

PHYSIOLOGICAL STRAIN DURING WALKING IN SNOW WITH BOOTS OF DIFFERING WEIGHTS

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In order to assess the physiological strain of different boot weights, seven male and three female subjects walked on a treadmill and a snowfield while wearing three types of boots: winter jogging boots (WJB), rubber boots (RB), and rubber safety boots (RSB) weighing ( $\bar{x} \pm SD$ )  $0.9 \pm 0.1$ ,  $1.9 \pm 0.4$ , and  $2.5 \pm 0.2$  kg, respectively. During each walk the subjects wore the same clothing ensembles and moved at the same speed.

The mean ( $\pm SE$ ) depths of footprint impression in snow while walking in the WJB, RB, and RSB were  $26.1 \pm 1.5$ ,  $25.6 \pm 1.4$ , and  $26.1 \pm 1.5$  cm (NS), respectively. During walking on the treadmill, the mean oxygen consumption was  $0.79 \pm 0.05$ ,  $0.81 \pm 0.06$ , and  $0.83 \pm 0.04$  l  $\cdot$  min<sup>-1</sup> (NS) and in snow  $2.24 \pm 0.18$ ,  $2.34 \pm 0.17$ , and  $2.34 \pm 0.19$  l  $\cdot$  min<sup>-1</sup> ( $P < 0.01$ ) with the WJB, RB, and RSB, respectively. The mean oxygen consumption levels observed during the walks averaged 230 and 65% of the subject's maximum oxygen consumption on the treadmill and in the snowfield, respectively. During the walking tests the corresponding mean heart rates were  $106 \pm 4$ ,  $93 \pm 5$ , and  $95 \pm 5$  beats  $\cdot$  min<sup>-1</sup> ( $P < 0.05$ ) on the treadmill, and  $151 \pm 11$ ,  $150 \pm 11$ , and  $151 \pm 12$  beats  $\cdot$  min<sup>-1</sup> (NS) in snow. No significant differences in ratings of perceived exertion were observed between the walking tests in snow with the three types of boots.

In accordance with earlier studies, walking in snow was found to be strenuous work. In conclusion, the **use** of the RSB is recommended during logging work in **snow**, since they are known to provide greater protection whereas the increase in physiological strain was not appreciably greater than that of boots of lighter weight.