Length Change of the Hip External Rotators in Common Stretch Positions

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Stretching of the deep rotator muscles of the hip is commonly employed in patients with lumbosacral, sacroiliac, posterior hip, and buttock pain. There is limited research that demonstrates the effectiveness of common stretching techniques on the short external rotators of the hip. **PURPOSE:** To evaluate length change of the inferior (IP) and superior (SP) piriformis, superior gemellus (SG), obturator internus (OI), and inferior gemellus (IG) during several commonly used stretching positions. **METHODS:** Seventeen hip joints from 9 embalmed cadavers were skeletonized leaving only the short external rotators and joint capsule intact. Polypropylene strings were attached from the origin to insertion sites of each muscle to represent the musculotendinous fibers. The change of length (mm) from the anatomical position to 4 specific stretch positions: 1) 45° internal rotation from neutral flexion/extension, 2) 45° external rotation with 90° hip and knee flexion, 3) 30° adduction from 90° of hip and knee flexion, and 4) 30°of adduction with hip and knee flexion to contact the lateral malleolus with the lateral femoral epicondyle of the contralateral limb (supine piriformis stretch), were recorded. **RESULTS:** There was a significant effect on length change based on the stretch position, $F(15,166) = 14.67$, $p < .0005$; Wilk's $\Lambda = .097$, partial $n^2 = .540$. The greatest length change for the SP (30.7mm), IP (23.7mm), and the SG (20.8mm) occurred when positioned in 30° adduction from 90° of hip and knee flexion followed by 45° internal rotation from neutral (SP: 22.2mm; IP: 20.6mm; SG: 17.4mm) and 45° external rotation with 90° hip and knee flexion (SP: 19.4mm; IP: 10.4mm; SG: 9.4mm). The OI (18.2mm) and IG (15.5mm) had the greatest length change with 45° internal rotation from neutral flexion/extension followed closely by 30° adduction from 90° of hip and knee flexion (OI: 17.1mm; IG: 14.7mm). The supine piriformis stretch caused the least amount of length change ($p < 0.05$). **CONCLUSION:** The three stretch positions that caused the greatest length change were: 1) 30° adduction from 90° of hip and knee flexion, 2) 45° internal rotation from neutral flexion/extension, and 3) 45° external rotation with 90° hip and knee flexion. Clinicians may apply the results of this study to select positions to effectively stretch the short external rotators of the hip.