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Analysis of the ratios of medial-lateral and proximal-distal muscle activities surrounding the hip joint in the step-up and step-down positions

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Background: Many practitioners recommend step up and step down exercises. However, decreased stability of the hip joint and imbalanced muscle activities can alter the biomechanics during these movements.

Objective: This study investigated muscle imbalance between medial and lateral muscle components and between proximal and distal muscle components by expressing the proportions of muscle activation in the step up and step down positions.

Methods: Nineteen (19) subjects participated. Activities of the vastus medialis oblique, vastus lateralis, semitendinosus, biceps femoris, adductor, gluteus medius and gluteus maximus were assessed.

Results: The semitendinosus and biceps femoris ratio was higher in the step down position than in the step up position. The adductor and gluteus medius, adductor and vastus lateralis, an adductor and biceps ratios were higher in the step up position than in the step down position. The gluteus maximus and biceps ratio was greater in the step down position than in the step up position.

Conclusion: Muscle activation in the medial hamstring is greater in the step down position, in the adductor; muscle activation is greater in the step up position. The step down position is more appropriate for those with proximal weakness, which can promote muscle activation in the gluteus maximus while maintaining biceps femoris activation.

Biography

So-Hyun Park has received her Bachelor, Master and PhD degrees in field of Physical Therapy from Daegu University in South Korea. She has worked as a Physical Therapist and Researcher at Kyungpook National University Hospital and Yeungnam University Hospital from 2006 to 2012. Currently she is an Associate Professor of the Yongsan University in South Korea and is a Chief Researcher in government funded project. Her major research interests include the lower extremity biomechanics for knee malalignment syndrome, spinal biomechanics and segmental stabilization and gait and posture, etc.

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