

厚底カーボン内蔵型マラソンシューズ(AFTシューズ)が ランニングにおける下肢の動態に与える影響

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【目的】

AFTシューズがランニングにおける下肢の動態に与える影響を、従来型薄底マラソンシューズ (TRADシューズ)との比較から明らかにすること。

【方法】

本研究の対象者は本学陸上競技部所属の長距離ランナー17名であった。参加者はTRADシューズとAFTシューズの2つのシューズ条件それぞれで3つの速度条件(12 km/h, 15 km/h, 20 km/h)でのランニングをトレッドミル上で1分間行われた。その際の皮膚及びシューズの表面に貼付した反射マーカの座標データを3次元動作分析装置を用いて記録し、プロネーションの評価指標を算出した。プロネーションの評価指標は脛骨に対する踵骨の外反角度及び角速度、地面に対する踵骨の外反角度及び角速度である。そして、シューズ条件及び速度条件がそれぞれの変数にどのような影響を及ぼすのかを各条件間で比較した。

【結果】

下腿に対する後足部の外反角度及び角速度について、最大外反角度及び総外反量においてはシューズ間に有意差は認められなかった。最大外反角速度及び初期外反量においては、AFTシューズ着用時はTRAD着用時よりも有意に高値を示した。また、20 km/hの速度条件でのみ、接地期中盤で有意区間が確認された。地面に対する後足部の外反角度及び角速度については、最大外反角度及び総外反量においてAFTシューズ着用時はTRAD着用時よりも有意に高値を示し、最大外反角速度及び初期外反量においては高値を示した。

【結論】

AFTシューズ着用時はTRADシューズ着用時と比較して、地面に対する後足部の最大外反角度及び総外反量は有意に高値を示し、初期外反量及び最大外反角速度は有意に低値を示した。一方で、下腿にに対する後足部の最大外反角度及び総外反量に有意差は確認されず、初期外反量及び最大外反角速度は有意に低値を示した。

Influence of Advanced Footwear Technology (AFT) Shoes on Lower-Limb Kinematics During Running

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[Purpose]

The purpose of this study was to clarify the influence of Advanced Footwear Technology (AFT) Shoes on lower-limb kinematics during running by comparing them with traditional (TRAD) shoes .

[Methods]

Seventeen long-distance runners participated in this study. The participants performed treadmill running for 1 min under two shoe conditions (TRAD and AFT) at three velocities (12 km/h, 15 km/h, 20 km/h). Reflective markers were attached to the skin and the shoe surfaces, and three-dimensional coordinate were recorded using a motion capture system. The pronation-related kinematic variables were calculated using these data. The evaluated variables included (1) rearfoot eversion angle and angular velocity relative to the shank, and (2) rearfoot eversion angle and angular velocity relative to the ground. The differences between the shoe and velocity conditions were examined for each variable. these data. The evaluated variables included (1) calcaneal eversion angle and angular velocity relative to the tibia, and (2) calcaneal eversion angle and angular velocity relative to the ground. Differences between shoe and velocity conditions were examined for each variable.

[Results]

Regarding the eversion angle and angular velocity of the rearfoot relative to the shank, no significant differences between shoes were observed in the maximum or total eversion angles between shoes. By contrast, both the maximum eversion angular velocity and the initial eversion were significantly greater when wearing the AFT shoes than when wearing the TRAD shoes. In addition, a significant interval was observed during mid-stance only at a running velocity of 20 km/h. Furthermore, for the eversion angle and angular velocity of the shank relative to the ground, the AFT shoes yielded significantly greater values than the TRAD shoes in terms of the maximum eversion angle and total eversion, and tended to show higher values in the maximum eversion angular velocity and initial eversion.

[Conclusion]

In comparison with the TRAD shoes, the AFT shoes showed significantly greater maximum rearfoot eversion angle and total eversion relative to the ground, whereas the initial eversion and maximum eversion angular velocity were significantly lower. By contrast, relative to the shank, no significant differences were found in the maximum calcaneal eversion angle or total eversion; however, the initial and maximum eversion angular velocities were significantly lower when wearing the AFT shoes.