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Comparison of the foot muscle EMG and medial longitudinal arch angle during short foot exercises at different ankle position

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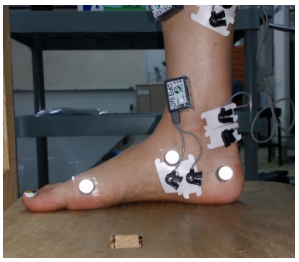

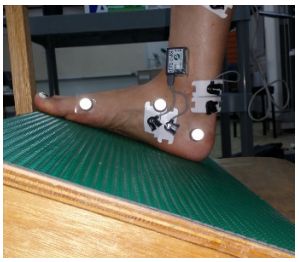

It has been generally known that the height of medial longitudinal arch (MLA) is influenced by both AbdH and extrinsic muscles. Previous studies revealed that the short foot exercise (SFE) is an effective exercise for the people with pronated foot by increasing the height of MLA. However, most of the research related to short foot exercise determined the efficiency of SFE using the enhanced abductor hallucis (AbdH) activation. Therefore, we examined a modified short foot exercise (MSFE) with three different ankle joint angle [neutral (NL), dorsiflexion (DF) at 30º and plantarflexion (PF) at 30º] to optimize the involvement of the foot extrinsic muscles together with AbdH. The purpose of this study was to clarify the effect of MSFE on MLA angle and activation of both intrinsic and extrinsic muscles and to determine the best condition for a pronated foot. 20 healthy subjects performed MSFE in sitting at different ankle positions. During each MSFE, we measured the activation of the AbdH, tibialis anterior (TA) and peroneus longus (PL) and the MLA angle. It is assumed that each ankle position provides different mechanical condition to TA, PL and AbdH. Consequently, the activation of the muscles would be influenced while the subjects perform a MSFE. The collected data were analyzed by one-way repeated-measures ANOVA. The activation of the AbdH and TA was significantly greater in the DF condition than in the NL and the PF conditions ($p<0.01$). The PL was most activated in the DF condition, but no statistical significance was detected. The MLA angle, however, showed no significant difference among conditions. Therefore, MSFE in ankle DF could be considered as more effective way than traditional exercise (e.g., SFE in a neutral ankle joint) in terms of balanced activation of the arch supporting muscles individually. Further longitudinal intervention studies are required.

Biography

Hyeo Bin Yoon is an MSc student in the Department of Physical Therapy at the Graduate School of Yonsei University. She has received her BS degree in Physical Therapy from Yonsei University. Her main research interests are rehabilitation of musculoskeletal impairments, gait analysis in patients with neurological impairments, physical therapy for pediatrics.

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