

ランニング・シューズの選択法と 使用限度の決定法に関する研究

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Changes of Cushioning Characteristics and Sensory Evaluations of Running Shoes According to Running Distance Increases

by

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ABSTRACT

Running shoe sole has an important role in absorbing the external impact forces that are transmitted from the running surface. In this study, the cushioning characteristics of running shoes were investigated by conducting mechanical tests and by analyzing distance runners' sensory evaluations. These tests and evaluations provide information on how mechanical properties on cushioning characteristics change in correlation with the change of sensory evaluations and how runners decide to stop using their shoes. Cushioning characteristics of shoe soles were measured by using the drop weight impact test system, which was made by considering the collision conditions between human heel and the running surface. This measurement was carried out at regular running distances. Running shoes were evaluated by rate of energy absorption and average Young's modulus, which were typical parameters given by the force and deformation

relationships derived from mechanical tests. At the same time, sensory evaluations of shoes were made based on the method of paired comparison, which compares new shoes with used shoes. As a result, criteria on which runners decided to stop using their shoes were dependent not on running distance but on the deterioration of mechanical properties, that is average Young's modulus and maximum load. Average Young's modulus and maximum load were respectively about 1.4 and 1.25 times those of new shoes.

要 旨

本研究は、ランニング・シューズに重要視される性能のひとつである緩衝特性に着目し、シューズの使用により緩衝特性がどのように変化するかを計測するとともに、人間の感覚による評価（官能評価）との相関を調べることにより、ランニング・シューズの使用限度に関する評価指標について考察することを目的としている。まず、ランナーに新品のシューズを使用させ、指定した走行距離間隔で、ランニングの着地時における衝撃条件にあわせた衝撃試験をシューズのリア・ソールに対して行った。同時に、ランナーには使用中のシューズを同じモデルの新品のシューズと比較させ、官能評価を行った。そして、衝撃試験から求めた力学パラメータと官能評価との相関を調べた結果、シューズの使用による官能評価の低下は緩衝特性の低下、特に平均ヤング率および最大荷重の変化と一定の相関があり、これらが使用限度の判定における指標のひとつとなることを実証した。