Intra-articular Hip Disorders in the Military Population: Evaluation and Management

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KEYWORDS

• Hip arthroscopy • Acetabular labral tear • Femoroacetabular impingement • Pincer • Cam • Hip dysplasia

KEY POINTS

- Hip disorders are common in the military population given the physical demands and demographics.
- The at-risk hip joint (1) has abnormal morphology that leads to impingement during the arc of motion, and (2) is exposed to supraphysiologic stresses, either acute or chronic.
- Femoroacetabular impingement is a dynamic problem that it occurs because the hip is under stress from the activities to which it is exposed.
- Intra-articular damage may be acute, but is usually the result of the cumulative effects of repetitive abnormal contact between the ball and socket.
- Radiographic abnormalities around the hip are common and a systematic approach to hip dysfunction requires integration of components from the history, physical examination, imaging, and arthroscopic findings.
- Hip arthroscopy is a powerful emerging tool in the management of hip disorders.
- Recognizing and correcting the underlying bony problem is fundamental to successful treating hip disorders.

INTRODUCTION

The hip joint has received considerable attention recently as an evolving understanding of the pathoanatomy and injury factors inherent in the femoroacetabular articulation has prompted clinicians to recognize, evaluate, and treat hip dysfunction at younger ages and earlier in the disease process. Sparked in part by the work of Ganz and colleagues[1] promoting the concept of femoroacetabular impingement (FAI), the management paradigm for hip disease has shifted from reactively treating

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Clin Sports Med 33 (2014) 655–674
http://dx.doi.org/10.1016/j.csm.2014.06.013 sportsmed.theclinics.com
0278-5919/14/$ – see front matter

the consequences of arthritis in advanced age toward recognizing and preemptively addressing the factors that lead to hip damage and degeneration in younger patients. The proliferation of hip arthroscopy has further expanded understanding of hip disease and has provided innovative treatment options.

The femoroacetabular articulation is a highly congruent ball and socket joint deep within the body that generally does not lend itself to damage or injury under normal circumstances with routine activity, when the morphology is normal. Unlike the more peripheral joints of the upper and lower extremity that are vulnerable to high external forces and moment arms, the hip joint is protected by a secure connection to the pelvis that limits extremes of motion and a thick soft tissue envelope that softens impact. Two primary factors should therefore be considered when evaluating the injured hip joint: the shape of the joint and the stress on the joint.

The at-risk hip joint is (1) has underlying skeletal morphology that leads to abnormal mechanics between the ball and socket; and/or (2) is exposed to supraphysiologic stress, either acute or chronic. These two factors are not mutually exclusively, and most patients who present with hip complaints have components of both. The magnitude of damage correlates with the severity of the structural incongruity and the amount of activity-related stress on the joint. Those patients who routinely expose the hip to greater forces or higher cumulative stress may overwhelm normal anatomy, whereas those patients with greater femoroacetabular deformity may experience symptoms earlier in life with less cumulative stress.

The military population is particularly at risk for hip disorders given the demographics and demands inherent this population.[2] Abnormal femoroacetabular morphology, especially cam deformity, is commonly seen in the young, athletic men who make up much of the military population.[3–6] High levels of athletic activity during skeletal development may contribute to abnormal morphology.[7,8] The physical demands of military training and active duty are similar to those of elite athletics and military personnel are susceptible to acute injuries to the hip as well as overuse conditions.[9,10] Joint reactive forces within the hip may exceed 5 times body weight during rigorous athletic activity.[11–13] Higher overall activity levels within the military population have been associated with higher incidence rates of hip osteoarthritis compared with the general population.[14]

ANATOMY

The skeletal junction between the pelvis and leg is the femoroacetabular articulation. Almost all motion at this diarthroidal joint is rotational, the limits of which are conferred by the configuration of the ball within the socket and the surrounding ligamentous structures. The articular surfaces of the hip joint are highly congruent with intrinsic stability provided by a deep acetabular vault that covers 170° of the femoral head.[15,16]

A fibrocartilaginous labrum that runs circumferentially around the acetabular rim augments hip stability, deepening the socket by as much as 20%.[15,17–19] Conforming to the perimeter of the femoral head through the arc of motion, the labrum has numerous functions including maintenance of negative intra-articular pressure, regulation of the intra-articular hydrostatic synovial fluid pressure, and even distribution of forces across the joint. Further stability is provided by a thick, fibrous joint capsule that contains the strongest ligaments in the body.[19,20]

Functioning synchronously, the hip joints form the static and dynamic foundation on which the upper body is positioned and moves over the legs. Through the complex integration of dynamic and static stabilizers around the multiaxial ball and socket joint, the normally functioning hip joints effortlessly support the body and maintain pelvic