

30. SWACSM Abstract

Uphill, Level, and Downhill Running in a New Style of Road-Racing Shoe

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ABSTRACT

Recent changes in road-racing shoe construction has prompted research comparing the metabolic benefit of new shoe constructions compared to older styles. Kinematic and kinetic changes with uphill and downhill running may affect the magnitude of benefit for this new style of racing shoe. **PURPOSE:** Due to the changes associated with downhill running, we hypothesize that new performance racing shoes will have a greater metabolic benefit when running downhill, than with level or uphill running. **METHODS:** Eighteen subjects (10 men and 8 women) ran on two separate days with shoe order reversed. They wore either the Saucony Type A (control shoe) or Saucony Endorphin Pro (treatment shoe) while running either uphill (4% grade), level, or downhill (-4% grade) in random order. Then, they switched to the other shoe and ran the various grades again. Treadmill speeds were adjusted to produce similar metabolic costs whether running uphill, level, or downhill. Efforts were relatively low for the caliber of subjects recruited. Oxygen uptake was recorded for the final 3 minutes of each 5-minute run at each grade. A linear model was used to determine the effect of the Endorphin shoe and grade on metabolic cost. **RESULTS:** The Endorphin shoe was effective in reducing metabolic cost compared with the Type A. However, the benefit was equal across grade conditions. Contrary to our expectations, the Endorphin shoe did not provide a greater benefit to metabolic cost during downhill running and a smaller benefit when running uphill compared with level running. We anticipated the downhill condition would show a greater metabolic benefit while wearing the Endorphin shoe. The Endorphin Pro shoe does provide an overall metabolic benefit when compared with the Type A shoe. **CONCLUSION:** The new style of marathon footwear seems to be effective. The lack of difference between the benefits of uphill, level, and downhill running show the current design of racing shoes works well across a range of grades. The main benefits seem to come from the foam, but the increases in bending stiffness and changes in shape of the shoe may also have room for improvement.