

GLUTEAL ACTIVATION AND INCREASED UNILATERAL FRONTAL PLANE PROJECTION ANGLE DURING A STEP-DOWN TEST IN YOUNG HEALTHY WOMEN

Autores

Alexandre Carvalho Barbosa, Ilha Fernandes, Edgar Ramos Vieira, Bárbara Badaró, Marcela Damázio e Michelle Almeida Barbosa.

Afiliação

Departamento de Fisioterapia da Universidade Federal de Juiz de Fora - Campus Governador Valadares.

Introduction: Gluteal weakness is often associated to abnormal femoral movements in internal rotation associated to adduction of the hip, leading the knee to medially move on the frontal plane. Young women are more affected and show greater changes in lower limb's kinematics. **Objective:** the purpose of this study was to investigate how the activation of gluteus maximus and gluteus medius interact with frontal plane projection angle (FPPA) in healthy young women while performing the step-down test. **Methods:** This was a non-randomized transversal study (CAAE 44416315.1.0000.5147). Eighteen adult female (22 ± 2 years of age, 165 ± 6 cm, 58 ± 8 kg) participated in this study. Inclusion criteria were to present FPPA greater than 15 degrees during the step-down maneuver on one limb. The other limb should present less than 15 degrees for comparisons. The FPPA was measured through photogrammetry between the line from the marker on the tibial tuberosity to center of the patella and the line from the anterior-superior iliac spine to the center of the patella at the frame that corresponded with the point of maximum knee flexion. Surface electromyography (sEMG) was used to analyze gluteus maximus (GM) and gluteus medius (Gm) activation. The maximal voluntary isometric contraction (MVIC) was used to normalize the sEMG signal. **Results:** The FPPA was correlated to right GM ($r=0.40$; $p=0.008$) and to the assessed side ($r=0.30$, $p=0.04$). Right and left gluteus maximus were also correlated ($r=0.65$, $p=0.001$). Two components were extracted from principal component analysis (PCA), explaining 73% of variance. PCA showed GM (right=0.95 and left=0.78) explaining 48% of the cumulative variance at the first component and the Gm (right=0.41 and left=0.77) explaining additional 25% of the variance at the second component. Differences in muscle activation were found when FPPA was the independent variable. The GM activation was higher on the side with angles above 15° ($48\pm 18\%$ vs. $33\pm 17\%$; $p=0.02$), without difference for other comparisons. **Conclusions:** Findings suggest relationship between increased FPPA and GM muscle, a determinant variable to such dysfunction. Also provides preliminary evidence that young woman with dynamic knee valgus exhibit greater GM activation, even before experiencing any symptoms such as anterior knee pain.

Key words: electromyography, photogrammetry, dynamic valgus, knee, hip.