



# Abordajes artroscópicos en cadera: abordaje extrarticular (fuera-dentro)



Dr. IÑAKI MEDIAVILLA

Prof. Asociado de la Universidad del Pais Vasco Hospital Universitario Basurto

Bilbao





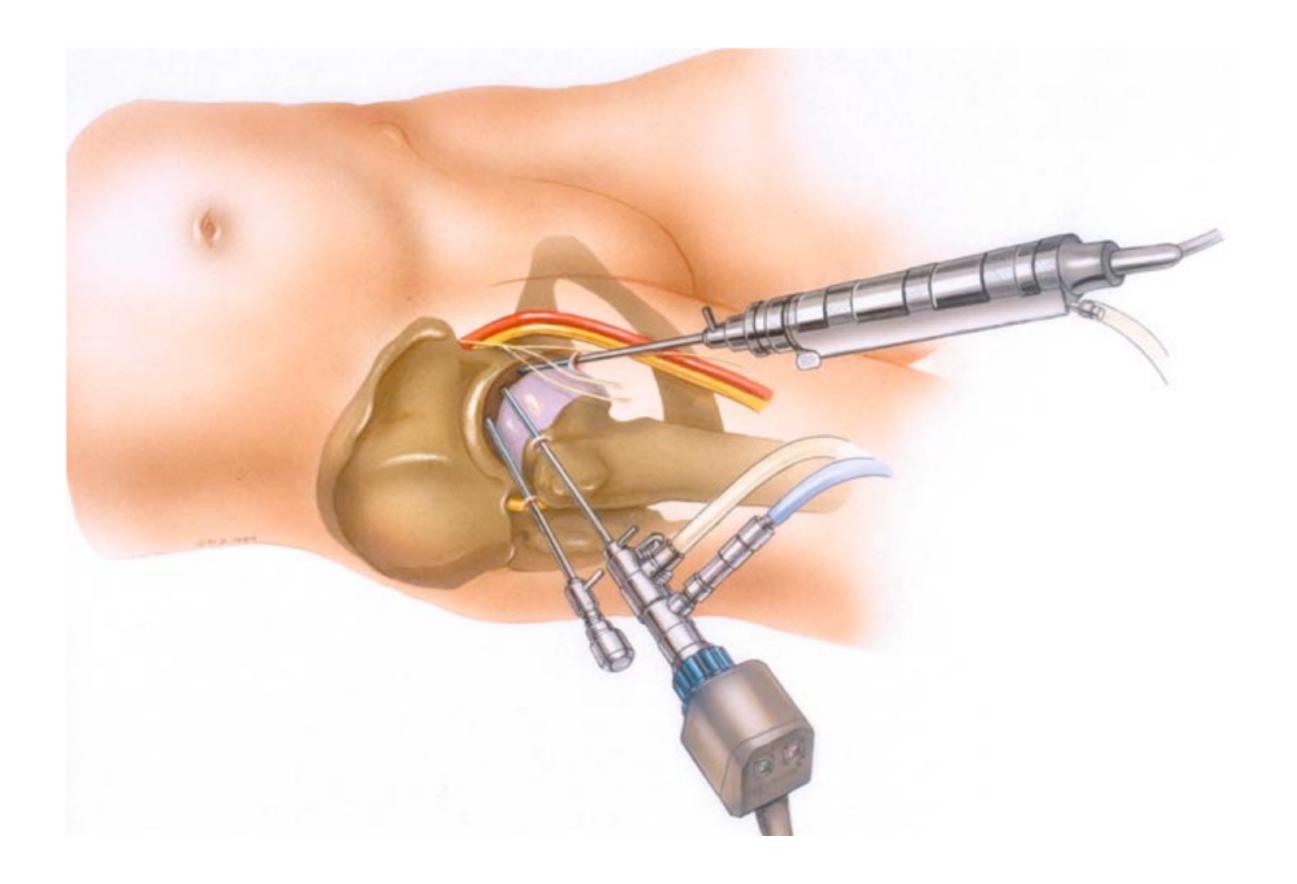
### Las presentaciones serán de 8 minutos...



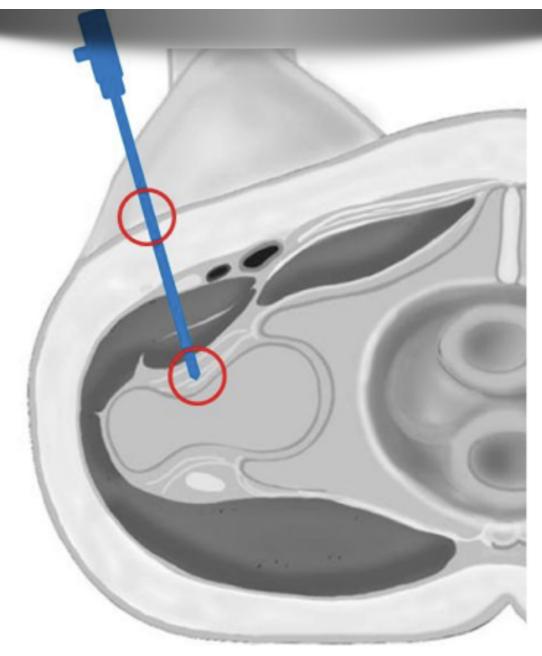
**IMPRORROGABLES!** 

- fundamentos
- posición
- portales
- capsulotomía
- tiempos quirúrgicos

- fundamentos
- posición
- portales
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# profundidad de estructuras



idificultad en la triangulación!

During hip arthroscopy, an anterior capsulotomy is typically performed at the beginning of the procedure with the goal of increasing the maneuverability of instruments and visualization of the joint. In most cases, the incision starts

1 cm from the acetabular rim and continues parallel to the labrum, connecting both portals<sup>23,25</sup>; however there are

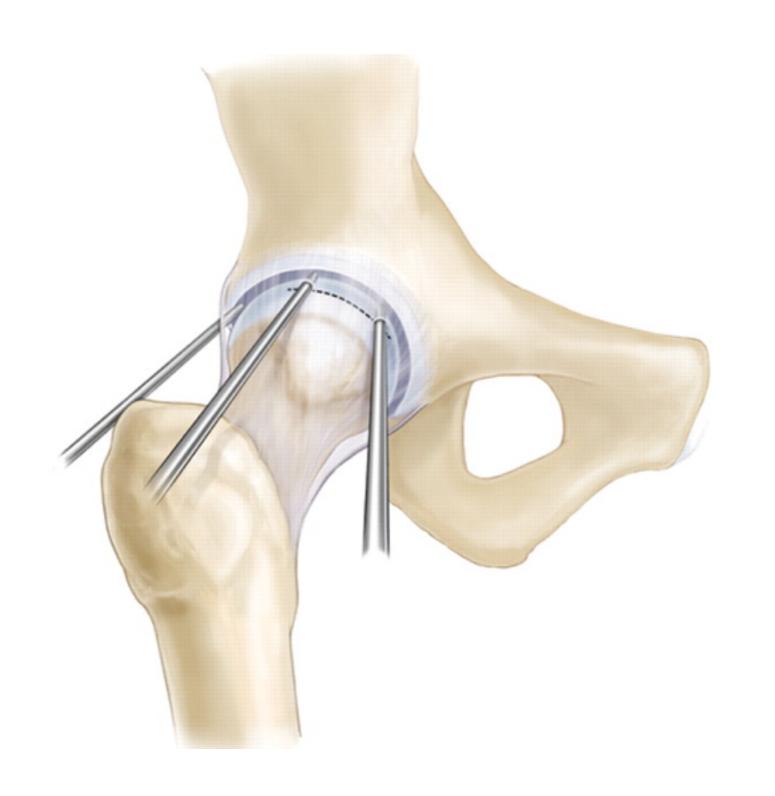
Arthroscopic management of femoroacetabular impingement: osteoplasty technique and literature review.

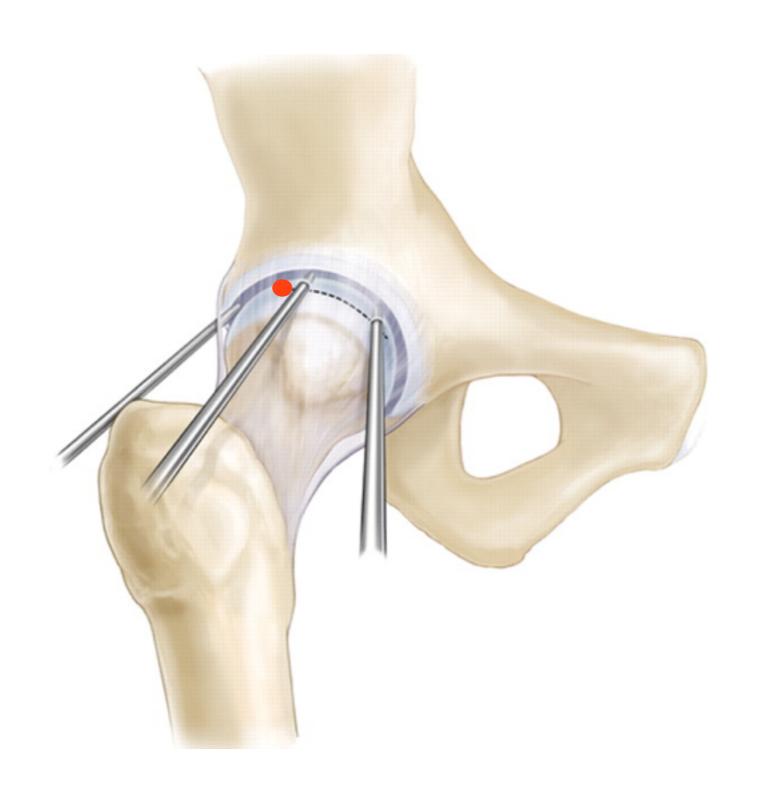
Philippon MJ, Stubbs AJ, Schenker ML et al. Am J Sports Med. 2007;35(9):1571-158

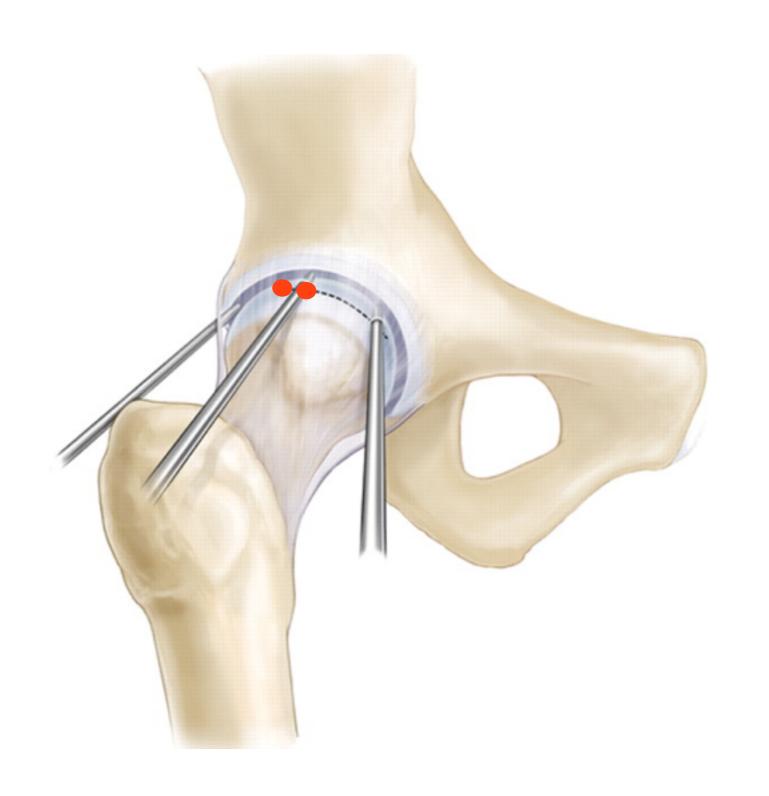
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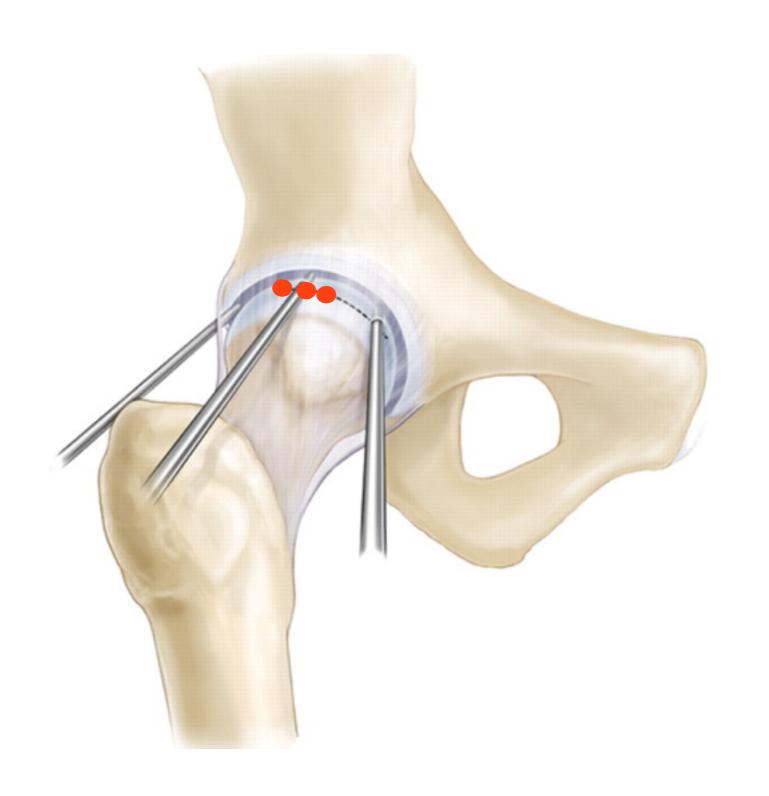
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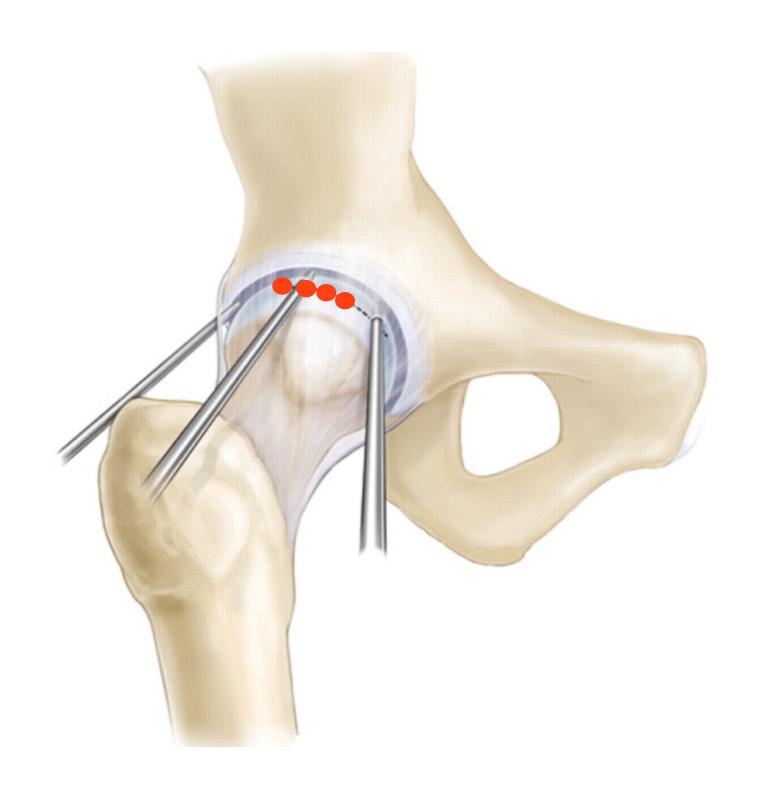
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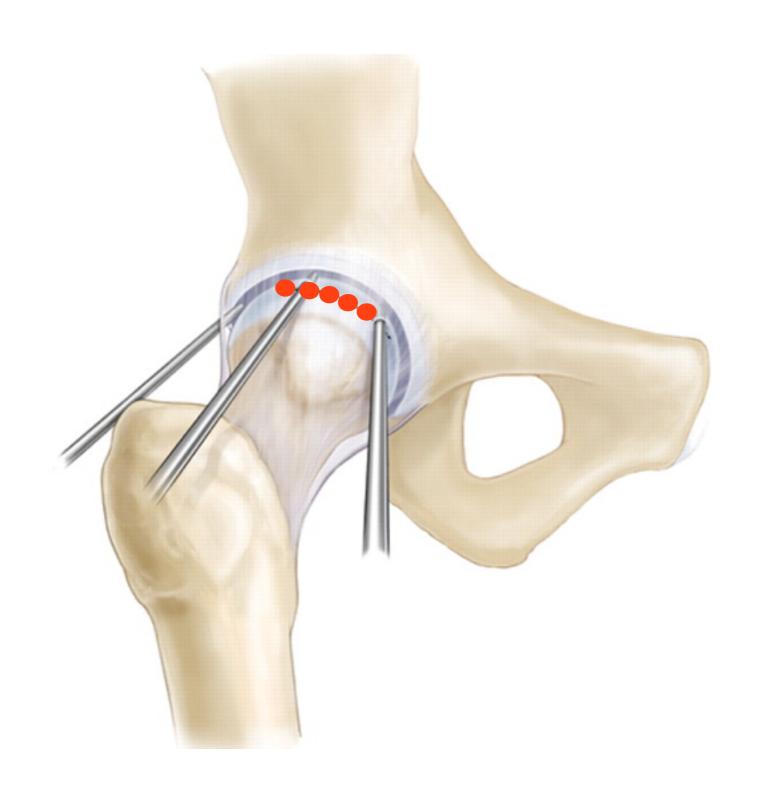


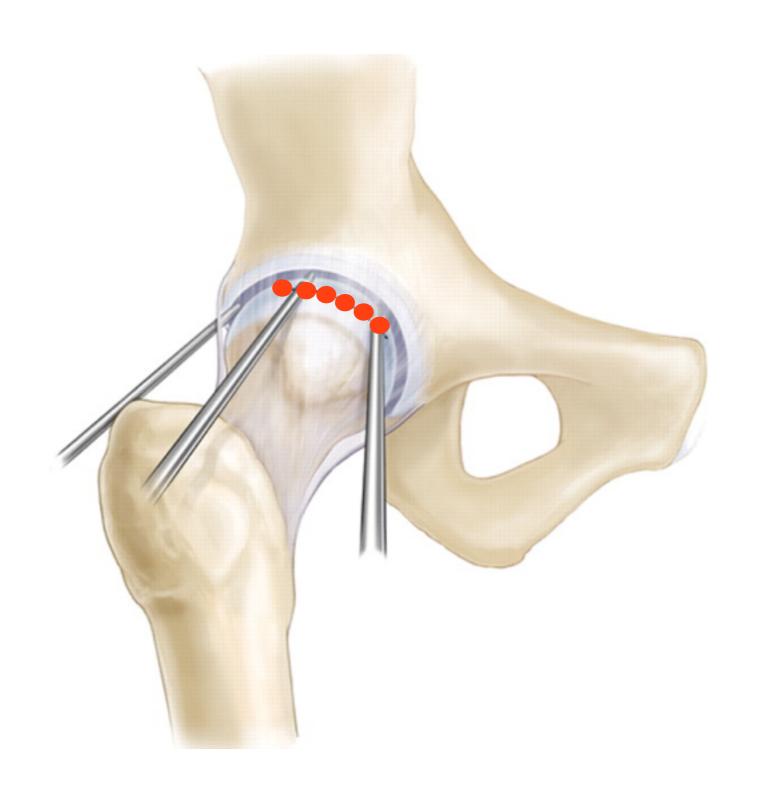


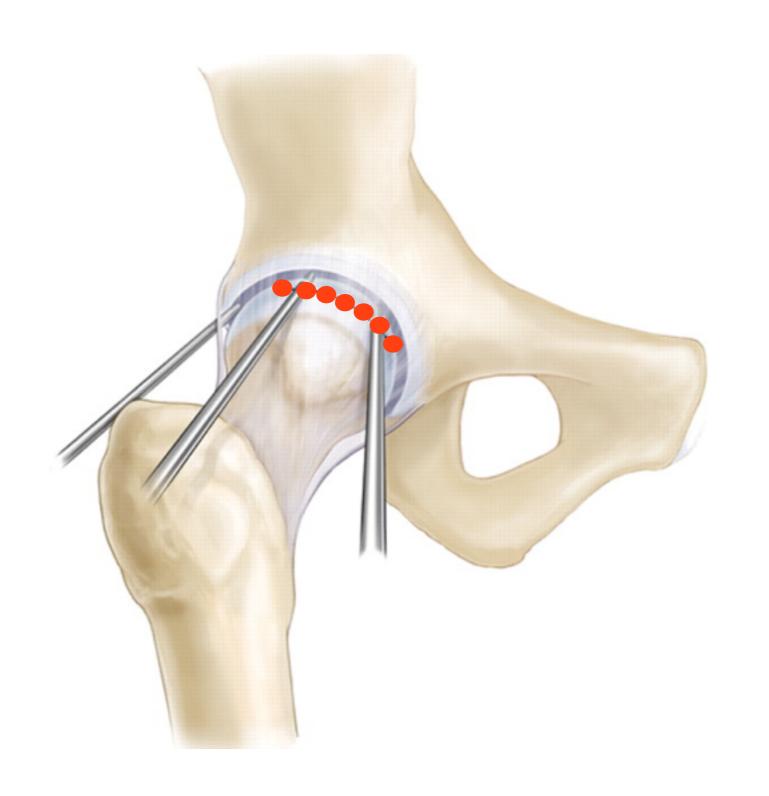


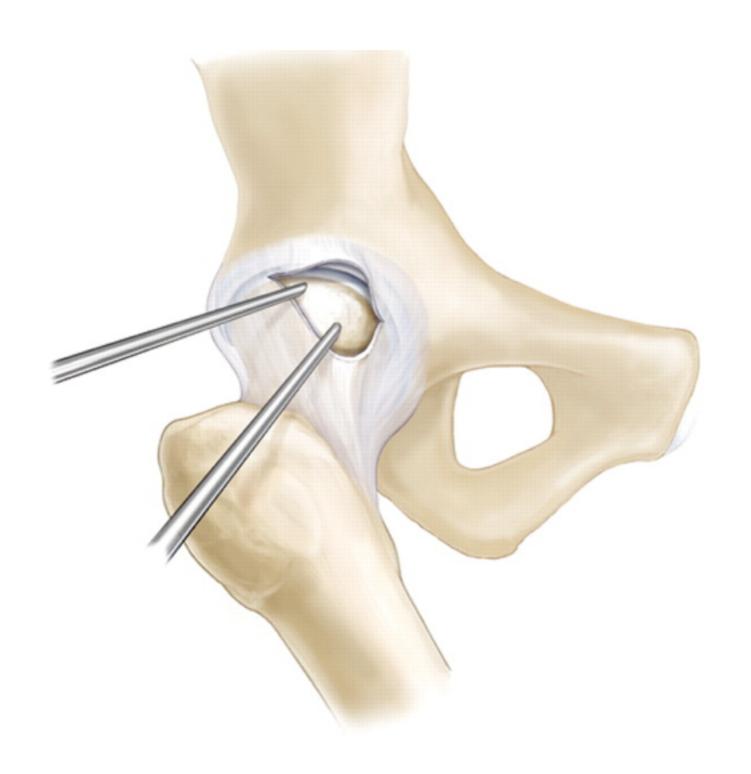


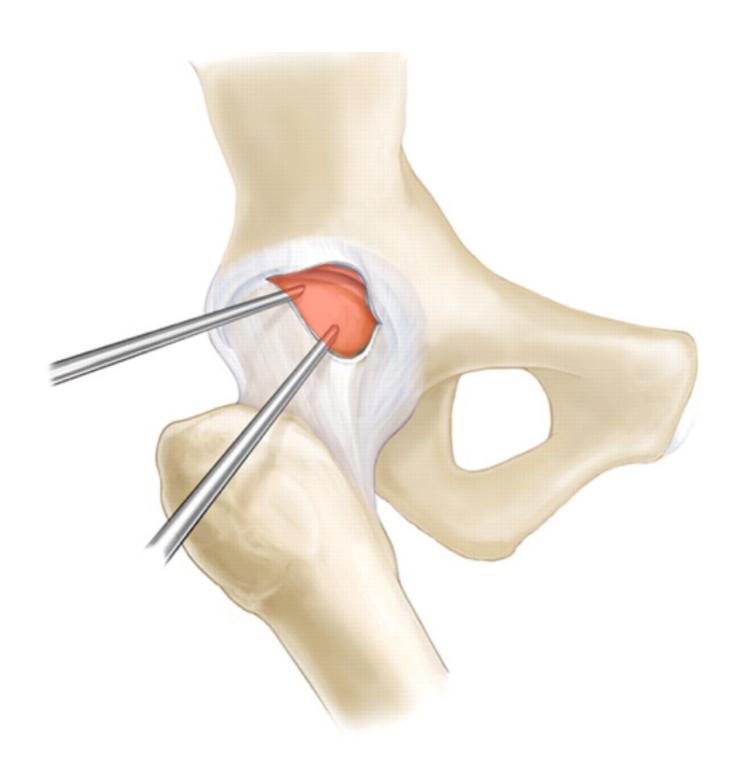




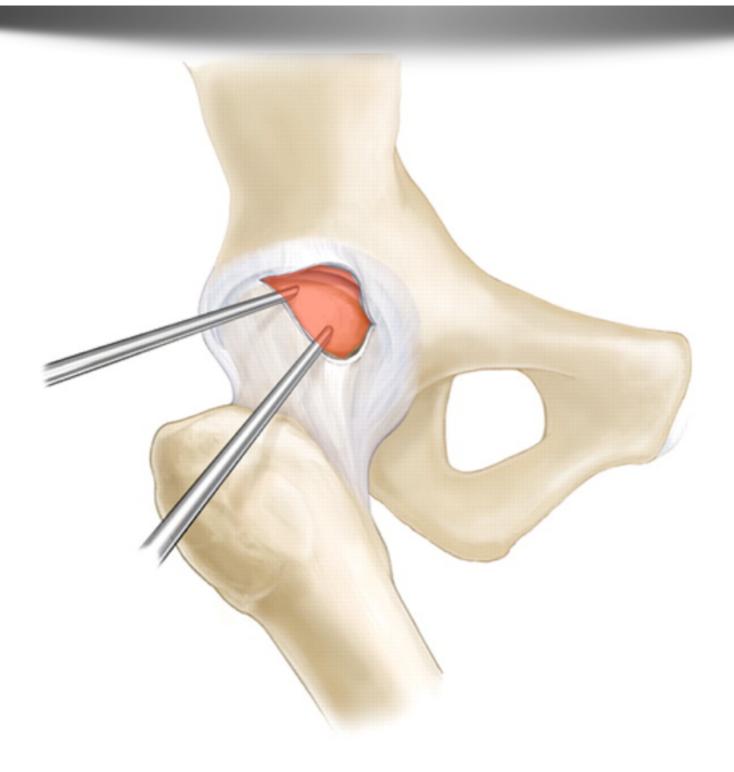






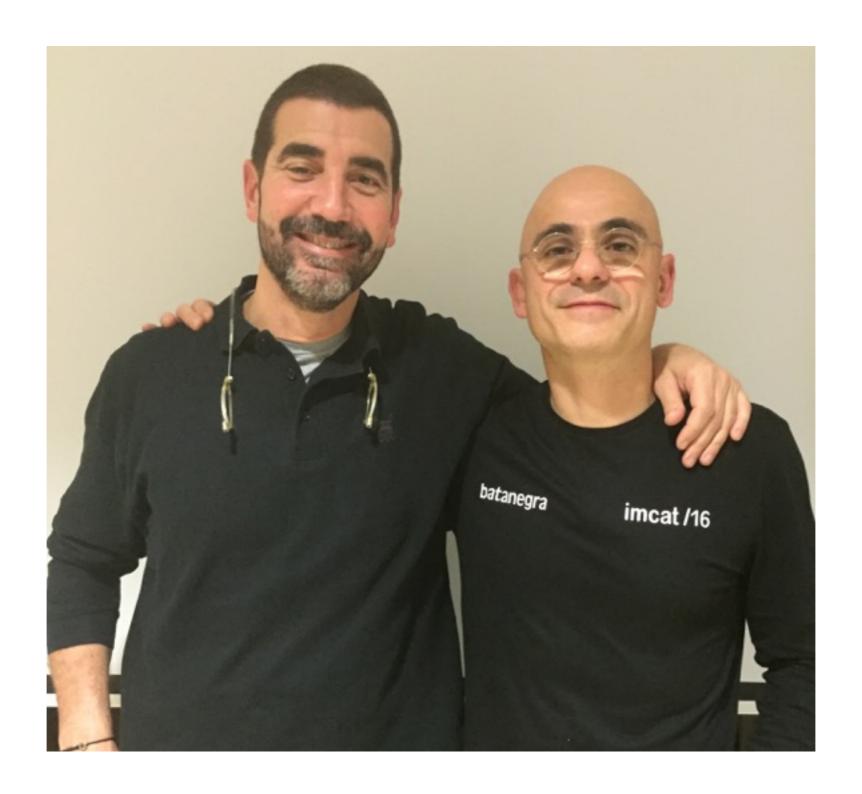


# concepto "ojal"



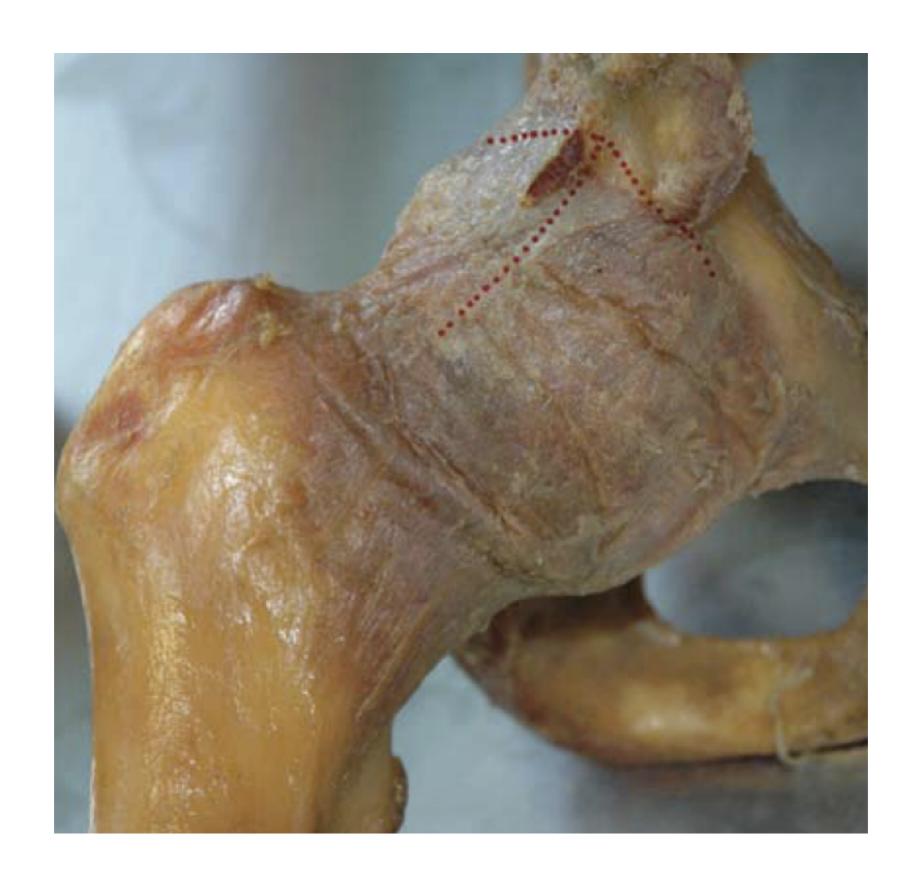
- EasyNormal
- Hard





# It's Easier! Than You Think!





### 2010

# Nuevo abordaje artroscópico de la cirugía de cadera: técnica *out-inside*

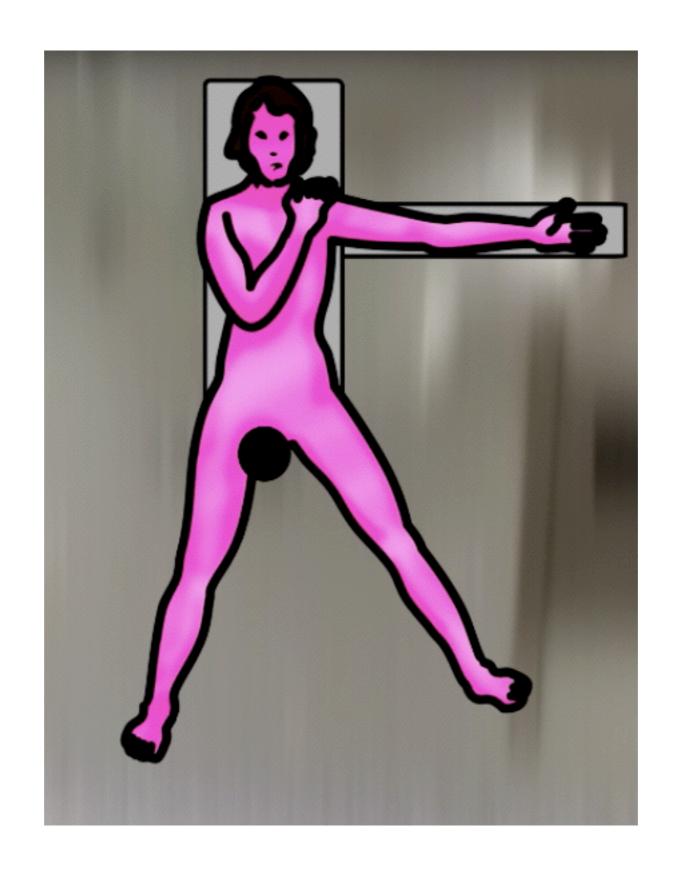
Eric Margalet<sup>1</sup>, Iñaki Mediavilla<sup>2</sup>, Oliver Marín<sup>3</sup>

#### Capsulotomía

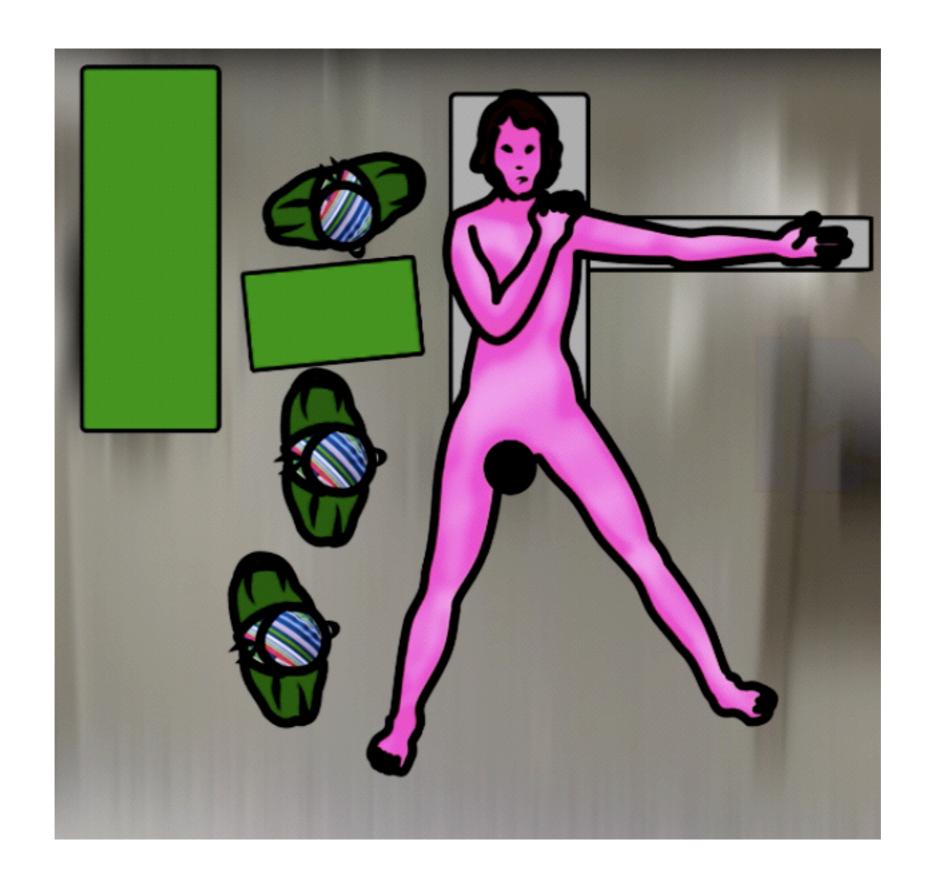
Con la ayuda del bisturí "banana" o de doble filo se inicia una capsulotomía siguiendo el eje del cuello temoral y siempre en sentido distal a proximal. Se continúa la capsulotomía (y se forma un ojal) con la ayuda del vaporizador (Figura 8). Secuencialmente, visualizaremos primero el tejido óseo del cuello femoral y más proximalmente el cartílago articular cuya visión precede a la del labrum. Seguidamente, y sobre el hueso pélvico, se realiza una incisión transversal para poder exponer la inserción del labrum (Figura 9).

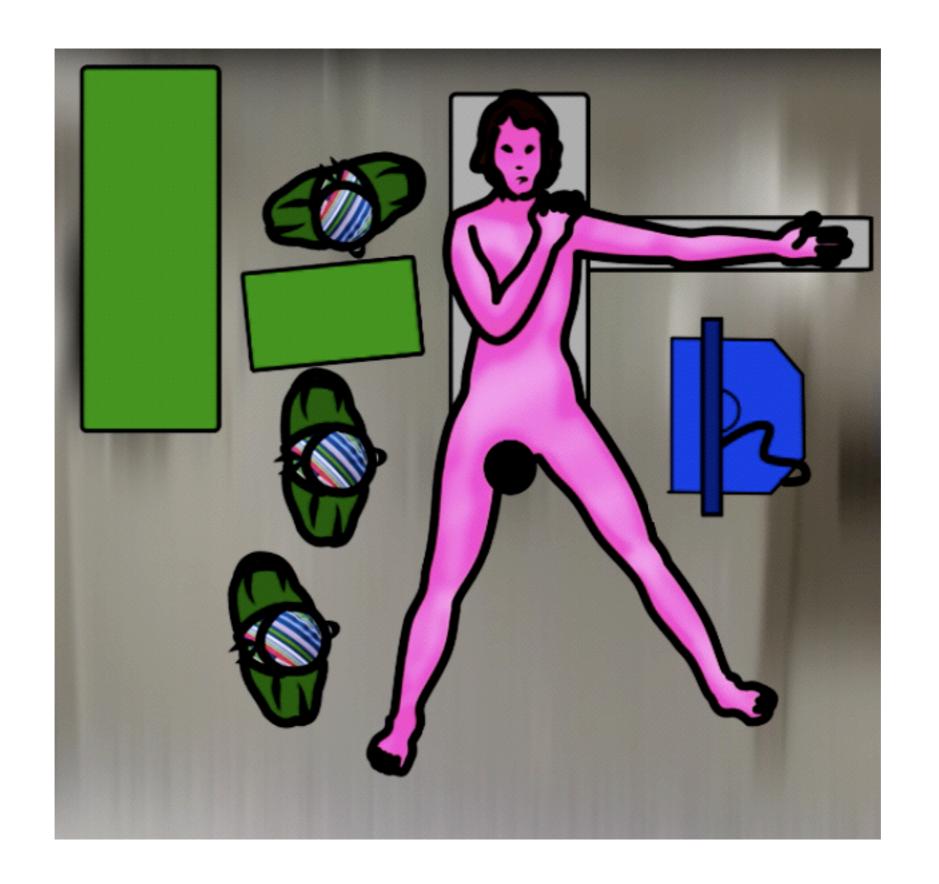


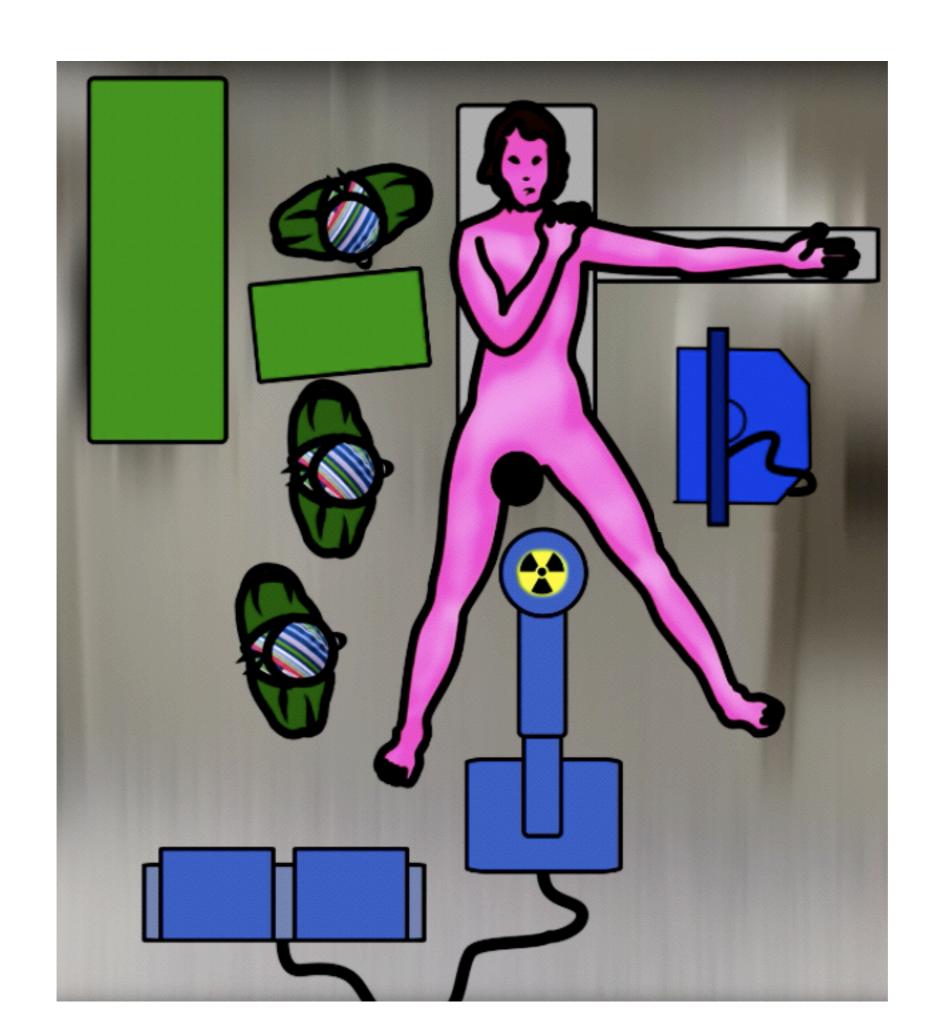
- fundamentos
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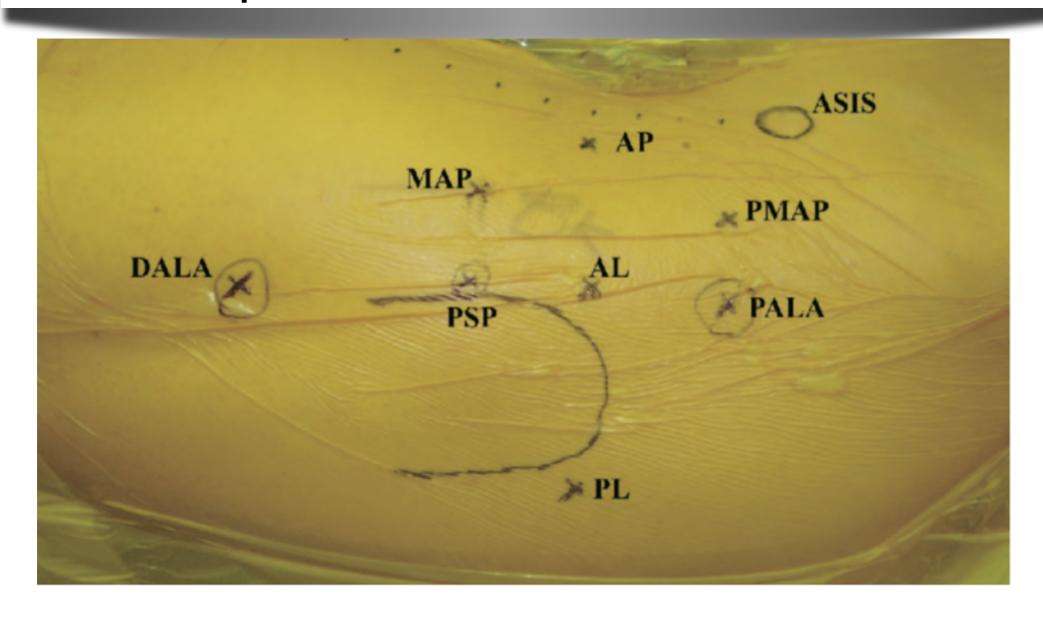






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# artroscopia de cadera "convencional"



imil acrónimos!

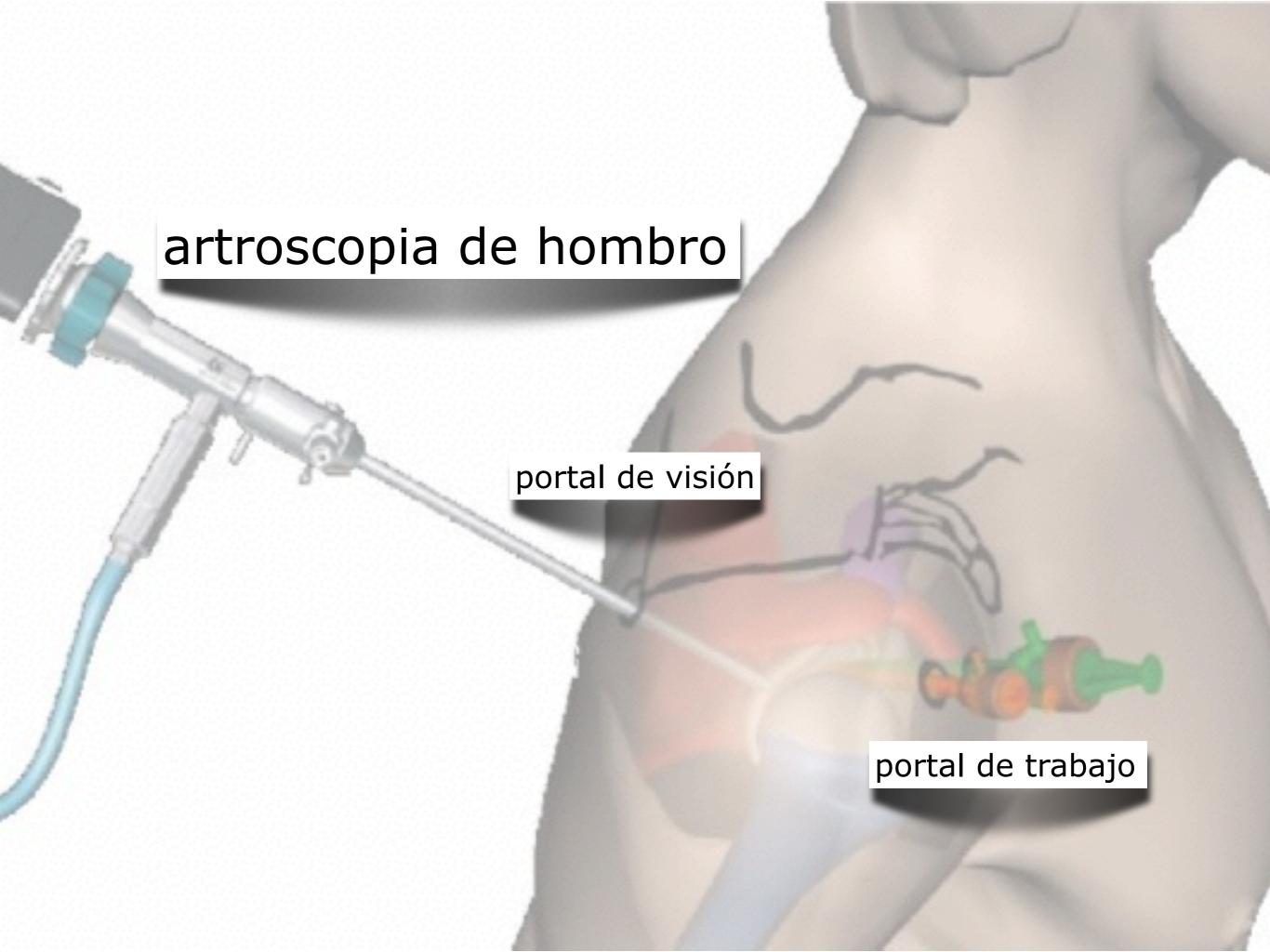
# The Safe Zone for Hip Arthroscopy: A Cadaveric Assessment of Central, Peripheral, and Lateral Compartment Portal Placement

William J. Robertson, M.D., and Bryan T. Kelly, M.D.

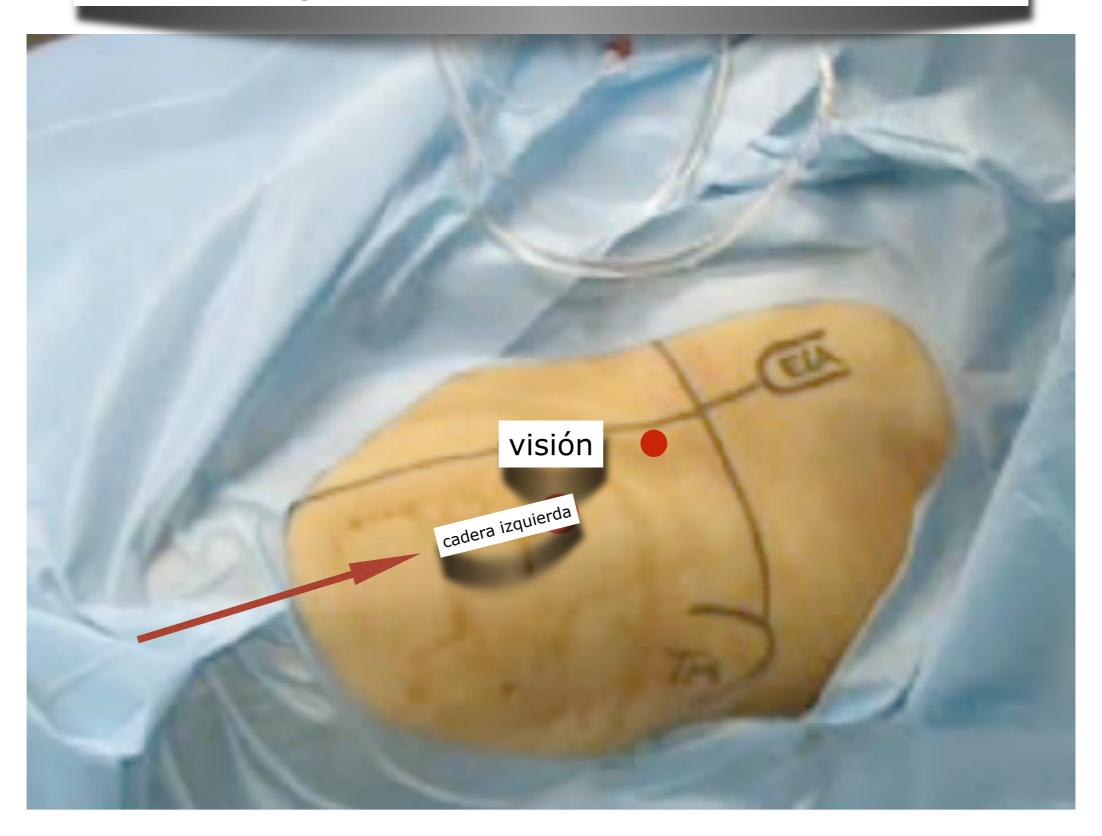
**Purpose:** This study evaluated 11 arthroscopic portals (4 central, 4 peripheral, and 3 peritrochanteric) with regard to their proximity to neurovascular structures and the extra-articular path taken before entering their intended compartments. **Methods:** We established 11 standard portals in 10 cadaveric hips, under arthroscopic and fluoroscopic visualization, using 3/16-inch Steinmann pins. Each hip was dissected, and the relation of the pins to the pertinent anatomy was recorded to the nearest 1 mm. Results: Only 2 of the 11 portals, the anterior and midanterior portals, came within 2 cm of a neurovascular structure before entering their respective compartments. The anterior portal placed the lateral femoral cutaneous nerve at risk, lying at a mean of 15.4 mm (range, 1 to 28 mm) away. The midanterior portal lies a mean of 19.2 mm (range, 5 to 42 mm) from the ascending branch of the lateral circumflex femoral artery. In addition, a small terminal branch of this artery courses a mean of 14.7 mm (range, 2 to 33 mm) and 10.1 mm (range, 1 to 23 mm) from the anterior portal and midanterior portal, respectively. **Conclusions:** This study showed that 11 arthroscopic portals can be safely inserted into the central, peripheral, and peritrochanteric compartments of the hip. The midanterior and anterior portals pass in close proximity to a small terminal branch of the ascending lateral circumflex femoral artery. The greatest risk still comes from the proximity of the anterior portal to the lateral femoral cutaneous nerve. However, a slightly more lateral location seems to provide substantial benefits. Clinical Relevance: This study investigated 11 arthroscopic hip portals inserted in a standardized fashion. This knowledge should help surgeons place the necessary portals both safely and accurately. Key Words: Hip-Arthroscopy-Portal-Safety-Lateral femoral cutaneous nerve-Nerve injury.

#### CONCLUSIONS

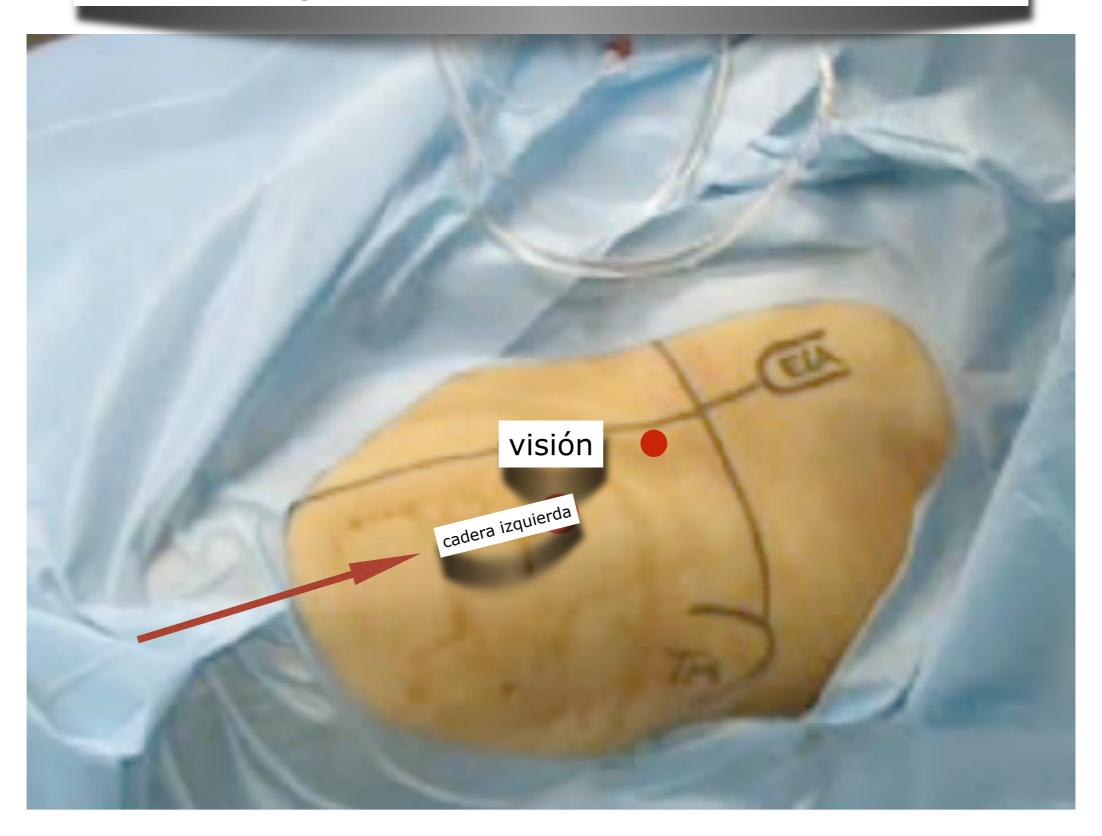
This study showed that during supine hip arthroscopy, 11 portals can be safely inserted to access the central, peripheral, and peritrochanteric compartments of the hip. The MAP and AP portal pass in close proximity to a small terminal branch of the ascending LCFA. The greatest risk still comes from the proximity of the AP portal to the LFCN. However, a slightly more lateral location seems to provide substantial benefits.

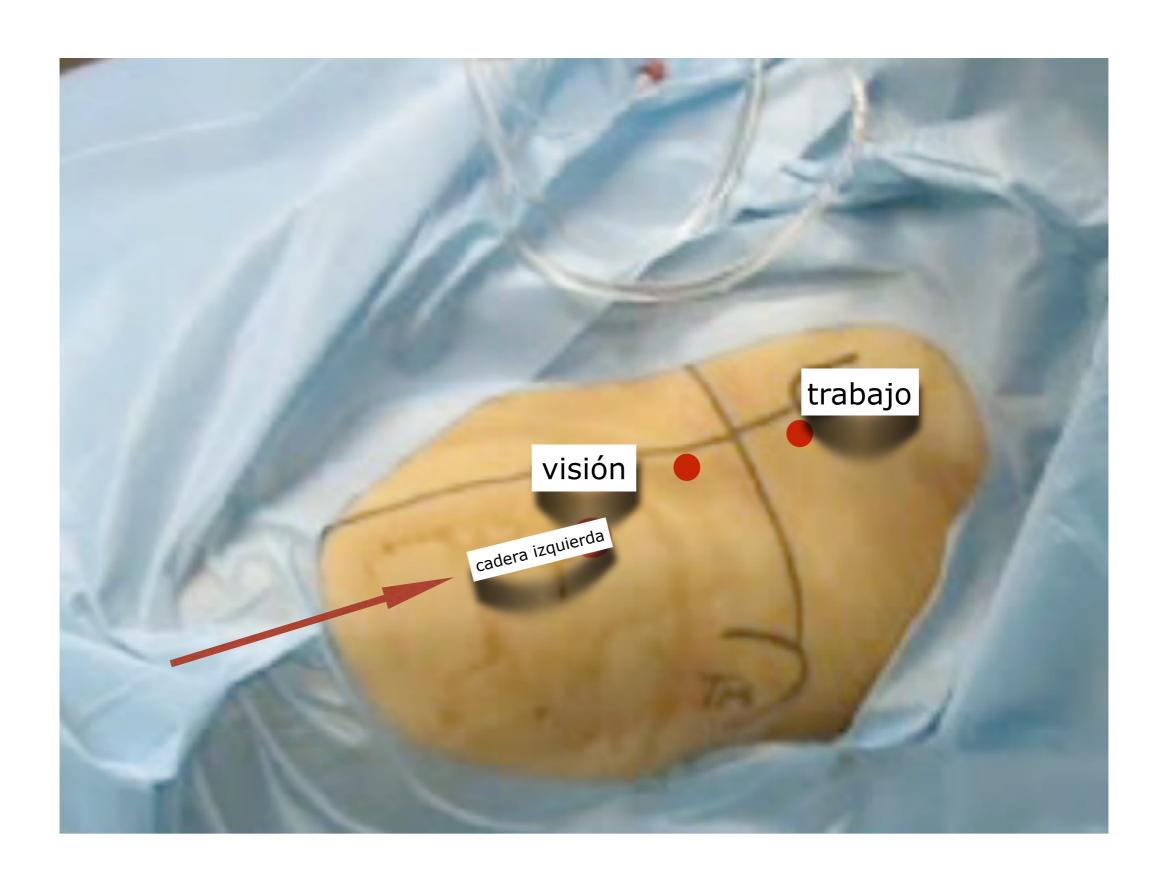


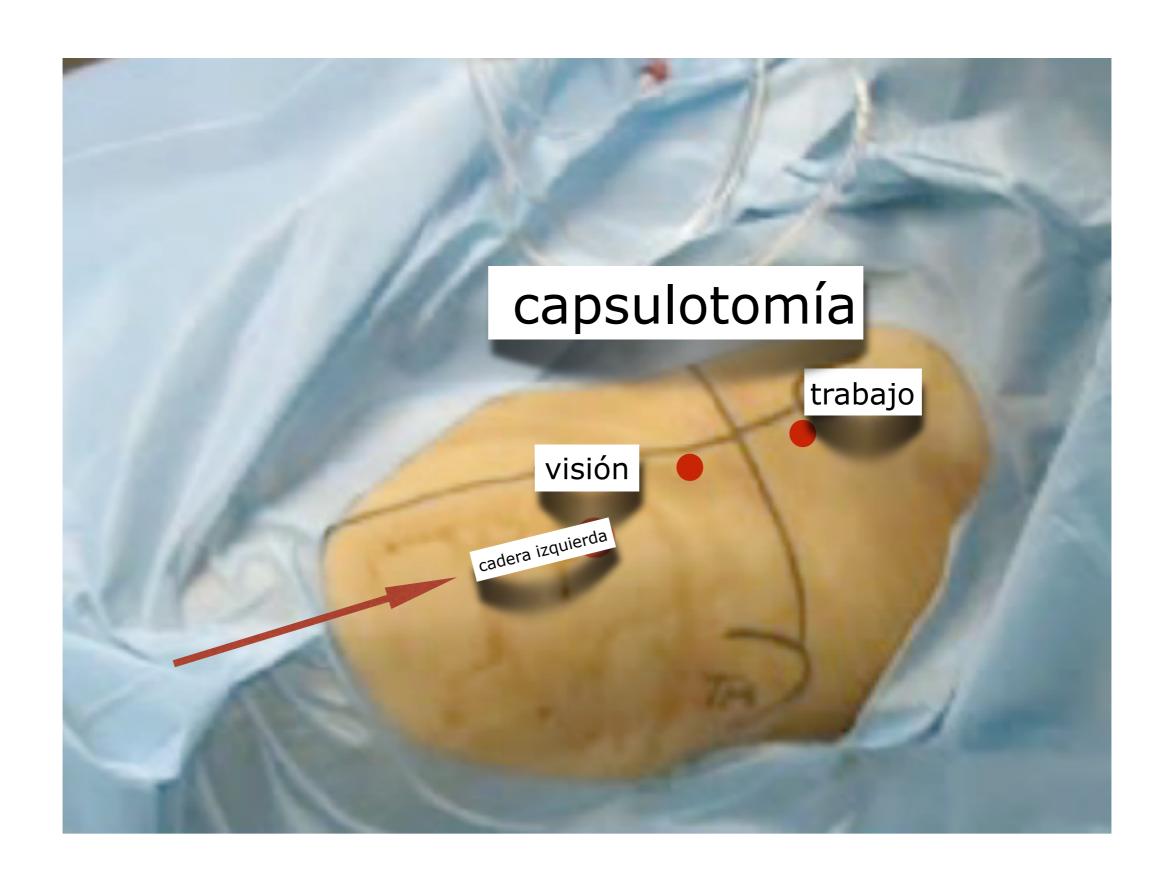
## artroscopia de cadera fuera-dentro

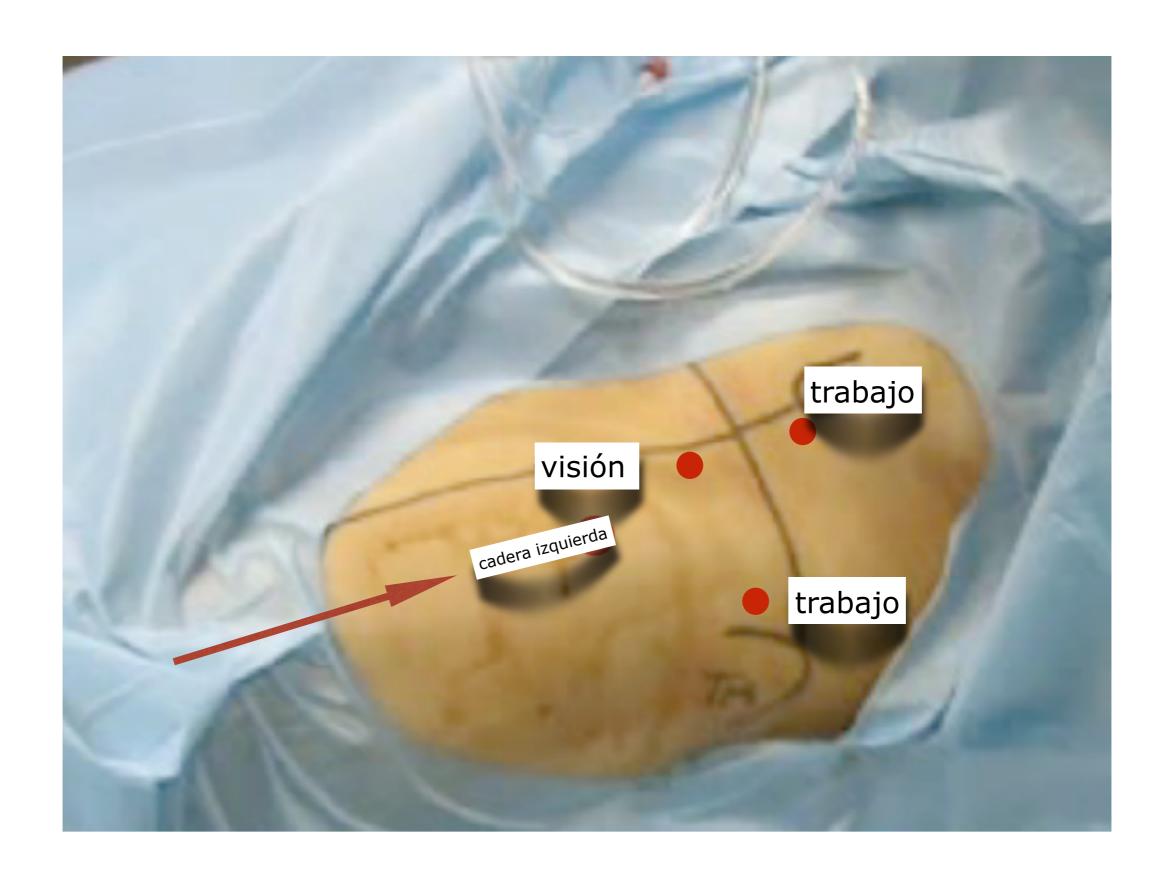


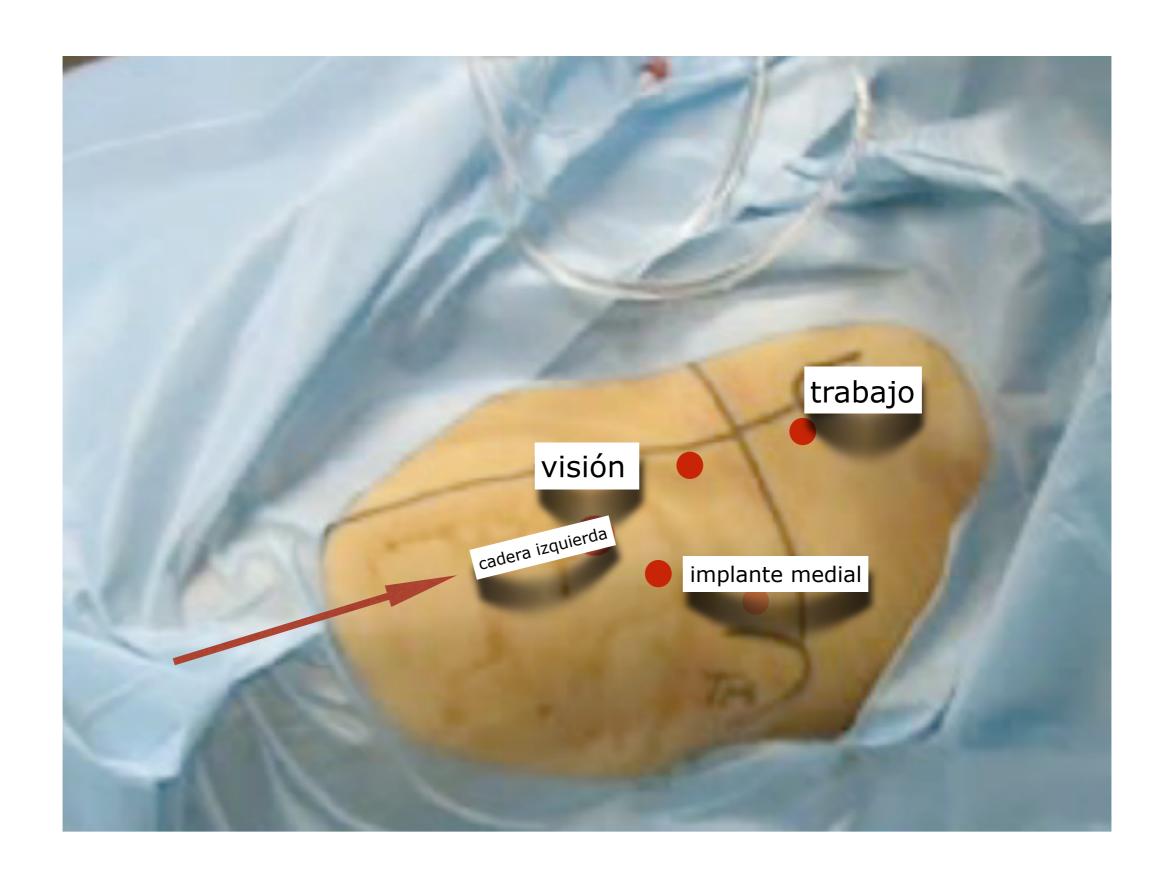
## artroscopia de cadera fuera-dentro

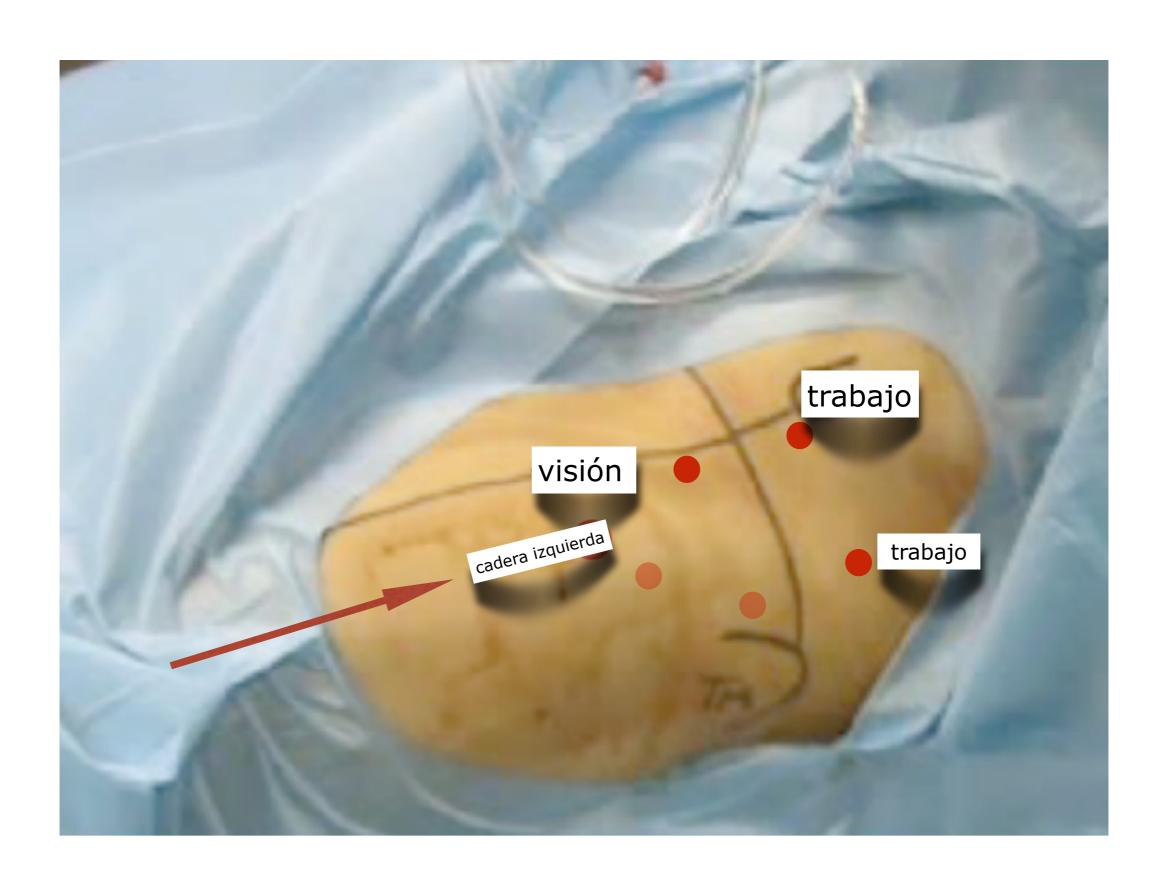


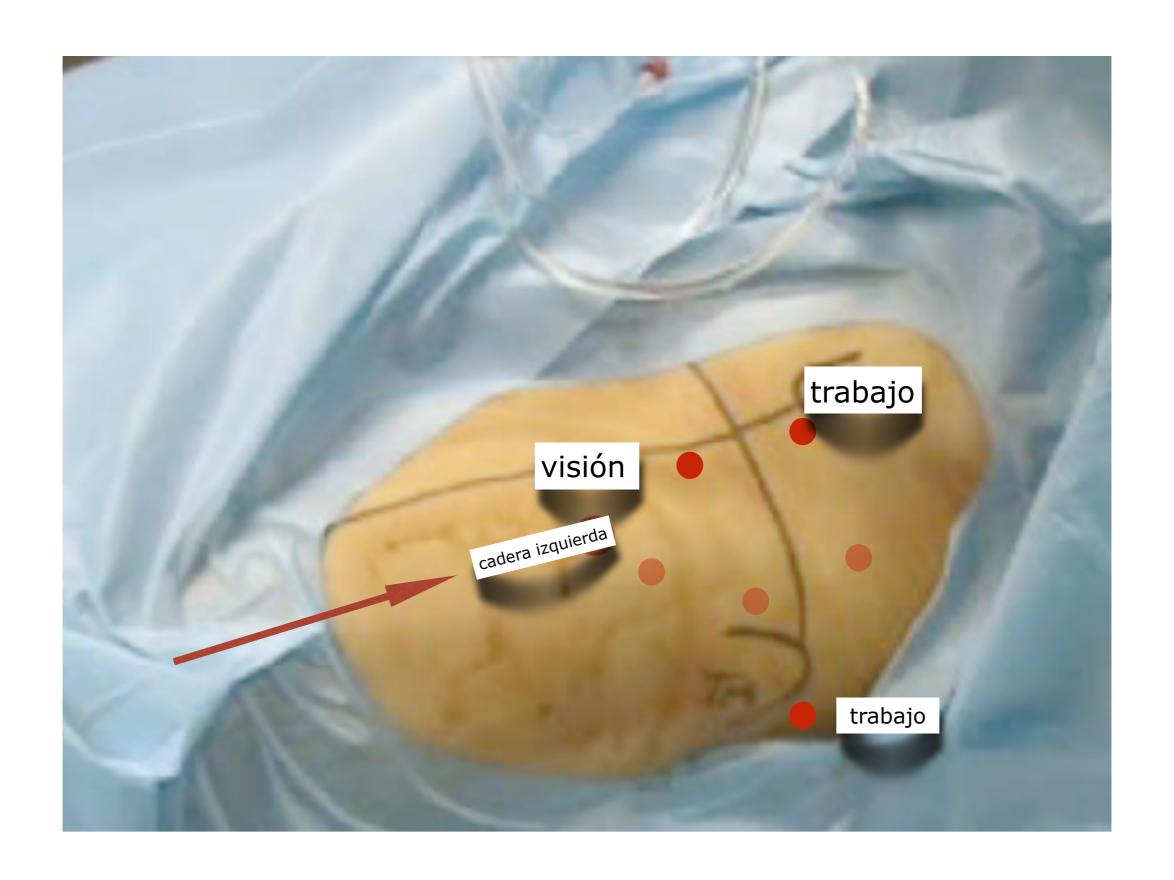










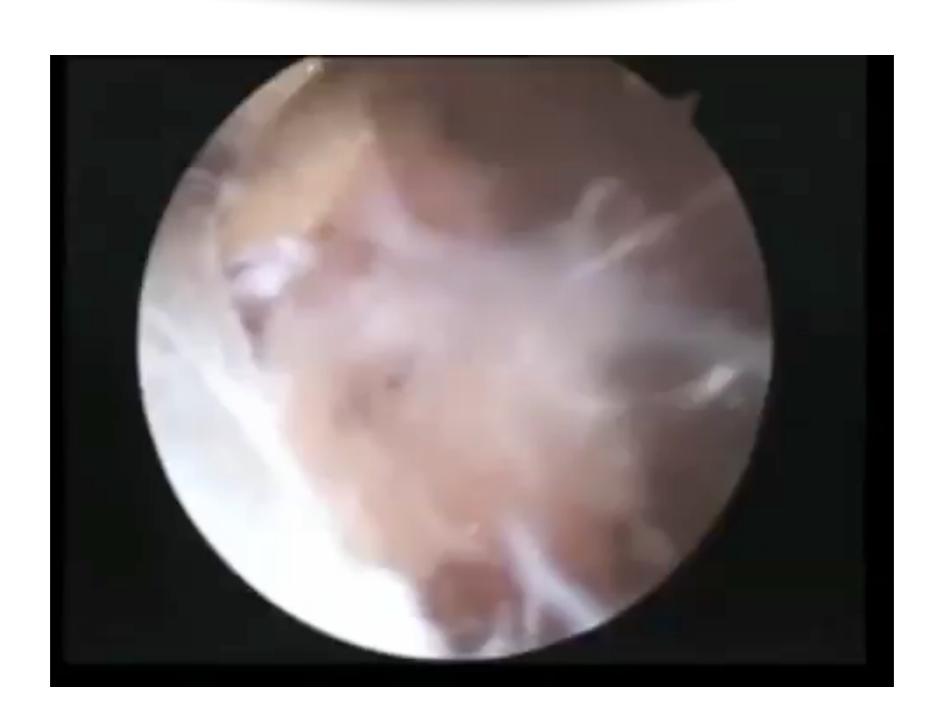


#### Abordajes artroscópicos en cadera:

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## acceso a espacio pericapsular



#### 2014

### New Findings in Hip Capsular Anatomy: Dimensions of Capsular Thickness and Pericapsular Contributions

Brian L. Walters, M.D., John H. Cooper, M.D., and José A. Rodriguez, M.D.

Purpose: The purpose of this investigation was to provide a detailed description of the anatomy of the hip capsule and pericapsular structures. Methods: Dissections were performed on 11 nonpaired, fresh-frozen cadaveric hips by 2 independent observers: 1 fellowship-trained orthopaedic total joint surgeon and 1 chief orthopaedic surgery resident. Documentation of capsular thickness, origins, insertions, and attachments to pericapsular structures including the abductors, rectus femoris, piriformis, short external rotators, and iliocapsularis muscles was performed. Tendinous insertions of the surrounding pericapsular muscles were measured according to size and distance from reproducible osseous landmarks. Results: The capsule is thickest near the acetabular origin at the posterosuperior and superior hemi-quadrants and is thinnest near the femoral insertion in the posterior and posteroinferior hemi-quadrants. The iliocapsularis, indirect head of the rectus, conjoint, obturator externus, and gluteus minimus tendons all show consistent capsular contributions, whereas the piriformis does not have a capsular attachment. Osseous landmarks for tendinous attachments are defined and illustrated. The inter-relation of these structures is complex, yet their relations to the anterior hip capsule and contributions to its thickness are predictable. Conclusions: The dynamic pericapsular structures pertinent to the hip arthroscopist include the iliocapsularis, gluteus minimus, and reflected head of the rectus femoris. At the acetabulum, the thickest region of the capsule is posterosuperior and superolateral. At the femoral insertion, the thickest region is anterior. Clinical Relevance: Knowledge of the intricate relation between the hip capsule and pericapsular structures presented here will be useful for surgeons as they perform the precise and specific capsular releases required during hip arthroscopy. Our anatomic findings contribute important qualitative data that build on the recent literature regarding the importance of capsular management during hip arthroscopy to postoperative hip stability.

A review of the literature shows that our understanding of the pericapsular anatomy and its contribution to hip stability is still evolving. It was not until the early 2000s that studies detailing the complex anatomy of the iliocapsularis, gluteus minimus, and medial femoral circumflex artery made essential contributions to our understanding of the pericapsular musculature and vascular anatomy.<sup>1-3</sup> These studies paved the way for later studies that have sought to more clearly define the relation between the dynamic

From the Center for Joint Preservation and Reconstruction, Lenox Hill Hospital (J.H.C., J.A.R.), New York, New York; and Andrews Sports Medicine & Orthopaedic Center (B.L.W.), Birmingham, Alabama, U.S.A.

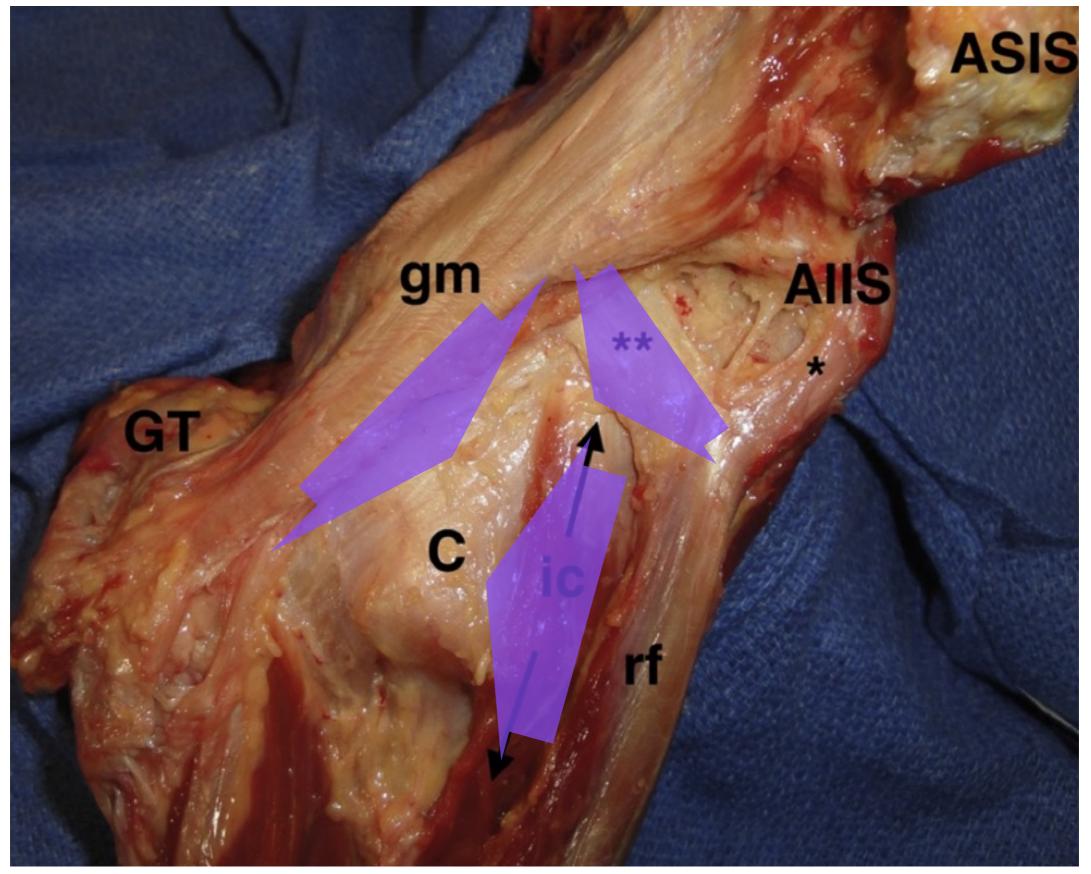
The authors report the following potential conflict of interest or source of funding: H.J.C. receives support from Smith & Nephew Orthopaedics. J.A.R. receives support from Smith & Nephew. Grant to pay for acquisition of cadaveric specimens. Smith & Nephew.

Received October 21, 2013; accepted May 16, 2014.

Address correspondence to Brian L. Walters, M.D., Andrews Sports Medicine & Orthopaedic Center, 805 St Vincent's Dr, Ste 100, Birmingham, AL 35205, U.S.A. E-mail: Brianwaltersmd@gmail.com

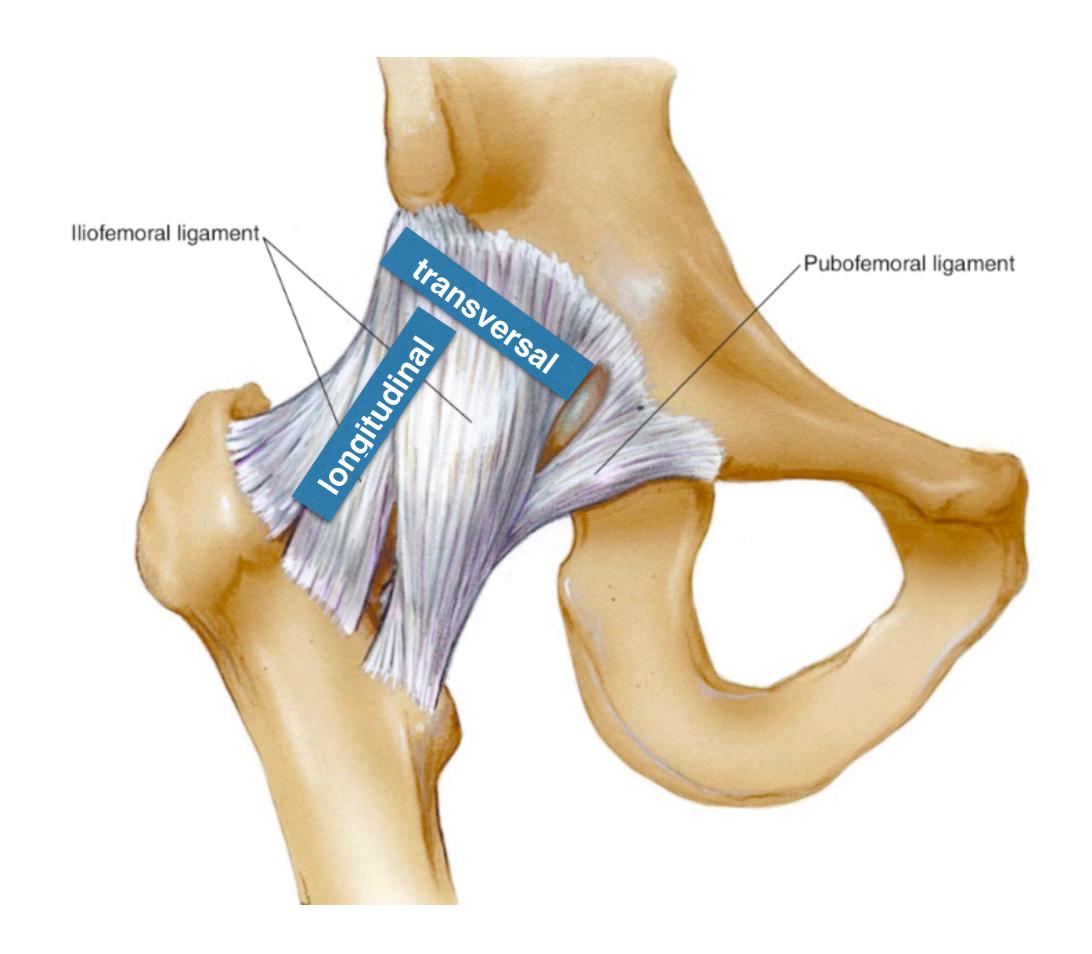
© 2014 by the Arthroscopy Association of North America 0749-8063/13747/\$36.00 http://dx.doi.org/10.1016/j.arthro.2014.05.012 and static contributions of the pericapsular anatomy and hip stability. 4-8 More recently, as hip arthroscopists have performed extensive capsular releases to address various pathologies in the peripheral compartment of the hip, there have been several case reports showing poor outcomes and complications related to post-operative hip instability. These case reports suggest that postoperative instability may be related to extensive capsulotomy without repair. Currently, research efforts are focused on determining the role the hip capsular ligaments and pericapsular musculature may play in hip stability and understanding how the preservation of their anatomy during hip arthroscopy may contribute to greater postoperative stability. 5-8,11

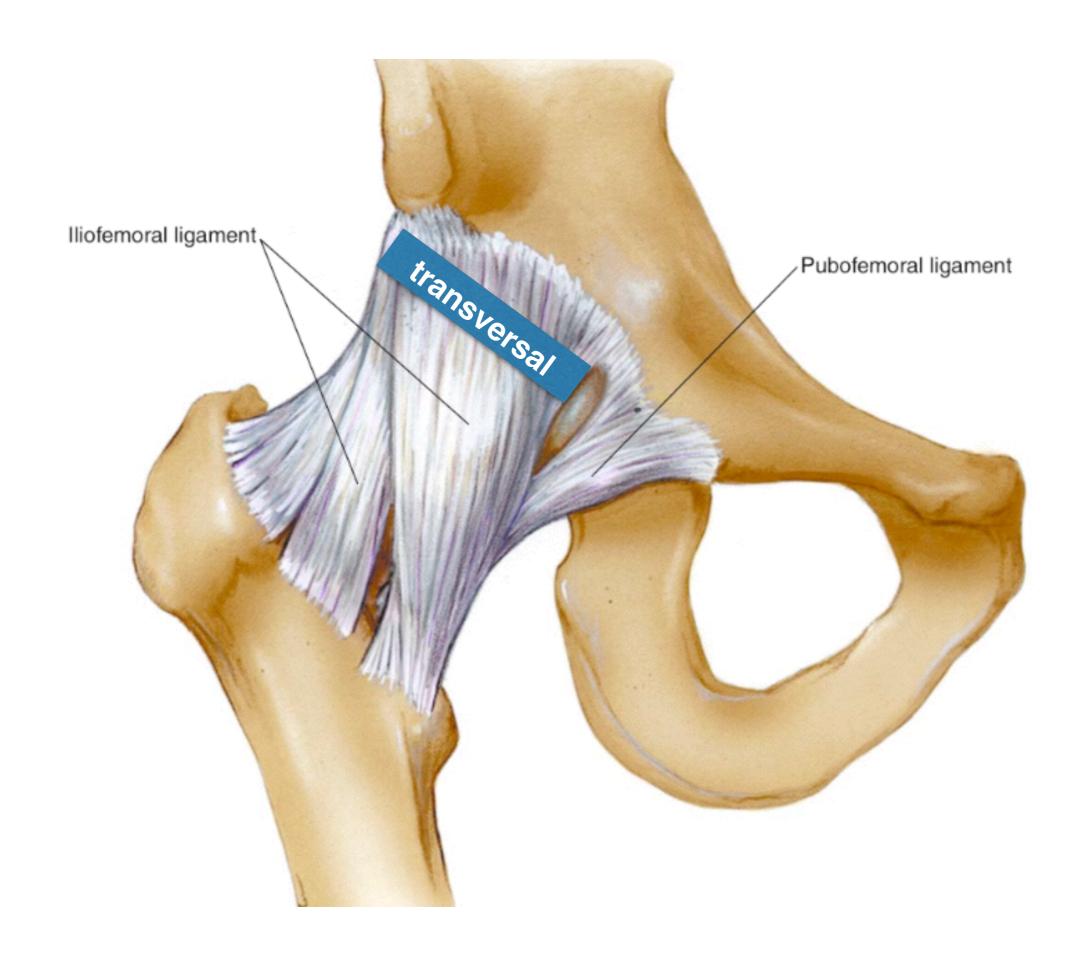
It is now clear that an accurate anatomic description of the hip capsule and pericapsular structures is necessary not only to allow surgeons to clearly understand the relations among these structures but also to facilitate analysis of their functional roles in hip stability through biomechanical studies. Correspondingly, the purpose of this study was to provide a detailed description of the anatomy of the hip capsule and pericapsular structures. We hypothesized that the anatomy of the hip capsule



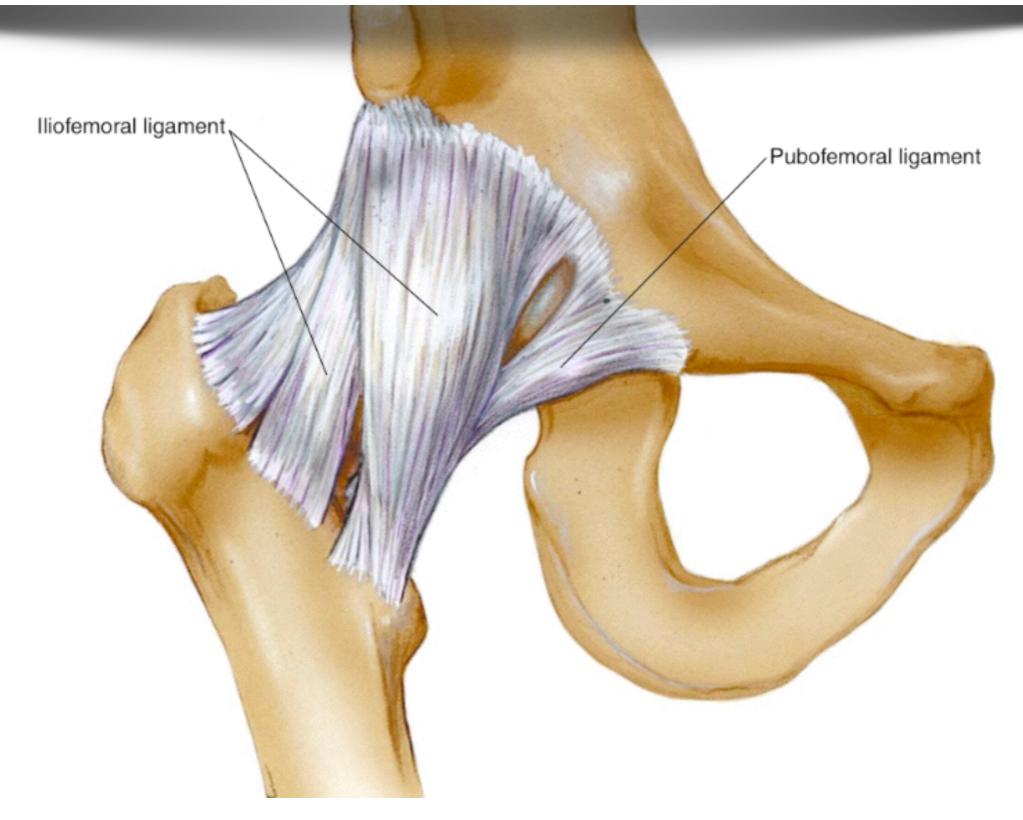
New findings in hip capsular anatomy: dimensions of capsular thickness and pericapsular contributions.

Walters BL, Cooper JH2, Rodriguez JA. Arthroscopy. 2014 Oct;30(10):1235-45.

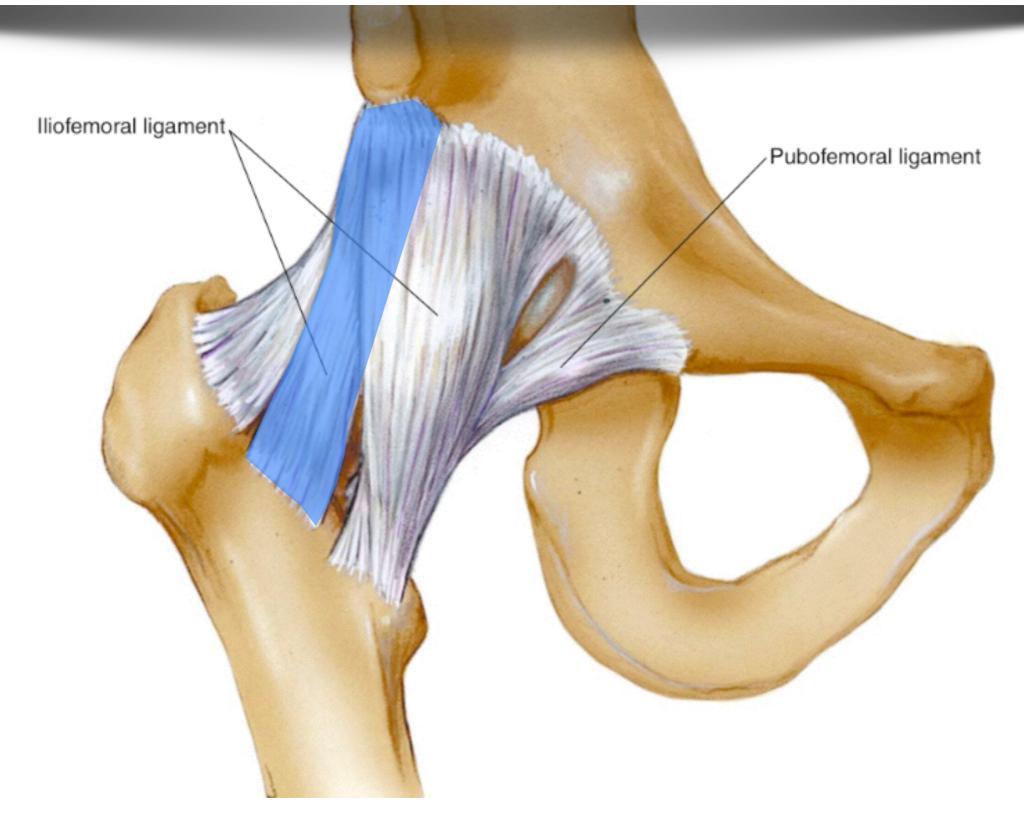




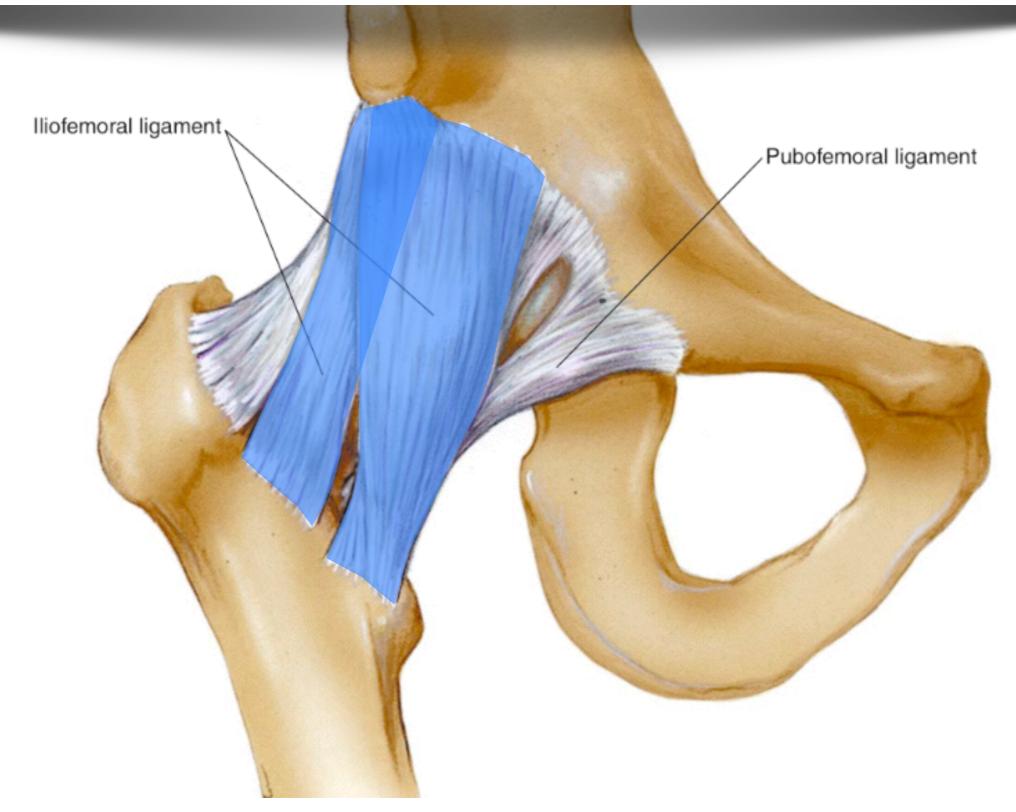
## ligamento ileofemoral



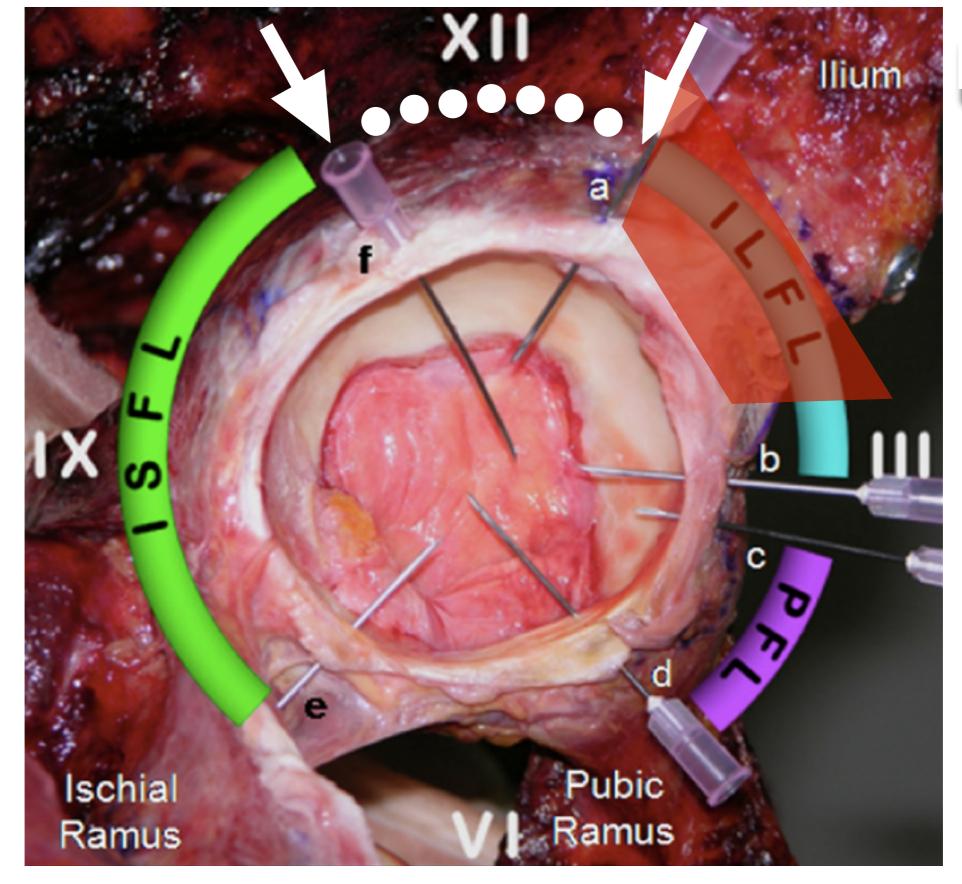
## ligamento ileofemoral



## ligamento ileofemoral

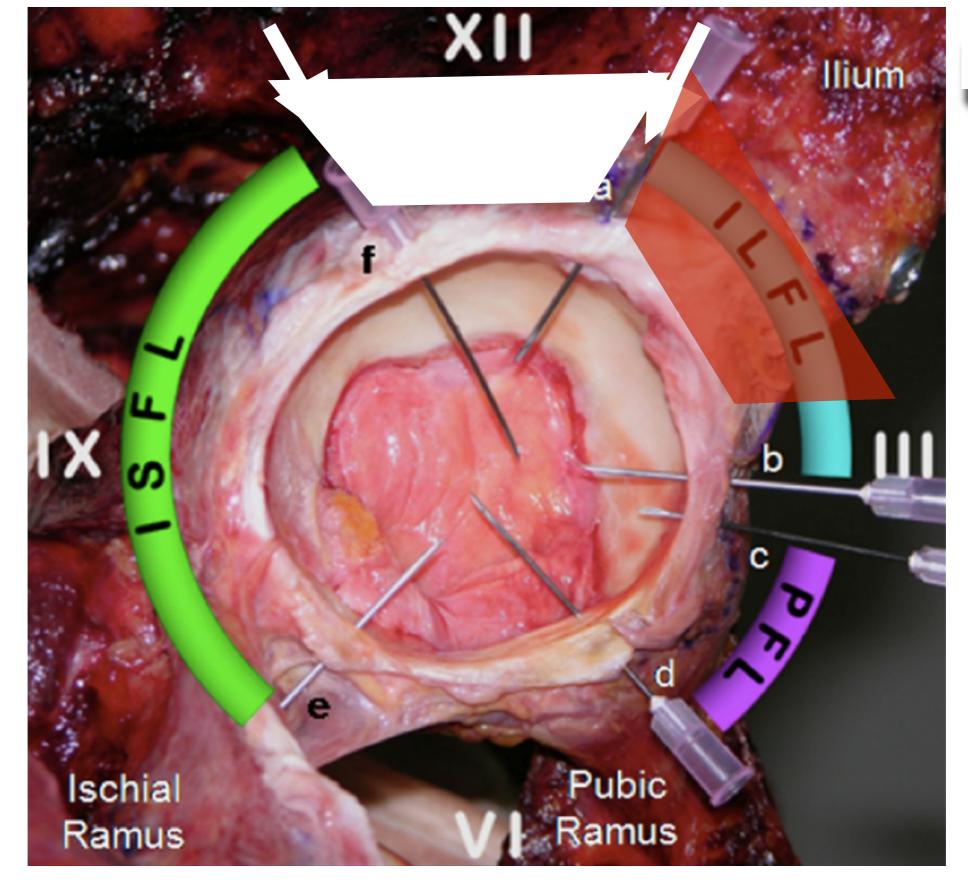






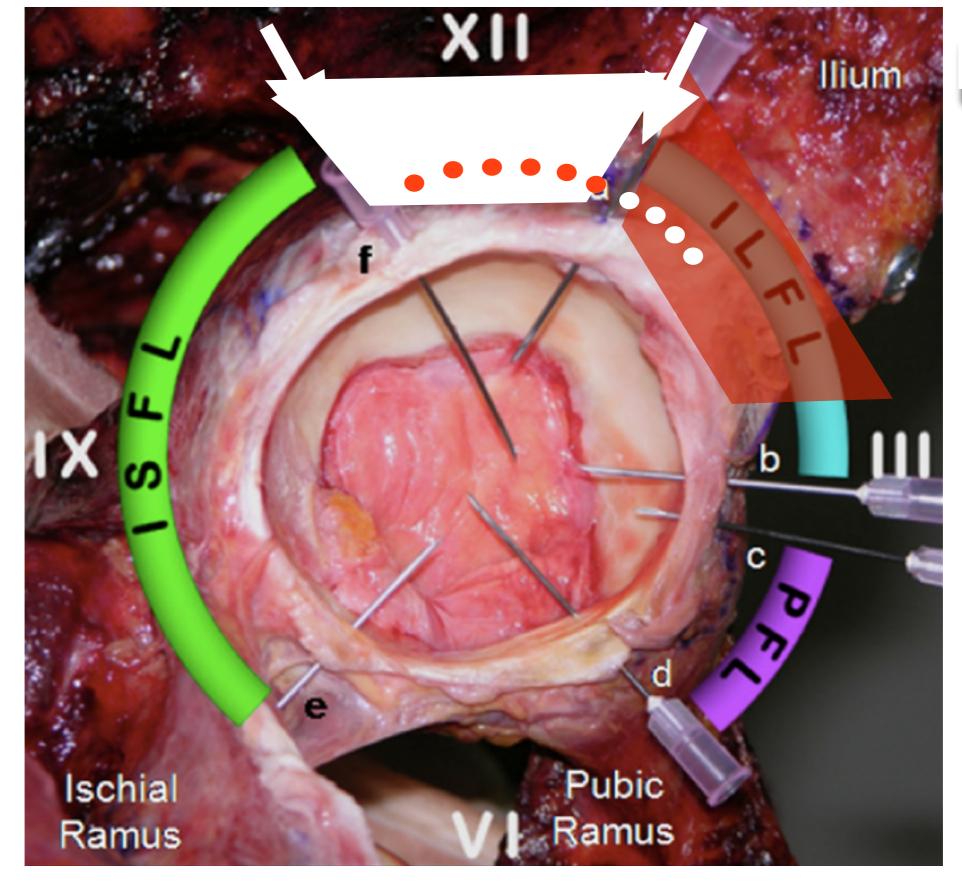
An anatomic arthroscopic description of the hip capsular ligaments for the hip arthroscopist. Telleria JJ, Lindsey DP, Giori NJ, Safran MR Arthroscopy. 2011 May;27(5):628-36.



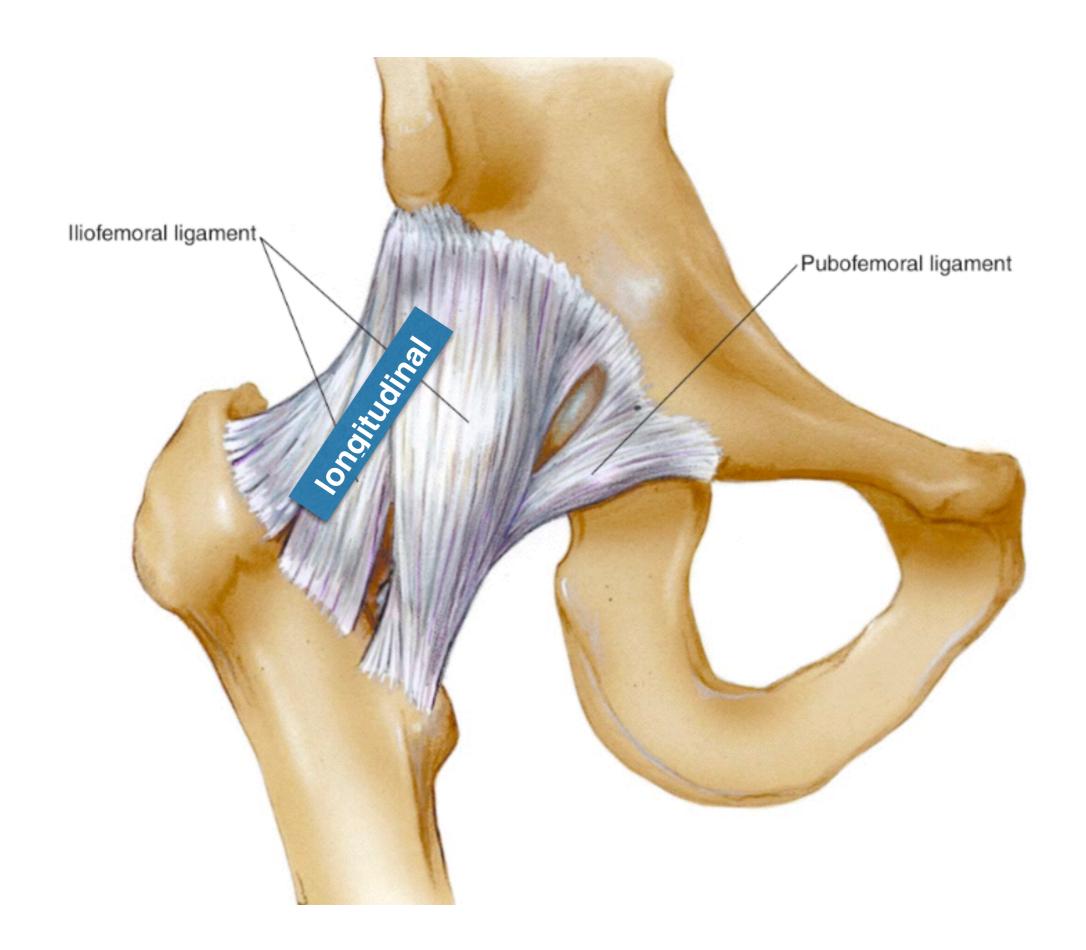


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An anatomic arthroscopic description of the hip capsular ligaments for the hip arthroscopist. Telleria JJ, Lindsey DP, Giori NJ, Safran MR Arthroscopy. 2011 May;27(5):628-36.



# The Proximal Hip Joint Capsule and the Zona Orbicularis Contribute to Hip Joint Stability in Distraction

Hiroshi Ito, 1 Yongnam Song, 2 Derek P. Lindsey, 2 Marc R. Safran, 3 Nicholas J. Giori<sup>2,3</sup>

<sup>1</sup>Department of Orthopaedic Surgery, Asahikawa Medical College, Midorigaoka Higashi 2-1-1-1, Asahikawa, 078-8510, Japan, <sup>2</sup>Veterans Affairs Palo Alto Health Care System, Palo Alto, California, <sup>3</sup>Department of Orthopaedic Surgery, Stanford University School of Medicine, Stanford, California

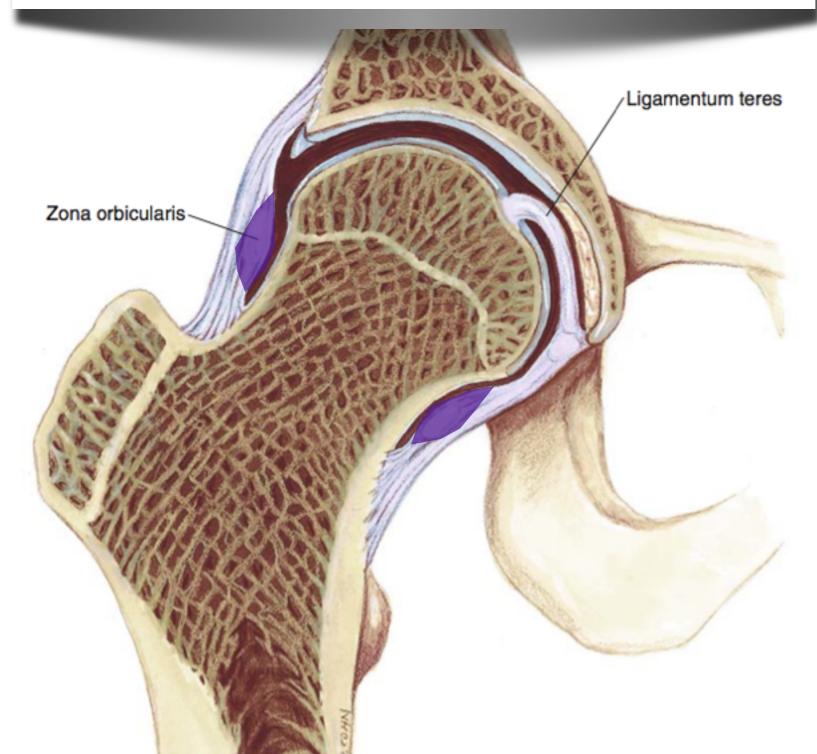
Received 29 May 2008; accepted 8 December 2008

Published online 15 January 2009 in Wiley InterScience (www.interscience.wiley.com). DOI 10.1002/jor.20852

ABSTRACT: The structure and function of the proximal hip joint capsule and the zona orbicularis are poorly understood. We hypothesized that the zona orbicularis is an important contributor to hip stability in distraction. In seven cadaveric hip specimens from seven male donors we distracted the femur from the acetabulum in a direction parallel to the femoral shaft with the hip in the neutral position. Eight sequential conditions were assessed: (1) intact specimen (muscle and skin removed), (2) capsule vented, (3) incised iliofemoral ligament, (4) circumferentially incised capsule, (5) partially resected capsule (distal to the zona orbicularis), (6) completely resected capsule, (7) radially incised labrum, and (8) completely resected labrum. The reduction of the distraction load was greatest between the partially resected capsule phase and completely resected capsule phase at 1, 3, and 5 mm joint distraction (p = 0.018). The proximal to middle part of the capsule, which includes the zona orbicularis, appears grossly and biomechanically to act as a locking ring wrapping around the neck of the femur and is a key structure for hip stability in distraction. © 2009 Orthopaedic Research Society. Published by Wiley Periodicals, Inc. J Orthop Res 27:989–995, 2009

Keywords: hip joint; stability; distraction force

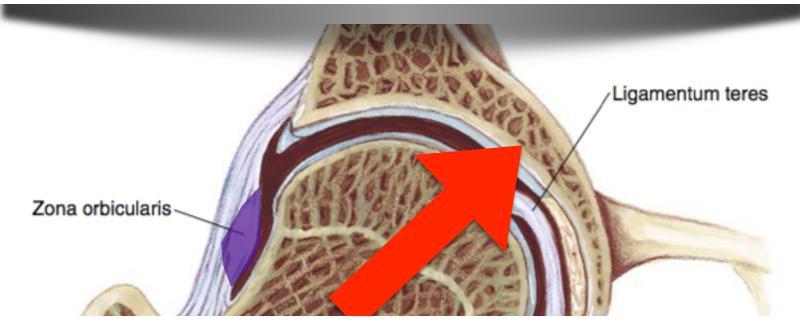
#### zona orbicularis



The proximal hip joint capsule and the zona orbicularis contribute to hip joint stability in distraction.

Ito, H., Song, Y., Lindsey, D.P. et al, J Orthop Res. 2009;27:989–995.

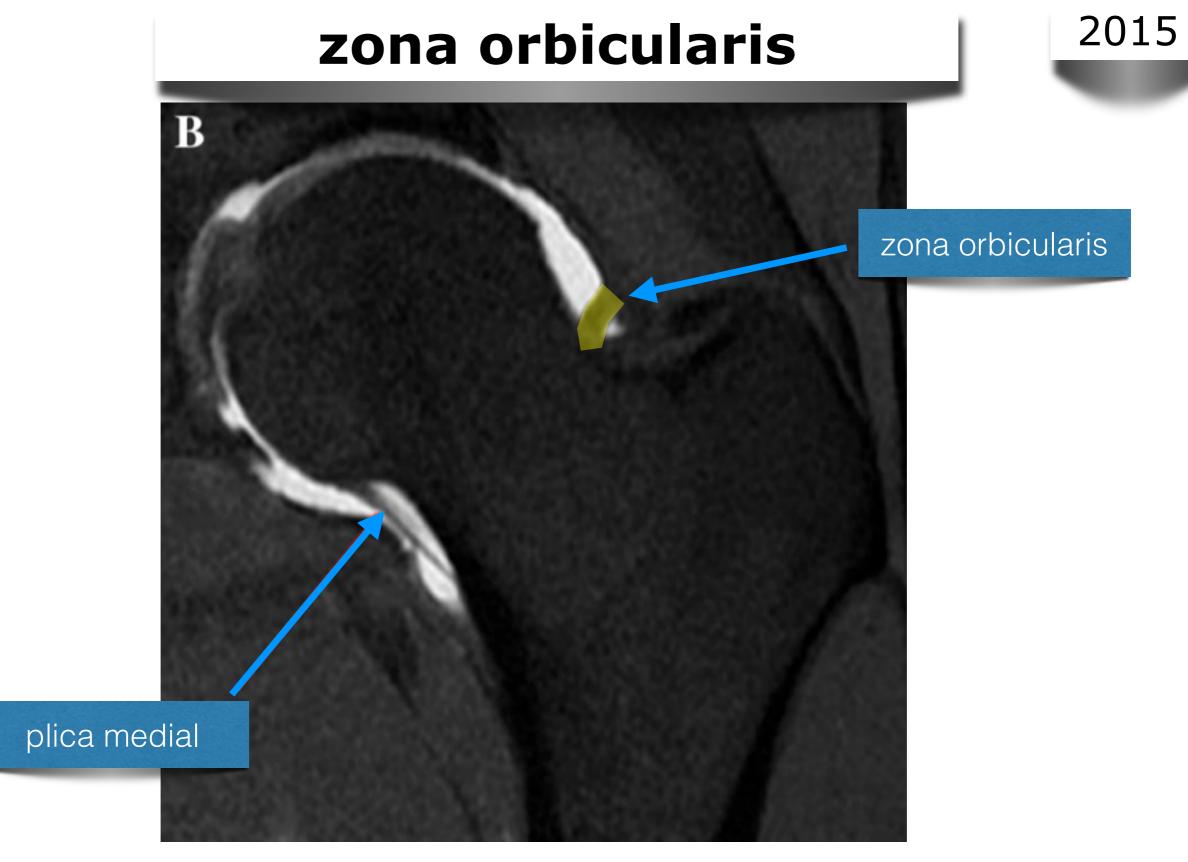
#### zona orbicularis



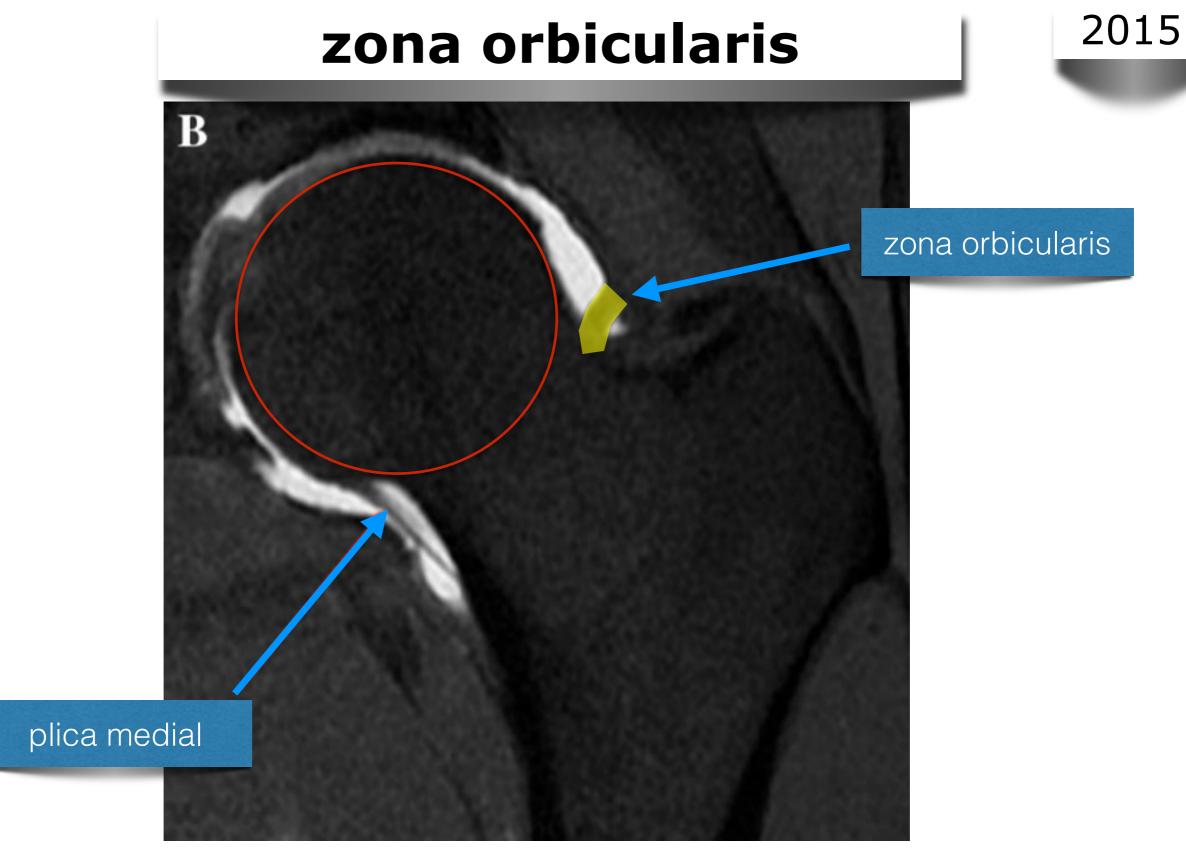
estabiliza frente a las fuerzas de distracción

The proximal hip joint capsule and the zona orbicularis contribute to hip joint stability in distraction.

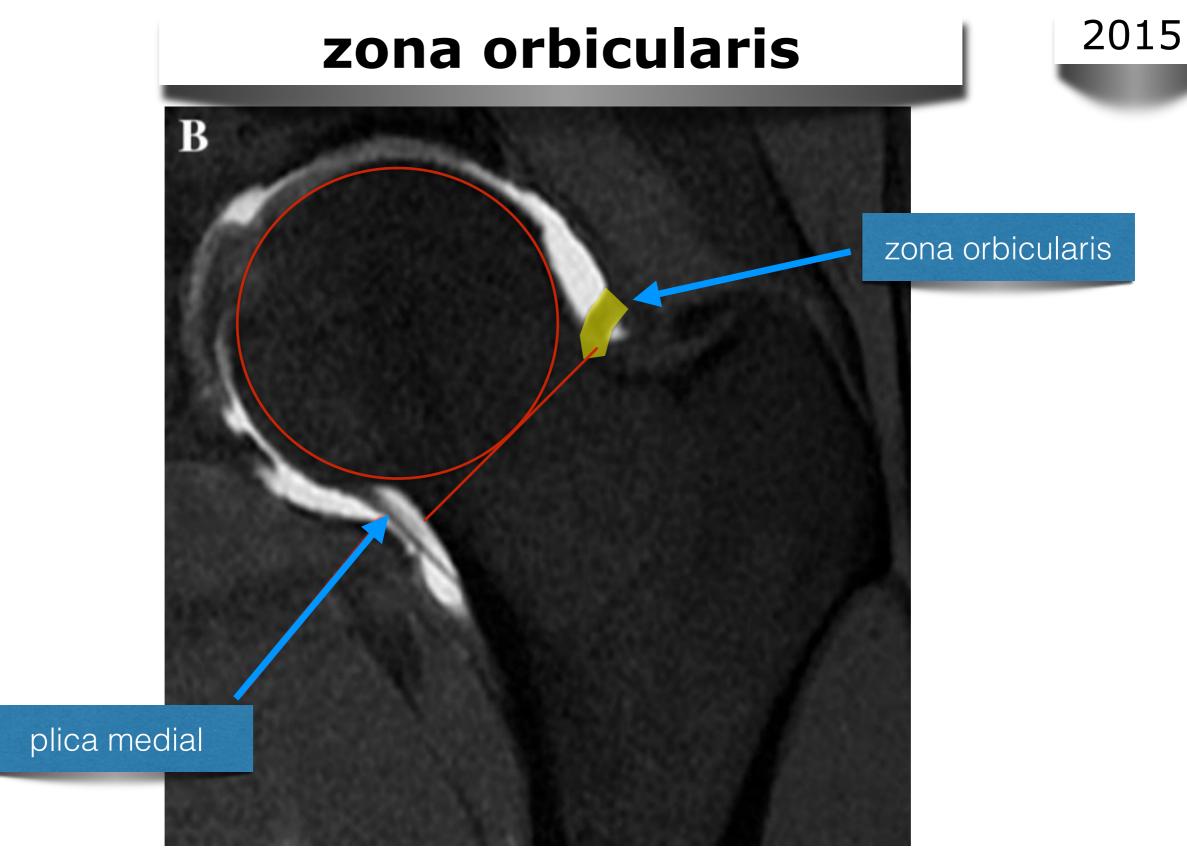
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Anatomy of the zona orbicularis of the hip: a magnetic resonance study. Malagelada F, Tayar R, Barke S, Stafford G, Field RE. Surg Radiol Anat (2015) 37:11–18



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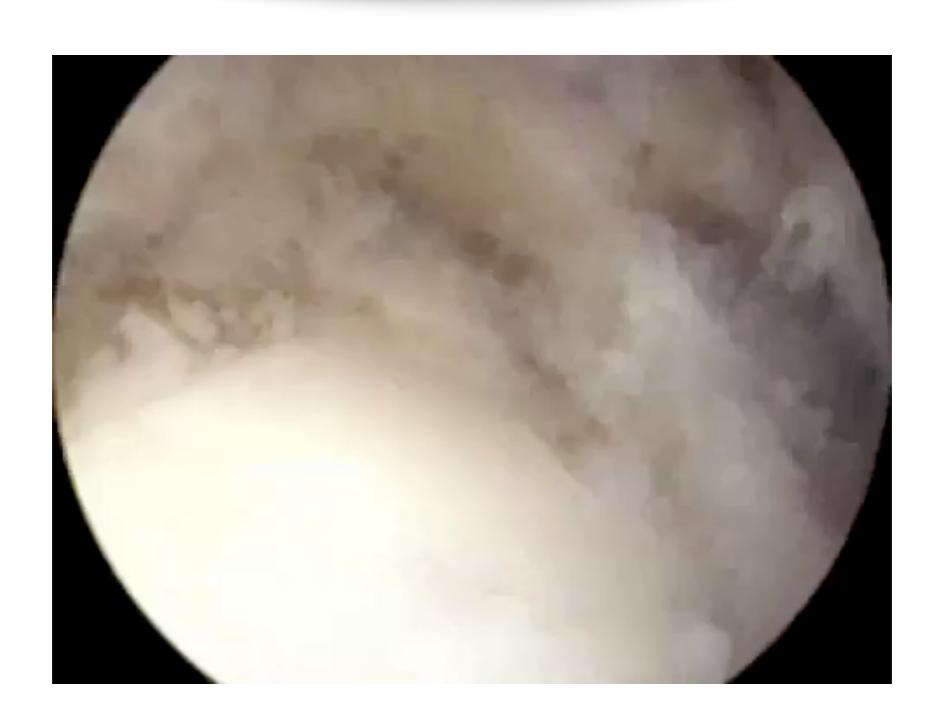


Anatomy of the zona orbicularis of the hip: a magnetic resonance study. Malagelada F, Tayar R, Barke S, Stafford G, Field RE. Surg Radiol Anat (2015) 37:11–18

## inicio de capsulotomía



## atisbamiento del labrum



# ¿la capsulotomía inestabiliza?

#### 2003

Hip arthroscopy: complications in 1054 cases.

Clarke MT, Villar RN. Clin Orthop Relat Res. 2003;406:84–88. 1054

2005

Complications of hip arthroscopy.

Sampson TG. Techniques in Orthopedics. 2005;20:63–66.

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Complications associated with hip arthroscopy.

Byrd JWT.

In: Byrd JWT, ed. Operative Hip Arthroscopy. New York: Thieme; 1998:171–176.

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# puede que no mucho

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# instability



## ARTHROSCOPIC TREATMENT OF FEMOROACETABULAR IMPINGEMENT

Thomas G. Sampson, MD

emoroacetabular impingement (FAI) is caused by conflicts among the femoral head-neck junction, the peripheral acetabulum, and the acetabular rim. Two types of FAI have been identified: cam and pincer.

Cam FAI is an out-of-spherical head, caused by a bone metaplastic overgrowth at the head-neck junction, that damages the articular cartilage from overload and shear as it rotates into the socket. The result is a spectrum of degenerative changes in the labrum and in acetabular internal rotation. Patients often complain of positional intermittent pain, sitting intolerance, or a painful pop in the hip. Limping is rare in early stages.

The hip examination may reveal full ROM, except for a reduction in internal rotation caused by bony anterior abutment. A positive impingement test is pain reported when the hip is flexed and internally rotated. Logrolling of the leg may not hurt, and a straight leg raised against resistance often is pain-free.

## The capsulotomy in most cases may be left open, but in patients with laxity or dysplasia the capsule should be reapproximated with side-to-side sutures.

tion, recreating a spherical head in cam FAI. Trimming of an acetabular rim osteophyte with either removal or refixation of the labrum was later described as a treatment for pincer FAI. An arthroscopic equivalent to the open treatment has become popular as a less invasive technique with less morbidity and faster recovery. 36

FAI affects men and women equally, begins in the second or third decade of life, and progresses slowly. Conservative management involves avoiding activities that aggravate the pain. In some cases, surgery may be the only alternative for relief.

Indications (examination and imaging may show subtle abnormalities)

Ideal candidates for arthroscopic treatment are young patients without evidence of arthritis. They may experience insidious onset of anterior groin pain or have an injury. Often, FAI is thought to be a groin sprain that never resolved. Some may confuse it with an inguinal hernia or sports hernia. Pain, which may present in other locations about the hip, is aggravated with hip flexion and supine approach)

The procedure can be performed with the lateral approach or the supine approach.

In the lateral approach, the patient is positioned in the lateral decubitus position, and care is taken to pad downside bony prominences and place an axillary roll. 9-11 Anterior and posterior hip positioners are placed much as in total hip surgery, and care is taken to maintain a clear view for the fluoroscopic C-arm, which is placed under the table. The operative leg is held in slight forward flexion



Dr. Sampson is Director of Hip Arthroscopy, Post Street Surgery Center, and Medical Director, Total Joint Center, Saint Francis Memorial Hospital, San Francisco, California.

Address correspondence to: Thomas G. Sampson, MD, 2299 Post St, Suite 107, San Francisco, CA 94115.

Am J Orthop. 2008;37(12):608-612. Copyright Quadrant HealthCom Inc. 2008. All rights reserved.

#### Role of the Acetabular Labrum and the lliofemoral Ligament in Hip Stability

#### An In Vitro Biplane Fluoroscopy Study

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Background: Recent biomechanical reports have described the function of the acetabular labrum and iliofemoral ligament in providing hip stability, but the relative stability provided by each structure has not been well described.

Hypothesis: Both the iliofemoral ligament and acetabular labrum are important for hip stability by limiting external rotation and anterior translation, with increased stability provided by the iliofemoral ligament compared with the acetabular labrum.

Study Design: Controlled laboratory study.

Methods: Fifteen fresh-frozen male cadaveric hips were utilized for this study. Each specimen was selectively skeletonized down to the hip capsule. Four tantalum beads were embedded into each femur and pelvis to accurately measure hip translations and rotations using biplane fluoroscopy while either a standardized 5 N·m external or internal rotation torque was applied. The hips were tested in 4 hip flexion angles (10° of extension, neutral, and 10° and 40° of flexion) in the intact state and then by sectioning and later repairing the acetabular labrum and iliofemoral ligament in a randomized order.

Results: External rotation significantly increased from the intact condition  $(41.5^{\circ} \pm 7.4^{\circ})$  to the sectioned iliofemoral ligament condition  $(54.4^{\circ} \pm 6.6^{\circ})$  and both-sectioned condition  $(61.5^{\circ} \pm 5.7^{\circ}; P < .01)$ , but there was no significant increase in external rotation when the labrum alone was sectioned  $(45.6^{\circ} \pm 5.9^{\circ})$ . The intact and fully repaired conditions were not significantly different. External rotation and internal rotation significantly decreased when the hip flexion angle decreased from  $40^{\circ}$  of flexion to  $10^{\circ}$  of extension (P < .01) regardless of sectioned condition. Anterior translation varied significantly across sectioned conditions but not across flexion angles (P < .001). The ligament-sectioned  $(1.4 \pm 0.5 \text{ mm})$ , both-sectioned  $(2.2 \pm 0.2 \text{ mm})$ , and labrum-repaired  $(1.1 \pm 0.2 \text{ mm})$  conditions all resulted in significantly greater anterior translation than the intact condition  $(-0.4 \pm 0.1 \text{ mm})$  (P < .001).

Conclusion: The iliofemoral ligament had a significant role in limiting external rotation and anterior translation of the femur, while the acetabular labrum provided a secondary stabilizing role for these motions.

Clinical Relevance: These results suggest that, if injured, both the acetabular labrum and iliofemoral ligament should be surgically repaired to restore native hip rotation and translation. In addition, a careful repair of an arthroscopic capsulotomy should be performed to avoid increased external hip rotation and anterior translation after arthroscopy.

Keywords: iliofemoral ligament; acetabular labrum; hip stability; capsulotomy; hip biomechanics

Hip instability has gained interest in recent years as a cause of pain and disability in the athletic population. The healthy human hip is an inherently stable joint primarily because of the bony congruence between the femoral head and acetabulum. However, the unique soft tissue anatomy surrounding the hip joint is also important in maintaining hip stability, particularly in the presence of hip injury or lesions. The iliofemoral ligament is the strongest of the 3

external rotation of the hip. <sup>13,16,18</sup> Additionally, the acetabular labrum is a fibrocartilage ring that attaches to the near-circular outer rim of the acetabulum and limits femoral head translation by deepening the hip socket and maintaining negative intra-articular pressure. <sup>8,11,12</sup> Athletes who participate in sports causing repetitive

capsular ligaments and functions to restrict extension and

Athletes who participate in sports causing repetitive twisting and pivoting of the hip frequently suffer from a combination of anterior labral tears, elongation of the iliofemoral ligament, and hip microinstability. Loads as high as 5 times body weight have been reported in the hip during running, with potentially greater loads present during more dynamic movements. Additionally,

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no reparadas<sup>20–22</sup>. Se ha comprobado también la mayor importancia de su reparación en los casos de displasia, ya que existe un mayor riesgo de subluxación que puede conducir a un proceso de coxartrosis precoz<sup>5,22</sup>. En otro estudio realizado con resonancia magnética a pacientes operados de cadera mediante artroscopia se describió un defecto capsular persistente en un 78% de los mismos<sup>21</sup>. Varias son las publicaciones sobre técnicas de cierre capsular<sup>10,14–16,23</sup>, pero existen aún pocos estudios clínicos que nos reafirmen en la conveniencia de proceder a su cierre en todos los casos<sup>9,13</sup>. Los fracasos capsulares descritos suponen una dehiscencia del trazo transverso de la capsulotomía<sup>21</sup>; el trazo vertical, al realizarse en la dirección de las fibras del LIF cicatriza más fácilmente. De

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### bibliografía comentada

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#### Evidence of capsular defect following hip arthroscopy

Frank McCormick · William Slikker III · Joshua D. Harris · Anil K. Gupta · Geoffrey D. Abrams · Jonathan Frank · Bernard R. Bach Jr · Shane J. Nho

#### Abstract

Purpose The purpose of this study is to identify the incidence of capsular defects in patients undergoing revision hip arthroscopy.

Methods A radiographic and anatomical analysis of MR arthrograms of patients undergoing revision arthroscopy was performed to assess for the presence of capsular defect. Intra-operative images and findings were reviewed. Patients with persistent cam and pincer lesions were excluded.

Results From October 2011 to October 2012, 25 patients underwent revision hip arthroscopy surgery, and 9 patients met our inclusion criteria. Within this series, all patients had post-surgical capsular irregularities and seven patients (78 %) had radiographic evidence of capsule and iliofemoral defects on MR arthrogram. Gross capsular defects were confirmed at revision surgery in two patients.

Conclusion The findings of this study demonstrate postsurgical radiographic and anatomical evidence of capsular defects in a select group of patients following hip arthroscopy.

Level of evidence IV.

#### Results

Of the 342 hip arthroscopies performed from October 2011 to October 2012, 25 were revision cases. Sixteen of the 25 revision cases were due to residual osseous impingement and, therefore, excluded from the study. Nine of these 25 cases did not have evidence of residual FAI based on alpha and centre-edge angle measurements, and an MRA was obtained before undergoing revision surgery. All nine patients that underwent revision hip arthroscopy had an abnormal hip capsule. When the MRA from these patients was evaluated, seven (78 %) were found to have a capsular defect in the coronal, axial plane, or both (Fig. 1).

#### De 342 ATK de cadera: 25 revisiones



9/25: no FAI residual

#### Evidence of capsular defect following hip arthroscopy.

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#### Results

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#### De 342 ATK de cadera: 25 revisiones

N: 9

i78% de 9!

#### Abordajes artroscópicos en cadera:

#### abordaje extrarticular (fuera-dentro)

- fundamentos
- posición
- portales
- capsulotomía
- tiempos quirúrgicos

# Tiempos quirúrgicos:

- tiempo pélvico: inicio de tracción



# Tiempos quirúrgicos:

tiempo pélvico

tiempo femoral





# gracias por su atención

# eskerrik asko zure arreagatik



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Bilbao





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Bilbao