

How to run better



Learn the proper mechanics associated with running.

Understand the basic principles such as base training, intervals, fartleks and speedwork

to teach your clients/ or for your own training

Learn how to put together an efficient program design

Biomechanics and running form

Posture is everything! Maintain a strong upright carriage with a slight forward lean (perpendicular to ground and the force of gravity). Avoid leaning back and try to relax the shoulders, avoid hunching. Keep the neck in alignment with spine/pelvis, to avoid the head hunch, head falling back or head sway in any direction. Hips should shift forward, and the jaw and entire body should be relaxed and loose.

Why?

You will be a more efficient running machine. The body will move as a unit with no energy wasted on maintaining balance. With proper alignment the body can generate maximum power reducing the effort required to run at any pace. Legs can extend maximally with no extra effort. Inefficient forward leaning and poor biomechanics can lead to injury over a period of time with muscle and tendons being especially susceptible. An upright carriage allows for full diaphragmatic breathing control to give maximum breathing capacity.

Proper running form

-Arm swing

Arm swing should be forward and backward with minimal lateral movement or horizontal adduction which can affect running speed. The elbow should be flexed at about 90 degrees and held in this relaxed position. If you let your legs lead your arms will follow naturally. Arm swing should be executed from the shoulder and not involve flexion/extension of the arm itself.

-The hands

The hands should not cross the midline of the body or go higher than the armpits. They should be loose, not clenched, with fingers opened slightly as they brush against the shorts. Watch for excessive movement of the upper arm.

-Foot Placement

The feet should point straight ahead avoiding any unnecessary rotation.

-Ankle efficiency

The ankle are efficient levers that utilize strong calve muscle giving a direct push on each step taking some of the load off the hamstrings muscle.

-Foot strike

In a one mile run the heel strikes the ground approximately 800-2000 times. Extreme forces are generated with each heal strike. Running style and footwear is extremely important.

The gait cycle

The gait cycle is the motion that occurs when the heel of one foot initially strikes the ground and that same heel strikes the ground a second time. The foot passes through two phases the stance phase and the swing phase.

-Stance phase or support phase (60% of the gait cycle)

The stance phase begins with the initial heel strike and ends when only the toe of the same foot remains on the ground.

1. Heel strike
2. Flat foot
3. Midstance
4. Heel off
5. Toe off

OR

1. Heel strike
2. Midstance
3. Takeoff

Avoid landing on toes. Practice landing on your heels or midfeet, learning to thrust explosively from foot to foot as you run. Footstrike should be quick, light and strong. The

push off should be forward rather than upward as vertical to forward thrusting can make a big change in a runner's efficiency.

-The swing phase or flight phase (40% of the gait phase)

1. Acceleration
2. Midswing
3. Deceleration

Swing begins after toe off and ends just before the heel of that same foot strikes the ground.
No foot strike.

Teaching tools

What to look for:

- footstrike closer to the person's center of gravity.
- Comfortable running stride/ what feels comfortable
- Decreased vertical bounce/ forward thrust.
- Less kick
- Chest up/ hips forward/ Push off strongly from foot.

How to get started

- Proper footwear
- The absolute beginner (steady progression eliminates endless distress)
- Progressive Overload (four components)
 1. Intensity (effort) - % of heart rate max. - % of max speed.
 2. Duration – Measure by time not distance
 3. Frequency – How often should you train?
 4. Specificity – Training effects depend in large part on the goal of each individual runner

Hill training

Transition to build strength

Hills prepare the muscles for the speed work

Hills are an important component of overall functional strength, aerobic efficiency and anaerobic power.

Easy recovery between reps

Hill running mechanics (Quads, hamstrings, glutes and calves)

As the calve muscle gets stronger, you can support your body weight farther forward on your feet and use the mechanical advantage of the ankle.

Up hill

- Shorten your stride! Essential for top hill training. As grade increases, stride decreases!
- Use a light push off with each step not an explosive motion. Keep feet low to the ground
- Maintain same level of effort and breathing as on level ground
- Don't try and race up the hill. Watch high knees!
- Posture upright. Head, shoulder and hips should form a straight line over your feet. Defy gravity. Keep feet directly under your body
- Maintain a smooth and efficient breathing pattern
- You've made it. Accelerate gradually as you crest the hill.

Downhill

- Running downhill teaches relaxation
- Can be used to increase leg speed and stride length (don't exaggerate it)
- Run downhill on the front portion of your foot.
- Rhythm is important.
- Bend forward slightly from your waist.
- Hold arms low/ tilt your body forward to keep body perpendicular to the slope.
- Watch landing too hard on toes.

Key points

- One session per week
- Hill 10-15% grade
- Length of hill 150-200m
- Pace is 80-85% effort (5km. Pace)

Speed work

Some are born with natural speed some are not

Limb length, muscle attachment and proportion of fast twitch fibers are some of the factor to take in considerations for speed improvement potential.

Most athletes can improve their running speed.

Component of running speed are:

- stride frequency
- stride length
- form
- speed-endurance
- reaction time, acceleration, strength, power, flexibility

Experience competitive runner find that their stride length shortens as they run faster. A key to running faster is stride frequency. If you increase the speed of your football and get a strong push off, you will improve.

Tips for starting speed work:

- Solid base.
- Try to do speed work one a week; at least every two weeks
- Warm up and cool down on the track
- Start with modest efforts and increase effort each week
- You should feel in control at about 80% of maximum effort.
- Expect some time to see a difference in race performances. (6-10 workouts or weeks)
- Don't kill yourself.
- Training lightly the day before and after your speed work.

Running Form Checklist

NOTES:

Posture	Upright	<input type="checkbox"/>
	Forward lean	<input type="checkbox"/>
	Backward lean	<input type="checkbox"/>
Foot Mechanics	Pronator	<input type="checkbox"/>
	Supinator	<input type="checkbox"/>
	Heel landing	<input type="checkbox"/>
	Toe Landing	<input type="checkbox"/>
	Feet straight	<input type="checkbox"/>
Stride length	Short	<input type="checkbox"/>
	Medium	<input type="checkbox"/>
	long	<input type="checkbox"/>
Body Mechanics		
Neck/head:	Relaxed	<input type="checkbox"/>
	Movement	<input type="checkbox"/>
Shoulder:	Relaxed	<input type="checkbox"/>
	Movement	<input type="checkbox"/>
Arms:	Relaxed forward swing	<input type="checkbox"/>
	Bend at 90 degrees	<input type="checkbox"/>
	Controlled action	<input type="checkbox"/>
Torso:	Upright	<input type="checkbox"/>
	Slight forward lean	<input type="checkbox"/>
Hips:	Rotational motion	<input type="checkbox"/>
Hands:	Clenched	<input type="checkbox"/>

Train to increase personal record

- Many variable need to be improved
- Many years are needed
- Do not rush!
- Finish the race
- Do not increase intensity, duration and speed too rapidly
- Shoot to take off 10-30 seconds each race. For example you ultimate goal is 5km at 22 minutes. Goal aim for next race is a sub 24 try 23:30 then 23:00 until you reach you ultimate goal. Don't rush if you need to stick to a 23:30 for a couple of races go ahead.

Strength Training & Energy system training For Runners



Long Distance running is about covering an X distance at the fastest speed possible.

This is where strength training and glycolytic work come in!

Biomechanics

The activity of running and movement patterns of interest

Running is an activity that requires chains of muscles to work in a synchronized fashion in a repetitive fashion. Let's break down the eccentric part of the stride to better understand how movement patterns trained in the weight room can contribute, biomechanically, to the activity.

Movements of the body	Movement Pattern
Right hip flexion	Lunge
Right torso rotation	Twist
Left shoulder flexion	Push
Right shoulder extension	Pull

This sequence is reversed so that the individual goes forward:

Movements of the body	Movement Pattern
Right hip extension	Bend (concentric)
Left Torso rotation	Twist
Left shoulder extension	Pull
Right shoulder flexion	Push

When looking at the activity of running, almost all movement patterns are being utilized. This means that if the body is trained to perform these movement patterns in the weight room, it will be more at ease to perform them for any period of time while running.

The central nervous system will require less energy to move in these patterns if it has been accustomed to do so at higher intensities. Thus, the execution of these movement patterns as a training tool is an excellent way of making your body more efficient at utilizing fuel for running.

Also, these movement patterns can be used to make your body move correctly. Muscle imbalances will alter the way you run. For example, if a muscle is weak and has a job to do it

will ask others to do its job. This creates faulty recruitment patterns as muscles that were designed to do X now do Y. This eventually leads to nagging pains while running, decreased time and possibly injury!

These muscle imbalances can be fixed by forcing the body to move properly. This means rehearsing the movement patterns that constitute running in a controlled, non fatigued climate. You cannot correct it as you run. It's the equivalent of thinking about breathing. Your body runs without you thinking about how you do it. It is possible to remind yourself as you are running to *push with the hip* or to *keep the knee straight* but as fatigue sets in, all these efforts will go unnoticed because of information overload. Your body will be so busy just running that the central nervous system won't be able to add on to the list of tasks all these running cues. The body will seek the path of least resistance "naturally".

Corrective exercises for common issues with runners

Runners usually have the muscle imbalances that follow:

- Hypertonic hip flexors; *Psoas is often the difficult one*
- Weak hip extensors and external rotators;
- Weak lower abdominals
- Weak & tight Quadratus Lumborum

Here are exercises that are geared toward balancing the athlete. Remember that these exercises may not be right for you. Only an evaluation can determine what you need to do.

- Releasing of Psoas by activating antagonist
- Glute max activation
- Belt squat
- Lower abdominal coordination
- QL lift
- Releasing QL by activating antagonist.

Energetic considerations and periodization

Month	Training focus	Type of training	Goal of training	Means
1	Strength training + Running	Rehab Focus: Muscle balance	To correct muscle imbalances and improve posture	Corrective training sessions 3 times a week + maintenance run twice a week
2	Strength training + Running	Medium sets/Medium reps Focus Hypertrophy	Increase muscle mass in order to produce more strength in the activity of running.	Strength training 3 times a week + maintenance run twice a week
3	Running + Strength training	Aerobic dominated running	Improve aerobic system	Running 3 times a week (continuous steady pace) + Strength training 1 time a week
4	Running + Strength training	Anaerobic glycolytic dominated running	Improve the anaerobic glycolytic system	Running 3 times a week (intervals 1:1 or speed training) Strength training 1 time a week
5	Strength Training	Medium sets/medium Reps Focus: Functional Hypertrophy	Converting the muscle mass into strength but also keep increasing muscle mass	Strength training 4 times a week + Running at new maintenance level twice a week
6	Strength training	Hi-reps/low Volume Sort rest intervals Focus: lactic acid clearance	Improve clearance rate of lactic acid of the leg muscles especially	Strength training 4 times a week and Running at new maintenance level twice a week
7	Running	Anaerobic glycolytic dominated running	Improve the anaerobic glycolytic system	Running 4 times a week (intervals 1:1) + strength training 1 time a week

8	Running	Anaerobic glycolytic dominated running	Improve the anaerobic glycolytic system	Running 4 times a week (intervals 1:2) + strength training 1 time a week
9	Strength training	Hi-Reps/low volume Very short rest intervals Focus: lactic acid clearance rate	Improve clearance rate of lactic acid of the leg muscle especially	Strength training 2 times a week and running at second new maintenance level 1-2 times a week
10	Strength training	Hi-reps/low volume Very short rest intervals Focus lactic acid clearance rate	Improve clearance rate of lactic acid of the leg muscle especially	Strength training 2 times a week and running at second new maintenance level 1-2 times a week
11	Running	Anaerobic glycolytic dominated running + ATP CP work	Improve the anaerobic glycolytic system	Running 3 times a week (intervals 1:2) + ATP CP work 1 time a week (1:5) + strength training 1 time a week
12	Running	Anaerobic glycolytic dominated running + ATP CP work	Improve the anaerobic glycolytic system	Running 3 times a week (intervals 1:2) + ATP CP work 1 time a week (1:5) + strength training 1 time a week

Duration	Classification	Energy Supplied By
4 to 20 seconds	Anaerobic	ATP + PC
20 to 45 seconds	Anaerobic	ATP PC + glycogen

ATP - Adenosine Triphosphate: a complex chemical compound formed with the energy released from food and stored in all cells, particularly muscles. Only from the energy released by the breakdown of this compound can the cells perform work. The breakdown of ATP produces energy and ADP.

CP - creatine Phosphate: a chemical compound stored in muscle, which when broken down aids in the manufacture of ATP. The combination of ADP and CP produces ATP.

The training of the different strength qualities:

Month 1	Muscular balance
Month 2	Hypertrophy
Month 5	Functional Hypertrophy
Month 6	Endurance (lactic acid threshold training)
Month 9	Endurance (lactic acid threshold training)
Month 10	Endurance (lactic acid threshold training)

As you can see, the strength training occupies an important place in this periodization plan. First, muscular balance is achieved to reduce the risk of injuries and improve the running stride. Second, muscle size is gained in order to sustain better performance once the heavy running begins. Finally, endurance of the working muscles is improved by improving the lactic acid clearance rate, which is in most cases the limiting factor for long distance runners.

The training of the energy systems:

Month 3	Aerobic system
Month 4	Anaerobic glycolytic (1:1)
Month 7	Anaerobic glycolytic (1:1)
Month 8	Anaerobic glycolytic (1:2)
Month 11	Anaerobic glycolytic (1:2) + ATP CP (1:5)
Month 12	Anaerobic glycolytic (1:2) + ATP CP (1:5)

The idea here is to improve the anaerobic glycolytic system the most as more gains in aerobic fitness are gained by training primarily this energy system. Also, ATP CP system is trained toward the end of the training plan in order to improve the last miles of the race.

The general idea behind this plan is to maximize running two months at a time. According to research by Charles Poliquin, this is the maximum amount of time someone can practice a long duration event and improve at it. If the training goal is too aerobic in nature, more than two months in a row of this type of training will lead to a training plateau. The reasons have to do with the endocrine and nervous system.

For running, as the years goes by, the training goal goes from aerobic to glycolytic. This is done so aerobic qualities are maintained while glycolytic qualities improve, which allows the athlete to clear lactic acid more efficiently.

It is important to notice that the nature of the intervals changes. As the months go by, they get progressively more glycolytic and less aerobic in nature. From a 1:1 ration, they will culminate at a 1:2 ratio by the 12th month.

For strength training, the general idea is to start with a corrective approach and get into lactate work as quickly as possible. This also helps the body in becoming more efficient at clearing lactic acid. Also, strength-endurance is enhanced. Strength-endurance is the dominating strength quality involved in long distance sports.

It has been reported that gains in the aerobic system are very limited over a lifetime and are mostly due to hereditary factors. So VO₂ max, in trained runners, does not improve significantly enough to increase performance in a given competitive field. For beginners this is the place to start.

The system that should be trained the most is the glycolytic system as this is the one that is the most trainable and the one that will contribute the most to overall progress in a race as most of the experience runner's efforts are spend on clearing lactic acid.

Nutrition guidelines for runners



Nutrition is an important, but often misunderstood, part of the running equation. Food is fuel, and as athletes, we need more fuel, and better fuel, as we increase distance or intensity. By making small dietary changes, staying away from fad diets, and understanding what our bodies need, we can successfully build our own eating styles that provide each of us personally with what we need to reach our goals.

What, where and when to eat

Approach of the event

Hyper glucidic phase

-3 days before the marathon

-10 gram of glucid/kg

-The day before the competition subject predisposed to digestion troubles will stair away from milk, raw vegetables and hard to digest foods.

- Priority goes to glucids that have a low glycemic index. Intake more Sugar with a high index, of cores without abuse.

- Maintain a normal protein intake. You should get your protein from low fat sources like light dairy products, fish & lean meat.

-Lipido-glucidic foods like pastries, crepes, pizza, lasagna, chocolate are to high in fat and should be avoided during the phase

-You will stop intakes of vegetables and complex cereal (ex. whole wheat whole grain) and simple carbs 48 hours before the event. The reason is that they contain to many fibers witch will slow down the storage of glycogen. Replace them with complex cabs for example rice and pasta.

The day of

Ideas for last meal (3 to 4 hours before competition)

Light yogurt, corn flakes, biscotti and honey.

Rice or pasta and ketchup, rice wafers

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Ration intake for wait period.

Fructose drink (that will not disrupt glycemic). Every 20 minutes until warm-up, especially for anxious participants. Intake glucose as soon as you start warm-up movements.

During effort

Intake of water and glucids, contributive separately in the increase and amelioration of performance.

One of the factors of accomplishing peak performance depends on beforehand prerequisites such as maximal glycogen storage. The intake of glucidic drinks during the activity is also very important.

Drinking energetic drinks does not stop the lipids of intervening in an equal manner to supplying energy.

Recuperation

Rehydration consists of the primary objective of the recuperation phase.

The second objective of recuperation consist of eliminating waist buildup and combating the acidity accumulation from the effort.

During the 6 hours after the event it is particularly recommended to replenish glycogen stocks of muscles and lever as well.

The time of recuperation of a 3 hour marathon is difficult to determine and varies a lot from individual. The impact on the body of an event of that magnitude is often still felt after 3 week.

Supplementation

Minerals : substance witch are essential to efficiency of numerous physiologic processes witch, includes muscle contraction and nerves influx transmission.

Potassium (K) Participates in the production of energy.