TACSM Abstract

The Influence of Hip Position on Lower Extremity Internal/External Rotations and Its Reliability

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ABSTRACT

The hip joint is important in activities of daily living (ADL), allowing tri-planar movements simultaneously. Range of motion (ROM) of the hips is essential for ADL, where a decreased hip ROM is associated with higher lower extremity injuries. Measuring ROM of the hips can assist in preventing lower extremity injuries. Goniometry is a common method used in measuring passive and dynamic hip ROM, however, limited mainly to non-weight bearing positions such as supine, prone and sitting. **PURPOSE**: To investigate the influence of weight bearing hip position on lower extremity internal rotation (IR) and external rotation (ER) ROM and its reliability, in the general population. **METHODS**: Ten participants (six males and four females, 21.9±2.4 years) participated in the study. The participants performed lower extremity IR and ER in eight randomized hip positions, on a rotational disc device with 360° dial (one-degree accuracy). The following are the eight hip positions: flexion IR (FIR), flexion ER (FER), extension IR (EIR), extension ER (EER), abduction IR (ABDIR), abduction ER (ABDER), adduction IR (ADDIR), and adduction ER (ADDER). Participants maximum IR and ER ROM was recorded using a video camera and measured in each hip position, by two raters. Participants were cued to hold the end ROM for 2 s. Each position was repeated three times for both right and left sides. A test-retest analyses were performed between the three consecutive trials in all eight hip positions, for each rater. Interrater analyses were performed between the two raters. Repeated measure ANOVAs were performed to determine the influence of different hip positions on hip IR and ER ROM, followed by Bonferroni post-hoc analyses, were granted, $p<.05$. **RESULTS**: Test-retest reliability for each hip position, side, and rater were between good to excellent, ICC 3,1 .802-.945. Based on the high reliability for each rater, the third trial was chosen to run the interrater analyses. Interrater reliability for each hip position and side were between very good to excellent, ICC 3,1 .876-.997. Repeated measure ANOVAs found significant main effects in hip IR ($p<.001$) and ER ($p=.025$). Bonferroni post-hoc analyses found the following: FIR (43.4°±10.7°) was significantly larger than EIR (31.4°±8.4°), $p=.001$; ABIR (41.2°±10.3°) was significantly larger than EIR, $p=.003$; ADIR (44.7°±13.0°) was significantly larger than EIR, $p<.001$; and FER (52.5°±15.0) was significantly larger than ADER (44.9°±15.4), $p=.011$. **CONCLUSION**: This study found good to excellent reliabilities for the test-retest analyses and very good to excellent reliability for the interrater reliability. Furthermore, Hip starting position found to influence mainly the IR ROM. When the hip was in flexion position IR and ER ROM were the largest. Practitioners need to be aware that measuring lower extremity IR and ER ROM in different weight bearing hip starting positions may influence the measurement outcome. These findings provide important information to consider when developing injury prevention programs and rehabilitation testing protocols.