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Letter to the Editor

Comparison of Clinical Effects of Ankle Rehabilitation Exercise Bare Foot or Wearing Shoes

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Dear Editor-in-Chief

Human's sole is the only point on the human body where somatosensory information is received by direct contact between the human body and the external environment in the starting position (1). There is an effect on muscle activity in response to increases or decreases of plantar pressure in accordance with sensory inflow changes depending on whether a person is bare foot or wearing shoes, and as a result motions and activity patterns are adjusted (2).

Physical activities carried out bare foot promote blood circulation by an acupressure effect, and they are also known to be beneficial in the cases of toe atrophy or transformation by shoes (3). Such activities are reported to reduce active oxygen and inflammation in chronic inflammatory patients by contact with the ground, regenerate human body tissues, and help restoration from injuries (4).

Meanwhile, the role and major function of wearing shoes is to protect various joints of the human body and prevent injuries including those to the ankle by absorbing impact from landing in the case of physical activities. If the human body experiences large and repetitive impacts, motor ability can be reduced; therefore, wearing shoes is important because strength is controlled and any impact is absorbed properly during functional activities (5).

This study aimed to compare the clinical effects of ankle rehabilitation exercise carried out bare foot and wearing shoes and to identify any differences, with a focus on the sole receiving information in the human body's somatosensory system from external contact. This study is an important opportunity for considering bare foot and wearing shoes in relation to the clinical effects from the application of rehabilitation exercise, and also it can provide new insights and information to enable rehabilitation clinical specialists and related researchers to take into account the factors of bare foot and wearing shoes.

This study targeted male badminton club members in their 20s who complained of ankle pain for more than six months and were diagnosed as suffering from chronic ligament damage and repetitive strain (stress) injury through a physical examination and radiographic inspection by orthopedic doctors. The purpose and procedure of the study were explained to the subjects, and they signed their consent to the examination and participated voluntarily in the experiment. The participants were divided into a bare foot group and a wearing shoes (sneakers) group, and ankle rehabilitation exercise was applied for two weeks. For the ankle rehabilitation exercise, the participants conducted balancing while rolling a 12 cm Blackroll DuoBall

(Blackroll, Germany) and a 91cm circular foam roller (Tratac, Korea) back and forth, each for 10 minutes; calf raise (20 reps x five sets) on a Jumper (Togu, Germany); and walking in place from the Jumper to knee height for 10 minutes. To analyze the effects of the rehabilitation exercise of both bare foot and wearing shoes, the pain level was evaluated using a visual analogue scale (VAS) and ankle function was evaluated using calf raise IRM and calf raise RM (repetition maximum). For the measured data, paired *t*-tests were performed for each group to compare changes before and after the application of rehabilitation exercise using SPSS 23.0 Windows. The significance level α was set as 0.05.

The participant characteristics were as follows: bare foot group (male, n = 7; age, 23.14 ± 2.26 yr; height, 174.28 ± 5.15 cm; weight, 71.48 ± 6.33 kg) and wearing shoes group (male, n = 7; age, 22.10 ± 1.91 yr; height, 176.14 ± 4.14 cm; weight, 72.88 ± 9.63 kg). According to the study results, the bare foot group showed a statistically significant decrease in VAS (P=0.001) after the application of rehabilitation exercise, and a statistically significant increase in calf raise IRM (P=0.004) and calf raise RM (p=0.008), which are ankle function evaluation items. No statistically significant change was shown in VAS (P=0.143) after the application of rehabilitation exercise in the wearing shoes group, and a statistically significant increase was shown in calf raise 1RM (P=0.030) and calf raise RM (P=0.031).

Although bare foot and wearing shoes were confirmed as helping ankle function improvement after ankle rehabilitation exercise, bare foot was verified to be more effective for pain level reduction. If the pain reduction effect in the case of ankle rehabilitation exercise through this study is considered, the application of bare foot rehabilitation exercise should be reviewed. This study provides an opportunity for bare foot and wearing shoes conditions to be taken into account in relation to ankle rehabilitation exercise. The study results are expected to make a contribution to the development of ankle rehabilitation programs in the public health field.

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Conflict of interest

The authors declare that there is no conflict of interest.

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