

温熱的快適性を向上させた換気機構付きの革靴の開発

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The Development of Leather Shoes with Ventilation Mechanism Improving Thermal Comfort

by

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ABSTRACT

The aim of study was to examine the effect of ventilation shoe which was made to improve thermal comfort of the foot. The ventilation shoe had the function to send off the air of the tip outside and to send the air of outside into the tip of a toe. The effect of the ventilation shoe was verified by the ventilation experiment by the tracer gas method. Moreover, it was verified by measuring the viable cell count after it had been put on continuously one week by subjective experiment. By water vapor transmission experiment of shoe in which a synthetic leather shoe was comparison with mesh type shoe, it was found that moisture transmission hardly occur for the synthetic leather shoe comparison with the mesh type shoe. By tracer gas method, the ventilation rate of ventilation shoe was compared with the dummy shoe and the mesh type shoe. It was clarified that the ventilation rate of ventilation shoe was about 40 percent improved

comparison with the dummy shoe while the mesh type shoe was 60 percent improved with the ventilation shoe. By measuring the viable cell count after week by subjective experiment, it was clarified that in the dummy shoe remarkably a lot of viable cell counts become insanitary easily from other parts. It was suppressed at the level that the bacterium in the tiptoe is the same as other parts in the ventilation shoe. It was suggested that the enforced ventilation by paving be effective while ventilating it to maintain hygiene from the above-mentioned result.

要 旨

足部の温熱的快適性を改善することを目的とし、指先に空気を送り込むとともに、指先の空気を送り出す機能を有する換気中敷き入りの換気靴を試作した。そして、その改善効果をトレーサガス法による換気量実験および被験者実験でフィールドでの連続着靴後の生菌数の計測により検証した。模擬足による靴の透湿性評価実験により合成皮革では、素材自体を通しての通気や透湿が起きないため、人体から放湿した水分が靴に溜まりこむ事が明らかになった。開発した換気中敷きが靴内の溜まりこんだ湿気の放湿に効果的であるかを検討するためにトレーサガス法により換気量を幾何形状は同じで換気機構のないダミー靴と比較した結果、換気中敷きにより換気量を4割増加できることが明らかになった。換気効果が連続着靴中の靴内の衛生状態を維持するのに効果的であるかを検討するために1週間の連続着靴後の生菌数を換気中敷き機構の有無で比較した。その結果、ダミー靴ではつま先部が他の部位よりも生菌数が顕著に多く、不衛生になりやすい事が明らかになった。換気靴ではつま先部の菌が他の部位と同じレベルに抑えられていた。以上の結果より、衛生状態を保つためには換気中敷きによる強制換気が効果的であることが明らかになった。