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A MECHANISM FOR LIGAMENTUM TERES INJURIES IN FEMOROACETABULAR IMPINGEMENT: AN ANATOMICAL STUDY

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ABSTRACT

Background: Femoroacetabular impingement can produce abnormal biomechanics that lead to compensatory injuries around the hip and pelvis. Ligamentum teres pathologies are commonly associated with these bony deformities but a mechanism for injury has not been described in the literature.

Purpose: The purpose of this study was to describe a potential mechanism behind ligamentum teres injury and impingement between the femoral neck and acetabulum.

Study Design: Laboratory controlled cadaveric study.

Methods: Twenty-six hips from 15 embalmed cadavers (8 male; 7 female) with lifespans between 55-93 years were skeletonized. The hip was placed in 90° flexion and 0° abduction/adduction and internally rotated until the femoral head neck contacted the acetabulum. This position of impingement with respect to internal rotation was recorded with a goniometer. The hip was then further internally rotated until end range of motion was achieved and again the position of internal rotation recorded with a goniometer.

Results: The positions of internal rotation at which impingement occurred (mean 9°; SD 4.2; Range -2° to 15°) when compared to end range (mean 21°; SD 5.7; Range 5° to 27°) were significantly different ($p < 0.005$; $t = 14.8$). In all the hips, after impingement occurred the site of bony contact between the femoral neck and acetabulum acted as a pivot point. The femoral head was levered inferiorly with a loss of the rotational center within the acetabulum, as internal rotation continued. This movement of the femoral head caused the ligamentum teres to tighten and restricted further movement. Movement into internal rotation beyond this end position caused rupture of the ligamentum teres.

Conclusion: Internal rotation range of motion can occur beyond the position of impingement and resulted in abnormal inferior movement of the femoral head and tightening of the ligament teres. This study provides cadaveric evidence for the mechanism of ligamentum teres injury in those with who engage in activities that required motion beyond the point of impingement.

Keywords: Femoroacetabular impingement, hip internal rotation, ligamentum teres, rotational stabilizer

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