

Treadmill Running – As Good as Outdoors ?

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Treadmill running instead of venturing out doors is very tempting especially when the weather is poor or during the cold dark winter months. But should we do it and do we get the same training effects?

Some differences are obvious such as wind resistance, the surface, the temperature of the environment. However, continual treadmill running can cause problems to your running style, which could result in injury or affect your performance.

There are three phases during a running stride. They are:

1. Touch down – first contact with the ground usually to the rear of the foot.
2. Toe-off - as the foot is just about to leave the ground.
3. Flight – when there is no foot contact with the ground.

Most treadmills are motorised and if you were to step off it, it would continue with almost the same speed that it was set. When selecting a running speed on the treadmill the assumption is that the body is moving forward at that speed. However, it is possible to make small, unintentional changes to your technique, which makes running easier resulting in the belt of the treadmill moving at the selected speed but not the body.

By increasing the movement of the body upward rather than pushing forward, during contact with the ground, the time of the flight phase can be increased. The treadmill continues to run beneath the body and since the period of non-contact with the ground is longer, the body gains an extra period of time where it does not have to produce forces. The action could almost be considered to be bounding and during the extra time spent in the air, the treadmill powers beneath you.

Increasing the movement of the body upward causes a change in the direction of the ankle plantar-flexion velocity (ankle push-off). As a result the gastrocnemius and soleus (calf muscles) are being trained in a different way to your normal running style out doors. Also, this change in technique can cause the upper body to move into a more upright position and the stride length to shorten. If this occurs the whole body mechanics have altered and if repeated regularly could cause injury and affect your out door performance.

The changes stated above may not occur but are more likely to when tired or running fast. It is also possible that the changes in your style could be very small and not seen by the human eye. If so, there would still be an effect but to a lesser degree.

Physiologically, it is difficult to equate a treadmill run to one outdoors.

Running on a flat treadmill (zero gradient) is very different physiologically compared to outdoors. This is mainly due to air resistance, temperature and the treadmill being motorised.

Jones & Doust (1996) found that 'a 1% treadmill grade was found to reflect most accurately the oxygen cost of running outdoors for velocities 2.92 – 5.0m/s' (9:08 – 5:20min/mile).

They also found that the oxygen consumption (ie energy) required to run at 9min/mile was the same as running 8.46min/mile on the treadmill. This means that using the

same amount of oxygen can result in a mile being covered 14s quicker on the treadmill. The difference was 4s quicker on the treadmill for faster speeds (5min/mile). Therefore when running outdoors your ability to cover a mile will require more energy than on a treadmill indoors.

When attempting to physically simulate training sessions on a treadmill it has been recommend that heart rate (HR) monitors be used. If treadmill training is to be used in conjunction with a monitor then it is recommended that an over ground session is replicated based on the output of the heart. Record the HR during an over ground run and set the treadmill to a given speed and gradient to produce the same training effect. However, there are many problems associated with solely training with HR monitors. There is a myriad of reasons for the HR to change, such as, new training shoes, different training venue and environment.

Other considerations:

- ◆ The magnitude of the impact that the body experiences at touch down is dependent upon the running surface, footwear and the individual. The treadmill surface is of similar hardness to the road. This is an important consideration when running high mileage or predominately speed work. It is generally recommended that 20% of your running is on a soft surface, such as grass. Therefore treadmill running should be considered as one of your hard surface sessions. Track training is another matter, which requires discussion but is also considered a hard surface.
- ◆ Most treadmills located in gymnasiums are not regularly calibrated. Therefore the speed that you have set them to is not necessarily correct. This also applies to calories used and distances covered. However, laboratory based treadmills should be regularly calibrated because incorrect readings will effect the results of a scientific test.
- ◆ There have been suggestions that a feeling of well being is associated with running out doors due to the passing of the surrounds. When treadmill running the surroundings remains the same so some of the psychological effect of running through the environment may be missed.

To conclude, treadmill running is a good form of training especially if out door conditions are extremely bad, unsafe or you have no other option. However, be cautious when it becomes a large part of you training