x BW, Overhead press 1 x BW.

Cardio conditioning

In the beginning set your goals like this: first increase your continuous running time from 10 to 30 minutes, no matter the speed. Increase the speed until you can run 30 min at 10 km/h pace for men and 9km/h pace for women.

Set a 3 km in 13 min for men and 15 min for women as a goal for 6 months to 1 year of training.

If you want to run a marathon race, after 2 years of training, you should have no problem if you are healthy and under 50 years age.

Remember that you sometimes have to make trade-offs between cardio conditioning and strength conditioning. If you wish to be a lion, take it easy on cardio. Exercise 3 times a week for 20 min each time at 60 – 70 % intensity, for overall health and conditioning.

If you like more being a gazelle dedicate most of your training time to running and just go for 2-3 whole body strength training sessions per week, 20 – 45 minutes each time for overall conditioning.

For some of the readers the rate of improved might seem very slow, other might think it is not achievable. Just remember that within one year of regular and organized training you will be a completely new and improved you. Within 2-3 years you will be envied and admired by most other “normal people”. After this you have a life time of health, fitness and beauty ahead of you.

It is extremely important to get over first 3 months. Many people give up within 3 month of starting an organized physical fitness program. Maybe this happened to you before; if not, for sure you might have friends or people whom you know they tried and gave up, before any significant results had the chance to happen.

It is like this with many other things in life. Try studying Japanese, piano or tennis. What do you think you can achieve after a few training sessions ? How good do you think you can be after one or two months ?

You know that you can achieve quite an acceptable level after one or two years; the same for fitness.

A Gym story

The story goes like this:

Monday you signed up for the new club opened two blocks down the street. You have made up your mind. The time has come.

In the first week you train four times. It is fun. There are many people training there, some of them look quite good. You have seen a stud bench pressing 180 kg and you thought: “One day I will be better than him”. You have tried all the machines.

Saturday you had to go to train, but you went with your friends to a surprise party.

Sunday you look in the mirror, and you find that you have not changed too much, even after four training sessions. It is OK still, no one became a champ in one week.

The second week you try some classes in the gym. It looks that everybody is better than you. Classes are not so fun. You decide that you will stick to machines and treadmills. Wednesday you trained 6 sets at the Butt Blaster and Thursday your but felt like you had an open wound.

You skip three days because of this. The mirror stubbornly shows the same physique as in the first day. You think that you did not have a good training plan. Starting with the 3rd week you will try the new plan you've seen in the fitness magazine.

The third week you train according to the new plan to the letter. Your bench press went up from 30 kg to 35 kg. It is still so far from the 190 kg you need to be better than the stud you've seen before benching 180 kg. You loaded the bar with four big plates each side and it felt like it was welded to the support. Maybe you will never get so strong.

In the end of the 4th week you have shown you biceps to your aunt and she was not impressed. She told you that she had a cousin who trained with a personal trainer for 6 months. She got some results so she felt she trained enough and she stopped. After not even 3 months she gained back the 25 pounds she had lost before and 10 more . So training hard might not be such a good idea.

But you have gotten your membership and you still go to train twice a week. You get busy, the holydays come and you forgot all together about training after two months.

You tried, but it was not for you.

The end of the story.

It is paramount to train seriously especially the first 3 months. Set goals, work hard to achieve them. If you achieved them set new goals and fight for them. If you don't reach your goals, train even harder and train smarter too.

I guarantee that after 12 month you will be a whole new and much improved you.

The training plan

Write your training plan before every training session. If the training doesn't go according to your plan, change it in the gym and write it over.

Write down your feelings and impressions while training, immediately after, next day and 2 days after one session. You should write how you feel every exercise, the weight chosen, how you perceive the intensity. Note DOMS feeling, degree and how long it lasted. DOMS is Delayed Onset Muscle Soreness.

Training no _3_ _2009.03.12 18:00 – 19:00

Strength training

No	Target muscle	Exercise	Method	Reps / Load (Kg , RM)
1	Chest	Barbell horizontal press	Pyramid	12/70, 10/75, 8/80, 6/85, 4/90
2	Chest	Dumbbell incline press	Classic	4 x 8/28
3	Back	Chin ups – wide grip	BW	12, 11, 10, 9, 8
4	Back	Dumbbell bent over row	Pyramid	12/50, 10/60, 8/70, 6/80
5	Shoulder	Standing barbell press	Classic	5 x 5/50
6	Shoulder	Upright row	Classic	4 x8/35
7	Abs	Gorilla crunch	BW	12,11,10,9,8
8				

For your aerobic training write as required for each column. In the “heart rate” column write the HR average, while in “3 min recovery” column write the HR after 3 minutes of recovery if above 120 bpm or write the number of seconds until your HR decreased to 120 bpm. (for example you can fill in 125 bpm if your HR reached 125 bpm after 3 min recovery, or write 120” (seconds) if your HR recovered to 120 bpm after just 2 min of recovery.)

Cardio training

Exercise	Method	Duration	Intensity (speed, rotation, resistance, incline)	HR	3”recovery
Running	Continuous	20’	9 km/h, 2 incline	140	110”

For stretching write down the name of the exercise or the body part you stretched

Flexibility

Duration – min	Exercise, Muscle
15’	Hamstrings, groin, chest

Obs： Felt some lower back stress when doing overhead press.

Today it was first time for Medium Grip Upright Row.

The chest feels sore when I contract it. Nice.

No feeling in my delts.

The soreness ended the second day after training.

Clothing, shoes and other accessories

Indoor

For aerobic training wear a T shirt and trousers which allow perspiration.

Wear good running shoes with a flexible outsole and good cushioning.

When performing strength training and train squats, deadlifts, snatches or other exercise which requires standing, wear hard sole shoes like special strength training shoes, classic old type Adidas, Nike, Chuck Taylor. Do not wear sport shoes with cushioning, or slippers.

Outdoor

If it is hot you can wear the same outfit as you would wear inside. During cold days wear a cotton T shirt on the skin, a cotton sweater above it and a wind breaker outside. Wear long cotton underpants and wind breaker pants outside. After finishing your training, go inside and change your clothes.

Weightlifting belt

In the beginning I advise not to wear one. Maintain proper form and slowly progress with your load. If you feel you need one, wear it just for really high loads above 1 RM x 90%, for exercises which need spinal stability (squats, deadlifts, military press, etc). Do not wear it for exercises which do not need high torso stability, and do not wear it for lighter loads or between sets. Instead of wearing a belt develop your natural belt by strengthening your abs, spinal muscles, glutes and learning how to brace them.

Strength training gloves

If you feel that you need, buy and wear a good pair of gloves. If you do not wear, you will develop thick calluses and you will not need any gloves.

If you train with very heavy weights you will find it is more difficult to grip the bar because of the thickness of the gloves adds to the thickness of the bar.

Hand straps

Hand straps are lifting aids used for pulling movements. I advise not to wear them at all times and develop a strong grip. You might need to wear them if your hand is too small for developing good grip strength.

You can use straps when training multiple sets of heavy deadlifts.

Other joints supports

Wear them if you are injured or recovering after an injury. If you do not have problems, stay away from braces and wraps.

Bench press and squat suit

If you wear them you might ask yourself who lifted the barbell: you or the suit?

Nutrition

When it comes about physical exercise and sport many people will find a lot of reasons to avoid them with great "success", but when it is about eating almost nobody can say "No".

You eat all your life for about 80 years more or less, every day, three times a day, tons and tons of food.

Literally "You are what you eat". Beside your brain cells, you completely renew your whole body several times during your life. All your new cells are made using the proteins, fats and carbohydrates obtained from daily food.

You get all your energy from the food you eat. With all the energy spent by an average person during a life time you could bring to the boiling point the water from more than 300 Olympic swimming pools (50 x 25 x 2 m).

Besides this, think how careful you are when having an injection. You are afraid that you might introduce germs or viruses in your body. Think that you introduce foreign things inside your body every time you eat. What and how you eat has a major influence upon your health and well being.

Healthy nutrition

You have heard many, many times words like "healthy nutrition", "healthy food", "eat well", etc. Everybody has an opinion about food and eating.

What is the meaning of good eating?

- Eat as many calories you need every day
- Eat the right proportion of proteins, fats and carbohydrates (the nutritive factors of food)
- Eat the right kind of proteins, fats and carbohydrates

- Consume a variant diet which includes all the essentials vitamins and minerals in the right proportion and quantities
- Eat at the right times according to your needs
- Consume enough vegetal fibers
- Eat clean food

Calories

One calorie (1Cal), popularly speaking, scientifically means one kilocalorie (1kcal). So when people speak about Calories, they are actually meaning kilocalories. Because of too much zeros, popularly we just use the word Calories. A Calorie is a unit of energy necessary to raise the temperature of one liter of water with one degree Celsius .

1000 cal = 1 kcal = 1 **C**al

1 Cal = 4.18 kJ (kilojoule)

How to measure your daily caloric expenditure?

In order to measure exactly your daily energy expenditure you need to live for a whole day or for several days in a special laboratory room where there is no exchange of energy with the outside of the room, and where you can precisely measure O_2 in- O_2 out and the varying temperature of the room. Another method is to wear a face mask and breathe O_2 in a closed circuit in order to know exactly how much O_2 you consume for a certain time period.

Your daily calorie expenditure is directly related with your O_2 consumption. For each liter of O_2 you consume you burn 5 Cal.

Obviously the above two methods require special equipment and special supervision, so there are not practical for most people.

A much more simple way of measuring your daily energy expenditure is using a simple formula:

DM = BM + BM x (30-100%).

DM = Daily Metabolism (also known as TDEE – Total Daily Energy Expenditure)

BM = Basal Metabolism (your daily lowest metabolic expenditure necessary for survival – circulatory system, respiratory system, maintaining the body temperature, brain activity, etc. This means how many calories you spend if you lie on the bed all day long, in thermal comfort without eating or having any activity.)

BM = BW (kg) x 24 (hours in a day) x 1 Cal for men (0.9 for women)

BW = Body Weight

This is a relative formula and the result is an approximation. Even if it is an approximation it has high practical value. We will see latter in the book how can we calculate it more exactly.

Another formula is:

BM = 392 + 21.8 x LBM (kg))

LBM = Lean Body Mass (LBM = Body weight – Body fat weight)

It is better to use this formula if the Body Fat Percentage is outside the range 10 – 20 % for men and 15 – 25 % for women.

How the basal metabolism varies?

- The younger you are the higher BM
- The more LBM proportion (low body fat percentage) the higher the BM

- The taller you are the higher the BM
- Men have a higher BM compared with women

As you can see you can influence just you LBM (Lean Body Mass), not your height, age, or gender.

Your daily metabolism DM, reflects the total energy consumption including the BM. Energy is required for the digestion of eaten food (10-15% of the total calories of the food), for physical activity and for coping with different stressful conditions (illness, cold, heat, special events, pregnancy, growing process).

Factors which can influence your daily metabolism:

- The more physically active you are during the day the more calories you burn
- Mental stress
- A condition of illness
- Pregnancy
- Etc

Of course the only desirable method of increasing your DM is by increasing your physical activity level and intensity.

DM = BM + BM x (30% - 100%)

How to choose inside this range?

30-40% - have extra adipose tissue, sedentary work, no physical activity

50-60% - sedentary work, some physical activity , house chores, weekend outdoor activity

70-80% - work involving some physical activity, and/or regular physical training

90-100% > - physical labor, and/or regular and intense, prolonged physical training

Physical activity means engaging in: walking, climbing stairs, playing, riding a bike, performing some house labors, having sex, etc.

This way of measuring the daily metabolism it is an approximation, but is the simples and the result can be corrected.

Ex.

Male 80 kg, fat percentage 15 %, sedentary work, some walking and house activity, plays football every Saturday

BM = 80 kg x 24 h x 1 = 1920 Cal/day

DM = 1920 + 1920 x 50 % = 2880 Cal/day

The second method

Another simple method can check the accuracy of the results delivered by the first method.

If your body energy expenditure equals your energy intake, your body weight will remain constant. So check your body weight on Monday morning after you use the toilet. Check again the next Monday and again the next.

For this two weeks record exactly everything you eat and what quantity. Check the table with the Caloric content of food and add up all the calories you eat. If your body weight remains

unchanged, you know that you burned all the calories you ate. Dividing to 7 for a week or 14 for two weeks, you can obtain an average of your daily calorie consumption.

In time, if you maintain your body weight and the same body fat percentage you will practically maintain the same daily metabolism.

This method is very useful, because with one or two weeks of keeping an eating record you will become aware about the caloric content of the foods, and you will know how to chose what you eat and in what quantities in order to lose weight, gain weight or maintain your body weight.

Proteins, fats and carbohydrates

Within food we find 3 macronutrients which contain calories: proteins, fats and carbohydrates.

Proteins

Proteins are formed by 22 amino acids; amino acids are like the letters of the alphabet which make up all the words from our vocabulary. There are thousands and thousands of different proteins in your body made from different combinations of amino acids. During the digestion process, the proteins contained in food are broken down to individual amino acids and reassembled into proteins necessary for the functions of our organism.

8 out of all 22 amino acids are called essentials because our body can not synthesize them and they should be obtained exclusively from food. The proteins which contain all the essentials amino acids in the right proportions for being absorbed by the body are called first class proteins.

Best sources for protein:

- first quality: egg whites, skimmed milk or yoghurt, chicken and turkey breast, soybean(doufu) , tuna fish, low fat beef
- second quality: beans, peas, rice, legumes, cereals;
- combining legumes and grains for the same meal offers a complete protein as the one obtained from the meats.

Role of the proteins for the organism:

- Main constituent of most cells: muscle, skin, organs
- Basic structure for enzymes and hormones
- Main part of antibodies
- Influencing the fluid distribution in organism
- Maintaining the acid-base balance
- Can be used for energy

How much protein do you need?

Healthy adults need 0.7-0.8 grams of protein for each kg (body weight) every day.

Athletes need 1.3-1.7 g P/kg/day.

Children, adolescents, pregnant women, sick people need about 1.2-1.8 g P/kg/day

Ex. One healthy sedentary 60 kg woman needs about 50 g P/day (30 g animal origin)

One 100 kg body builder man needs 150 – 170 g P/day

1 gram Protein = 4 Cal

60 % of the total amount of daily proteins should be complete, high quality proteins, obtained from animal origin foods (milk, eggs, meat).

Out of your daily total number of calories, proteins should contribute 10-15 %. If you eat 2000 Cal/day, 200-300 Cal should come from Protein.

What happens if you consume too much protein?

In any developed country most of the people have no problem to consume enough protein in the daily diet.

Some people believe that ingesting large amounts of proteins (food or athletic supplements) will lead to extra muscle tissue growth.

Exercise is the primary factor responsible for muscle fiber enlargement, not the protein from the food. Muscle contains about 75 % water, so about 200 grams of extra protein are enough for building one kg of muscle mass. Thinking that you might add at most 2 kg of muscle mass in a month (this means more than 20 kg of muscles during one year), simple math tells us that you need about 200 g of extra protein for 15 days. This means 15 extra grams a day should be enough to build 20+ kg of muscle in one year.

Too much protein in the food might lead to overstrained kidneys and to loss of minerals from the bones. Also, extra protein in the daily diet will be converted and stored as fat in the body.

Proteins

1 g P = 4 Cal	Daily needs: 0.7 – 1 g/kg BW/day	1.3 – 1.7 g./kg BW/day for athletes	10 – 15 % of the total number of calories
	50 – 80 g/day	80 – 150 g/day	60 % animal protein
Eggs, low fat milk, veal	Fish, chicken and turkey breast	Tofu, beans, legumes, grains	Legumes + grains = complete proteins

Fats

Even if many people regards the fat as a "bad" nutrient, a certain amount of fat in the daily diet is essential for a healthy living.

Roles of fat in the body:

- Protection of internal organs (kidneys)
- Thermal insulation
- Reservoir of energy – a normal adult stores about 100 000 Cal in the body fat tissue. This amount of calories can sustain life for almost 100 days or can provide the necessary energy for running 1400 km.
- Reservoir for fat soluble vitamins – A,D,E,K
- Present in many cells – neurons, cell membrane, etc
- Some fat, when needed, can be converted in hormones, bile, vitamin D.

Roles of fat in the daily diet

- Nutrient – essential fatty acids
- Energy – concentrated source
- Transports the fat soluble vitamins A,D,E,K and assists their absorption
- Offers taste, smell and texture to the food, stimulating the appetite and bringing satiety

There are more types of fat:

Types of Fat- Characteristics Sources

- Saturated - Solid at room temp, raises blood cholesterol - Animal sources, coconut, palm oil
- Unsaturated - Liquid at room temperature - Plant sources

- Hydrogenated Unsaturated- converted chemically to Saturated- Regular Margarine
- Polyunsaturated- Lowers blood cholesterol -corn, soy, sunflower, fish
- Monosaturated -No effect on blood cholesterol – canola

Too much fat in the body can have damaging effects:

- Obesity
- Atherosclerosis – the depositing of Cholesterol (a type of fat) inside the arteries, narrowing them and leading to hypertension, heart attack, cerebral stroke and peripheral vascular disease
- High blood pressure
- Diabetes (90 % of the diabetes patients are overweight or obese)

Cholesterol

Cholesterol it is a type of fat, which has many functions in the body, one of them being sexual hormones synthesis. The body can also produce cholesterol by itself. There are 3 kinds of cholesterol: the "bad cholesterol" LDL (Low Density Lipoprotein) and VLDL (Very Low Density Lipoprotein) and the "good cholesterol" HDL (High Density Lipoprotein). The LDL and the VLDL, when exceeding a normal concentration within the blood, deposit inside the arteries, narrowing and hardening them. When an artery gets completely obstructed, the result can be a heart attack (coronary artery) or a cerebral stroke (any cranial artery).

The HDL binds the LDL and the VLDL and flushes them out of the body, maintaining clean and healthy arteries.

A normal cholesterol concentration in the blood is:

Ideal Range

- Total Cholesterol < 160mg/dl 140-240
- HDL 60mg/dl > 35-75
- LDL < 100mg/dl 100-130
- Triglycerides < 150mg/dl 150-250
- VLDL < 30mg/dl 30-50
- TC/HDL Ratio < 3.5 3.5-4.5

Only animal fat contains cholesterol. Some foods contain large amounts of cholesterol, like egg yolk, beef liver and brain, so do not eat them in excess.

Many people do not eat the egg yolk. The egg yolk is extremely rich in nutrients. If you eat 1-2 egg yolks a day, this should pose no risk for a healthy adult.

There are foods which can lower the LDL and increase the HDL. **Deep sea fish, olive oil, nuts and soy bean** contain fats beneficial for a healthy heart. The Japanese people, who consume large amounts of deep sea fish (tuna, salmon, etc) and the people living in the Mediterranean area where olive oil is a staple food have a much lower rate of heart disease compared with other similar populations.

Daily recommended cholesterol intake: 0 – 300 mg

How much fat should your daily diet contain?

Your daily calories should be no more than 30% derived from fats (65 g of fat/day – for an average person), with no more than 10% derived from saturated (animal) fats.

1 gram F = 9 Cal

If the diet contains too less fat, you will feel hungry.

Fats

1 g F = 9 Cal	15 – 30 % of the total Cal	< 10 % calories from animal fats	Cholesterol 0 – 300 mg/day
	< 65 g/day for a 2000 Cal diet	< 20 g/day	LDL, VLDL = bad HDL = good
Deep sea fish	Olive oil	Limit animal fat	Nuts, soy bean oil

Carbohydrates

There are different types of carbohydrates: simple (sugars) and complex (starch).

The simple sugars are absorbed very fast and elevate the blood insulin concentration. Sweets, fruits, refined sugar, honey contain simple sugars.

The complex carbs require longer time to digest and are a more stable source of energy. They are found in cereal, legumes, beans, etc.

According with the absorption time and with the insulin response the carbs have a different Glycemic Index (GI). It is recommended to consume more carbs with a low GI because they maintain a more stable blood glucose level. Complex carbs have a low GI, while sugars have a high GI.

The role of carbohydrates in the body:

- Source of energy – the carbs offer most of our energy. The brain and the nervous system rely almost exclusively on carbohydrates energy
- Protein sparer – if the body can rely on carbohydrates for its daily energy, the proteins are not used as a source of energy

The carbs are stored in muscles and liver, with a limit of 2000 Cal. If carbohydrates are consumed in excess they will be transformed and stored as fat.

How much carbohydrates should I eat every day?

Beside the recommended protein and fat intake, the rest of the calories should come from carbs. Between 50-75 % of the total number of the daily calories should come from carbs, with less than 10 % (total calories) from refined sugars. This is about 300 g of complex carbs for an average person's diet.

Carbohydrates

1 g C = 4 Cal	50 – 75 % of the total calories	< 10 % of the calories form refined sugar	Choose carbs with a low Glycemic Index
	300 g/day	Eat more complex carbs	
Grains	Legumes	Fruits	Beans and potatoes

Vegetal Fibers

Vegetal fibers are also a type of carbohydrates, but they are indigestible for the human digestive system. However they are very important in the diet and for maintaining good health.

Role of fibers for maintaining good health

- Improve body's handling of glucose and the insulin, by slowing the digestion and the absorption of carbs, therefore decreasing the risk for developing diabetes
- Maintain a good fitness of the colon and digestive tract, reducing the risk of colon cancer and diverticulosis (weak intestinal wall which bulge out)

- Reduce energy intake by displacing calorie dense foods from the diet, therefore helps in weight control
- Reduce the risk for heart and artery disease by lowering LDL level and displacing fat rich foods from the diet
- Promote feelings of fullness because absorb water and swell, increasing the time for digestion and maintaining satiety between meals
- Help prevent constipation, hemorrhoids and prevent appendicitis by maintaining the content of the intestine moist and easy to eliminate and by increasing the stool weight
- Stimulate bacterial fermentation in the colon

WHO recommends 27-40 g of fiber each day, or 11.5 g of fiber for each 1000 Cal of the diet.

Fiber rich foods: legumes, grains, vegetables, fruits, etc.

Vegetal fibers

No calories	27 – 40 g/day	11.5 g / 1000 Cal	
Legumes	Grains	Vegetables	Fruits

Water

The human body is 60-70% water.

If without food at all a person could survive 40-60 days, without water he would die within 2-3days.

What does water do for your body?

- Water dissolves amino acids, glucose, minerals and many other needed substances
- Water is transport vehicle for all nutrients
- Water is body's cleansing agent, removing wastes and toxins
- Water acts as cushion agent and lubricant for joints and protective agent for spinal cord and eyes (because water is incompressible)
- Water lubricates the digestive tract and other tissues which need moistened
- Water is our body's internal heat regulator, helping to maintain a constant body temperature no matter the weather conditions.
- Water participates actively in many chemical reactions from our bodies

Water daily needs

For a person who spends 2000 calories a day, 2-3 liters of water are needed to maintain the optimal balance.

If you do prolonged heavy physical work, or physical exercise you may need to replace up to 6-8 liters of water during a day. If the weather is hot and humid and you sweat a lot the water replacements needs increase. As an example soccer players during Summer World Cup matches or Formula 1 drivers loose up to 3 liters of water in just 1.5 hours of action.

Drink water throughout the day, before and after meals, without waiting to be thirsty. Thirst feeling lags water needs. When you feel thirsty, you are already in a state of mild dehydration. Many foods contain large quantities of water: fruits, vegetables, milk and milk products, meat. Eating this foods also helps you replace lost water.

If the water is not replaced promptly as needed, **dehydration** may occur. With mild dehydration (less than 5% body weight) you will be thirsty, notice sudden weight loss, dry skin, mouth and throat, your pulse will increase, blood pressure will decrease and you will feel weak without enough energy.

If case of severe dehydration (more than 5% body weight water loss), the skin turns pale, fingertips and lips change bluish, the blood thickens, the pulse becomes irregular and the breathing shallow. First you may experience confusion and dizziness and later shock, seizures, coma or death.

If too much water is ingested **water intoxication** may occur, with similar symptoms as dehydration. Water intoxication occurs much, much rarely than dehydration.

Vitamins and minerals

Vitamins

Vitamins are essential, noncaloric, organic nutrients needed in very small amounts in the diet.

Vitamins help many processes necessary for living and good health to happen: digestion, absorption, metabolism and other body functions.

Get too little vitamins and you will get sick; get too many of them and you will get sick too. The key is to get the needed amounts of each vitamin.

Vitamins are shared in two groups: fat soluble and water soluble.

Minerals have major functions inside the human body. We have major minerals which are present in large quantities in the body. They can ass up to two – three kg in all.

Beside major minerals we also need trace minerals, necessary in minute quantities, but also extremely important.

Fat soluble vitamins

Vitamin A

Vitamin A is also called retinol; its main precursor is beta carotene a powerful antioxidant.

It is important for vision, maintenance of cornea, mucous membranes and epithelial cells. It assures skin health, bone and teeth growth, reproduction, hormone synthesis and regulation and body immunity.

Its deficiency will lead to anemia (small blood cells), cessation of bone growth, painful joints, impaired enamel formation, cracks in teeth, and easy tooth decay. Diarrhea will occur together with changes in body and intestinal linings. The immune system will be impaired and frequent respiratory, bladder and vaginal infections might easily occur. The skin will get rashes and keratinization (hardening); the eye cornea will degenerate and blindness may happen. Growth process will be impaired and stone kidney are also possible.

Too much vitamin A might lead to frequent bleedings, bone pain, growth retardation, headaches, abdominal cramps, vomiting, diarrhea, weight loss, loss of appetite, dry skin, hair loss, amenorrhea, liver and spleen enlargement.

In both deficiency and toxicity death is possible to happen.

Rich sources of Vitamin A: fortified milk, butter, chesses, egg, liver. Getting enough beta carotene will lead to adequate supplies of Vit A; dark leafy greens (spinach), broccoli, apricots, carrots, pumpkin, sweet potato.

Vitamin D

The vitamin D is also named calciferol.

It is important for mineralization of bones.

Deficiency will lead to abnormal growth, misshaped bones (rickets and osteomalacia), soft bones, joint pain, malformed teeth and muscle spasms.

Too much Vit D will lead to excessive thirst, headaches, irritability, loss of appetite, weakness, nausea, kidney stones, mental and physical retardation.

Rich sources of Vitamin D are: fortified milk, eggs, liver, and sardines. Through exposure to sunlight the body will self synthesize Vitamin D.

Vitamin E

The vitamin E, also called alpha-tocopherol, is a powerful antioxidant. Excessive oxidation leads to illness, cancer and premature aging. Vitamin E regulates the oxidation process, stabilizes the cell membrane and protects Vit A.

Deficiency will result in red blood cell breakage, anemia, degeneration, weakness, leg cramps and fibrocystic chest disease.

If consumed in excess the result will be general discomfort.

Best sources of Vitamin E are: plant oils (margarine, salad dressing), green and leafy vegetables, wheat germ, whole grain products, nuts and seeds.

Vitamin K

Also called phylloquinone, Vitamin K is required for synthesis of blood clothing proteins and a blood protein that regulates blood calcium.

Deficiency will lead to excessive hemorrhage.

Significant sources for Vitamin K are bacterial synthesis in the digestive tract and liver, green leafy vegetables, cabbage and related plants, milk.

Water soluble vitamins

B group vitamins

B1 (thiamin) is important for energy metabolism, appetite and nervous system function.

Deficiency symptoms are edema, enlarged heart, abnormal heart rhythms, heart failure, degeneration, weakness, pain, low morale, difficulty walking, loss of reflexes, mental confusion and paralysis.

Major deficiency can cause beriberi, a lethal disease which once decimated whole populations.

There are no best sources, many nutritious foods contain thiamin in small proportions; pork, ham, bacon, liver, whole grains, legumes and nuts are richer sources.

B2 (riboflavin) is important in energy metabolism, supports normal vision and skin health.

Deficiency symptoms include cracks at corners of mouth, hypersensitivity to light, reddening of cornea and skin rash.

Good sources are: milk, yogurt, cottage cheese, meat, leafy green vegetables, whole grain foods and cereals.

B3 (nicotinic acid) is important for energy metabolism, supports health of skin, nervous system and digestive system.

Deficiency can lead to diarrhea, black, smooth tongue, irritability, loss of apetite, weakness, dizziness, mental confusion which may progress to delirium and flashy skin rash after sun exposure. Deficiencies are rare.

Toxicity symptoms are diarrhea, heartburn, nausea, ulcer, irritation, vomiting, fainting, dizziness, excessive sweating and painful rash, abnormal liver function and low blod pressure.

Best sources for Vitamin B3 are milk, eggs, meat, poultry, whole-grain, cereals, nuts and other foods which contain protein.

Vitamin B6 (pyridoxine) important for fatty acid metabolism, also helps make red blood cells.

Deficiency can cause anemia, smooth tongue, irritability, muscle twitching, convulsions, rashes, greasy dermatitis, irritation of sweat glands, kidney stones.

Too much Vitamin B6 can cause depression, fatigue, impaired memory, irritability, headaches, numbness, damage to nerves, difficulty walking, loss of reflexes, weakness, restlessness.

Best sources for Vitamin B6 are green and leafy vegetables, meats, fish , poultry, shellfish, legumes, fruits, whole grains.

Folate (folic acid) is important for new cell synthesis.

Deficiency can cause anemia (large cell type), heartburn, diarrhea, constipation, suppression of immunity with frequent infections, smooth red tongue, depression, mental confusion, fainting.

Best sources for folate are leafy green vegetables, legumes, seeds, liver, cereal, pasta and grains.

Vitamin B12 (cyanocobalamin) is important for new cell synthesis and helps maintain nerve cells.

Deficiency symptoms are: anemia, smooth tongue, fatigue, degeneration of nervous system, hypersensitivity of skin.

Best sources of Vitamin B12 are： animal products – meat, fish, poultry, cheese and eggs.

Panthothenic acid is important for energy metabolism.

Deficiency signs are vomiting, intestinal distress, insomnia, fatigue.

Panthothenic acid is wide spread in many foods.

Biotin is important for energy metabolism, fat and glycogen synthesis and amino acids metabolism.

Deficiency can cause abnormal heart action, loss of appetite, nausea, depression, muscle pain, weakness, fatigue, drying and rash of skin, hair loss.

Biotin is widespread in foods.

Vitamin C supports collagen synthesis which strengthens blood vessels, forms scar tissue and matrix for bone growth, thyroxine synthesis, amino acid metabolism, strengthens resistance

to infections, helps absorption of iron. Vitamin C is also a powerful antioxidant fighting free radicals which can cause cancer and ageing.

Serious deficiency causes scurvy which was a great course for sailors for many centuries ago. Deficiency symptoms are anemia, small hemorrhages, suppression of immune system with frequent infections, bleeding gums, loosening teeth, muscle degeneration and pain, hysteria, depression, bone fragility, joint pain, rough skin, blotchy bruises and failure of wounds to heal.

Too much Vitamin C can cause nausea, abdominal cramps, diarrhea, excessive urination, headache, fatigue, insomnia, skin rashes.

The best sources for Vitamin C are: citrus fruits (oranges, lemons, grapefruit), different cabbage types, dark green vegetables, strawberries, peppers, lettuce, tomatoes, cantaloupe, potatoes, papaya, mango.

Major Minerals

Calcium (Ca) is the principal mineral of bones and teeth. Acts in normal muscle contraction and relaxation, nerve functioning, blood clotting, supports nerve function and the immune system, helps maintain blood pressure.

With deficiencies of Calcium stunted growth in children and adult bone loss (osteoporosis) will occur. In excess Calcium is excreted from the healthy body.

Significant sources of Calcium milk and milk products, oysters, small fish with bones, doufu, greens and legumes.

Phosphorus (P) is important in cells' genetic material, in cell membrane (phsopholipids), and in genetic transfer.

Deficiencies can cause appetite loss, bone pain, muscle weakness, impaired growth and rickets in infants. Too much Phosphorus can case Calcium excretion.

Good sources for Phosphorus are all animal tissues.

Magnesium(Mg) is a factor involved in bone mineralization, the building of protein, enzyme action, normal muscular contraction, transmission of nerve impulse and teeth maintenance.

Deficiency can result in weakness, muscle twitches, appetite loss, confusion, depressed insulin and glucagon hormones secretion. In extreme deficiencies can cause growth failure in children, convulsions, hallucinations and difficulty in swallowing.

Excess Magnesium (because of too much laxatives and other medication for elderly) can cause confusion, lack of muscle coordination, coma and death.

Important sources for Magnesium are nuts, legumes, whole grains, dark green vegetables, sea food, chocolate and cocoa.

Sodium (Na) together with chloride and potassium are called electrolytes. They maintain cells' normal fluid balance and acid-base balance in the body. Sodium is important in nerve signal transmission.

Deficiencies of Sodium can lead to loss of appetite, muscle cramps and mental apathy. Excess can lead to hypertension.

The best source is salt (NaCl).

Chloride (Cl) beside its electrolyte functions is also necessary for proper digestion.

Deficiency can cause growth failure in children, loss of appetite, muscle cramps and mental apathy. Too much Chloride can cause vomiting.

Chloride is part of salt.

Potassium (K) facilitates reactions, including making of protein, supports cell integrity, transmission of nerve impulses and the contraction of muscles including your most important muscle, the heart.

Deficiency accompanies dehydration, cause muscular weakness, paralysis, confusion and even death.

Sulfur (S) is a component of some amino acids, part of vitamins biotin and thiamin and of the hormone insulin.

It is present in all protein containing foods.

Trace minerals

Iron (Fe) is part of hemoglobin, the blood O2 carrier, and part of myoglobin in muscles, which makes the oxygen available for muscle contractions. Iron is also necessary for the use of energy.

Deficiency symptoms are: anemia, weakness, pallor, headaches, suppressed immune system, inability to concentrate, cold intolerance.

Too much Iron intake can cause fatigue, infections, liver damage, growth retardation in children, acidosis, or bloody stools.

Best sources for Iron are: red meats, fish, poultry, shellfish, eggs, legumes, dried fruits.

Iodine (I) is a component of thyroxine, the thyroid hormone. Thyroxine helps regulate growth, development and metabolic rate.

Deficiency can lead to goiter and cretinism, while toxicity can cause depressed thyroid activity and goiter like thyroid enlargement.

Significant sources for Iodine are: iodized salt, seafood, bread, some plants and meats.

Zinc (Zn) is part of insulin and many enzymes. Zinc is involved in making genetic material and proteins, immune reactions, transport of Vit A, taste perception, wound healing, sperm production and normal fetus development.

Deficiencies can cause growth failure in children, dermatitis, sexual retardation, loss of taste, poor wound healing.

Toxic levels of Zinc can cause fever, nausea, vomiting, diarrhea, muscle incoordination, dizziness, anemia, accelerated atherosclerosis, kidney failure.

Zinc is present in significant quantities in all protein rich foods：meats, fish, shellfish, poultry, grains, vegetables.

Selenium (Se) is part of an enzyme that protect cells against chemicals and also works with vitamin E as an antioxidant.

Deficiency of Selenium can cause muscle degeneration and pain, cataracts, depressed sperm production, fragile red blood cells, pancreas damage, heart damage, growth failure in children.

Toxic levels can cause nausea, abdominal pain, nail and hair changes, nerve, liver and muscle damage.

Best sources are seafood, organ meats, meats, grains and vegetables depending on soil condition.

Fluoride (Fl) helps form bones and teeth and also helps teeth prevent decay.

Deficiency may expose the teeth to decay. Toxic levels causes discoloration of teeth, nausea, vomiting, diarrhea, chest pain, itching.

Good sources for Fluoride are fluorinated water, tea and seafood.

Chromium (Cr) associates with insulin and is needed for energy release from glucose.

Deficiency can lead to abnormal glucose metabolism.

Toxic levels may cause muscle degeneration.

Best sources for Chromium are meats, whole grains, vegetable and oils.

Copper (Co) helps form hemoglobin and is part of some enzymes.

Deficiency can cause anemia and poor wound healing.

Toxic levels of Copper can cause diarrhea and vomiting.

Best sources are meat and drinking water.

Vitamins and minerals

Vitamin	Helps Support	Daily Mineral or Vitamin Requirement *	Common Natural Sources
Vitamin A	Eyes	5,000 IU	Cod liver oil, egg yolks, butter, raw whole milk, liver
Mixed carotenoids (e.g. beta carotene)	Immune System	5,000 – 15,000 IU	Carrots, pumpkin, sweet potatoes, spinach, butternut squash, tuna, cantaloupe, mangoes, apricots, broccoli, watermelon
Folic Acid	Heart , Brain, red blood cell development	400 – 800 mcg	Legumes, poultry, tuna, wheat germ, mushrooms, oranges, asparagus, broccoli, spinach, bananas, strawberries, cantaloupes
Vitamin B6	Brain, Heart, Immune System, protein metabolism	50 – 200 mg	Fish, soybeans, avocados, lima beans, chicken, bananas, cauliflower, green peppers, potatoes, spinach, raisins
Vitamin B3 (Niacin)	Fat, protein and carbohydrate metabolism, nervous system	25 mg (more in supplement form with medical supervision)	Meats, poultry, fish, peanut butter, legumes, soybeans, whole grains, broccoli, asparagus, baked potatoes
Vitamin B12	Nerves, Blood, tissue growth	50 - 100 mcg	Salmon, eggs, cheese, swordfish, tuna, clams, mussels, oysters

Pantothenic Acid	Energy, protein and carbohydrate metabolism	25 - 150 mg	Fish, whole grain, mushrooms, avocados, broccoli, peanuts, cashews, lentils, soybeans, eggs
Biotin	Hair, Skin, Energy	30 – 300 mcg	Peanut butter, eggs, oatmeal, wheat germ, poultry, cauliflower, nuts, legumes
Vitamin B2 (Riboflavin)	Eyes, cell development, skin	10 – 50 mg	Milk, cottage cheese, avocados, tangerines, prunes, asparagus, broccoli, mushrooms, beef, salmon, turkey
Vitamin B1 (Thiamin)	Energy	10 – 50 mg	Pork, sheath germ, pasta, peanuts, legumes, watermelon, oranges, brown rice, oatmeal, eggs
Vitamin C	Immune System	250 – 2000 mg	Citrus fruit, strawberries, tomatoes, bell peppers, spinach, cabbage, melons, broccoli, kiwi fruit, raspberries
Vitamin D	Bones, calcium absorption	400 – 800 IU	Sunlight, eggs, milk, butter, tuna, salmon
Vitamin E	Heart, Immune system	200 – 400 IU	Nut and vegetable oils, wheat germ, mangoes, blackberries, apples, broccoli, peanuts, spinach, whole wheat
Vitamin K	Blood clotting	20 – 60 mcg	Spinach, broccoli, Brussel sprouts, cabbage, parsley, eggs, dairy products, carrots, avocados, tomatoes

Mineral	Helps Support	Daily Mineral or Vitamin Requirement *	Common Natural Sources
Calcium	Bones, teeth, muscle and nerve function	800 – 1,200 mg	Milk, cheese, yogurt, salmon, sardines with bones, broccoli, green beans, almonds, turnip greens, kale
Magnesium	Blood pressure, nerve and muscle function	400 – 600 mg	Molasses, nuts, spinach, wheat germ, pumpkin seeds, seafood, dairy products, baked potatoes, broccoli, bananas
Selenium	Immune system	100 – 300 mcg	Meats, whole grain, dairy products, fish, shellfish, mushrooms, Brazil nuts
Sodium	Fluid balance, nervous system function	2,400 mg	Salt, processed food, soy sauce (most people will not need to supplement their sodium intake, given the prevalence of sodium in our diets)
Potassium	Acid balance in body, fluid balance (works with sodium)	3,000 – 6,000 mg (from food sources)	Potatoes, avocados, bananas, yogurt, cantaloupe, spinach, mushrooms, milk, tomatoes
Zinc	Immune system, prostate, wound healing	15 – 20 mg	Oysters, lean beef, wheat germ, seafood, lima beans, legumes, nuts, poultry, dairy products
Phosphorus	Energy, bones (teams up with calcium)	800 mg –1,000 mg	Meats, fish, poultry, eggs, dairy products

Manganese	Blood sugar, energy	2 – 10 mg	Nuts, whole grains, legumes, pea, dried fruits, spinach, green leafy vegetables
Molybdenum	Nitrogen metabolism, energy	25 – 250 mcg	Legumes, meats, whole grains, milk and dairy products
Chloride	Aids digestion, fluid balance (works with sodium)	750 mg	Foods with salt (note most people will not have to supplement their chloride intake due to their high salt intake)
Chromium	Carbohydrate metabolism	50 – 200 mcg	Whole grains, broccoli, grapes, oranges, brown sugar, meats, black pepper, brewer's yeast, cheese
Copper	Blood cells, connective tissue formation	1.5 – 3 mg	Oysters, other shellfish, nuts, cherries, cocoa, mushrooms, gelatin, whole grains, eggs, fish, legumes
Flouride	Tooth enamel	1.5 – 4 mg	Fluoridated water, fish, tea (most people do not have to supplement their fluoride intake due to fluoridation of the water supply)
Iodine	Proper thyroid function	150 mcg	Spinach, lobster, shrimp, oysters, milk, iodized salt
Iron	Carries oxygen in blood, energy metabolism	10 – 20 mg	Clams, asparagus, meats, chicken, prunes, raisins, spinach, pumpkin seeds, soybeans, tofu

* Based on a diet consisting of 2,000 calories per day. Your daily mineral and vitamin requirement is proportional to your daily calorie intake. For example, if you consume 3,000 calories per day, your daily vitamin requirement is increased by 50%.

Basic groups of foods

1. Milk and derivates – main source for Calcium (Ca), contains vitamins B2, B12, A, many minerals (no iron), high quality proteins
2. Bread, grains, pasta, rice, dried legumes – main source for carbohydrates, contain proteins (second quality), the group of B vitamins and Iron (Fe). Grain sprouts contain many vitamins, especially E vitamin, whole grain breads bring big quantities of B group vitamins and minerals
3. Meat and meat products (poultry, fish, game) – main source for high quality proteins and Iron, but also has a lot of fat except fish, poultry (without skin). Liver contains large quantities of vitamin A and Iron, but also cholesterol
4. Eggs – the yolk contains almost all the vitamins and minerals and high quality proteins, but also 200-300 mg of cholesterol. The egg white contains little fat and has the highest quality of proteins
5. Fats and oils – vegetal and animal fats. Bring a lot of calories, good appetite, taste and satiety and fat soluble vitamins (A, E). Pay attention to the cholesterol and the total amount of calories brought in by fats and oils
6. Legumes, vegetables and fruits – main source for vitamins (especially vitamin C), minerals, vegetal fibers and water. Also bring in carbohydrates.
7. Sweets and sugar – bring in a lot of carbohydrates and other nutrients according to their composition. Avoid consuming too much of them
8. Drinks – nonalcoholic and alcoholic – nonalcoholic drinks bring in the water needed for body's hydration. Some contain vitamins, minerals and carbs. Alcoholic drinks are not necessary for a healthy body. There have been reports than in moderate quantities (eg. 240 ml wine/day, or 50 ml whisky) can protect the health of the heart and vascular system. Consumed in excess are detrimental for the health.

When to eat?

The best approach for healthy eating is to eat throughout the whole day according with your energy needs.

4-6 small meals are better than the traditional 3 meals a day because of the following reasons:

- Maintain a more stable sugar level in your blood allowing you to feel more energetic
- You will burn slightly more calories for the digestion process
- Better hunger suppression
- Increased protein absorption

The morning meal it is a very important meal in your day: you haven't eaten for 10 or 12 hours and you need to go out for work. Aim to eat about 60 percent of your calories before 13:00 o'clock.

Eat your lunch accordingly with your afternoon activity.

Eat 1.5-2 h before your night sleep or earlier. The food consumed in the evening tends to be more easily stored as fat; you also do not need too much energy for sleeping. Avoid too much fat or proteins at your last meal, because they have a slower rate of digestion and might affect your sleep.

Training and eating

- Before training - It is best to eat 2-1.5 hours before your training, a meal consisting mainly of complex carbs, for optimal energy levels while training. Avoid eating too much, or a high fat or protein content, because your digestion process should not interfere with your training
- After training – allow 45 min to 1 h before eating (while exercising vigorously your blood gets diverted to your working muscles which need much more oxygen then at rest, so after training you need to wait for the blood redistribution – stomach, liver, spleen for optimal food processing). High quality proteins and complex carbs are needed for your post training meal in order to help your body recover and progress..

Exception – You can have a protein powder meal immediately after strength training. Because your muscles were stimulated, there is a "window" for higher protein

assimilation; normal food would hurt your stomach, but protein powders are soft and ready to be assimilated.

If you are hungry you can eat some chocolate, bananas, but pay attention to the total calories you eat.

Summary:

Best sources of protein:

- first quality: egg whites, skimmed milk or yoghurt, chicken and turkey breast, soybean(doufu) , tuna fish, low fat beef
- second quality: beans, peas, rice, legumes, cereals;

Best sources of carbohydrates :

- cereals, bread, oatmeal, pasta(noodles), brown rice, potatoes, sweet potatoes
- vegetables: broccoli, cauliflower, tomato, cucumber, spinach, lettuce, onion, radish, carrots, green pepper, peas, mushrooms
- fresh fruit: apple, pear, banana, orange, pineapple, grape, grapefruit, strawberry, peach, plum, water melon ;
    - avoid too much refined sugars (ice cream, table sugar, chocolate, cakes, jam, cookies, sweets)

Best sources of fat: - olive oil, deep sea fish fat, soybean, nuts, seeds, vegetable oils;

- avoid too much animal fat (egg yolk, fat pork , fat beef, mutton, hamburgers, hot dogs, bacon, chicken skin, fat milk, fat cheese)
- limit oil fried foods (French fries, oil fried pork, etc)

Dietary guidelines

- split the total calories between 4-6meals, taken at equal intervals (200-800 cal for a meal);

- eat the meal according with the latter activity-(ex: if you have to work in the office for the next hours take a light meal 250 - 500 cal, 90 min before training take about 400 - 800 calories, mainly from carbohydrates) ;

- drink plenty of liquids (water, green tea, fruit juices, milk) during the day, at intervals, without waiting to be thirsty (at least 2-3 liters a day), more in hot weather and during and after training;

- while exercising keep a full bottle with you and sip every few minutes; you should aim to eat the same amount of liquid as you lose through sweating;

- eat fresh food, do not store it for a long time, do not overcook it ;

- eat plenty of fresh, raw fruits and vegetables- due to phytochemicals, fibers and vitamins contained, the fruits and vegetables, along with cereals are the best for supporting a good health and a prolonged life ,free of diseases;

- have a varied diet, including foods from all the food groups, and well balanced (see the food pyramid);

- one hour after the training eat a meal rich in animal protein and carbohydrates;

- do not eat late in the evening (after 21:00), or eat some fruits and vegetables;

- at least once or twice in a week eat deep sea fish for its omega 3 fatty acids and/or some olive oil ;

- avoid or limit alcoholic beverages intake - the alcohol contains 7 cal per gram and it can ruin your diet, along with other unwanted effects;

Example for one day fat loss diet for a woman (1600 Cal)

Time	Following activity	Food (grams)	Proteins (grams)	Fat (grams)	Carbohydrate (grams)	Calories per food	Calories per meal
7:00	Going to the office	- cereals - 50 g - milk (skimmed-2%fat) - 200 ml	3 7	2 4	40 10	200 105	300
10:00	Office work	-banana- 200 g - 1-2 biscuits - 25 g	2,5 2	1,2 1.5	27 20	130 75	200
12:30	Office work	-chicken breast-100 g -cucumber 250 g - tomato –250 g	24 3 3	6,5 0.5 1	4 8 16	185 50 75	300
15:00	Office work	-yogurt- 250 ml - one apple – 200 g	8 0.3	0.2 0.4	10 17	75 75	150
17:30	Training	- brown rice- 150 g - beans –50 g - strawberries-100 g	4 12 1	1 1 0.5	35 25 8	165 150 45	400
21:00	After training Sleeping	-tuna fish-100 g -onion-50 g - broccoli- 200 g - rice – 20 g	24 - 0.7 2	4 - 0.1 1	- 5 8	145 25 45 35	250
Total			95	25	225	1590	
Total ideal			80	25	240	1600	1600

How to make your own diet plan

Weight loss hypo caloric diet

This means that you have to eat less calories than you burn, but you also need enough proteins, vitamins and minerals.

Calculate your daily calorie needs (use the method described on page ???) and subtract 200 – 500 Cal. The lower this number the better you will maintain your Lean Body Mass, making it easier to maintain your future achieved lower body weight. The higher the number, the faster your weight loss will be. I suggest to subtract accordingly with how far are from your goal – if you need to lose just 2-4 kg, eating 200 calories less than you burn would be a better choice.

If severely overweight (20 – 30 kg above your desired weight) you can subtract as much as 1000 cal/day.

Choose about 1.5 grams of protein per day for every kg body weight. Considering that you are training, you want to maintain your lean body mass and that you already are on a calorie deficit, a little more protein is required.

Do not adopt any diet with less than 1200-1300 Cal if you are a woman and less than 1800 if you are a man. With less than this amount, your basal metabolic rate will decrease, hampering your weight loss plan and you would not be able to satisfy your daily needs for high quality proteins, vitamins, minerals and fibers. It is very difficult to comply with a very low calorie diet; you will feel hungry, your immune system will be suppressed and you would have no daily energy to work.

Ex.

Woman 1.65m, 70 kg

Goal 58 kg and maintain LBM

BM = 70 x 24 x 0.9 = 1680 x 0.9 = 1512 Cal/day (approx 1500 Cal)

Works as office clerk, walks 2 km a day, normal daily chores, exercises 4 times/week x 100 min.
DM = 1500 x 1.5 = 2250 Cal/day

Daily calorie goal :1800 Cal/day

Proteins: 1.5 g/day x 70 kg = 105 g x 4 Cal/g = 420 Cal

Fat: 20 % = 1800 x 0.2 = 360 Cal: 9 Cal/G fat = 40 g

Carbohydrates: the rest 1800 – (420 + 360) = 1020 : 4 = 255 g

Proteins (1g P=4 Cal)	Fats (1g F=9 Cal)	Carbohydrates (1g C=4 Cal)	Calories
105 g (420 Cal)	40 g (360 Cal)	255 g (1020 Cal)	1800 Cal

Make a table as the one exampled on the dietary guidelines, but use your own numbers.

Look up in the food composition table from this book (you can also find more complete tables inside some nutrition books or on the web).

Monitor your body weight and body fat percentage every week in similar conditions and adjust your diet accordingly.

You may find it difficult and time consuming at the beginning, but after a few weeks you will become quite knowledgeable about what you eat and it will be much easier.

Fat loss, weight maintaining normocaloric diet

If you are satisfied with your body weight, but unhappy with your fat percentage, what you need is to have a diet containing the same amount of calories as you spend and strength train seriously.

You can use the same pattern as above, but you can calculate your protein intake at 1.2 – 1.8 g for every kg of body weight.

Weight increasing hyper caloric diet

If you want to increase your weight, strength train and increase your calories you eat, adding **200 – 500 Cal/day** more than you burn.

Too much aerobic type of exercise may hinder your muscle gain efforts, so limit cardio to 100 min/week.

Have a disciplined life style with enough rest.

About body fat percentage

Your body fat percentage it is also an indicator of your overall fitness conditioning.

See the table below:

Body fat percentage %	Men	Women
Morbid	30 % >	35 % >
Very high	25 – 30 %	30 -35 %
High	20 – 25 %	25 – 30 %
Healthy range	< 20 %	< 25 %
Athletic range	< 15 %	< 20 %
Minimal healthy	3 – 4 %	10 – 12 %

How to calculate your body fat percentage?

The standard way of measuring body fat percentage is by underwater weighing or Helium displacement of air in a special chamber called BOD. You will have little chances to use either of these methods in the near future.

Another good method is the Fat fold method.

You will measure your fat fold at 5 sites:

1. Triceps – in the middle vertically
2. Scapular – under , obliquely
3. Abdomen – 2-3 cm sideways from the navel vertically
4. Waist – above the crest of the hip bone exactly at the body side, obliquely
5. Thigh – in the middle vertically

Pinch with your thumb and index. You should pinch the entire fat layer, lift it from the muscle and fold it in two without angle between the two fat layers.

Caliper

How to pinch the fat layer

How to measure the fat layer

Triceps – in the middle vertically

Scapular – under , obliquely

Abdomen – 2-3 cm sideways from the navel vertically

Waist – above the crest of the hip bone exactly at the body side, obliquely

Thigh – in the middle vertically

Use a caliper for exact measurements. You can also approximate it between fingers, if you wish. Record the measurements in millimeters and sum them up.

Find the correspondent in the table below.

Body fat percentage table

Fat percentage	5 fat folds	Fat percentage	5 fat folds	Fat percentage	5 fat folds	Fat percentage
%	Mm	%	Mm	%	mm	%
8.05	69	16.15	123	24.25	177	32.35
8.2	70	16.3	124	24.4	178	32.5
8.35	71	16.45	125	24.55	179	32.65
8.5	72	16.6	126	24.7	180	32.8
8.65	73	16.75	127	24.85	181	32.95
8.8	74	16.9	128	25	182	33.1
8.95	75	17.05	129	25.15	183	33.25
9.1	76	17.2	130	25.3	184	33.4
9.25	77	17.35	131	25.45	185	33.55
9.4	78	17.5	132	25.6	186	33.7
9.55	79	17.65	133	25.75	187	33.85
9.7	80	17.8	134	25.9	188	34
9.85	81	17.95	135	26.05	189	34.15
10	82	18.1	136	26.2	190	34.3
10.15	83	18.25	137	26.35	191	34.45
10.3	84	18.4	138	26.5	192	34.6
10.45	85	18.55	139	26.65	193	34.75
10.6	86	18.7	140	26.8	194	34.9
10.75	87	18.85	141	26.95	195	35.05
10.9	88	19	142	27.1	196	35.2
11.05	89	19.15	143	27.25	197	35.35
11.2	90	19.3	144	27.4	198	35.5

11.35	91	19.45	145	27.55	199	35.65
11.5	92	19.6	146	27.7	200	35.8
11.65	93	19.75	147	27.85	201	35.95
11.8	94	19.9	148	28	202	36.1
11.95	95	20.05	149	28.15	203	36.25
12.1	96	20.2	150	28.3	204	36.4
12.25	97	20.35	151	28.45	205	36.55
12.4	98	20.5	152	28.6	206	36.7
12.55	99	20.65	153	28.75	207	36.85
12.7	100	20.8	154	28.9	208	37
12.85	101	20.95	155	29.05	209	37.15
13	102	21.1	156	29.2	210	37.3
13.15	103	21.25	157	29.35	211	37.45
13.3	104	21.4	158	29.5	212	37.6
13.45	105	21.55	159	29.65	213	37.75
13.6	106	21.7	160	29.8	214	37.9
13.75	107	21.85	161	29.95	215	38.05
13.9	108	22	162	30.1	216	38.2
14.05	109	22.15	163	30.25	217	38.35
14.2	110	22.3	164	30.4	218	38.5
14.35	111	22.45	165	30.55	219	38.65
14.5	112	22.6	166	30.7	220	38.8
14.65	113	22.75	167	30.85	221	38.95
14.8	114	22.9	168	31	222	39.1
14.95	115	23.05	169	31.15	223	39.25
15.1	116	23.2	170	31.3	224	39.4
15.25	117	23.35	171	31.45	225	39.55
15.4	118	23.5	172	31.6	226	39.7
15.55	119	23.65	173	31.75	227	39.85
15.7	120	23.8	174	31.9	228	40
15.85	121	23.95	175	32.05	229	40.15
16	122	24.1	176	32.2	230	40.3

Ideal weight

Your ideal weight it is the weight you are most satisfied with, perform at your best and look your best.

BMI = Body Mass Index

This BMI formula was created for assessing the ideal rapport between height and weight for large masses of people. It is more accurate for sedentary people.

$BMI = BW / Height^2$ (BW = Body weight in kg , Height in meters)

BMI	Assessment
< 17	Severely underweight
17 – 19	Underweight
19 – 25	Normal body weight
25 – 30	Overweight
30 – 35	Very overweight
35 >	Extremely overweight

As you can see the BMI formula does not differentiate between fat and muscle, so if you have well developed muscle mass you will fall within "overweight" category.

You should be more concerned about your fat percentage than about your body weight. Many people think they have a good body weight, but they have high body fat percentages.

Waist/hip ratio

Use a tape to measure your waist. Take measurement at navel level if you are a man and at your narrowest site if you are a woman.

If you have a big and protruding tummy take measurements at the peak.

Measure your hips at your largest standing tall with feet together.

Divide your waist measurement to your hips measurement.

Men should have a W/H ratio under 0.9, while women under 0.8.

A ratio higher than ideal it is considered risky because of exaggerated abdominal obesity. You are at higher risk than thin people for CVD, diabetes, some cancers, high blood pressure, and so on.

Lose fat

Almost everybody thinks him or herself fat; or at least a little fat. Everybody is trying once or more times during a lifetime to lose some adipose tissue. Because of the fat alone, billions of dollars are spent every year in the world, for all kinds of drugs, surgical operations, cosmetic treatments, magic belts and apparel and many other devices who lure the consumers in the hope for burning, melting, shredding off the evil body fat. Everywhere in the world, especially in developed countries, the fat alone brings huge troubles through the diseases which usually accompany the obesity, as high blood pressure, diabetes, atherosclerosis, heart diseases, joint problems and incalculable social problems, like the affection received by the fat people, chances for finding a good job, chances for being promoted or altered social perception.

It is not normal to be fat. It is not cute, or sexy, no healthy either. The days when a fat kid was a considered a healthy kid and when a fat person was thought to be a rich person are long gone. Now, being fat, most of the time is a sign of poverty, a sign of poor health and poor physical condition.

"Who likes me, likes me as I am".

Get real ! People have a lot of choices now. You can go to a bar; you can search the web for people who live near you. Most of the times, if you are fat, you will end up alone or with another fat partner; or maybe in the chat room with Wynona Rider's photo on your profile.

How do you get fat?

Among all fat people, less than 3 % of them have some endocrine problems slowing down the metabolism and leading to easy fat accumulation and slow and difficult fat reduction. Even if you have endocrine problems doesn't mean that you are condemned to a life of fatness; it means that you should be more careful with your diet and more perseverant with exercise, compared with other people.

For the others 97 % the reason for being fat is simple: eating more calories than the body's daily requirements and/or lack of physical activity and physical training.

Suppose you are a person of average height and weight (170 cm, 65 kg), working in an office, who drives a car or takes the bus. You spend almost all the time sleeping, working in an office, sitting in a car, watching TV and sometimes doing some home chores or going out for shopping or a slow walk. You need about 2400 Calories/day. If you eat 2800 Calories/day, the extra 400 Cal (100grams of bread) will inevitably turn to fat. Think of ten such a day and you are fatter 1 pound (0.45 kg). 100 days will add up to 10 pounds (4.5 kg). Over one year you will put on 35 pounds (15 kg). Even gaining 1 kg of fat every year, from 20years to 30 you gain 10 kg, when you are 40 years old you are 20 kg fatter!! I am speaking about undesirable, soft, ugly, pure fat.

Moreover, after the age of 25-30 years all the inactive individuals start losing muscular tissue at a rate of about 1 lb every year. This adds up to 10 lbs of active muscle every 10 years. Loosing 10 Lbs of muscle tissue will lower your daily metabolism about 300-500 Cal per day, "helping "you in your fat accumulation task.

What do you do in order to lose fat?

Try a magical diet

Sounds logically that if you drastically reduce your caloric intake every day you will enter in a calorie deficit state and you will reduce your fat tissue. But, does your body think the same?

If you adopt a diet very scarce in calories, for example eating just 500 or 1000 calories a day, your body will perceive this as a famine period and it will drastically reduce your basal metabolic rate (the amount of calories needed at rest for the basic physiological functions of the body) and will try to conserve your precious fat reserves for even "harder times". After depleting your carbohydrate reserves your body will look up to the muscle tissue, burning it for the its energy needs.

Why doesn't your body allow you to lose fat on a starvation diet?

Today's human body is **exactly** the same as 30 000 years ago. That is right: 30 000 years – 28 000 years Before Christ. This means that if we could have a 30 000 years ago little kid and raise him up in today's society he would be like any other kids, playing electronic games, studying a foreign language, going to university and so on.

That times there was no Wall Mart, no Carrefour, no Mc Donald's and not KFC either. Pizza Hot neither, if you are having any thoughts. What I mean here, 30 000 years ago, our grand, grand fathers were not sure what and if they could have a decent feeding today, tomorrow or even next Sunday. That time the body adapted to starvation: it started to crave fat (because of its 9 Cal per gram) and adjusted the metabolism for starvation periods, just about the same as a bear metabolism slows down during the winter.

Because of this adaptation we made it through hard times until today. What made us winners 30 000 years ago, makes us losers today. By us, I mean the people who get to go to sleep with a full belly every day, not the poor guys in some countries who still need to search and chase their meal.

Let's take a look at this scenario:

Woman 165 cm, 75 kg, fat percentage 35%, inactive, daily caloric needs 2200 Cal/day, usual daily caloric intake 2600 Cal..

She adopts a diet with 700 cal each day. This equals to 1500 Cal/day caloric deficit.

2 weeks after 165cm, 70 kg, fat percentage 37%, daily caloric needs 1800 Cal/day.

4 weeks after 165cm, 67 kg, fat percentage 39%, daily caloric needs 1600 Cal/day

6 weeks after 165cm, 64 kg, fat percentage 40%, daily caloric needs 1500Cal/day

So, even if the body weight dropped, the fat percentage increased, because the body shredded more muscle than fat. She is very happy anyhow, because his majesty "the scale" is good to her and an increase of body fat from 35% to 40% can not be easily noticed anyway. At this point the immunity should be quite weak and the daily chores feel like Hercules's ordeals. Almost 100% of the people can't sustain this kind of depriving diet and anyhow even if sustained it can not have the desirable ending.

Therefore our subject will start eating as she was used before – 2600 Cal/day.

8 weeks from the beginning 165cm, 67 kg, fat percentage 42%, daily caloric needs 1700 Cal/day

10 weeks 165cm, 70 kg, fat percentage 44 %, daily caloric needs 1900 Cal/day

12 weeks 165cm, 75 kg, fat percentage 46%, daily caloric needs 2000 Cal/day

The result is that after a three months weight loss conquest, including one month and a half of starvation, our subject ended up in a much worse body shape, at the same initial weight, but a much higher fat percentage, therefore looking fatter than before, with a lower physical capacity and a lower daily metabolism, making much more difficult a future fat loss attempt.

This is a theoretical situation, but I assure you that you do not want to live it for real.

Other "magical moments" for fat loss could be trying a three days or one week 'bullet proof" weight loss program offered by many, many quacks.

You may be starved, water depleted and all your muscles in agony and may lose 3 to 5 kg and a few hundred dollars along the way. You will return home, drink water, eat, rest as every human should do and invariably return to your pre program state of being. But you will be wiser a few hundred dollars.

Many people believe that if you want to achieve results with a physical conditioning program and a sound diet you should have access to some special secret knowledge mastered by only a few people in the world. You should know that there is no magic about any physical exercise program or about any nutritional plan. All the people you see on the magazines' covers, in the Hollywood movies, on the TV or on the stage with terrific bodies even at an advanced age, train and eat as everybody knows or should know. They run, ride the bicycle, skate, perform squats, push-ups, bench presses, pull-ups, crunches, and play basketball, soccer, and volleyball like everybody else. They eat meat, vegetables, fruits, cereals, milk like everybody else.

They can achieve results and you can't? Of course you can too. Just go for it!

What is the best way for non being fat?

For sure the best thing you can do is:

Don't ever get fat !. Eat soundly, exercise regularly and do dot accept yourself when you get out of shape.

This is how I am. I have seen a lot of fitness "gurus" on the web, claiming that they before they were living an unhealthy life, they were very fat and how they turned on the situation and while in process of resurrection they got a lot of knowledge and become experts.

I have to admit that I am "guilty" for being in very good shape all of my life. I was very active since I was one or two, I started to attend sport instruction when I was five, at 13 I started to train basketball at the local team 5-6 times every week and when I was 17 I started to systematically improve my physical conditioning. Now I am 35 years old and I am in the best shape of my life.

You know how it goes:

You are 23 and you are a stud, freshly graduate from the college. At 25 you are very, very busy. Your belly starts to grow, you look in the mirror and you say to yourself:

"It is OK, I see something down here, but I still look good"

At 28: "Oh man, I have some belly, but my girlfriend does not object too much"

At 30:"I have to admit that I am fat, but my friends are about the same as I am. It is normal to look like this."

At 32: "How did I get so fat? I do not eat too much and I am busy like hell at the office? But look at John, thou. For sure he is fatter than me"

And finally at 35: "I am a fatso. I even need a mirror to see my tinny, little mouse. It is so hard to get in shape?!"

Do not accept being fat. Pinch your belly fat every day between two fingers. Do not let it go ever 20 mm. Never, ever.

As it goes over 15 mm, eat less and exercise more. Do not lose it.

Do not look elsewhere for acceptance. Being fat is bad.

A word for parents

Do not hurt your children and let them be fat! As an adult you have choices, but as a kid you depend on your parents.

Fat kids will end up fat adults almost every time. Being fat as a kid, your fat cells will increase in number making the fat loss much more difficult as an adult.

Set a good example for your kids: Exercise regularly and teach them to enjoy sports and physical activity. Eat soundly. Statistically, having one obese parent will lead to 60 % of the kids to future obesity; both parents obese leads to 90 % of the kids become future obese adults. So if you do not find the inner strength to be fit for you, at least do it for your kids.

I repeat: The best thing for not being fat is never get fat.

OK. So you got fat before reading this book. Keep on reading.

What should I monitor when I am on a fat loss program?

- First monitor your body fat percentage. Aim to bring it inside healthy levels. Keep records of your fat folds measurements.
- Second monitor your body weight. Check it just once or twice a week in similar conditions (same clothing, in the morning before breakfast, after going to the bathroom). Do not check it too frequently. Think that your body weight changes as you eat, as you drink liquids, as you sweat, after you go to toilet, and by wearing different shoes and outfit. Use the same weight scale.
- Monitor your girths: neck, arms, chest, waist, hips, thighs, calves. Aim for changes in your waist/hips ratio.

What do you have to do to lose fat?

1. control your caloric daily intake and nutrients proportion;
2. increase your daily caloric expenditure;
3. maintain or increase your lean body mass;
4. modify and control your lifestyle and behavior.

1. **Control your daily caloric intake and nutrients proportion.**

First of all you have to understand that in order to lose fat weight you have to eat less than you consume. I do not mean that you have to starve yourself, but you have to control your caloric intake and nutrients quality and proportion.

One kilogram of body fat contains approximately 7000 calories, so in order to lose one kilogram of fat you have to burn over a period of time 7000 calories more than you take in, while maintaining your fat free mass.

For example if every day you spend 500 calories more than you assimilate, you should lose 0.5 kg of fat in one week.

This means that if during a certain day you burn 2500 Cal, for example, in order to lose fat is necessary to eat less than this； 2000 – 2300 Cal should be just fine. You do not want to go under 2000 because you do not want to alert your body to decrease the metabolic rate.

Once in every 3-4 days you can "treat" yourself with 2500 Cal. This won't let your brain realize that you are on a diet, and also will make it easier for you as a person.

Count every little bit of any food you eat.

See in a previous chapter how to calculate your daily caloric needs and how to make your own diet.

How to decrease the daily number of eaten calories?

- Wise food choices. Eat foods with lower calorie content.

Eat lean meat instead of fat meat.

Eat chicken and fish instead of pork and mutton.

Eat boiled, broiled and grilled food instead of oil fried food, or food with greasy sauce.

Eat non fat milk instead of regular.

Eat cottage cheese instead of Cheddar cheese.

Eat more at home and less outside.

Base your diet on vegetables and fruits.

- Cut or eliminate some foods.

  Reduce or eliminate oils and sweets.

  Cut on bread, rice and pasta.

  Eat chicken without the skin.

2. **Increase your daily caloric expenditure**

You can achieve this goal through a higher daily volume and/or intensity of your physical activity (walking, stair climbing, physical work) and through physical exercise (strength training, aerobic training, sports).

Physical exercise is one of the most calories consuming activity. If during one whole day (24 hours) you burn 2500 calories for example, in just one hour of physical exercise you can consume 300- 500 calories and even up to 1000 and more if you can train hard.

Beside this, frequent participation in physical exercise brings tremendous benefits:

- decreased risk for developing a vast array of diseases (heart disease, diabetes, cancer, high blood pressure, obesity, etc):
- increased immunity and faster recovery after illness ;
- decreased body fat, much better appearance ;
- delaying of aging effects ;
- longer and more productive life;
- better sexual life;
- better social life (acceptance, respect, admiration, love), and psychological well being.

Exercise guidelines:

- aerobic training – full body exercise, if bearable – jogging, stair climbing, uphill walking, elliptical machine, swimming， kettlebell swinging, etc.
- weight training – high density (active rest periods)or circuit training, minicircuit, full body basic exercises (squat, chest press, pull down, dips, etc) – 10-15 reps (10-20 RM)

You can calculate your calorie expenditure while walking or running using the formula:

Calorie consumption (kcal) = Body weight (kg) x distance (km)

Ex. 75 kg x 6 km = 450 kcal .

Calorie expenditure during sport activities depends on more factors, like your level of sport skill, time duration and intensity.

Everything counts. If you climb 6 floors up and down every day, over 356 days of one year you will burn about 35000 Cal, or 5 kg of fat. If you walk an extra 1000 meters every day, you will burn again 3-5 kg of fat in one year. 10 minutes of exercise every day, again counts for another 5 kg of fat every year.

Mountains are being shaped by a drop of water and some wind. Do not underestimate short bouts of exercise and physical activity practiced every day.

If you just go with the diet without exercise, as long as you are on a negative calorie balance, you will lose weight. The problem is that you also lose muscle tissue along with fat. If you gain weight without exercise, it is almost just fat. That is why the lady from our example ended up with more fat than she started with.

3. **Maintain or increase your Lean Body Mass (LBM)**

Of equal importance is to maintain or increase your basal metabolic rate. The most important factor altering BMR is your muscle mass.

Adding one kg (2.2 lbs) of muscle to your body will increase your BM (basal metabolism) 50 Cal/ day.

Strength training is a key element when you are on a fat loss program, because strength training protects your fat free mass; this means that a sound strength training program guarantees you that every calorie you eat less, you will lose it from body fat only.

Increasing your Lean Body Mass will transform you into a fat burning machine.

Your muscles will help you burn your fat. It is so simple and direct. Without enough muscle mass there are 2 ways to maintain a good body weight: exercise with a high volume almost every day and/or maintain a low calorie intake every day. Not being engaged in any kind of vigorous, strength requiring physical activity or exercise, leads to continuous muscle loss after the age of 25 – 30 years old, in favor of adipose tissue.

For achieving a healthy and pleasant body weight and appearance, the body fat percentage should range in between 10 – 20 % of the total body weight for men and between 15 – 25 % for women. Most of the times, even if the body weight is inside a desirable range, the body fat percentage is disappointing.

Weight training can do miracles for almost every one of us when is about losing fat and achieving a beautiful appearance.

Many people, especially women are afraid of the terrible bulkiness seen in professional bodybuilding. They refuse to weight train for the reason that they do not want to develop big size muscles. As you have seen before in this book, this is not the case.

I am not trying to convince you to go for Mister or Miss Olympia title, I am just hurrying you to weight train to improve your appearance, your health and your physical capabilities. Just aim for replacing your 3-4 kilograms of your fat tissue with muscle tissue. You will feel and look much better.

If you eat less than you burn and perform strength training, you will lose weight just from fat only.

If you eat the same amount of calories as you burn and perform strength training, you will maintain your body weight, increase your muscle mass and lose adipose tissue.

If you eat more calories than you burn you will increase your weight. If you weight train properly, at least a part of the extra weight you gain will be muscle and not fat.

I think that everybody, if it is to choose his or her ideal body composition, prefers muscle and not fat.

4. **Modify and control your life style and behavior**

It is clearly that if you are overweight or you have a high body fat percentage it is because your life style.

Maybe you led an inactive life style, with very little or absent physical exercise. Maybe your nutrition was not well controlled, skipping meals often and frequently overeating and overdrinking during the evening.

I do not mean here that you acted totally erratic, but small imbalances over long periods of time can have big a big impact on your physique.

If you want to be healthy and have a beautiful body you need to become an active person.

Tips for having an active life:

- Insert more physical movement during your daily life – walk 1-2 kilometers instead of taking a bus or driving, climb 2-7 floors instead taking the elevator, play;
- Find a group of active friends and engage in hiking, soccer, cycling, basketball, badminton, squash, tennis, swimming, etc.
- Join a fitness club.
- Do more house chores.

Tips for a healthy nutrition:

- Do not skip meals;
- Do not overeat at one meal, especially during dinner;
- Do not drink alcohol excessively – one gram of alcohol contains 7 cal , so overdrinking can ruin your diet and your health;
- Choose healthy foods (vegetables, fruits, lean meats, milk) instead junk foods (snacks, sweets, fatty foods, oil fried foods);

Cardinal sins when on a fat los program

Very low calorie diets

The least amount of calories you should eat every day is 1200 Cal if you are a woman and 1800 if you are a man.

Below are the reasons why a very low calorie diet will not work:

- Slows down metabolic rate
- Muscle tissue loss
- Hunger
- Low adherence
- Extremely high rate of fat regain (more than 95%)
- Decreases your body ability to burn fat
- Decreases your energy levels and work capacity

Skipping meals

Of most importance when on a fat loss program is to prevent metabolic slow down and lean tissue wasting. When you skip a meal you are doing exactly this. Don't.

Not exercising

If you do not do strength training when on a fat loss program, you will lose lean tissue along with fat mass. Losing lean tissue (muscle) is the major reason for weight loss rebound, because the metabolic rate will surely slow down.

If you do not do cardio, the rate of fat loss might be very slow.

Eating 1 or 2 meals a day

If you eat just 1-2 big meals a day, you metabolic rate will slow down, you will be hungry and you have a much higher chance that the calories you eat to be stored as fat.

Adopting a temporary low calorie diet and exercise program

If your healthy diet and you physical training program are temporary, so will be your results: temporary. It is logic that if you go back to your old lifestyle and habits you will regain fat. You must make permanent changes in your diet, lifestyle and habits and you will gain a lifetime of health and good physical fitness.

The black list of foods for a fat loss diet :

- Ice cream
- Sweets: chocolate, jam, cakes
- Oil fried foods
- Fat meat: pork, mutton, fat beef, hamburgers, hot dog, poultry skin, bacon
- Sugar - sweeten drinks
- White bread
- Sweeten breakfast cereals

The white list of foods for a fat loss diet:

- Oatmeal, whole grain products, brown rice
- Lean protein: fish, turkey breast, chicken breast, low fat milk, lean veal, egg whites
- Vegetables: broccoli, cauliflower, tomato, cucumber, spinach, lettuce, onion, radish, carrots, green pepper, peas, mushrooms
- Potatoes, sweet potatoes, tofu
- Fresh fruit: apple, pear, banana, orange, pineapple, grape, grapefruit, strawberry, peach, plum, water melon
- Nuts, olive oil, fish fat (EFA)

What to do if you reach a fat loss plateau ?

You might reach a plateau after you successfully lost some fat and you progress reaches a halt. How to break trough a plateau?

- Eat less calories
- Modify your nutrient proportion
- Modify meal timing and frequency
- Improve food choices
- Increase duration of exercise
- Increase frequency of exercise
- Change the method and the type of exercise
- Increase intensity of exercise
- Zig zag your calories – eat less calories for 3 days and eat more the forth day.

  For example if you calculate you Daily Metabolism at 2000 Cal/day, eat for 3 days 1500 Cal, and 2000 Cal for the fourth and than repeat. This strategy might give you a boost for your metabolism by preventing starvation metabolic slowdown and improve adherence.

- Plan 1-2 cheat meals per week – almost everybody loves to eat delicacies. If you got used in the past to eating how you like (and not how you need) it will make it very difficult for you to adjust to a healthy but bland diet. 1 or 2 tasty meals per week might even boost you metabolism and will improve long term adherence with a restricted diet. Planned cheat meals will prevent frequent cheating with your diet.

The rate of fat loss:

Scientifically you can lose between **0.5-1.5%** of your body weight of fat per week.

The more you are overweight, the faster the fat loss rate.

In the beginning you might experience even faster weight loss – mostly of it comes from water depletion, and not from fat weight.

Even if it feels that you lose fat very slowly, it is paramount that you have the will and discipline to keep on going. If you are very fat you might need even 1 or 2 years to reach your final goal. At times your weight and body fat will freeze at the same level, maybe even for months. Keep on fighting. Think that once you will achieve your dream physique, you can maintain it for life.

Do not give up.

If it took years to accumulate fat, you can not expect to get rid of it in weeks.

"Nothing great was achieved without perseverance"- Emerson

Fat loss fallacies and other fitness related controversies

The fat loss industry gets billions of dollars every year. There are many companies which sell products supposed to reduce the body fat – fat loss supplements, magic clothes and belts, vibrating machines, electrical muscle stimulation machines, fat loss through massage and acupuncture, body wrapping, cosmetic slimming creams, significant fat loss over a few days or weeks, etc.

Almost all are quacks and their products will benefit nobody except to the producer and the seller. Take a look on www.quackwatch.com.

You will be amazed what you can accomplish over months, years and over your life time by following a correct diet, a regular exercise program and a healthy lifestyle.

Fat loss around specific areas of the body – spot reduction

Many people try to use diverse methods to reduce the body fat around not so good looking zones, especially around the waist and hips.

They believe that increasing the amount of time spent training specific body parts ,like doing **uncountable series and reps of abdominal training** or butt extensions, "**fat loss massage"** of specific areas, wearing "**magic belts"** and "**slimming pajamas"** , **spot sweating** using plastic wrappings, using **cellulite creams**, will achieve fat loss of these sensible areas.

Fat is burned as a result of increased metabolism and is transported through the blood stream, throughout the whole body. As you can not just drink the water from the middle of the bottle without drinking the water from the top, you can not achieve spot fat reducing.

Even professional tennis players, who exercise day by day, thousands and tens of thousands of hours mainly using their skilled arm, have similar fat folds on both arms.

The aerobic training and the fat burning zone

"If you want to lose fat you have to do mostly aerobic training"

"If you want to burn more fat during training keep your training intensity inside the fat burning zone - **about** 65 % of your MHR – maximal heart rate"

"You will start burning fat after 20 minutes of continuous aerobic exercise and not earlier! Your training will be effective for fat loss just after these 20 minutes"

I have seen these things written in many publications, I have heard if from many trainers and even teachers. What is the connection between aerobic type exercise and fat loss? What is this "fat burning zone "?

Based on the physiological knowledge that aerobic exercise relies on fat for energy, many people assume that this should be the best training method for loosing fat. Is this right? Not necessarily.

Think about 100m sprinters, category weight lifters (under 105 kg), fighters (except super heavyweights) and other pure anaerobic sport disciplines. Are they fat? Their body fat percentage usually ranges between 4-8 % which is extremely low and they really avoid aerobic training, because aerobic training adaptations might interfere with peak power development.

Thinking that the aerobic training is “the best method” for fat loss is the same thing like “not seeing the forest because of one tree”. People think that if they bought a membership in a fitness club, and run on the treadmill and take the aerobic classes regularly they will get the fat loss results they want.

I am not saying that aerobic training is not good to be part of a fat loss program, but what it is much more important is to see the complete picture: eat fewer calories than you burn, maintain or increase your fat free mass and lead an active and healthy lifestyle.

The fat burning zone – “You will start burning fat after 20 minutes of continuous aerobic exercise and not earlier! Your training will be effective for fat loss just after these 20 minutes”. Some people red just one book, they have seen the energy expenditure during continuous effort table and have noticed that the longer you go, the more your body relies on fat for energy. This is true, but what is important is your total energy balance (energy in-energy out) for a given time period (a day, a week, a month). There is no use if you burn 50 grams of fat during a training session and go back home and eat it back with tree bites.

“You need to exercise at 65 % x MHR intensity if you want to burn more fat!” The lower the intensity the higher the percentage of energy obtained from fat. This means that you burn the highest percentage of fat when you are sleeping. By this theory, sleeping should be the best exercise for fat loss. We all know that this is not true.

If you exercise for fat loss, the harder you work out the more you burn. The longer you go the more you burn. Choose the highest training intensity you are able to bear physiologically and psychologically.

The sound reason behind the 65 % aerobic training intensity is that at this intensity you still burn many calories without being too exhausted, you can adhere better to a program, recover quickly and are able to maintain a high frequency of training sessions.

“**Beware of the people who red just one book.”**

Fat loss through sweating

"Buy the sliming sauna belt and you will lose the fat around your waist while watching your favorite TV show."

"The portable full body sauna came into town. Loosing fat is easier than ever".

This kind of ads should be banned by low. But when you live in a free country, you should allow freedom of choice. Do not fall for ads.

Some people think that fat is liquid and can be lost through sweating. Fat is liquid, but at very high temperatures, much higher than body temperature. If you try to panfry yourself, it might work.

Blood is over 90% water, muscle about 75%, while fat a mere 20% water. So sweat comes primarily from your blood and your muscles and not from your fat. And anyhow you need to replace the water lost through exercise. You need it for healthy living and for other reasons.

Losing too much water through sweating can be dangerous, even fatal. So forget about fat loss through sweating.

Mumbo Jumbo metabolic diets

They have been around since snake oil salesmen were peddling from door to door. You have heard and read about them.

Dr. Atkins' new diet revolution, Demis Russos dissociated diet, the Los Angeles diet, the cave man diet. I could fill half of this book just with the names of these diets.

They promise that some magic metabolic wizardry will happen in your body if you adopt an awkward diet.

What do they preach?

- Some blame and ban the carbs from the diet
- Some advise to eat some magic combinations of foods
- Some tell you to eat apples one day, goat milk another day and fish the third day
- Some call for some secret plants found only in Madagascar and on the peak of Himalayas
- Most promise quick and permanent fat loss and improved health

The carbs are essential for your diet; they should provide most of your daily energy. They help store water in your body. Every gram of carbs fixes 4 grams of water. When you deplete your body of glucose, you also lose a lot of water. That is why low carbs diets seem to work fast and reduce your body weight as you start them. Remember that your goal is to lose weight from fat and not from water.

Without enough carbs in your diet bad things might happen

- Your brain needs exclusively carbs for energy, so your body will start to convert fat to ketone bodies to feed the brain; ketosis disrupts the optimal acid-base balance in the body and promotes mineral loss.
- Your body will turn on to proteins and break them down for energy. Most of the proteins inside your body are part of muscle tissue, heart, liver, and so on, so you may want to spare them.
- You feel weak without energy; you are in a continuous state of hypoglycemia (low blood sugar)
- You receive less vegetal fibers because most fibers come from carbohydrate rich foods; you are more inclined to constipation and colon cancer

Why the dissociated diets are bad for health?

- Your body needs a balanced amount of nutrients every day: protein, carbs, fat, vitamins and minerals. A very bland diet made up from just one type of food or two it is highly improbable to contain an optimal amount and proportion of nutrients

Some of this diets work; they work because the restricted amount of calories and not because other special reasons.

People who adopt these diets are known for a life time of trial and error dieting. Their weight goes up and down as the sea tide, together with their mood.

Practice what you read in this book and you will enjoy a LIFETIME of health, fitness and beauty.

Use your logic and your brain when adopting any major changes which might influence your well being. Seek to understand the reason behind the health, fitness and nutrition programs.

Why sometimes I do not lose fat over long periods of time even if I exercise regularly?

Many people enrolled in a training regimen having their main goal fat loss, but over more weeks, even months of regular training, the weight scale holds still on the same number for them. What is the problem?

As I wrote earlier, one kilogram of body fat contains about 7000 calories. That is enough to power on a 70 kg individual over one 100 km run??!!

Sometimes people who train overestimate their exercise calorie expenditure and "reward" themselves with some extra delicacies (sweets, meat, staple foods, etc) for their hard work and dedication. Some foods are packed with calories with 300-700 calories for 100 grams.

"I can eat a little more if I exercised so hard, can't I?"

Sometimes they “reward” themselves with some extra rest, or reduce some daily physical activity.

“I do not have to take the stairs, because I go to the club now!”

It is important to understand that you have to respect every condition in order to successfully lose fat: burn more calories than you eat, increase your daily energy expenditure, maintain your fat free mass and adopt a healthy lifestyle.

The body is very adaptable and tries to maintain the initial weight even under changing conditions.

“A winner never quits and a quitter never wins” - Napoleon Hill

“**You do not need to train if you are not fat”**

It is very sad to hear this, but I have heard it many times. Physical exercise can offer you much more than just fat loss: much better overall health over you entire life span, superior physical qualities (strength, endurance, flexibility, speed, balance and coordination), a truly beautiful body and a lot of fun.

“You do not need to brush your teeth if you do not have cavities”, “You do not need to study if you can read” are all similar statements.

“**I need to get in shape before I can join a club or exercise outside”**

If you are truly intimidated and shy to go to a club or exercise outside, you can exercise at home or find a club with very little traffic or where many unconditioned individuals are working out, like a hotel fitness club or a rehabilitation facility.

"**I am worried that if I begin to exercise and then I quit, I will get fat"**

There is an ounce of truth in this statement. Some professional athletes, after their retire get fat in no time at all.

When they trained they ate 4000 calories per day and spent them all. After suddenly giving up on exercise, they kept on eating 4000 calories as before, but spent just 2500 of them every day. On this diet balance you may gain 1 kg every 5 days, so in 50 days you will be 10 kg fatter.

If you start to exercise and than quit, you will return to your previous physical aspect and capability.

What you need to do is do not quit physical exercise or if you do it adjust your daily calorie intake according to your newer needs.

The quick fix solution (often without effort)

If you can hope to get rich overnight by picking the winning ticket for the New Year Lottery, remember that there is no "Fitness Lottery" where you can get fit and healthy by chance.

If any program, machine, pill or any other gimmick promises you that you will lose all the fat you want to lose and see your six packs without effort and/or in a very short time you can bet your home against ten dollars without hesitation that it is not true.

If piano playing would be very popular, you will see in short time the "magic piano socks" which you wear at night and you will become a sought after piano master.

The good news is that you can be 100% sure that you can be fit and show a good looking body if you persist with a proper exercising program, a sound nutrition and a healthy lifestyle.

I am too old to start exercise

There are many scientific studies and experiments conducted on men and women in their 90's who started to exercise. They all had extremely encouraging results: strength increases of almost 100%, maximal walking speed increased from 3.5 km/h to 5.5 km/h, 50% reducing in the falling rate, better overall life quality.

"**Use it or lose it"**

The truth is that many people are too old to afford **not** to exercise.

You can get significant improvements in overall fitness (cardio respiratory endurance, muscle strength and endurance, flexibility, etc) at any age.

You can get the same amount of improvement until you are 60-65 of age. This means that if you start exercising when you are 25 years old and in 6 months you can improve your bench press from 50 to 75 kg and gain 6 kilos of muscle mass, the same can happen when you are 58 years old, in the same amount of time. After 60-65 years old, your growth hormone and testosterone production level starts to have a more accentuated decreasing rate; you can still reap the health and fitness improvements of a fitness regimen, even if at a lower rate.

There are many people past their 60's who look and perform better than almost all sedentary people in their 30's.

After how long time after I begin to exercise, I will start to see the results?

You will start to feel the results immediately after the first sessions: you will feel better about yourself, feel more confident and sleep better.

After about **one month** you should start having actual fitness improvements:

Cardio respiratory improvements – it will be much easier to complete what in the beginning felt quite strenuous exercise;

- your resting heart rate, and effort heart rate (for similar conditions) will decrease;
- your VO2 max will increase (there have been reported even gains as high as 10% of VO2 max after just 10 consecutive days of aerobic training)

Strength improvements – you strength should increase for all the movements

You may lose between 1 – 6 kg of body fat or gain 1-2 kg of muscle mass.

After the first month you should be able to see your improvements.

After **3 months** the others should see your results.

You can lose up to 10 kg of fat or pack on up to 6 kilos of muscles.

After about **6-12 months**

You should be radically changed. If you were "normal" at the beginning, now you should look like an athlete.

After 6-12 months of exercise you may lose up to 25 kilos of fat, you can reach 10% or even less body fat, you can put on 10-15 kg of muscle.

Most of the people adopting a structured exercise program and a controlled diet should reach their fitness and beauty goals before **1 or 2 years** are over .

How should you train if you are really time crunched?

You live in a big city. Right now is maybe the biggest economic downturn of our century. You may really work your butt out from morning until late evening.

Your colleagues, moaners and whiners complain how hard and unfair life is; you do not. You know that life is not always as you see in the movies and you work hard to succeed. Beside money and career, you believe your health and your physique are important too.

What to do?

- You can join a gym which has a late closing time if it is conveniently located. Train for 20 – 30 min each time. Do the program bellow 2 – 3 times a week.

Training 1

Squats 5 sets x 5 reps x 5 RM

Horizontal bench press 5 x 5 x 5 RM

Pull ups 5 x n

Do the bench in superset with pull ups

Training 2

Deadlift 5 x 5 x 5 RM

Dumbbell standing press 5 x 5 x 5 RM

Standing barbell curls 5 x 5 x 5 RM

Gorilla Crunch 5 x n

- Buy 2 kettlebells and train at home in the morning or in the evening: a big one for strength and a smaller one for stamina and power.
- Do body training at home. Do pistol squats 5 x 5, explosive pushups 5 x 5. Buy a door frame pull up bar and do pull ups 5 x n.
- If you have enough space, buy a Power Rack and a good Olympic bar with plates. With a Power Rack you can train safely and professionally. You can do squats, deadlifts, bench presses, shoulder presses, biceps curls, pull ups, dips – all the big value exercises.

The "No Sweat" training program

It happened to me many times. I had some time off (10 – 15 minutes) and I wanted to do some exercise but I did not want to get sweaty.

Sometimes I did not have enough time to change clothes and to take a shower, sometimes I did not have change clothes with me, sometimes I was outside and had an appointment after half an hour.

How to perform the "No Sweat" training

- Do sets of 1-5 reps with very heavy weights (squats, deadlifts, bench presses, shoulder press), slow pistol squats, slow pull ups
- Rest more in between sets, until your heart rate returns to normal
- Stop and cool down if you feel that you begin to sweat

With this kind of training you can increase you strength and avoid detraining, lose fat and gain muscle.

Of course that you will not sweat when training if the air temperature and humidity are at a level that allow you to walk slowly without sweating.

No excuses!

Whom should I trust?

Fitness world it is plagued with misinformation and quackery. When big money is at stake, charlatans are ready to profit.

Fitness magazines

Most of the fitness magazines stay in business because of the ad revenues. Most of the ads money comes from supplement producers and from exercise equipment manufacturers and resellers.

Some of "most prestigious" magazines belong to supplements companies and have been built to support and enhance supplement sales.

I do not wish to say that all fitness magazines are bad and you should not trust any of them; I am saying that you should filter almost everything you see, hear or read through you brain.

Equipment manufacturers earn money by selling high tech equipment. The more high tech the machines, the more profit they bring when sold. Dumbbells and kettlebells sell for much less

than treadmills and selectorized equipment, so it is very logic that they will not receive too much ad money and paid publicity.

Most of the high tech machines, equipment and other gizmos are designed and sold by manufacturers purely for profits they bring and not because of the utility they have and the fitness results they deliver.

Most commercial gyms buy and display "the latest and the shiniest" machines to lure unknowledgeable customers to spend money for memberships. They buy them for design and marketing and not for training.

Many trainees like to come to the gym to socialize and simulate training.

Have you ever seen ads for apples or for onion? At least I have never seen. Why? Could it be because apples and onion are not good and healthy food? Of course they are.

The reason for not seeing apple and onion ads is because by producing and selling apples and onions there are not too much money to be made. A totally different picture is when commercially produced vitamins, supplements and other magic potions are chemically mass produced for pennies and sold for tens of dollars to millions and millions of buyers.

The same thing is true for high tech equipment vs. free weights. They sell for a good profit so they are marketed through all the possible channels.

Web sites

Spending 50 bucks a year anybody can own a web site. Nobody checks the web for misinformation; you can write anything you wish on your website. Pay special attention if you see any "new discoveries and methods" and if the site sells anything "which will help you accomplish your goal".

Leave immediately if you see or hear anything like "fit in 30 days", "with no effort what so ever", "tone your problem zones" or anything which is "revolutionary" or "secret".

Make use of your common sense to judge everything you see, hear and read.

Check our who is behind the scene

If the guy behind the article or product does use what he preaches you may believe him.

If the guy behind the web site helped others to get results you may believe him.

If what you read is too good to be true, than mostly all of the time it is exactly like this.

Personal trainers

Nowadays in any country in the world everyone can claim that he is a personal trainer. He/she just needs to be hired by a club manager and wear a PERSONAL TRAINER T shirt. Or he might just say he is a personal trainer as I can say I am a fisherman. I like to go fishing, I own some fishing tools, and therefore I am a fisherman.

Not anybody could claim that he is a doctor, a lawyer, an engineer or a priest. You need to go to special schools, to graduate, to practice as an apprentice and then to pass through rigorous examinations and reexaminations in order to claim this.

There are no standards or rules, not any laws or regulations for personal trainers.

Of course many of them have solid theoretical knowledge and practical skills, but also many of them happened to be in this position purely by chance.

Check your trainers education background, see if he practices what he preaches, see if he has many successful clients.

Use the knowledge you learnt in this book, to check them.

The best home gym

I will explain here how to make your best home gym with little expense and real value. The items are in order of the needed investment.

At home you can start a program without any expense: body weight training

The next step you can buy some simple stuff:

- jump rope (with a small ball bearing inside the handle to allow for smooth rotations of the rope);

- gym ball (55 cm diameter if you are under 1.65 m tall, 65 cm (1.65 – 1.85) and 75 cm ball if you are taller than 1.85 m);

- kettlebells – buy 2 in the beginning as I advised in the kettlebell chapter;

- adjustable dumbbells;

- adjustable short bar barbell with plates;

- aerobic step – chose a sturdy one you can use for cardio training and also use it as a bench for resistance training;

From here up you need to put in more money

- Olympic barbell with plates;

- Power rack;

- spinning bike for cardio;

- treadmill if you have no good outdoor conditions for running

Do not buy any multifunctional machine. They are pure crap.

You can get a very good value for your money by buying a Power Rack. Using a Power Rack you can practice every one of Strength Training 10 Big drills.

Metal Gear produces some of the best and most professional Power Racks in the world. (www.MGstrength.com)

Metal Gear Power Rack

Alcohol abuse

You have seen in many magazines, you may have even seen it on TV: according to multiple studies moderate alcohol drinking it is beneficial to your cardiovascular system.

The key word here is MODERATE and not “you can drink alcohol”.

What moderate means?

One serving per day for men and half of serving for women.

What is one serving?

30 ml whisky, vodka, rum 40 % alcohol

350 ml beer 4% alcohol

200 ml wine 10% alcohol

If you haven’t drank one day this doesn’t mean that you can catch up on weekend. One serving per day is one serving per day. Not more.

Excess alcohol drinking hurts and kills

- it is the number one reason for deaths under 30 years old; most of them by car accident and alcohol poisoning
- about 60% of all murders happen because excess alcohol drinking – the murderers and the victims too

- it is the number one reason behind divorce and child abuse
- it is the major cause for liver diseases (fatty liver and cirrhosis)
- it causes many other diseases: stomach diseases, brain damage, hypertension, high blood cholesterol
- it is one important reasons for career failures

It is not fun to get drunk. You get incoherent; you lose good motor control and even conscience. You get sick and vomit your guts out; often you piss on yourself (without Pampers). You do things which you will be ashamed and regret later. You hurt your friends and your loved ones. You hurt your wife and your children; you hurt your parents. Sometimes you get in a fight and of course that most of the times you lose them. Sometimes you might even sleep on the street like a bum. You may even sleep on your own vomit and piss.

When you wake up, you feel like you got hit behind the head with a baseball bat. You feel like doing nothing and you linger until the evening.

Excess alcohol will ruin your diet because of the hefty 7 calories present within every gram of alcohol. They are called “blind calories”; no protein, no carbs, no vitamins, or minerals. Just calories which can be stored as fat.

You will wonder why many alcoholics are quite skinny? Because they are undernourished for long periods of time; they live at the limit between health and illness.

Smoking

In China smoking is a sad reality. As a foreigner I am amazed about the popularity of this deadly habit in China. I even may say that smoking is encouraged and embedded in the Chinese tradition and culture.

- there are almost no interdictions related to where smoking is allowed: you smoke in restaurants, hospitals, universities, public institutions, sport fields, etc
- when two young people get married, the groom will offer cigarettes to the bride's father, and cigarettes will be served at the table; the groom and the bride will even walk around the tables and light cigarettes for almost all the participants at the wedding
- many country officials smoke in public
- some of the most powerful Chinese companies are cigarette producers
- the annual cigarettes market in China is about 300 billion yuan (40 billion USD)
- programs aimed to cut smoking and the number of smokers are almost inexistent

Smoking it is not a normal habit. It is a bad habit; the same as spitting, pissing on the street and farting in public.

Smoking it is not cool and sexy. It is ugly and disturbing for others.

Non smokers do not like smokers; many even detest them, simply because smokers stink and they disturb others around them.

I bet that 50 or 100 years from now, the future humans will look back in time and laugh at us the 20th century humans. They will not understand how humans could harm their health absorbing

smoke inside their lungs. The same as we look back at men eaters before our times and wonder how humans can eat other humans.

"I can not help myself not to smoke", " I would like to quit, but I can't" . This is bulls..t. Just stop.

Take your cigarettes, throw them down and step on them; screw the balls of your toes on them and spread the tobacco all over the floor.

Next time you think about smoking or you are invited to smoke, just say with loud voice: "I do not smoke. I am not a smoker. You should quit too. Smoking is the worst possible habit for your health"

Do not be a slave to the stinky god of cigarettes. You are better than a slave.

There should be no understanding and no compassion for smokers.

Smokers can not even point out why they smoke and what they like about smoking. "It calms me down", "It helps me concentrate better".

More bulls..t!

Do you think that non smokers are nervous all the time and they can not concentrate? I do not think so.

"I need to smoke". Smoking is not needed. You need to eat, to sleep, to drink water and to go to toilet. You do not need to smoke. Proof you can find easily: there are people who do not smoke at all. Yes, they are a lot of people who get around without smoking.

Smoking will not make you more a man. Actually will make you less a man; you will know it better when you will be searching the web for generic Viagra in your 30's.

It is all about the money the cigarettes companies make. If they would not earn a lot, smoking would simply disappear faster than the Gobi desert camel.

Smoking also causes almost half of all accidental fires.

Just STOP !!!

Read the reports:

The Surgeon General of the United States, working with a team of leading experts on smoking and health, released a new report in 2004. After reviewing scientific evidence, researchers reached these important conclusions:

Smoking harms nearly every organ of your body. It causes diseases and worsens your health.

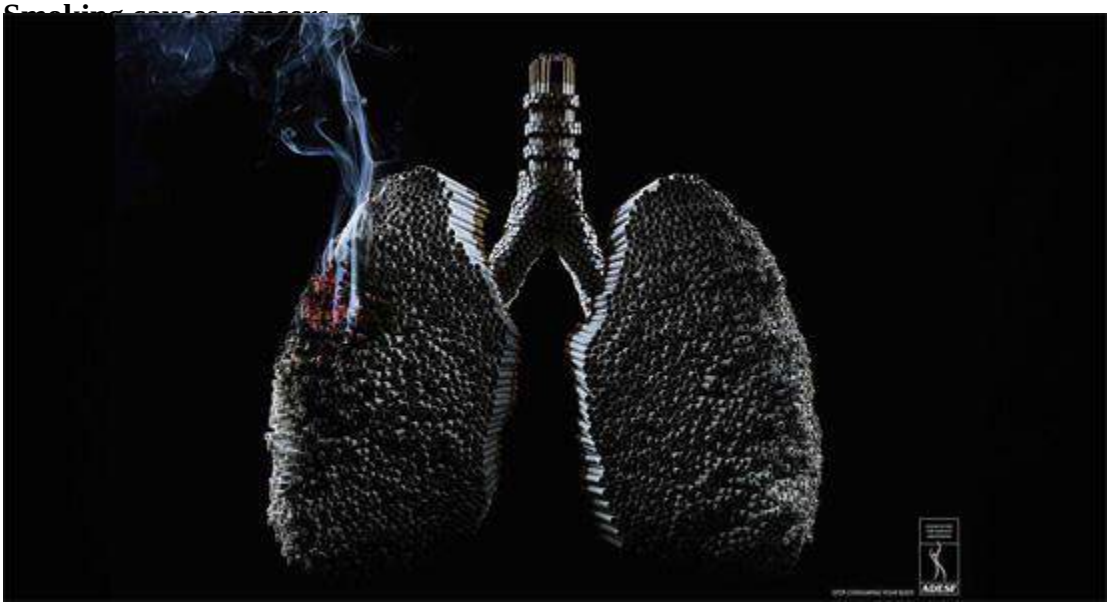
Quitting smoking has many benefits. It lowers your risk for diseases and death caused by smoking and improves your health.

Low-tar and low-nicotine cigarettes are not safer to smoke.

The list of diseases that we know are caused by smoking has grown even longer. The list now includes cancers of the cervix, pancreas, kidneys, and stomach, aortic aneurysms, leukemia, cataracts, pneumonia, and gum disease.

Facts you should now

Smoking causes cancers



Smoking causes cardiovascular diseases

Most cases of these diseases are caused by atherosclerosis, a hardening and narrowing of the arteries. Damage to your arteries and blood clots that block blood flow can cause heart attacks or strokes.

Cigarette smoking speeds up this process even in smokers in their 20s. Cigarette smoke damages the cells lining the blood vessels and heart. The damaged tissue swells. This makes it hard for blood vessels to get enough oxygen to cells and tissues. Your heart and all parts of your body must have oxygen. Perhaps most important, cigarette smoking can increase your risk of dangerous blood clots, both because of swelling and redness and by causing blood platelets to clump together.

Smoking harms your lungs. If you smoke, your lungs can't fight infection well and this causes injuries to lung tissues. Tissue injury leads to chronic obstructive pulmonary disease (COPD), sometimes called emphysema, and other respiratory diseases. People with COPD slowly start to die from lack of air.

COPD is the fourth leading cause of death in the United States. It is responsible for more than 100,000 deaths per year. Smoking causes more than 90 percent of these deaths.

Most sudden respiratory illnesses, such as bronchitis or pneumonia, are caused by viral or bacterial infections. They are usually diagnosed as upper respiratory tract infections (nose, throat, and larynx) or lower respiratory tract infections (below the larynx). Smokers have more upper and lower respiratory tract infections than nonsmokers. This happens because smoking damages your body's defenses against infections.

Normally, your body helps keep dangerous viruses and bacteria out by clearing your nose with mucus. But this defense takes almost twice as long in smokers as in nonsmokers. Once viruses and bacteria are inside your body, cells in your immune system usually kill them and prevent infection. But in smokers, some of the cells that destroy germs are decreased while others are increased. This imbalance makes a smoker's immune system weaker.

Chronic lung diseases are long lasting. They usually affect your airways and the tiny sacs where oxygen is absorbed into your lungs. Lung injury in smokers begins when smoke causes lung

tissues to become red and swollen. This releases unwanted oxygen molecules that damage the lung. It also causes enzymes to be released that can eat delicate lung tissue.

Normally, your body fights damaging oxygen molecules with antioxidants. It fights the destructive enzymes with defensive enzymes. Smoking makes antioxidants and defensive enzymes less effective. Over time, redness and swelling cause scarring and destroy your lungs, causing COPD.

Smoking harms people of all ages.

Infants. Effects of smoking on lung development can begin before birth. When mothers smoke during pregnancy, it hurts their babies' lungs.

Children. Children and teens who smoke are less physically fit and have more breathing problems. Smoking at this age can slow lung growth. If you smoke as a teenager, your lung function begins to decline years earlier than nonsmokers. This hurts you when you want to be active.

All Ages. At any age, smoking damages your lungs. The more cigarettes you smoke, the faster this happens. Air pollution, being overweight, and not eating enough fresh fruit increase your risk of lung disease even more if you smoke. However, if you quit smoking, your lungs can gradually return to normal for your age.

Mothers who smoke during pregnancy hurt their babies' lungs.

Smoking harms every phase of reproduction. Women who smoke have more difficulty becoming pregnant and have a higher risk of never becoming pregnant. Women who smoke during pregnancy have a greater chance of complications, premature birth, low birth weight infants, stillbirth, and infant mortality.

Low birth weight is a leading cause of infant deaths. More than 300,000 babies die each year in the United States because of low birth weight. Many of these deaths are linked to smoking. Even though we now know the danger of smoking during pregnancy, fewer than one out of four women quit smoking once they become pregnant.

High Risk Pregnancy. Smoking makes it more difficult for women to become pregnant. Once they are pregnant, women who smoke have more complications. One complication is placenta previa, a condition where the placenta (the organ that nourishes the baby) grows too close to the opening of the womb. This condition frequently requires delivery by caesarean section. Pregnant women who smoke are also more likely to have placental abruption. In this condition, the placenta separates from the wall of the womb earlier than it should. This can lead to preterm delivery, stillbirth, and early infant death. If you smoke while you are pregnant, you are also at a

higher risk that your water will break before labor begins. All these conditions make it more likely that, if you smoke, your baby will be born too early.

Low Birth Weight Babies. Babies of mothers who smoked during pregnancy have lower birth weights, often weighing less than 5.5 pounds. Low birth weight babies are at greater risk for childhood and adult illnesses and even death. Babies of smokers have less muscle mass and more fat than babies of nonsmokers. Nicotine causes the blood vessels to constrict in the umbilical cord and womb. This decreases the amount of oxygen to the unborn baby. This can lead to low birth weight. It also reduces the amount of blood in the baby's system. Pregnant smokers actually eat more than pregnant nonsmokers, yet their babies weigh less. If you quit smoking before your third trimester (the last 3 months), your baby is more likely to be close to normal weight.

Sudden Infant Death Syndrome. The death rate from sudden infant death syndrome (SIDS) has fallen by more than half since the "Back to Sleep" campaign began in the 1990s. This campaign reminds parents that babies should lie on their backs while sleeping. Yet more can be done. Babies exposed to secondhand smoke after birth have double the risk of SIDS. Babies whose mothers smoke before and after birth are three to four times more likely to die from SIDS.

Babies whose mothers smoke before and after birth are 3 to 4 times more likely to die from sudden infant death syndrome.

Smoking damages your health in many other ways. Smokers are less healthy overall than nonsmokers. Smoking harms your immune system and increases your risk of infections. The toxic ingredients in cigarette smoke travel throughout your body. For example, nicotine reaches your brain within 10 seconds after you inhale smoke. It has been found in every organ of the body, as well as in breast milk. If you smoke, your cells will not get the amount of oxygen needed to work properly. This is because carbon monoxide keeps red blood cells from carrying a full load of oxygen. Carcinogens, or cancer-causing poisons, in tobacco smoke bind to cells in your airways and throughout your body.

Smoking harms your whole body. It increases your risk of fractures, dental diseases, sexual problems, eye diseases, and peptic ulcers. If you smoke, your illnesses last longer and you are more likely to be absent from work. In a study of U.S. military personnel, those who smoked were hospitalized 28 percent to 55 percent longer than nonsmokers. And the more cigarettes they

smoked, the longer their hospitalization. Smokers also use more medical services than nonsmokers.

Among people younger than 65 enrolled in a health maintenance organization, or HMO, health care costs for smokers were 25 percent higher than for nonsmokers.

One half of all life time smokers will die early because of their decision to smoke.

Smokers lose an average of 13 to 14 years of their lives

The end