THE DEBATE

FOR

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When treadmills became popular around the time of the home fitness equipment boom in the 1960s, they were seen as the perfect solution for people who wanted to keep fit without the inconvenience of having to leave the comfort of their own home. Unfortunately now it is not uncommon to see a queue for the treadmills in a sweaty gym while outside it is a lovely sunny day and the roads are just crying out for a pounding!

In my opinion there is no question of "road or treadmill?" Although the treadmill has its place and can serve as a useful introduction to running for some people, running outside really is the gold standard and as personal trainers we should be encouraging our clients outside as much as possible.

Our bodies are designed to move, negotiating the terrain while maintaining balance and posture. Our highly tuned senses are set to assimilate the surroundings, providing us with billions of pieces of information every second about the environment we move through; temperature, colour, familiarities and speed.

As well as depriving ourselves of these natural senses, treadmill running differs considerably from road running on many other levels. Running "on the spot" can lead to an earlier onset of boredom and mental fatigue than running outside. Gyms have tried to combat this with cardio theatres (bad news for gym staff trying to engage members in conversation!) but concentrating on a screen can often lead to a disengagement from the workout and a tendency to train at a lower intensity.

Several studies (Dr LGCE Pugh, London, 1965, was the first) have shown that the absence of wind resistance on a treadmill leads to a significantly lower oxygen consumption compared to running outside, making treadmill running easier.

This effect can be explained when you consider that drag force is proportional to velocity *squared*. When running outside at low speeds, these forces are small and total resistive forces are similar to those experienced on the treadmill. If, however, you double your running speed, you quadruple this drag force when running outside, providing a much more significant contribution to the overall resistance while these extra forces are still not experienced on the treadmill.

Although it is common practice to add a small incline on to the treadmill to simulate the effects of wind resistance, running uphill changes the biomechanics of running. It increases the forward lean and reduces stride rate, and so does not offer an accurate simulation of these forces.

Studies into the kinematics of treadmill running (eg Penn State University, US, 1972) have shown that at certain speeds a runner will exhibit an increased stride length on a treadmill when compared to running on the road. One of the reasons for this increased stride length is the runner's increased requirement for more stability on the moving treadmill belt, leading to a longer support time during stance phase.

Consequently treadmill running is not specific enough to be considered functional training for someone trying to improve their 10k time, for example. Indeed, as most distance runners would benefit from reducing ground-contact time, treadmill running may actually hinder progress.

I have lost count of the number of clients who complain that running outside is "too hard", and that they can run faster and further on the treadmill. However, when these clients become more experienced at road running they soon find that the great outdoors offers far more than the treadmill ever could. Interestingly, I have never come across a road runner who discovers the treadmill and then never hits the streets again. Coincidence? I don't think so.

> "A road runner who discovers the treadmill and then never hits the streets again? I don't think so"

In summary, if someone has the option to either sit at home watching EastEnders or go to their local gym and run on a treadmill while watching EastEnders then of course they would be better off choosing the exercise option. However, as with most machine-based exercises, there is always a better alternative and in this case it's taking a trip to God's Gym.

The topic for the next debate will be the leg press vs the squat.
If you would like to be part of this debate or have an idea for a future debate, email publish@fitpro.com

Treadmill vs road

Is running outdoors better than treadmill running? Going head-to-head are George Anderson and Steve Barrett.

AGAINST

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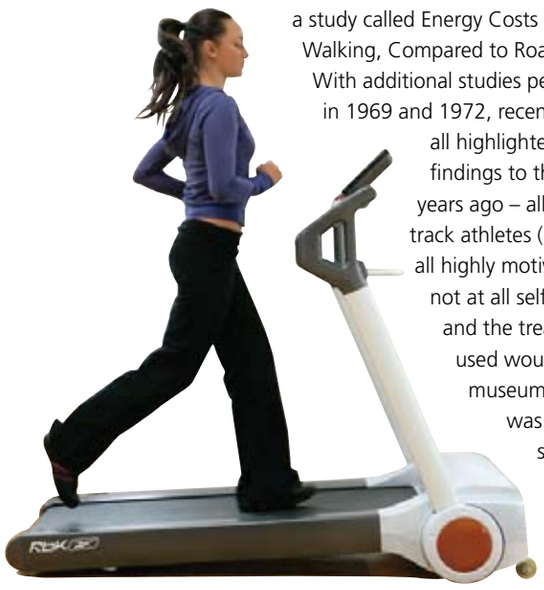
Will Paula Radcliffe run 100 miles a week on her treadmill, in preparation for her next marathon? No. In the same way, Lewis Hamilton didn't become an amazing racing driver by going around Silverstone on a PlayStation®.

Paula won't be using a treadmill because she is a world-class athlete. As an athlete she will combine a careful mix of training in the mountains with the right races to bring her to peak performance. So, let's leave competitive athletes out of this debate, because they should train on the same surface they want to perform on. However, we cannot completely ignore them as it seems most studies done on this subject used athletes. What we are trying to decide here is should we be telling Joe Public not to go on treadmills, because the road is "better" for them. Well, if we had 100% participation in regular exercise in this country it might be worth telling them about the negligible differences, but we have drastically low levels of exercise participation in the UK. So telling the fattest ever generation of British public that the route to fitness is going out in all weathers and running on death trap pavements is not an attractive proposal.

"Telling the fattest ever generation the route to fitness is going out in all weathers and running on death trap pavements is not an attractive proposal"



This debate goes back to 1953, when the US Office of the Quartermaster General did a study called Energy Costs of Treadmill Walking, Compared to Road Walking. With additional studies performed in 1969 and 1972, recent studies all highlighted similar findings to those done years ago – all of which used track athletes (no doubt, all highly motivated and not at all self-conscious, and the treadmills they used would now all be museum pieces). This was long before sophisticated, shock-absorbing running decks, quiet motors and accurate speed calibration. The common findings of these treadmill vs road studies are:

1. Running on a treadmill at any speed produces less energy costs than running outdoors. This is in part because of wind resistance. When running outdoors at approximately 6m per second (67-second 400m pace), 8% of your total energy costs are used to overcome wind resistance. NB – if reduced energy costs is the biggest issue, run a little longer on treadmills and you can balance the books.

2. The longer stride lengths achieved on a treadmill cannot be reproduced on the road. NB – if you take a look at most recreational runners on the road they are quite happy with an economical stride length, rather than gazelle-like bounding.

3. Oxygen costs from running on the road are greater than those achieved running at the same speed on a treadmill. NB – despite this, there are numerous health club members who have quite innocently improved their VO(2) max while watching the latest episode of EastEnders while on a treadmill.

With a treadmill you are in control; you know your speed, distance and route, you can choose if you have hills, or not. And if you, unlike all those tested athletes, are carrying surplus fat, you can console yourself that running on a quality treadmill is imposing less impact forces than walking or running on unforgiving road surfaces.

Running on the road should be the predominant stomping ground of all those wishing to chase medals and the cherished race t-shirt. But, even these amateur competitive runners shouldn't dismiss the treadmill outright. The treadmill, because of its ability to rapidly incline, can cause lactic levels to be very high, giving you a controlled environment in which to improve lactate thresholds, not to mention increase stride cadence.

Don't get me wrong, I love running outside. The problem is we have a population so lazy they get pizza delivered, rather than take responsibility for preparing their own food, so as a person whose commodity is fitness, I know that Joe Public isn't going to rush out into the rain because wind resistance is a good training aid for them. But they might get off the PlayStation® if they know that rather than just getting exercise on the road they can get safe, progressive exercise and entertainment on the treadmill.