Right hip pain in a 20-year-old epee fencer

Catherine N. Petchprapa • Jenny T. Bencardino •
Robert J. Meislin

Received: 12 July 2011 / Revised: 11 October 2011 / Accepted: 19 October 2011 / Published online: 18 November 2011
© ISS 2011

Part II: diagnosis The “notch sign” of pincer-type femoroacetabular impingement.

Discussion

The hip joint’s stability, conferred by the depth of the acetabulum and conforming femoral and acetabular anatomy, is at the expense of its range of motion. The hip joint’s normal range of motion [flexion (120°), extension (10°), abduction (45°), adduction (25°), internal rotation (15°), and external rotation (35°)] is mainly limited by osseous constraints [1].

Femoroacetabular impingement (FAI) describes a premature limit to the range of motion due to conflict between the femur and acetabulum primarily when the hip is flexed, adducted, and internally rotated. This occurs at the endpoint of the normal physiologic range and is due to morphologic abnormalities of the proximal femur, acetabular rim, or both [2]. In cam FAI, lack of the normal concavity of the

anterosuperior femoral head-neck junction results in a femoral contour too proud to clear the acetabular rim. In pincer FAI, a deep acetabulum prevents further hip adduction/internal rotation when the hip is flexed. In either case, repetitive conflict causes damage to the interposed labrum and adjacent articular cartilage.

For pincer FAI, the acetabular socket may be mildly deepened (coxa profunda), indicated by overlap/medial position of the acetabular teardrop with respect to the ilioischial line on a properly positioned pelvic radiograph, or more pronounced (acetabular protrusion), with overlap/medial position of the femoral head cortex with respect to the ilioischial line. When only the anterosuperior acetabulum is proud, the normal relationship between the anterior and posterior walls is reversed; this is termed cranial acetabular retroversion (“crossover” sign).

A femoral impaction injury can also occur in pincer hips; this is referred to as the “notch sign” [2]. This sagittally oriented depression along the femoral head-neck cortical margin occurs at the site of acetabular conflict and can be thought of as the “pincer equivalent” to fibrocystic changes in cam impingement [2]. Associated subcortical marrow edema characterizes the acute stage, whereas subjacent cortical thickening reflects reactive bone remodeling in chronic cases. The notch sign is most obvious on axial oblique MR images and cross table lateral radiographs [2] (Fig. 1). We suspect that both location and length will depend on the location and extent of the acetabular abnormality.

Pincer FAI can occur in morphologically normal hips in individuals chronically operating beyond the normal range of motion. This functional pincer impingement has been described in dancers, figure skaters, hockey players,

The case presentation can be found at doi:10.1007/s00256-011-1314-0.

C. N. Petchprapa (✉) • J. T. Bencardino
Department of Radiology,
NYU Langone Medical Center - Hospital for Joint Diseases,
6th Floor, 301 East 17th Street,
New York, NY 10003, USA
e-mail: petchc01@nyumc.org

R. J. Meislin
Department of Orthopedic Surgery,
NYU Langone Medical Center - Hospital for Joint Diseases,
301 East 17th Street,
New York, NY 10003, USA

Fig. 1 **a** En-garde position: the hip and knee are partially flexed. **b** Advancing: the hip internally rotates. **c** Lunging: the hip and knee in deep flexion. Images courtesy of Gregory Chang, MD

gymnasts, yoga practitioners, martial artists, and mountain climbers [3]. With regards to fencing stances, in the en garde position the hip is flexed; it internally rotates when advancing. The hip is further flexed while internally rotated when lunging. With much of the time during a bout spent in these positions, our patient had clinical (not imaging) findings of impingement; as such she was conservatively managed.

Conflict of interest The authors declare that they have no conflict of interest.

References

1. Buckwalter JA. Orthopaedic basic science: biology and biomechanics of the musculoskeletal system, 2nd ed. Rosemont, IL: American Academy of Orthopaedic Surgeons; 2000.
2. Tannast M, Siebenrock KA, Anderson SE. Femoroacetabular impingement: radiographic diagnosis—what the radiologist should know. *AJR Am J Roentgenol.* 2007;188(6):1540–52.
3. Bizzini M, Notzli HP, Maffiuletti NA. Femoroacetabular impingement in professional ice hockey players: a case series of 5 athletes after open surgical decompression of the hip. *Am J Sports Med.* 2007;35(11):1955–9.