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“The Effects of Anteverting Periacetabular Osteotomy on Acetabular Retroversion and Hip Capsular Mechanics”

Femoroacetabular impingement (FAI) associated with acetabular retroversion – characterized by a mal-oriented or global over-coverage of the hip socket – is a growing concern for early hip injuries and osteoarthritis. As a surgical treatment, the anteverting/reverse periacetabular osteotomy (PAO) is an approach which involves cutting around and reorienting the acetabular socket to reduce the risks of impingement and adverse joint loading. Concomitantly, there is also a growing interest in how the hip joint capsule is affected by various hip preserving surgical techniques and their potential impacts on joint stability.

Although the anteverting PAO aims to preserve the native hip and restore joint function, it is still unclear how surgical management affects joint mobility, stability, and capsular function. The aim of this *in vitro* cadaveric study is to examine the effects of surgical anteverting PAO on acetabular retroversion and capsular mechanics. The objectives are to: 1) create a laboratory model to simulate anteverting PAO to treat acetabular retroversion; 2) examine the changes in range of motion and capsular tensions before and after surgery, using a robotic testing protocol; and 3) identify the ideal correction angles and capsular management to preserve joint function.

Understanding how the hip capsule is affected during acetabular reorientation is critical to optimize surgical management as well as clinical outcomes. The study will examine how both the acetabular osseous structure and soft tissue capsule play a role to balance joint stability. To preserve the native hip and delay joint degeneration, it will be crucial to preserve the capsule and elucidate the amount of acetabular reorientation needed without causing iatrogenic instability and compromising hip mobility and function.