

ヒールレスシューズ歩行が血流量と血中代謝物質に 及ぼす影響

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The Effect of Walking Wearing Heel-less Shoes on Blood Flow and Blood Metabolites

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ABSTRACT

Six male students volunteered to take part in the present study. They walked wearing regular athletic shoes and heel-less shoes at the constant speed of 60 m/min, 80 m/min, 100 m/min and 120 m/min for 10 min on a treadmill at 0 % grade. Heel-less shoes means that the heel and toe of the shoes were cut at 15 ° and 10 °, respectively. Step frequencies, stride were measured during each walking. Calf blood flow (CBF) and blood lactate, plasma adrenaline and noradrenaline concentrations were measured at rest and immediately after walking exercise. Heart rate was monitored during the experiments. There was no significant difference in step frequencies and stride between regular athletic shoes and heel-less shoes during each walking speed. During walking at speeds ranging from 60 m/min to 100 m/min in regular shoes, 60 m/min to 80 m/min in heel-less shoes, the CBF increased linearly in relation to walking speed.

The CBF showed its highest mean value at 80 m/min in heel-less shoes, at 100 m/min in regular athletic shoes walking. However, at higher walking speeds than these, it decreased in both shoes. The CBF immediately after 80 m/min of speed was higher in walking with heel-less shoes compared to regular athletic shoes. Blood lactate concentration after walking with heel-less shoes at the speed of 120 m/min was significantly higher than basal level, but it remained unchanged after walking with regular athletic shoes in comparison to the level before the walking exercise. Heart rate and plasma noradrenaline concentrations at the speed of 120 m/min in heel-less shoes walking was significantly higher than in regular athletic shoes.

In conclusion, the CBF wearing heel-less shoes at the speed of 80 m/min was higher than regular athletic shoes. At even higher speed (120 m/min) the increase in glycogen breakdown in heel-less shoes walking might be due to the increase of sympathetic nerve activity, causing lower CBF.

要 旨

本研究ではヒーレスシューズ歩行が血流量と血中代謝物質に及ぼす影響を検討した。男子大学生6名を対象に、60, 80, 100, 120 m/minのスピードにてランニングシューズとヒーレスシューズ歩行を10分間行わせ、心拍数、歩数、歩幅、下腿血流量、血中乳酸、血漿アドレナリンとノルアドレナリン濃度を測定した。80 m/min スピードでのヒーレスシューズ歩行の下腿血流量はランニングシューズ歩行に比べ有意に増加した。120 m/minでのヒーレスシューズ歩行での血中乳酸濃度は安静値に比べ有意に増加したが、ランニングシューズでは有意な増加は認められなかった。120 m/minでのヒーレスシューズ歩行においての心拍数とノルアドレナリン濃度はランニングシューズに比べ有意に高い値が認められた。

以上の結果から、普通の歩行スピード(80 m/min)でのヒーレスシューズ歩行はランニングシューズ歩行に比べ下腿血流量が増加し、速い歩行スピード(120 m/min)では交感神経活動の亢進、グリコーゲン分解の増大と下腿血流量の減少が認められた。