

Comparison of Two Restraint Systems for Pelvic Stabilization during Isometric Lumbar Extension Strength Testing

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Abstract

Among strength testing methods, varying degrees of stabilization are used. The purpose of this study was to compare isometric lumbar extension values obtained from two different restraint systems designed to isolate the lumbar extensors through pelvic stabilization. Both restraint systems stabilized the pelvis by preventing movement of the lower extremities during testing with the subject in a seated position. One restraint system (KNEE) applied pressure just below the knees while the lower leg was positioned at 120° of knee flexion. The other (FOOT) applied pressure to the bottom of the feet while the lower leg was positioned at 60° of knee flexion. Fifteen men (age = 37 ± 10 yr; height = 177.7 ± 5.3 cm; weight = 61.4 ± 10.9 kg) and six women (age = 43 ± 7 yr; height = 170 ± 7.9 cm; weight = 61.4 ± 10.9 kg) were tested at seven positions through 72° range of motion with each restraint system. Analysis of variance for repeated measures indicated a significant difference ($p \leq 0.05$) between restraint systems and a significant restraint system by joint angle interaction. Subjects were able to generate 9.4 to 10.9 percent more torque at 72, 60, 48, and 36° of lumbar flexion with the KNEE restraint system compared to the FOOT restraint system. No differences ($p < 0.05$) between restraints were noted at 24, 12, or 0° flexion. Thus, the restraint system employed can influence lumbar extension strength values and affect the shape of the isometric lumbar extension strength curve.