***Chapter 4***

*Technique: The Art of Jogging and Walking*

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alking and jogging is not completely a function of fitness. While significant, fitness reflects only one element of the sport. The objective of improved running and walking extends beyond fitness and in to injury prevention and conserving energy through efficiency. These “secondary” elements can be accomplished by developing proper technique and are the main focus of this chapter.

For some, technique can be a difficult concept to understand. After all, most humans begin walking within the first 1-2 years of life which almost certainly do not involve any type of advanced instruction on the technical aspects of gait patterns or energy conservation. Most parents will simply encourage an infant to “take a step.” In contrast, a running coach may instruct a teenager or collegiate athlete how to hold their arms or emphasize proper foot placement. Often, this “new” style requires significant changes from the infant and juvenile technique that happens so naturally.

So, the reader should ask the question: If I learned to walk or run naturally, why should I learn a new method? Or, another way to put it: Wouldn’t my walking/jogging pattern I learned naturally be the best suited for me? The answer to that question is a difficult one but in short, yes and no. It’s entirely possible a change wouldn’t be needed for some. However, for those that do, it could help increase pace, conserve energy, and most importantly help prevent injury.

Injury prevention might be the best reason to change. It would be difficult to quantify how many injuries occur to walkers and joggers as a result of poor technique. However, a good argument could be made that 100% of injuries are related to poor form. Why? Unlike contact sports where injuries often result from sudden impact trauma such as a devastating hit to the ribs in American football, jogging or walking injuries generally occur as a cumulative effect of repetition (i.e. overuse injuries). Changes in running technique could be as simple as angling the toe inward slightly, a change of only a few centimeters. However, the accumulation of those centimeters over the course of a half marathon, for example, add up to a significant change.

To apply this concept to injury prevention, consider the load the feet/legs must carry to run a half marathon (13.1 miles). An average runner’s foot will strike the ground about 85 times per minute while bearing the load of 2-3 times the body weight with each step. If it takes this 150- pound runner 9 minutes to run a mile, that runner’s foot will strike the ground 765 times per mile or roughly 10,000 times during the full race! At impact forces of 2 times the body weight, that’s 3 million pounds of weight the feet/legs must absorb! By altering technique, even a small change, big results will occur. In other words, overuse injuries may be less about quantity of use and more an issue of using the joint/muscles improperly through technique flaws.

**Proper Technique**

While walking varies less, it may be surprising to know there are multiple styles, or techniques for running. For example, the Chi Method and Pose Method are both popular running styles. Other methods include the Alexander Method, the Yessis “Explosive Running” technique, or more recent trends emphasizing barefoot running. It is not the intention of the author to detail each running style but rather outline some of the common, and important points of each.

As mentioned previously, the main objectives of monitoring and possibly changing your walking technique relates to injury prevention and improved efficiency. However, other positive side-effects such as increased comfort, better muscle conditioning and faster times may occur.

To begin examining your technique, it’s advisable to use a video recorder or photographs to see your current positioning and **gait pattern**. Do you really know what you look like when you walk or jog? Often, our perception of how we look is that we run with perfect strides, like a gazelle. In reality, we may be as awkward as a newborn giraffe. Using these types of media should help you visualize and internalize your positioning. From there, you can begin to make changes where necessary.

In order to properly address technique, it is important to understand some of the terminology associated with a normal gait pattern. Use [this link](https://www.physio-pedia.com/Running_Biomechanics) to assist in understanding the running gait pattern. While the terms of the gait pattern are slightly different, it will at least help with getting a visualization of the gait pattern.

* ***Pull back***-This phase begins from the outward extension of the leg and when the leg starts moving backwards towards the body.
* ***Ground Contact***-When the foot hits the ground.
* ***Kick***-after ground contact, the leg continues its backwards movement.
* ***Recovery***-after the kick, the leg initiates its movement to extension out in front of the body.

**Characteristics of Good Walking Technique**

Specific photos of walking technique can be viewed here: <http://racewalk.com/howTo/basicTechnique.php>

**Head and Body Position**

Good posture is imperative to walking technique. You should walk like a “peacock.” Head up and eyes forward, chest out (like a peacock) by standing tall. An easy way to envision your posture is to stand with your heels, head, glutes and shoulders against the wall. By doing this, you will notice the chest opens up which promotes airflow and the lower back moves to a neutral position setting the hips up to carry the upper body. This alignment between the shoulders and hips should remain throughout the walking session although the body position may be slightly leaned forward. You should notice however, the lean doesn’t change straight, tall posture because you lean from the ankles as opposed to bending at the lower spine.

**Arm Position and Movement**

Keeping the shoulders and hands relaxed, the elbows should be bent at approximately 80-90 degrees while walking for fitness. The arm swinging motion is initiated at the shoulders and works like a pendulum swinging anywhere between the 3 and 9 o’clock position (relative to the upper arm). As speed increases, the amount of arm swing will also increase.

In relation to the legs, the arms work in opposites. For example, during the recovery phase of the left leg, the right arm will also swing forward. As the arms swing forward and backward, they will ideally not cross the body too much. In other words, they should move as close to straight forward and backward as possible as opposed to side to side movements.

**Foot Placement and Foot Strike**

During walking, the ground contact phase begins almost exactly when the recovery swing ends. There is very little pull back time. The ground contact phase should occur with the foot slightly out in front of the body, with the ankle flexed at about 45 degrees. The foot contacts the ground with the heel and then rolls forward to the toes as the body passes over foot. Once this occurs, push off with your toes and the kick phase begins.

Occasionally, you will want to look down at your feet to assure proper placement. Doing this too often or continuously should be avoided as it is counter-productive to good posture. When looking down at our feet, make sure your middle toe is pointed straight ahead, and your feet are not moving too closely to the center line of your body. You want them to land in a way so that they aren’t rolling from heel to toe over the side of the foot (outside of heel to little toe, called **pronation**) or just the opposite (over the inside of the heel to big toe-called **supination**). In other words, adjust your stance so your feet are rolling over the full surface of the foot and finishing with the middle/big toe pushing off. This is easier visualized by thinking of a car tire. Proper alignment makes it so the flat area of the tire makes contact with the ground as opposed to the inner or outer sides of the tire, which would wear out the tire tread quickly. Likewise, you want your foot to roll over the “flat” area. This is achieved by widening your stance slightly.

[Click here](https://www.runandbecome.com/natural-gait-analysis) to view the differences between pronation and supination.

**Proper Jogging Technique**

**Head and Body Position**

Much like the technique for walking, you should stand tall, straight and keep your head up and eyes forward. The primary difference here is there will be more upper body lean as speed increases. An easy way to visualize this can be done by standing up with good running posture and then gently leaning forward. As you lean forward, bend as little as possible at the hip area while bending at the ankles. You will begin to fall forward and will reflexively move one of your legs forward to catch yourself from falling all the way to the ground. To a certain degree, running is simply leaning forward and preventing yourself from falling to the ground. Keep in mind as you lean, you aren’t dramatically changing the hip/torso angle, you’re simply changing the angle of the shoulders hips relative to the ground by bending at the ankles.

**Arm Position and Movement**

Arms should be bent at the elbow to 80-85 degrees. Shoulders and hands remain relaxed as the arms pendulum back and forth. As speed increases, the pendulum motion will lead the elbows closer to 3 and 9 o’clock positions. Arms should move in a straight line back and forth rather than inward and outward towards or away from the body.

**Foot Strike and Foot Placement**

The key difference in running is the foot strike. Because of the speed of the leg movement and momentum of the leg during the recovery phase, there is a more pronounced pull back. In addition, the foot should land more underneath the body than the walking stride. By doing this, the ground contact will more likely occur with the foot landing on the flat surface of the foot or forefoot rather than the heel.

This aspect of running is imperative in preventing injury. When the foot lands out in front of the body, called **over-striding**, the impact forces significantly increase and place tremendous stress on the ankles, knees and hips. Over-striding is the equivalent of putting on the brakes with each step leading to inefficiency along with the extra wear and tear. Using another analogy, think of a skateboarder. To move forward and keep the momentum going, the skateboarder must contact the ground with the pushing foot landing underneath the body. Otherwise, if the foot lands behind the body, very little force is generated. If too far in front, the angle of the leg when the foot makes ground contact slows the forward momentum. Likewise, the runner must keep the foot strike underneath the body and use the momentum of the pull back to maintain momentum.

Foot placement in jogging/running is exactly the same as in walking with the purpose being to make contact with the ground using the large surface of the foot rather than the outside or inside areas.

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|  | **Walking** | **Jogging** |
| **Head/Body Position** | Looking straight ahead, tall stance, mostly upright | Looking straight ahead, tall stance, some lean |
| **Arm Position** | Elbows bent to about 90 degrees | Elbows bent to about 80 degrees |
| **Foot Placement** | In front, heel strike | Underneath, forefoot strike |

**Indirect Influencers of Good Running Form**

Several factors, beyond what was mentioned above, indirectly influence how running form is carried out. Some of these factors will be discussed in greater detail at a later point in the book. However, they’re important enough to go ahead and mention here.

* Flexibility-muscle tension influences the length of muscles, their ability to move through a full range of motion, and general comfort during a running session. Improving flexibility will significantly improve chances at successfully modifying your form and reduce your risk of form related injuries. Stiffness changes range of motion making it more likely to begin **overcompensating** (when one leg begins to do more work as a result of disuse of the other).
* Core strength-developing good posture comes from excellent core strength. Core strength relates to those muscles in the hip and abdominal region (front, back and side areas). As fatigue begins to set in, many runners and walkers begin to slouch which places more stress on the spinal column and legs, impedes breathing, and squashes efficiency. Development of a strong core results in a self-perpetuating cycle of good form which drives fitness and vice versa. More about strength training will be discussed later.
* Self-awareness-this applies not only to paying attention to your body in the context of fatigue and aches and pains, but also in the context of spacial awareness. Developing the ability to “feel” your body position, foot placement, and leg motion will greatly assist you in practicing good form on a consistent basis.

**Equipment**

One of the major selling points for walking and jogging is the simple fact that very little equipment is required to participate in this lifetime sport. In its most basic form, you simply need comfortable clothing and shoes and a safe place to perform your exercise. In some locations, even shoes (and clothes) are a luxury! Beyond that, other items fall into the “unnecessary-but-could-help” category.

**Shoes**

In an interesting and popular book amongst runners titled “Born to Run,” the author Christopher McDougall goes to the Copper Canyons in Northern Mexico to connect with a people that are believed by some to be the best runners on the planet. One of his most interesting findings were that the meager shoes they wear consist of a dense leather bottom with some Greek style leather laces to secure them to their feet. This indigenous people, the Tarahumara, don’t simply run a few hundred meters, or a few miles, but ultra-marathon-like distances in these shoes. One take home message for many readers (although not the purpose of the book) from McDougall’s book was an increase in interest for “barefoot” running, a style that was already gaining some notice. As a result, more shoe manufacturers have tried to appeal to those interested in this “minimal” shoe philosophy.

This increase in interest for minimal shoes stems from several ideas related to barefoot running:

* Barefoot is the natural, most efficient, and intended method for humans to walk/jog.
* The additional cushioning and support of shoes hinders strength in the feet and actually promotes injury.

Although widely debated, there does seem to be some validity to these claims. For example, as mentioned in the technique section, a feel for foot placement will improve technique. By using shoes with minimal cushioning and support, the nerves of the foot engage more during the run and promote an improved feel for your foot when striking the ground. In addition, the support shoes offer may serve as a “crutch,” by making it so the muscles of the foot don’t have to work as hard (the shoe is doing it for them). The result is weakness in the foot and eventual injury. Once again, while many of these ideas seem plausible and may very well be true, each walker and jogger should examine their own needs when selecting footwear. The issue over supportive and cushioned shoes compared to minimal shoes is widely debated with current scientific literature unable to support one as being any better than the other.

Here are specific items you should look for when purchasing footwear (in no particular order):

1. Cost-of all of your walking and jogging gear, your shoes are the most important. Do not skimp on this item, especially if you plan to increase mileage over time. There’s no need to go and break-the-bank, but you generally get what you pay for when it comes to shoe purchases.
2. **Heel-to-toe drop**-all shoes are offset, or designed to have an offset height at the heel and forefoot. The greater the offset or difference, the more cushioning you’ll find in the heel. The less the offset, the more “barefoot” the shoe will feel. When considering this element before purchasing, think about what your intended use of the shoe will be. A greater offset is more useful and found more often in the walking shoe, which promotes heel strike. A smaller offset tends to promote forefoot and front-foot ground strike. Because of the differences in shoe offset, the smaller heel-to-toe drop will stretch the calves more with each foot strike resulting in fatigue and possibly soreness after the first use, especially if you’re not used to the small offset. So, if you’re used to larger heel-to-toe difference, a gradual change over the course of 2-3 shoe life-spans is recommended to avoid injury.
3. Cushioning-cushioning in a shoe is most often associated with comfort. However, it should also be considered in the light of efficiency. Finding that balance, especially for shoe makers, can be tough to do. Walkers need more cushioning in the heel because of the heel foot strike pattern. Runners need more cushion in the forefoot area. However, too much cushioning can lead to inefficiency. A thick, soft shoe sole will absorb the downward forces from the foot strike. However, when the foot pushes off, forward propulsion will be lost in the “give” of the cushion resulting in more energy needed to move at a faster pace. Shoe makers are now trying to make good cushion with more “springy” materials to avoid this dilemma.
4. Durability/comfort-Look for a shoe that is durable and comfortable. Many durable materials are stiff and inflexible. While resistant to wear and tear, the lack of flexibility and weight aren’t very comfortable. Shoes that are lightweight, breathable, flexible, made from materials like mesh and soft leathers or synthetics make for good comfort and usually good durability.
5. Purpose (trail/track/road)-the days of the Taylor Berry Converse all-purpose shoes are long gone. Shoes have become remarkably specific to terrain and purpose. You will find shoes designed specifically for trails, pavement, and cross training shoes. In addition, racing flats, long distance running, triathlon, and walking shoes are all designed specifically to meet the demands of the event. Determine your purpose of use and look for shoes that meet that need.
6. Support-with the increasing interest in barefoot, support has almost become a bad word! Support in shoes is based on the needs of the foot and incorporated into the design of the shoe. For example, if you land on the outside of your foot at ground strike, you may need a shoe designed for pronators. An over-pronation shoe will generally have a thicker arch and support plate in the shoe sole to keep the ankle from rolling inward and prevent the arch from collapsing too much on foot impact. Shoes for mild-pronators are often labeled “stability” shoes. Most people have this gait pattern. For those walkers/joggers with serious over-pronation challenges, they will find more success with shoes labeled “motion control” and/or “stability.” “Neutral” shoes work great for those non-pronators. Many shoe stores now offer a free gait analysis before purchasing their shoes to help you purchase the correct shoes. You can also easily determine your gait pattern by looking at the tread wear on the bottom of your shoe. Pronators generally have the most tread loss on the outside heel of the shoe and on the inner front (near the location of the big toe).

**Other Equipment**

While shoes would be considered the most important piece of walking or jogging equipment, there are other items that may help you be comfortable and enjoy your exercise experience.

**Clothing**

It goes without saying that comfortable clothing is necessary to enjoy your walking or jogging experience. Like shoes, endless styles exist which have been designed specifically for various environmental conditions and even some with claims to promote blood flow and recovery. Regardless, the key objectives are twofold: comfort and functionality.

Clothing options begin with the under-garments, specifically briefs and bras. Briefs should be breathable fabric and help manage too much rubbing which would cause chafing. Much of this goes to personal preference in regard to the level of support needed. Many shorts have briefs built into the shorts making it possible to avoid an additional article of clothing. In addition, many manufactures claim their under-garments, or built in briefs, have anti-microbial properties. The validity of these claims have yet to be determined but the concept is ideal to avoid bacterial contact and smelly underpants.

Females should consider sport specific bras using the same basic criteria as briefs: moisture wicking, breathable, and supportive. Special attention should be given to the location and feel of the straps as they can rub under the arms, neck and back.

Shorts and shirts should be loose enough to allow for ease of movement but tight enough in the right areas to prevent chaffing. Areas of specific concern include the inner thighs, under the arms and sometimes the nipples. Socks should be moisture wicking fabric (cotton/polyester blends) and should fit snug to the foot so the shoe doesn’t rub creating foot blisters.

Depending on when and where you run, your clothing should provide reasonable protection from the elements. In both hotter and colder climates, wear clothing that wicks moisture away from the skin. Hats can be used to protect your face from sun exposure and help keep sweat from dripping into your eyes. Sun sleeves reflect radiating heat away from the arms which may help to maintain a good body temperature.

**Work Rate Monitors**

For decades, experts and amateurs have found ways to measure the amount of work they are doing when performing cardiorespiratory-type exercises. As mentioned in chapter 3, the amount of work that can be done while exercising ultimately determines the level of performance and fitness. These measurement tools have included cycling ergometers, heart rate monitors, step counters, pacing charts, and more recently through power meters. The objectives of measuring work rate are to measure calories burned, distance traveled, performance, and progression over time. With the advancement of technology in recent years, many of these once expensive and impractical measurement devices can now be downloaded to the palm of your hand through smart phones.

Heart Rate Monitors

One of the most common and most widely used tools is the heart rate monitor (HRM). Because the heart rate monitor has been covered extensively in chapter 3, details will be limited here. HRM’s are what could be termed, “effort based” devices simply because your heart rate will reflect your effort level.

Of course, heart rate can change as fitness improves. For example, a beginning runner may run at a pace of 8 min/mi with an 80% effort level reflected by heart rate) of 167 bpm. However, after months of training, this same athlete may actually do the same pace at 160 bpm. This would of course reflect an improvement in fitness and would change the effort level since the max heart rate would stay the same.

In summary, heart rate monitors create an excellent way to measure intensity, or work rate, during the exercise session and track progress over time.

Step Counters

Step counters have been used for decades now and still come as a feature in many smart phone apps and wrist devices. Because they’re inexpensive (often free) and easily accessible, they often are used for large group contests and other challenges. They’re primary function, to count steps throughout the day or during exercise, can then be used to estimate a distance traveled. The American College of Sports Medicine estimates 2000 steps to be one mile for the average adult, making the average stride length approximately 31 inches. Using the recommended daily step count of 10,000 steps and this would accumulate to about 5 miles per day.2

It’s important to note that these are approximations. In many cases, a change in the direction of the accelerometer, inside the step counter, is what signals the step to be counted. So, simple movements that shake the accelerometer could be interpreted as steps. Also, stride length varies widely throughout the day as climbing stairs makes for short stride lengths and stepping over objects, such as a puddle of water, make for longer strides.

Pacing Charts

Pacing charts are generally more performance-oriented tools designed to improve fitness. The pace is the rate at which the walking and jogging is taking place and is generally expressed as minutes per mile. For example, if a one-mile assessment is completed in 9 minutes and 36 seconds, the pace is 9:36 min/mi. Pace based training varies from effort-based training because pace doesn’t include heart rate as a marker.

To generate a pacing chart, it’s important to establish a “personal best” pace on a given course such as a 1-mile assessment or 5k. Once the personal best pace is established, the time can then be used to calculate other training or race paces for various distances. For example, a jogger who measures a 9:36 min/mi could use this pace to calculate how fast they should try and jog at a 10k, half marathon, and marathon as well as use that pace to establish training paces for various kinds of training sessions. These training sessions could include 400-meter intervals which would be done at a faster pace than the 1-mile pace. Or, stamina type running session designed to simply build endurance rather than speed which would be done at a slower pace. A great place to see an example, and one of the more accurate pace calculators, can be seen at [www.mcmillanrunning.com](http://www.mcmillanrunning.com).

As noted, this type of tool is primarily used for those interested in improving performance rather than those interested in improving only health or weight loss. However, it is better in improving performance than by using the heart rate monitor to achieve the same objective.

A criticism of this tool stems from its application to a single course. If the above-mentioned jogger ran a personal best on a track, flat terrain, it would be unlikely to see that same pace on course with rolling hills. Therefore, a pacing chart would need to be created for each course with different terrain. Additionally, environmental conditions such as head-winds and sun may make it very difficult to hold a particular pace although effort could be quite high. As a result, this could lead to overtraining and frustration.

Power Meters

Recent technology has taken a tool that was once primarily associated with the sport of cycling and made it available to runners. While the validity and usefulness of the product is still being evaluated, like a cycling power meter, it attempts to determine the amount of wattage (power), that is being used during a jogging session. As a result of having this information available, a much more precise means of gauging effort can be used. This would help a jogger improving pacing, determine a more precise number of calories burned, and predict the impact of the exercise session on the body for recovery purposes. As with the pacing charts, this tool is all about improving performance.

Smartphone Apps

Smartphone apps can be very helpful in tracking many or all of the above information either as a stand-alone tool or when paired with other devices. For example, many apps use the GPS tool in smartphones to track distance over the course of a day’s activities which could be used to track distance as opposed to using a step counter. Or, a heart rate strap could be purchased and paired with a phone app using the Bluetooth in the smartphone. By doing this, a detailed history of activities can be kept, improvements tracked, and activities shared with others. A few smartphone apps are:

* MapMyRun
* Strava
* GarminConnect (needs to be paired with Garmin product)

**Hydration Systems**

As mentioned in chapter 3, staying hydrated is key to preventing both heat- related and cold-related illnesses. However, many walkers and joggers find it difficult stay hydrated during their workouts without excessive stopping. The importance of this concept, and impracticality of frequent stops, has led to the development of multiple hydration systems.

If and when you consider a means of staying hydrated, i.e. hydration system, you need to make sure it will fulfill its purpose: make fluids easily accessible to you with as little discomfort as possible. Ultimately, your choice will come down to personal preference but there are several options available.

* The hydration backpack uses a backpack with a bladder inserted into the satchel portion of the pack. A long straw-tube leading from the bladder is then used to access the water.
* Hydration belts use a belt around the waist with various compartments to hold small flasks for easy access to fluids.
* Hand held water bottle covers allow for a water bottle to be inserted in the casing carried in the hand by using a strap that goes around the palm of the hand.

## **Summary**

In summary, improving technique should be viewed as important, if not paramount, in preventing injury and improving performance. Likewise, equipment can do much of the same, help you from overtraining by monitoring your work rate and helping you improve your performance.

**Key Terms**

**Gait pattern**-a person’s manner of walking related to foot placement and leg motions.

**Pronation**-a common gait pattern observed by the foot rotating or collapsing inwardly.

**Supination**-a common gait pattern observed by the foot rotating or rolling outwardly.

**Over-striding**-a gait pattern often observed by runners when the foot lands out in front of the body, leading to a significant increase in the impact forces and places tremendous stress on the ankles, knees and hips.

**Overcompensation**-a natural, often sub-conscious adjustment to gait pattern on one side of the body as a result of weakness or injury to the opposite side of the body.

**Heel-to-toe-drop**-the difference in stack height of a shoe measured at the heel and toe areas.

**Test Your Knowledge**

1. The primary reason for exploring and possibly changing walking/running form is:
   1. Look better when you walk or jog
   2. Injury prevention
   3. Increase the calories you burn
   4. Natural is better, you shouldn’t alter your walking/running form
2. All of the following are terms associated with the running/walking gait pattern **EXCEPT**:
   1. throw back
   2. Ground contact
   3. Recovery
   4. Kick
3. Which of the following is one of the few differences between walking and jogging technique?
   1. Walking posture should include leaning forward
   2. Jogging should include forefoot strike as opposed to heel strike in walking
   3. Arms should not be bent while walking
   4. There is no recovery phase in walking
4. One of the key elements that makes walking and jogging so appealing is:
   1. Every workout is a comfortable
   2. The fitness improvements from walking and jogging are substantially better than most other exercise
   3. Very little equipment is required
   4. There are multiple, fun pieces of technology that can be used with walking/jogging.
5. The increase in interest for barefoot running (and minimalistic shoes) stems from:
   1. Believed to be more “natural” and most efficient footwear
   2. Additional cushioning believed to hinder strength and promotes injury
   3. Decreasing rubber production for shoe soles is more environmentally friendly
   4. Both a and b
6. When purchasing footwear, you should look for all of the following **EXCEPT**:
   1. Cushioning-how much is best for you
   2. Comfort and durability
   3. Heel-to-toe drop
   4. Cost-always buy the expensive shoes

Answer Key:

1. b.
2. a.
3. b.
4. c.
5. b.
6. d.

**References**

1. American College of Sports Medicine, retrieved April 2017, ACSM Step Counters <https://www.acsm.org/docs/brochures/selecting-and-effectively-using-a-pedometer.pdf>