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# 2

## Treadmill Pros and Cons

As a running coach and a personal trainer, I get questions concerning the advantages and disadvantages of treadmill training from all types of clients. My running clients are concerned about the training effects of running on the treadmill. My personal training clients that are more interested in overall fitness and my weight loss clients have questions concerning calorie burn and health benefits.

For fitness, health and weight loss purposes, there are really no disadvantages to treadmill training. A calorie burned on a treadmill is the same as a calorie burned during any other activity. Cardiovascular fitness is improved at a similar rate whether you run on a treadmill or outside on the road or track. The treadmill provides many added benefits for this type of user including injury prevention, safety, convenience and improved exercise adherence.

The treadmill also provides these same benefits to competitive runners. Fitness gained from running on the treadmill have been shown to be very similar to training effects from free range running. In some cases treadmill training provides even greater training benefits. An example of this is the consistent pace of the treadmill. Many training pro-

grams require workouts that are performed at a precise pace and distance. The treadmill makes maintaining an exact pace and judging the precise distance much easier. You never need to guess or make assumptions concerning your distance or speed.

There are some disadvantages for competitive runners. The disadvantages are mostly related to the lack of specificity when training for road or track racing. There is a rule of training called the “rule of specificity” that says training should closely mimic the activity you are training for. There are very definite differences between treadmill running and free range running that violate this rule. Here is a summary of the pros and cons associated with treadmill running.

## **Pros**

### **Adverse Weather**

You look out your living room window. The wind is howling, the mercury in your thermometer is shivering at the bottom of the scale and the snow is piling up on your driveway. You have a five mile tempo run planned. Are you going to lace ‘em up and head out? Unless you are about 400 meters short of a full mile, you are going to stay huddled in front of your fireplace! In situations like that a treadmill is the perfect answer. You can perform any of your training runs in the safety and comfort of your own home or at your gym.

Poor weather conditions are the bane of a distance runner’s existence. There are a few die hard’s out there that still enjoy running in the rain, snow and cold, but most runners, including myself, do not like it. A treadmill takes the weather factor out of the equation. You can always hop on your treadmill and do nearly any workout that you could have done outdoors. If ice or snow is present, running on the treadmill will certainly provide a better workout than running outside in those treacherous conditions.

If you’re running outside on ice or snow, you must be

very cautious of your footing. It is nearly impossible to concentrate on your form or pacing when running on ice. It is also very difficult to maintain your planned pace, since you must slow down on such a slippery surface. The bulky or multi-layer clothing that you must wear in cold weather can disturb your stride and arm action.



High wind can also create havoc with your workout. Most competitive runners have a specific pace or intensity level planned for each workout. If you are running into a head wind, your pace will drop in relation to the intensity of the workout. And visa versa, if you have a tail wind your pace will be higher in relation to your intended run.

Cold weather alone will probably not adversely affect your run, but it can become an excuse not to do your planned workout. This is especially a problem for beginning runners. A treadmill removes all excuses for not running. Cold weather can also cause some breathing problems for runners with asthma. Running in a warm, climate controlled environment can help alleviate these problems.

Safety is also an issue in some weather conditions. A slip on the ice or snow can cause serious injury that could put a quick halt to your racing and training season.

Cold, ice and snow are not the only weather related problems a runner must deal with. Hot weather can create an even more serious situation. Dehydration, heat exhaustion and heat stroke are very serious conditions that are frequently encountered by runners. Each of these conditions are caused by a combination of high heat and insufficient fluids.

Running on a treadmill in a climate controlled environment with fluids readily available will take away all chances of developing these problems.

## **Speed Work/Interval Training**

Successful interval training depends upon running your planned repeats at a fairly precise speed and for a precise distance. It is hard for most runners to accurately judge pace while training at the track and it becomes even more difficult when training on the open road. When training on the track, you at least know the exact distance you are running but on the open road it's all guesswork. There are some fairly accurate GPS training watches available that use satellite information to give you your pace and distance. These have proven to be fairly accurate, but are still not as precise as treadmill running.

When doing interval training on a treadmill, you can set the pace and be assured that you are running at that speed throughout the repeat. The treadmill does not allow you to slow down or speed up. It forces you to maintain your target pace throughout your repeat or workout.

## **Consistent Pacing**

When you begin to fatigue during your outside training runs, you may subconsciously slow down. You do not realize that you are slowing down because you feel like you are running at the same rate of perceived exertion. In other words, you still believe that you are running at your goal pace. The accumulating effects of fatigue makes your goal pace feel harder and harder, so you slow down in response. This unintentional reduction in your pace can have a negative affect on the quality of your workout. This problem with inconsistent pace can happen in all workouts from speed work to long runs.

The treadmill will force you to maintain the pace that you had planned for your workout. The only way to slow down is to intentionally reduce the speed of the treadmill. This consistent pacing benefit can actually make treadmill training a higher quality workout than track or road training in some situations.

## Easy Runs

Most competitive runners like to run fast. They love their speed work and tempo runs. But you cannot run hard and fast all of the time. Your muscles need time to rest and recover. Without that recovery time, you will not be able to complete your harder workouts at an optimal pace and quality.

Running easy is hard. In fact, running easy is one of the hardest things to do for many runners. Easy runs are necessary to allow your muscles to recover from hard, intense or long running sessions, but it can be very difficult to run at a pace easy enough to allow for muscle recovery. It can feel very slow and therefore many runners have a tendency to perform their easy runs at too fast a pace.

The treadmill fixes this problem. Once you determine your easy pace, it is a simple matter to set the treadmill at that pace and jump on. As long as you don't give into temptation and increase the speed of the machine you will stay at your easy pace for the duration of the session. Maintaining an easy pace on your rest days will allow your muscles to stay fresh and will improve the quality of your harder training runs and avoid overtraining problems.

Beginning runners can also benefit by using the treadmill for easy runs. It is important for a new runner to strengthen seldom used tendons and muscles gradually before doing any intense or fast training. Setting the treadmill at an easy pace will help avoid any tendency to run faster than they should.

*How easy should your easy runs be?. One rule of thumb is the "talk test". As you are running you should be able to speak clearly, but not sing.*

## Hill Training

Hill running is one of the best and most efficient workouts for building running strength, running economy and improving race performance. The problem is that many runners are hill challenged. They live in areas that have few hills, if any. So, what do you do if you live in a hill challenged area? Simple - get on your treadmill. Most treadmills will elevate from 1 percent to 12 percent. Some elevate as high as 15% or more. There are some newer models that also decline 2 or 3 percent, which would be great training for races with some downhill sections such as the Boston Marathon or trail races. The elevation selections will allow you to closely mimic nearly any outside trail or road race.

Even if you have access to hills in your area the nearly unlimited variety of possible hill workouts on your treadmill will give you a greater variety of hill training options.

The treadmill not only supplies hills to those without hills, it also removes hills for those that don't want them. Many runners that live in mountain communities have problems finding a route that does not have hills. There are many times, especially during easy runs and periods of rest and recovery, that you do not want to run on hills. The treadmill will flatten the most hilly terrain!

## Long Runs

The term long run brings up visions of running long distances in parks, on roads or urban trails. There are many great benefits of doing long runs on that type of terrain. However, more and more runners are doing at least some of their long runs on the treadmill. Many do all of their winter long runs on the treadmill to avoid weather related problems.

Running on a treadmill for two or three hours sounds boring. But for that matter so is running outside for long periods of time. When doing long runs on the treadmill you can watch television or listen to music to help alleviate boredom. I like to tape marathons or other running events

and watch them while I run. I also enjoy watching running movies. Any movie will entertain you while you run, but I find that running movies keep me motivated.

The quality of your long runs can also be improved by running on the treadmill. The precise pace control will allow you to keep the pace down when necessary. It will keep you from running too fast during the first part of your long run. It will also keep you at a quality pace if you are doing goal pace long runs. It can be very difficult to maintain that quality goal pace in the later stages of your long run. The treadmill will keep you at that goal pace and you don't even have to think about it. This is essential for marathon training. During the last 6 to 8 miles of a marathon, it becomes very difficult to maintain your pace. In order to run your best marathon, you should practice maintaining your goal pace when you are very fatigued. Since the treadmill does not get tired, you must push the button to slow it down. So, the machine will keep you on your pace unless you make the decision to reduce your speed.

When doing your long runs on a treadmill, you are also near all of your water and fluid replacement drinks. No need to hide fluids in a bush or carry them with you. You are also just steps from a bathroom. No more quick trips behind the bushes.

## **Injury Prevention/Rehabilitation**

Running on concrete and asphalt day in and day out places a lot of stress on the connective tissues, joints and muscles in your legs. This can lead to potential overuse injuries.

High quality treadmills that are produced today give you a stable but more forgiving surface. Treadmills are available in a fairly wide range of surface "softness". The firmness of the treadmill is determined by a combination of the running deck and the suspension system. Some are designed to more closely mimic the firm asphalt or concrete surface of the road and others are designed with a lot of "give" in order to provide a very soft ride for heavy run-

ners or those with injury problems. There are even some machines available that are adjustable to different levels of shock absorption.

## **Programmed Workouts**

Most quality treadmills have pre-programmed workouts that are designed for anything from weight loss to 10K races. This feature makes it easy for runners that are not interested in designing their own program.

For those that do develop their own training programs, many treadmills have the ability to store custom workouts. You just manually adjust the treadmill as

you run. The treadmill will “remember” the workout. The next time you do that workout the treadmill makes all of the adjustments automatically. Some of the newer, high tech treadmills even have the ability to download custom workouts over the internet.

*When rehabilitating an injury it is important to add stress to the injured area very gradually. The softer running surface makes treadmill a superior method of rehabilitation.*

## **Mental Toughness**

The sport of running is a solitary activity that requires self-motivation, discipline and commitment along with both physical and mental toughness. These are all attributes that must be learned and practiced.

Running on a treadmill is comfortable, efficient and safe. But, it is not psychologically easy. It is really quite difficult to run and maintain pace on a treadmill. This is due, in part, to the perception that you are not going anywhere. You do not have the psychological cues that you are making progress, such as the wind in your face and the objects

and scenery moving by. You also do not have other runners around you to keep you motivated.

Since running on the treadmill is usually a solitary activity it helps build self-motivation and commitment. Running and maintaining your pace on the treadmill builds a mental “toughness” that will help you in your races and outside training runs.

## **Great For Beginners**

The treadmill is ideal for beginning runners. Many new runners feel a bit intimidated by the sport and by more experienced runners. There is no reason for them to feel this way but many do none the less. The treadmill gives these beginners a great place to start and to gain confidence in themselves so that feeling of intimidation melts away.

Most new runners start with walking. The treadmill is a great tool for incorporating those first running steps into a training program. It is very easy to add in very short surges of running. The treadmill provides them with a stable, level and dry surface in which to practice those first running steps.

The information provided by the display, such as time, speed, calories burned and distance traveled are all great motivational tools for beginners.

## **Heart Rate Training**

Training by heart rate is a currently popular method of monitoring running intensity. Many mid and top range treadmills have built in heart rate monitoring capabilities. Some monitor heart rate by using a belt that wraps around your chest and others use monitoring pads on the treadmill handle grips.

A very useful function incorporated into some high end treadmills, is a program that regulates the treadmill speed and incline according to your heart rate. You simply tell the treadmill what your target heart rate range is. If your heart rate drops below your target range the treadmill ei-

ther speeds up or increases it's incline. If you rise above your target heart rate the treadmill decreases it's speed or it's incline in response.

This is an essential feature for those that are running to rehabilitate after an illness, surgery or injury. Doctors often prescribe exercise performed at a specific heart rate. Heart rate feedback will keep these individuals exercising at the proper intensity.

## **Workout Variety**

Treadmill workouts have an unlimited number of possible combinations of speed, distance and incline. You are able to design a run that will provide you with the exact workout that you desire. There is no outside training area that can give you everything you want in a workout. Only the treadmill gives you this kind of flexibility. This is an advantage to runners of all abilities, from a beginner to an elite runner.

## **Running Feedback**

The console of today's treadmills give you a wealth of information. They tell you the distance you traveled, speed, average speed, calories burned, heart rate, pace and incline. This feedback provides you with important training information, training records and is also a motivational tool.

## **Air Pollution**

Running outdoors in an area of high air pollution can be hazardous. Air pollution can come from automobile traffic, industrial exhaust, wood or coal burning or even forest fires. You should avoid running outside during times of high air pollution, especially if you suffer from asthma or any other respiratory problem.

Check air quality reports in your local paper. You can also check the current Air Quality Index (AQI) on the in-

ternet at [www.epa.gov/airnow](http://www.epa.gov/airnow). If the readings are 100 to 150, sensitive individuals can be adversely affected. If it is over 150 outside running can be hazardous for everyone. Running indoors on the treadmill is the ideal answer when you encounter these types of conditions.



## Cons

The treadmill provides many benefits. But, as with everything, it is not perfect. Along with its many advantages, the treadmill does have some disadvantages.

### Law of Specificity

One of the “laws” of training is the law of specificity. This simply means that your training should be as specific as possible to your training goal. In other words, your training should match your goal as closely as possible. You are training to run outside on the road, trail or track and run races, not to run on a treadmill.

Treadmill training has been proven, in scientific studies, to have very similar physiological effects, to outside or free-range running. In simpler terms, treadmill training gives you very similar training benefits when

compared to free-range running. However, even though the physiological effects are very similar, it is not specifically the same as running outside. There are physical differences, which include lack of wind resistance, lack of changing

*The training law of specificity states that your training should match your goal. This is the main reason that you should do some of your workouts on the road or track.*

terrain, running on a moving belt, bio-mechanical differences and psychological differences.

## Lack of Wind Resistance

When running on the treadmill you are obviously running in place. You're not running through the air. When you run outside you are running through the molecules of the air which create resistance. The faster you run the more of an effect the air resistance has on you. Studies have estimated that air resistance creates an increase in your running workload of between 2% and 10%, depending upon your running speed. The faster you run, the more of an effect the wind resistance has. This problem is simple to overcome. You can compensate for the wind resistance by simply elevating your treadmill one percent.

## Running Bio-Mechanics

In addition to the wind resistance problem, there is some evidence that running bio-mechanics are different when running on the treadmill. There have been very few conclusive studies done on the running form differences between treadmill and free range running. The studies that have been done have presented some rather conflicting data. Here is a brief summary of the reported running mechanics problems that have been associated with treadmill running.

- **Stride Length** - Many runners use a treadmill stride length that is either longer and shorter than outside running. One study on the effects of treadmill running came up with some very interesting data. The study used one group of subjects that were very experienced runners and compared them to a group of new runners. The results showed that the more experienced group had longer strides when running on the treadmill, compared to their same pace when running outside. The interesting part is that the in-

experienced group had the exact opposite result. They had shorter stride lengths on the treadmill than they did when running outside. More research is needed to determine why this happens and if it happens consistently to a large group of runners.

- **Longer Support Time** - Support time is the amount of time that your support leg spends on the ground. Some runners tend to spend more time on their support leg when running on the treadmill. In order to maximize your running efficiency your support time should be kept at a minimum. If your support leg is on the ground longer, you are probably not running as efficiently as you could be. This increase in support time is probably caused by an unconscious desire to provide a more stable running base on the moving and somewhat unstable treadmill.
- **Less Forward Lean** - Some studies have determined that some athletes run with less of a forward lean when running on the treadmill. This can cause more energy being wasted on up and down motion and less energy focused on forward momentum. Less forward lean can also contribute to over striding.

## Running Surface

The even and soft surface of the treadmill is an advantage in many ways but it does present one major disadvantage. When running outside you encounter uneven surfaces, stones, soft areas, hard areas, dry areas, wet areas and various combinations of these surfaces. The challenge of running over these surfaces improves your proprioception or the ability of your neuromuscular system to correct for the effect these types of surfaces have on your muscles and the position of your body parts and joints. This is critical to runners because it affects balance, power and running economy. Running on the treadmill removes this very important part of training.

## Psychological Differences

Psychology plays a large role in the performance of runners. Treadmill running has several psychological factors that can affect the benefits of treadmill training.

- **Lack of Visual Cues** - When running outside you are moving past trees, buildings, automobiles and other people. When you are on the treadmill, you are not moving so you do not have those visual cues that signify movement. This can be very disconcerting and can lead to problems with running mechanics, confidence and training adherence.
- **Perception of Limited Room** - A properly fitted treadmill gives you more than sufficient room for even the longest running strides. However, the limited size of the running surface of the treadmill can give the impression that you may either “run off” the front of the machine or “fall off” the back. This commonly leads to a shortened and/or more vertical stride.
- **Lack of Confidence** - Many runners, especially more experienced runners that have been training most of their lives on the open road, do not trust the training benefits of treadmill running. This can be a self-fulfilling prophecy. If you do not believe in something, it can and probably will have a negative effect on its benefits.
- **Boredom** - This is the daddy of all mental hurdles of treadmill training. Running in place can be boring and tedious. But take heart. This one is easily overcome.

## Availability of Gym Treadmills

If you don't have your own treadmill and choose to use one at a gym there is the problem of availability. Treadmills are very popular in a gym and it can be hard to find one not in use. When you do find one, there is usually a time limit

of around 30 minutes per person so you may not be able to do long workouts. The best way to solve this is to go to the gym during off hours. If there is no one waiting in line to use the treadmill you can usually stay on the machine as long as you want.

## **Accuracy**

As I mentioned earlier, the workouts on a treadmill can be more precise than outside running because you can monitor exactly how fast and how far you are running. But, that is assuming that your treadmill is calibrated accurately. Treadmills are notorious for being delivered from the factory with poor calibration. Most treadmill manufacturers do not pay a lot of attention to exact accuracy. They don't believe that most users will notice the inaccuracy and many do not care. So, they don't put a lot of their resources into insuring accuracy. This is more of a problem with low end treadmills. The makes of high end treadmill pay much more attention to those types of details in their machines.

It doesn't take much of an error to make a big difference in your training. An error of just 10% can create problems. A 7:00 pace on an inaccurate treadmill could actually be a 7:15 pace. An error of this size can totally change the result and quality of your training run.

A good technician can calibrate your treadmill for you and it is well worth the money. If you just bought a treadmill have it checked. The manufacturer warranty will cover the cost of calibration of any high quality treadmill.

Here is an easy way to check the accuracy of your treadmill. To do this you need to know the length of your running belt. Get the information from your treadmill manufacturer. If you can't find the information you will need to measure the belt. You need the length of the entire belt including the part wrapping around the rollers.

Divide 2,112 by the length of your belt in inches. This will give you how many complete revolutions the belt should make in one minute at 2 MPH.

Now place a small piece of bright tape on the belt. Start

the treadmill and take it up to 2 MPH. Count the number of revolutions the belt makes. For every one revolution higher or lower, the treadmill speed is off by .1MPH.

Here is an example: If your treadmill belt is 100 inches long -  $2112/100 = 21.12$ . If you counted 23 revolutions in 1 minute, your treadmill speed is about .2 MPH too fast.

## **Cost**

Quality treadmills are not cheap. You can buy lower end treadmills at a discount store for \$500 or less. But, this type of treadmill will not stand up to the abuse that a runner puts on it. It will also not operate smoothly, will not be as accurate, will be noisier and just not be an enjoyable experience.

A quality treadmill will start at around \$1000 and go up to over \$8000 for a club quality machine. This is a lot of money but if you are going to use your treadmill on a consistent basis it will be worth the extra cost to get a quality machine. You can usually find a good used treadmill in the classified ads. A good time to buy is in the several months after the New Year. Many people buy treadmills as a New Years resolution. They use them one or two times and then give up. You can usually pick one up for a bargain price. Also check with fitness specialty retail stores. Some of these shops will take used treadmills as trade ins or may have a treadmill returned by dissatisfied buyer. These machines can be purchased at discount prices.