Results of Hip Arthroscopy Vs Open surgical dislocation in Treatment of Femoroacetabular Impingement: A Systematic Review

Systematic Review

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Dedication

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List of Abbreviations

Abb.	Full term
AP	Anteroposterior
CT	Computed tomography
FAI	Femoroacetabular impingement
HOS	Hip Outcome Score
HOS-SSS	HOS sportsspecific subscale
mHHS	Modified Harris Hip Score
MPFA	Medial proximal femoral angle
MRI	Magnetic resonance imaging
NAHS	NonArthritic Hip Score
OA	Osteoarthritis
PCS	Physical component scale);
SF-12	12-Item Short-Form Survey
SSS	Sports-specific subscale
THA	Total hip arthroplasty
UCLA	University of California Los Angeles activity index
WOMAC	Western Ontario and McMaster Universities Arthritis Index.

INTRODUCTION

Hip pathology is one of the significant sources of hip pain and dysfunction among athletic individuals and femoroacetabular impingement is often a causative factor [1].

Multiple factors [2] including genetic, biochemical and mechanical influences have been suspected to have a role in the development of osteoarthritis (OA). Secondary osteoarthritis in the hip usually occurs following trauma, avascular necrosis of the femoral head, developmental dysplasia of the hip, slipped capital femoral epiphysis and Perthe's disease [3].

Femoroacetabular impingement (FAI) is defined as anterior hip abutment between the acetabular rim and proximal femur due to abnormal morphology of proximal femur or acetabulum which can lead to intra-articular pathology and eventual osteoarthritis. FAI is an increasingly recognized disorder. [4, 5]

There are 2 primary mechanisms of FAI development: cam and pincer impingement [5]. Cam impingement is the result of the contact between an abnormal femoral head-neck junction and the acetabulum, where as pincer impingement is typically the result of a deep acetabulum or local anterior overcoverage (retroversion). Cam impingement leads to a shearing stress at

the anterosuperior acetabulum with subsequent acetabular chondral delamination and articular-sided labral detachment. Pincer impingement leads to crushing of the labrum between the overcovering acetabulum and proximal femur [6].

The first structure to fail in this situation is the acetabular labrum, which is degenerated because of repetitive impact of abutment. Both types of FAI occur at the anterior part of the hip joint [7].

Cam impingement refers to the cam effect caused by abutment of non-spherical femoral head with acetabular rim. This may occur as a result of sequelae of pediatric hip problems such as slipped capital femoral epiphysis, but most commonly is attributed to eccentric closure of the capital physis in adolescence. It has been demonstrated that intense physical activity at a young age may precipitate in this partial physeal arrest and end up with cam lesion. Cam impingement is clearly a causative factor in joint damage among athletic individuals. With extreme range of hip flexion, the non-spherical portion of the head rotates into the acetabulum, creating a shear force on the anterolateral edge of the acetabular articular surface. With repetitive motion, this eventually results in articular delamination and failure of the acetabular articular cartilage [8,9].

Hip arthroscopy is an attractive evolving method to treat FAI, and recent literature reports has demonstrated early promising results of this procedure. However, experience in

arthroscopic techniques for the hip joint is mandatory. Careful preservation of blood supply to the femoral head is very important in the arthroscopic procedure as it is in the open surgical dislocation. The maximum limit of bone resection should not exceed 30% of the neck volume in both techniques to avoid post operative complication like fracture neck femur[10].

Traditionally, FAI has been managed safely and effectively by hip dislocation and trochanteric osteotomy, with promising results in early and midterm follow up of the patients with minimal degenerative changes [11].

Surgical treatment of FAI focuses on improving the clearance of hip motion and alleviating femoral abutment against the acetabular rim. Resection osteoplasty of the prominent anterior neck or non-spherical part of the head and resection of acetabular overcoverage have been performed by an open surgical dislocation technique which preserves the deep branch of the medial femoral circumflex artery [11].

AIM OF THE STUDY

To perform a comparative systematic review to determine whether there is a significant difference in clinical outcomes and progression to THA between hip arthroscopy and open surgical hip dislocation treatment for FAI.

REVIEW OF LITERATURE

Anatomy

The hip joint classified as a ball and socket joint which consists of the femoral head and the acetabulum of the pelvis, and provides a wide range of movement. Articular cartilage is predominantly composed of type II collagen, which covers most of the femoral head. The articular surface of the acetabulum is also composed of articular cartilage surrounds its periphery. The floor of the acetabulum has a fatty layer on its central portion known as pulvinar therefor the central acetabular floor is non-articular portion [12].

Three major ligaments surround the hip joint capsule. Anteriorly lies the iliofemoral ligament, which tightens on hip extension. Inferomedially lies the pubofemoral ligament, the weakest, which tightens in hip extension and abduction. The ischiofemoral ligament runs horizontally and posteriorly, its fibres tightening with hip extension and limiting internal rotation (Figure 1)[12].

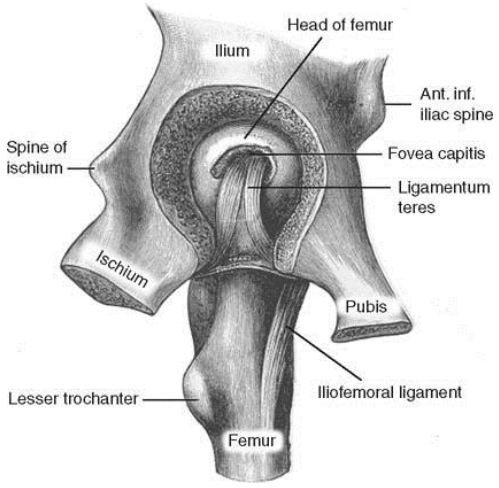

Figure (1): Lateral diagram of the hip joint. Reproduced from the 39th edition of Gray's anatomy [12].

The Labrum

The acetabular labrum is a fibrocartilagenous rim, attached to the bony edge of the acetabulum and runs circumferentially around its margin [13].

The labrum ends at the lower edge of the acetabulum, and transverse ligament of the acetabulum completes the ring, which acts as a heavy fibrous band continuos with the labrum. The distal free edge of the labrum is narrower than its insertion to the acetabulum, creating a triangular cross-section. It functions to enable the acetabulum to cup slightly more than half of the sphere of the femoral head [13].

Types of FAI

There are three types of FAI: pincer, cam, and combined impingement.

- Pincer. This type of impingement occurs because extra bone extends out over the normal rim of the acetabulum. The labrum can be crushed under the prominent rim of the acetabulum.
- Cam. In cam impingement the femoral head is not round and cannot rotate smoothly inside the acetabulum. A bump forms on the edge of the femoral head that grinds the cartilage inside the acetabulum.
- Combined. Combined impingement just means that both the pincer and cam types are present (Figure 2)[13].