THE EFFECT OF A BAREFOOT TRAINING PROGRAM ON RUNNING ECONOMY AND PERFORMANCE

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ABSTRACT
Barefoot (BF) running has developed into a recent training technique for elite and sub-elite endurance runners. BF running is a modern type of training that may improve a runner’s Running Economy (RE) and, ultimately, performance, by allowing for an enhancement of the foot and lower-leg musculature, which, in turn, could improve running biomechanics by allowing the runner to land on the metatarsal or forefoot. In spite of the many methodological statements that have been raised regarding the benefits of BF training, there has been limited research evaluating a systematic training program designed to teach this skill and then test the outcome of this training on a runner’s economy and race performance.

PURPOSE: To determine the effect of a systematic barefoot training program would result in an improved running economy and race performance.

HYPOTHESIS: That this 10-week training program would yield an improvement in running economy as well as 5k race performance.

METHODS: To date, 1 adult male who were habitual shoe-wearing runners (SHOD) have completed all testing. Each participant reported to the laboratory four times. On Day 1, informed consent was completed and subject characteristics were determined including height, body mass, and body composition. A 10 min test on a treadmill using a Cosmed K4b2 portable telemetric gas analysis system was performed. Four to seven days later (Day 2), subject’s underwent 6 tests on a treadmill in three conditions (flat, 5.4 m/min; decline (5.6 km/h) at 0% grade; and incline (2.3% grade) at 5 km/h and a 10% incline) and a 10% incline trial performed on an indoor track. All tests were conducted in the SHOD condition. Following testing, subjects were offered a one-week break prior to enrolling in the 10-week systematic barefoot training program. This 10-week training program was a gentle and progressive program designed to enhance motor memory while running BF. After two weeks of Barefoot running, Day 1 and 2 testing were repeated in the BF condition.

RESULTS: Following the 10-week BF training program and compared to the SHOD condition, VO2, did not change, while RE improved 4.0% (flat), 3.3% (incline), and 0.1% (decline) in the BF condition. The 5km race time decreased ~1.0% post-training.

CONCLUSIONS: These preliminary findings suggest that a progressive, 10-week barefoot training program may result in improved BF, that in turn, yields a faster race performance.

BACKGROUND/INTRODUCTION
Running Economy (RE) is measured as the submaximal volume of oxygen (VO2) required to run at a given speed and is often the limiting factor that determines successful elite endurance performances. Lieberman et al. found that individuals who run in shoes often present with a noticeable heel strike as well as deconditioned feet, poor force distribution, limited proprioception, and increased injury risk (3).

Barefoot (BF) running and Simulated Barefoot Running (SBR) are associated with improvements in RE (1, 2, 4).

Although improvements in RE are noticeable with SBR, it is not the same as BF running (1).

There is limited research evaluating a systematic training program designed to teach this skill and then test the outcome of this training on a runner’s economy and race performance.

RESULTS

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<tr>
<th>Principle Measure</th>
<th>Running Economy (RE) and Performance</th>
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<td>RE was measured before (SHOD) and after (BF) the 10-week systematic training program, while wearing the Cosmed K4b² portable telemetric gas analysis system. Each participant was required to run on the flat (4 m/min), uphill (5% grade at 3 m/min), and downhill (5% grade at 4.5 m/min) treadmill conditions. The subjects were allowed an eight-minute rest period between trials.</td>
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<td>Performance was measured before (SHOD) and after (BF) the 10-week systematic training program by means of a 5k-time trial on the UNH Paul Sweet Oval Indoor Track. A participant was required to wear the Cosmed K4b² portable telemetric gas analysis system for a total of 31.25 laps. The subjects were provided with one-mile, two-mile, and three-mile timed splits.</td>
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CONCLUSIONS

| *Vo2max* did not change due to the training. |
| Running Economy (RE) improved 4.0% (flat), 3.3% (incline), and 0.1% (decline). |
| 5k split improvements were observed mostly at mile 3. |
| Faster overall: 5k race time (~1.4%) post training. |
| This seemingly low percentage improvement in race time could nevertheless determine whether or not someone reaches the podium. |

REFERENCE