Editorial: is the hip really a stable joint?

Olufemi R. Ayeni¹ · Christopher M. Larson² · Nicolas Bonin³ · Marc R. Safran⁴

Received: 29 July 2016 / Accepted: 11 August 2016 / Published online: 20 August 2016
© European Society of Sports Traumatology, Knee Surgery, Arthroscopy (ESSKA) 2016

Olufemi R. Ayeni

Christopher M. Larson

Nicolas Bonin

Marc R. Safran

✉ Olufemi R. Ayeni
femiayeni@gmail.com
Christopher M. Larson
chrislarson@tcomn.com
Nicolas Bonin
dr.bonin@lyon-ortho-clinic.com
Marc R. Safran
msafran@stanford.edu

- ¹ Division of Orthopaedic Surgery, Department of Surgery, McMaster University, 1200 Main St West, 4E15, Hamilton, ON L8N 3Z5, Canada
- ² Minnesota Orthopaedic Sports Medicine Institute at Twin Cities Orthopedics, 4010 West 65th Street, Edina, MN 55435, USA
- ³ Lyon-Ortho-Clinic, 29 B Avenue des Sources Batiment Trait d'union, 69009 Lyon, France
- ⁴ Department of Orthopaedic Surgery, Stanford University Medical Center, 450 Broadway St, Pavillion A, Redwood City, CA 94063, USA

Keywords Hip instability · Hip joint · Biomechanics · Surgical management · Femoral head

The anatomically “normal” hip joint is an inherently stable joint due to the congruency of the femoral head and acetabulum as well as the capsular–ligamentous–muscular envelope that surrounds the hip [8]. This understanding was the purported theory or conventional thought about hip stability; it follows that instability events would be rare in the absence of substantial trauma [1]. Improved knowledge in terms of hip biomechanics has resulted in an improved understanding of conditions such as femoroacetabular impingement [6, 9]. Moreover, instability of the hip and the degrees to which it occurs is becoming increasingly evident. Cadaveric and clinical studies have demonstrated that the femoral head is not a true sphere, and that there is motion (translational and rotational) between the femoral head and acetabulum in its native state [3, 4, 12].

Other cadaveric studies have documented the importance of soft tissue structures around the hip in maintaining stability [12–14]. Currently, clinical evidence is emerging that hip instability can occur to varying degrees and, sometimes, can get worsened or improved as a result of surgical intervention [7, 11, 15]. Also, there are a number of complex unanswered questions related to this important topic, such as the importance of the ligamentum teres, the role for capsular plication, the coexistence of impingement and instability, as well as the impact of femoral sided instability [2, 10].

While no definitive treatment or preventative strategy currently exists for hip instability, adhering to surgical principles of atraumatic dissection, restoration of tissue integrity, judicious rehabilitation, and choosing the appropriate surgical approach (open vs. arthroscopic) appear to play important roles in preventing iatrogenic instability. Recent studies have also demonstrated promising results when treating patients with conditions predisposing to instability [5, 10].

In this issue of the journal, the stability of the hip is highlighted with various levels of evidence. First, a case report of a unique reconstructive procedure to address gross instability after hip arthroscopic intervention is presented [15]. Next, a systematic review of the evidence regarding capsular management around the hip joint with special attention to instability is reported. These studies and other included studies will continue to help advance the understanding of hip-related instability and the degree to which surgical interventions play a beneficial or deleterious role [12].

Compliance with ethical standards

Conflict of interest The authors declare no competing interests.

References

1. Beebe MJ, Bauer JM, Mir HR (2016) Treatment of hip dislocations and associated injuries: current state of care. *Orthop Clin North Am* 47(3):527–549
2. Canham CD, Yen YM, Giordano BD (2016) Does femoroacetabular impingement cause hip instability? *A Syst Rev Arthroscopy* 32(1):203–208
3. Charbonnier C, Kolo FC, Duthon VB, Magnenat-Thalmann N, Becker CD, Hoffmeyer P, Menetrey J (2011) Assessment of congruence and impingement of the hip joint in professional ballet dancers a motion capture study. *Am J Sports Med* 39(3):557–566
4. Duthon VB, Charbonnier C, Kolo FC, Magnenat-Thalmann N, Becker CD, Bouvet C, Menetrey J (2013) Correlation of clinical and magnetic resonance imaging findings in hips of elite female ballet dancers. *Arthroscopy* 29(3):411–419
5. Fukui K, Briggs KK, Trindade CA, Philippon MJ (2015) Outcomes after labral repair in patients with femoroacetabular impingement and borderline dysplasia. *Arthroscopy* 31(12):2371–2379
6. Ganz R, Parvizi J, Beck M, Leunig M, Nötzli H, Siebenrock KA (2003) Femoroacetabular impingement: a cause for osteoarthritis of the hip. *Clin Orthop Relat Res* 417:112–120
7. Harris JD, Gerrie BJ, Lintner DM, Varner KE, McCulloch P (2016) Microinstability of the hip and the splits radiograph. *Orthopedics* 39(1):e169–e175
8. Ito H, Song Y, Lindsey D, Safran MR, Giori N (2009) The proximal hip joint capsule and the zona orbicularis contribute to hip joint stability in distraction. *J Ortho Res* 27(8):989–995
9. Khan M, Bedi A, Fu F, Karlsson J, Ayeni OR, Bhandari M (2016) New perspectives on femoroacetabular impingement syndrome. *Nat Rev Rheumatol* 12(5):303–310
10. Laplaza FJ, Root L (1994) Femoral anteversion and neck-shaft angles in hip instability in cerebral palsy. *J Pediatr Orthop* 14(6):719–723
11. Larson CM, Stone RM, Grossi EF, Giveans MR, Cornelsen GD (2015) Ehlers-Danlos syndrome: arthroscopic management for extreme soft-tissue hip instability. *Arthroscopy* 31(12):2287–2294
12. Safran MR, Lopomo N, Zaffagnini S, Signorelli C, Vaughn ZD, Lindsey DP, Gold G, Giordano G, Marcacci M (2013) In vitro analysis of peri-articular soft tissues constraining effect on hip kinematics and joint stability. *Knee Surg Sports Traumatol Arthrosc* 21(7):1655–1663
13. Telleria JJ, Lindsey DP, Giori NJ, Safran MR (2014) A quantitative assessment of the insertional footprints of the hip joint capsular ligaments and their spanning fibers for reconstruction. *Clin Anat* 27(3):489–497
14. Wuerz TH, Song SH, Grzybowski JS, Martin HD, Mather RC, Salata MJ, Espinoza Orías AA, Nho SJ (2016) Capsulotomy size affects hip joint kinematic stability. *Arthroscopy*. doi:10.1016/j.arthro.2016.01.049
15. Yeung M, Memon M, Simunovic N, Belzile E, Philippon MJ, Ayeni OR (2016) Gross instability after hip arthroscopy: an analysis of case reports evaluating surgical and patient factors. *Arthroscopy* 32(6):1196–1204