

Hip-Femoral Acetabular Impingement

Christian N. Anderson, MD^a, Geoffrey M. Riley, MD^b,
Garry E. Gold, MD^c, Marc R. Safran, MD^{d,*}

KEYWORDS

- Hip • Magnetic resonance imaging • Femoroacetabular impingement
- Magnetic resonance arthrography • Cam impingement • Pincer impingement
- Acetabular labral tears

KEY POINTS

- Femoroacetabular impingement is caused by repetitive abutment of a morphologically abnormal proximal femur and/or acetabulum during terminal range-of-motion of the hip.
- The abnormal pathomechanical impingement seen in femoroacetabular impingement results in damage to the labrum and acetabular cartilage.
- Magnetic resonance imaging of the hip requires high field imaging (1.5 or 3 T) and a dedicated hip protocol to ensure appropriate quality of images.
- Magnetic resonance arthrography increases contrast resolution and is important for evaluating the acetabular labrum and articular cartilage.
- Assessment of both normal and pathologic magnetic resonance imaging anatomy requires a systematic evaluation of bony structures, acetabular labrum, femoral and acetabular cartilage, chondrolabral junction, and other soft tissues including the ligamentum teres.

INTRODUCTION

Femoroacetabular impingement (FAI) was first described in the 1990s,^{1,2} and since that time has been increasingly recognized as a source of hip pain and dysfunction.

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^a Department of Orthopaedic Surgery, Stanford University Medical Center, 450 Broadway Street, Redwood City, CA 94063, USA; ^b Department of Radiology, Stanford University Medical Center, 300 Pasteur Drive, S-056, Stanford, CA 94305, USA; ^c Department of Radiology, Stanford University Medical Center, 1201 Welch Road, P271, Stanford, CA 94305, USA; ^d Department of Orthopaedic Surgery, Stanford University Medical Center, 450 Broadway Street, M/C 6342, Redwood City, CA 94063, USA

* Corresponding author.

E-mail address: msafran@stanford.edu

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Extensive work by Ganz and colleagues³ has demonstrated that FAI is caused by repetitive abutment of a morphologically abnormal proximal femur and/or acetabulum during terminal range-of-motion of the hip. This pathomechanical process eventually results in characteristic damage to the labrum and acetabular cartilage, depending on the location of the osseous abnormality.³ The 2 most common osseous abnormalities that lead to FAI are a loss of the normal femoral head-neck offset, resulting in cam impingement, and acetabular overcoverage, resulting in pincer impingement.³ A third type of FAI has components of both cam and pincer and is referred to as mixed or combined impingement.

Cam Impingement

- Most common form of isolated FAI (17% of all FAI types)⁴
- Typically seen in young adult men 20 to 30 years old⁵
- The loss of normal femoral head-neck contour can be due to an abnormal extension of the proximal femoral epiphysis,⁶ short or long femoral neck, varus femoral neck, or residual deformity from femoral neck fracture, perthes, or slipped capital femoral epiphysis
- The nonspherical portion of the anterolateral femoral head produces a shear force at the chondrolabral junction as it enters the acetabulum during hip flexion³
- Over time, repetitive shearing results in chondrolabral separation, acetabular chondral delamination from the subchondral bone, and labral detachment (**Fig. 1**).^{3,4,7,8}

Pincer Impingement

- Most commonly seen in women⁹ 30 to 40 years old¹⁰
- Acetabular overcoverage can be caused from focal overcoverage at the antero-superior acetabular rim, relative anterior overcoverage (acetabular retroversion), or global overcoverage (coxa profunda, protrusio acetabuli)
- Overcoverage of the acetabulum results in crushing the labrum against the normal femoral neck in hip flexion and internal rotation (**Fig. 2**).³

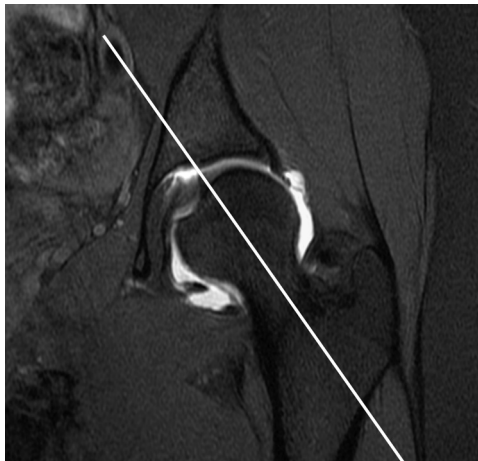


Fig. 1. Orientation to prescribe the oblique axial sequence. Coronal T1-weighted fat-suppressed MR arthrogram image demonstrates the plane used to obtain the oblique axial sequence.

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