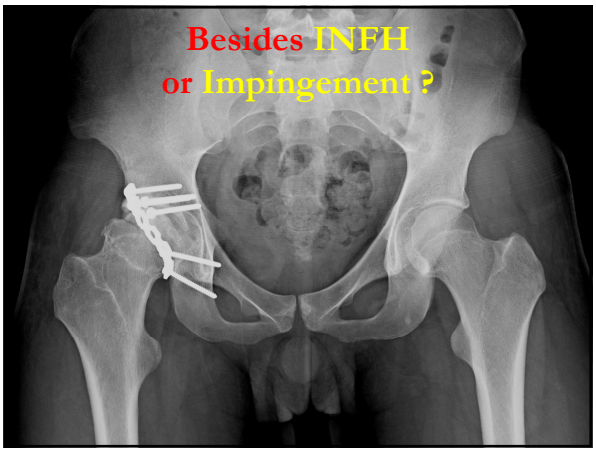
中華民國骨科醫學會
106年度第72次春季聯合學術研討會

Bony Abnormality in PostTraumatic Hip joint dislocation : Preoperation Morphologic Mapping by 3D-CT relative to Dynamic Test in Hip Arthroscopy Procedure

鄭國中 醫師
K. C. Cheng MD.
國軍桃園總醫院 骨科部
Department of Orthopedic Surgery
Army Force Taoyuan General Hospital

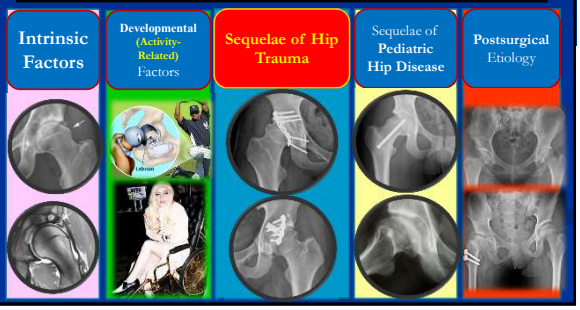
Besides INFH or Impingement ?



[Orthopaedic Surgery]

The Etiology of Femoroacetabular Impingement: What We Know and What We Don't

Harman Chaudhry, MD,† and Olufemi R. Ayeni, MD, MSc, FRCSC†*



Post Traumatic Hip Dislocation

- Osteonecrosis : occur in 10% to 34% of hip dislocations.
- Coxathrrosis after hip dislocation :
  - ➢24% for simple dislocations.
  - ➢88% for with acetabular fractures.

- Foulk DM, Mullis BH. J Am Acad Orthop Surg 2010;18:199-209.
- Philippon MJ, Kuppersmith DA, Wolff AB, Briggs KK. Arthroscopy. 2009;25:169-174.

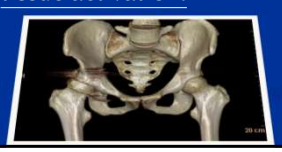
➢**Morphological abnormalities are the main risk factor.**

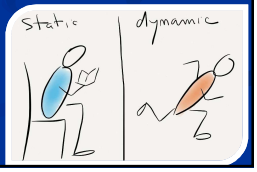
Role of PreOP Mapping for Hip arthroscopic Osetoplasty

Inability to assess the **presence**, **location**, and **severity of impingement** would be hampered the surgeon's planning.

3D CT mapping for Bony Structure

- **Helps in diagnosis** of the problem by visualisation and subsequent planning for surgical resection.
- **Static 3D** reconstruction **could not providing** of visualizing the impingement problem like in **Physical Examination.**
- *Fail to analyze* Dynamic condition *with* Soft tissue activation.





Purpose of Study

- Hip arthroscopy treatment **symptomatic** Post Hip Dislocation Traumatic FAI.
- 3D CT mapping : Static condition be into pre-OP evaluation.
- Dynamic Check during the osteoplasty.

- Evaluate preOP and postOP **hip joint motion**, functional score.
- Compare the different of the necessary amount and area of **Osteoplasty.**

Material and Method

Between Jan 2015 – Oct 2016

6 patients received Hip arthroscopic osteoplasty procedure

Inclusion Criteria :
-PHD
-FAI S/S

Exclusion Criteria :
- Severe OA.
- INFH

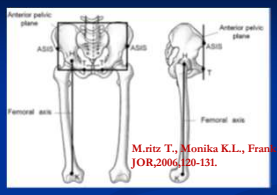
Mini Follow-Up 6 months

Participation

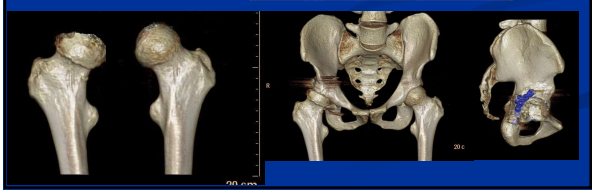
Patient Demographics

No.	Age/Gender	Injury Mechanism	Associate Injury	Time from Injury to Arthroscopy (month)
1	21/M	Traffic A.	Acetabulum	22
2	21/M	Traffic A.	Femoral Head	16
3	23/F	Falling	No	15
4	28/M	Traffic A.	Acetabulum	14
5	33/M	Traffic A.	Acetabulum	19
6	22/M	Traffic A.	Acetabulum	16

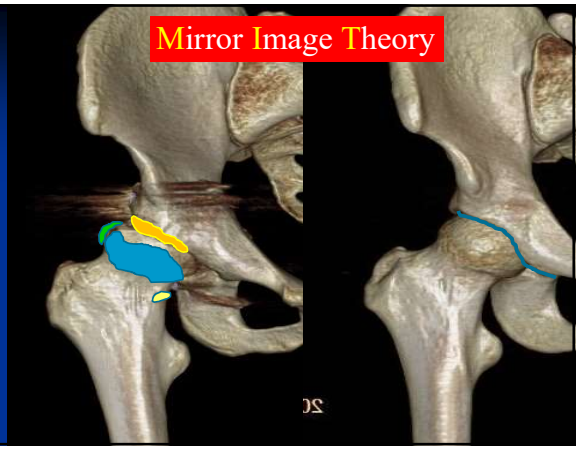
Method of Mapping



M.ritz T., Monika K.L., Franz L., JOR,2006,120-131.

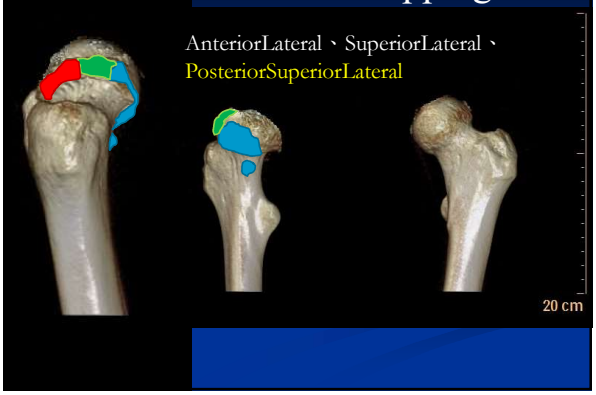


Mirror Image Theory



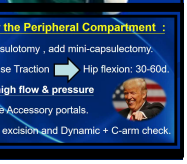
Mapping

AnteriorLateral、SuperiorLateral、PosteriorSuperiorLateral



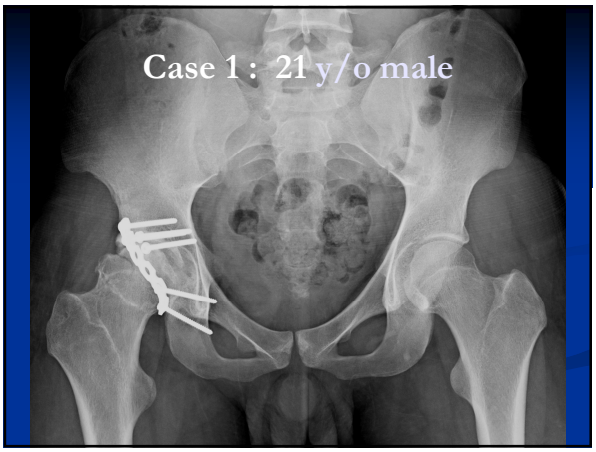
Surgical Procedure

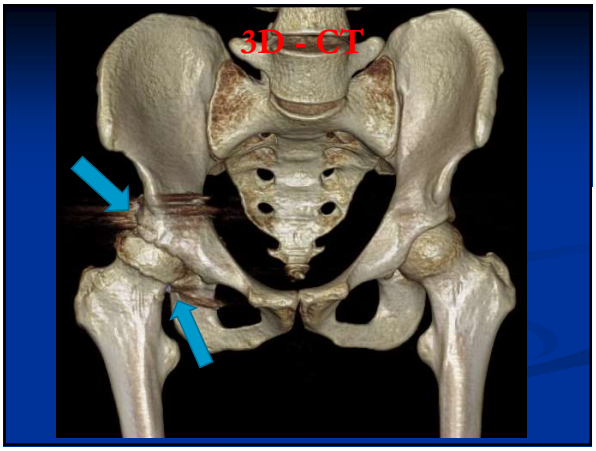
- Well prepare before the sugery.
- Central compartment first : intra-articular pathology, labral deb.or repair, rim resection
- Dynamic Check Strategy:
  - Full dynamic check before osteoplasty.
  - Hip flexed to almost 90^0 and IR.
  - Flexed to 45^0 and ABER.
  - Gradually from Extension to flexion 90^0 in neutro-rotation.
  - No bony impingement or labral displacement is observed during the dynamic examination procedure.

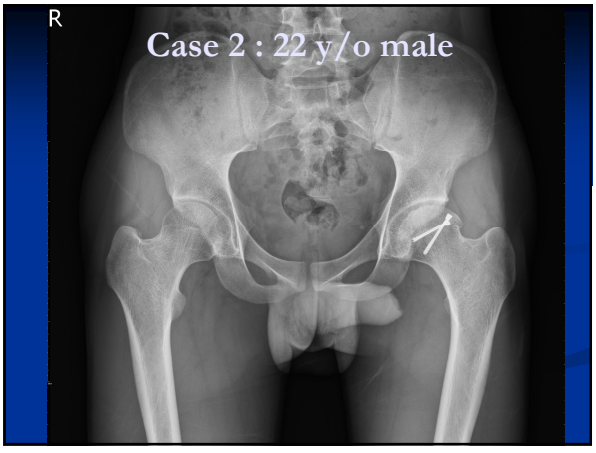


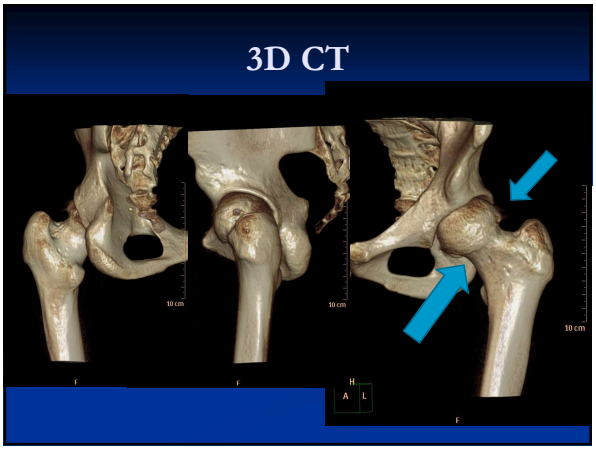
For the Peripheral Compartment :

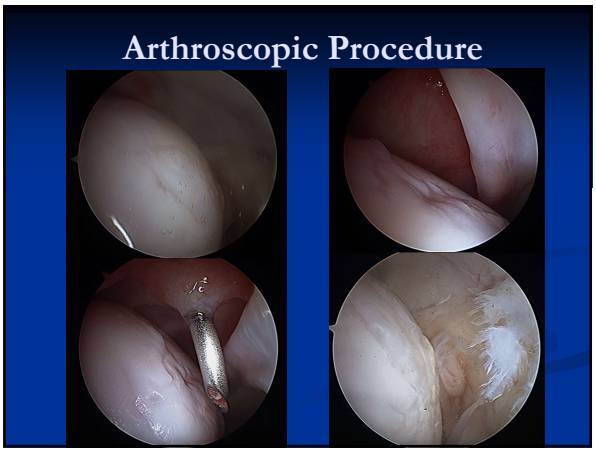
- T-capsulotomy , add mini-capsulectomy.
- Release Traction ⇨ Hip flexion: 30-60d.
- Use high flow & pressure
- Maybe Accessory portals.
- Piece excision and Dynamic + C-arm check.

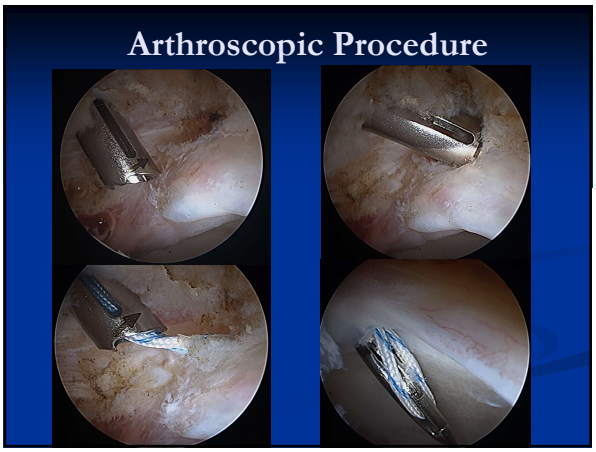


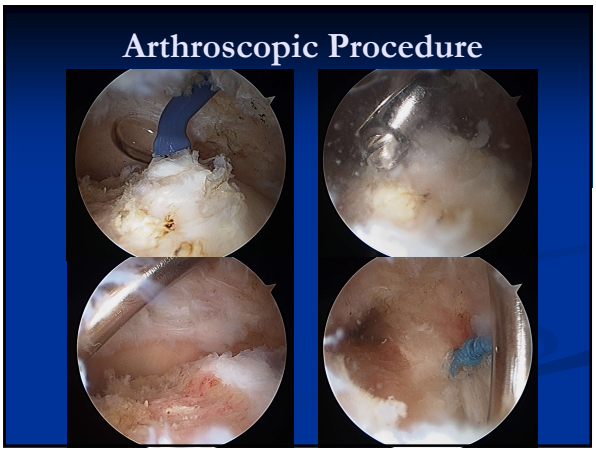


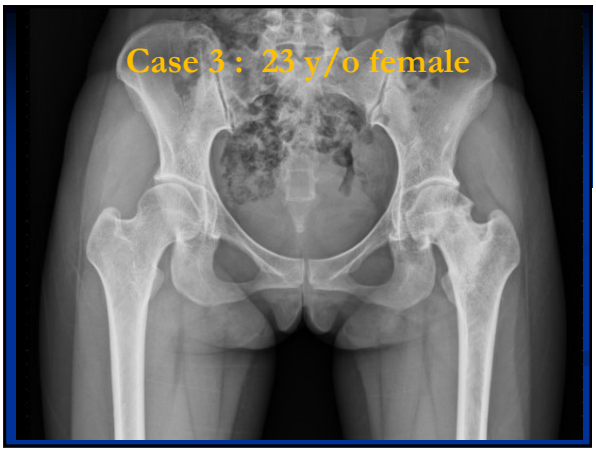


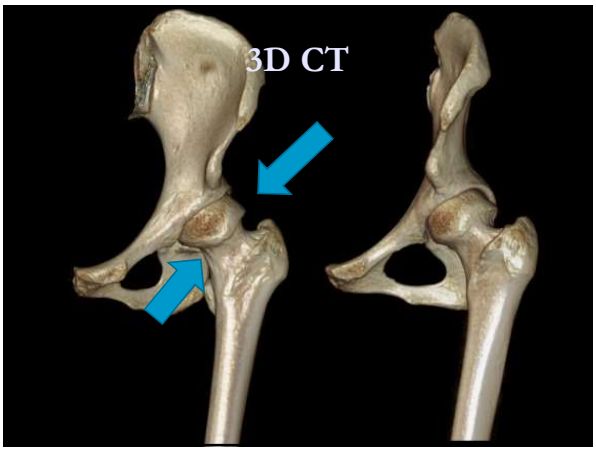


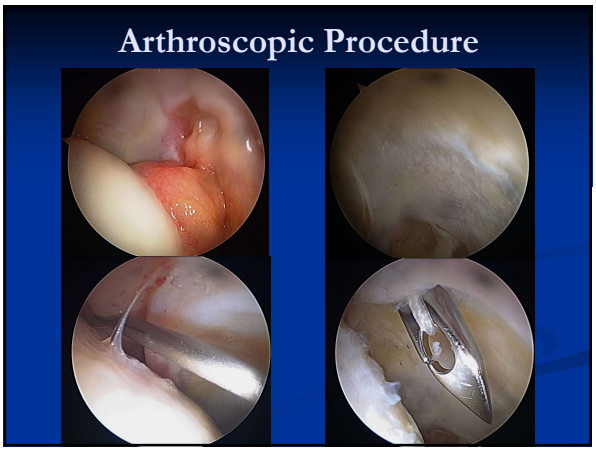

Arthroscopic Procedure


Arthroscopic Procedure

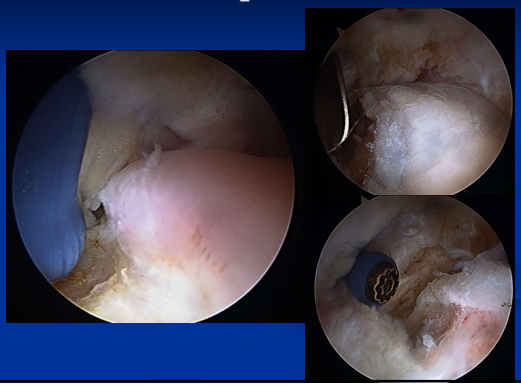

Arthroscopic Procedure


Case 3 : 23 y/o female


3D CT

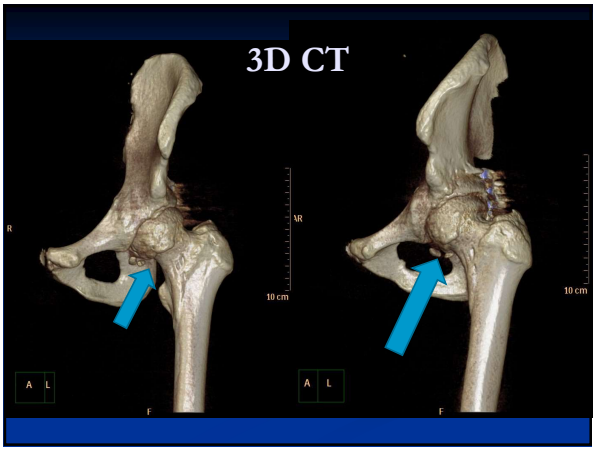

Arthroscopic Procedure

Arthroscopic Procedure

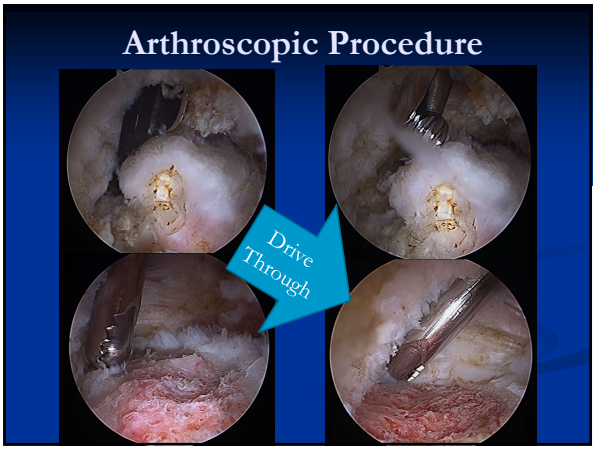


Case 4 : 21 y/o male

3D CT



Arthroscopic Procedure



Result

Surgical Findings and procedure of Patients

No.	Labrum	Cartilage (Outerbridge classification)	Cam & Rim, Others	Ligamentum teres	Capsule Repair
1	Deb.	Gr.1	Cam excision Removal of LBs	complete	N
2	Deb	Gr.1	Cam excision	partial	N
3	Repair	Gr.1	Cam excision Removal of LBs	partial	N
4	Deb.	Gr.1	Cam excision	partial	N
5	Repair	Gr.2	Cam excision Rim osteophyte excision	complete	Y
6	Repair	Gr.1	Cam excision Removal of LBs	partial	N

Result

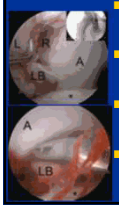
Data of Clinical Result

No.	Modified Harris Hip Score		Range of Motion				Physical Examination				Xray
	preOP	pOP	Internal Rotation		Flexion		A.I.T.[a]		FABER[a]		
			preOP	pOP	preOP	pOP	preOP	pOP	preOP	pOP	
1	78	98	7.0°	18.0°	106.0°	120.0°	+	–	+	–	E
2	74	92	9.0°	18.0°	110.0°	125.0°	+	–	+	–	U [b]
3	78	94	7.0°	20.0°	100.0°	124.0°	+	–	+	–	U [b]
4	70	92	7.0°	19.0°	98.0°	120.0°	+	–	+	–	U [b]
5	66	80	5.0°	19.0°	98.0°	118.0°	+	+	+	+	E
6	72	96	9.0°	19.0°	108.0°	127.0°	+	–	+	–	U [b]

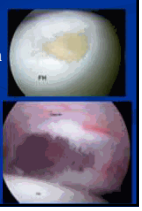
[a]A.I.T.: anterior impingement test. [a]FABER: flexion, abduction, and external rotation. [b]E: equal resection. [b]U: under resection

Feature of Post Hip Dislocation Traumatic FAI

- 2009, Marc J. Philippon : Arthroscopic Findings Following Traumatic Hip Dislocation in 14 Professional Athletes
- 2011, Victor M. Ilizaliturri Jr : Hip Arthroscopy After Traumatic Hip Dislocation



- High incidence of intra-articular pathologies.
- Concluded indication for arthroscopy with mechanical hip symptoms
- Easy to identify abnormal bony morphology in traumatic FAI.
- Relative easy distraction in procedure

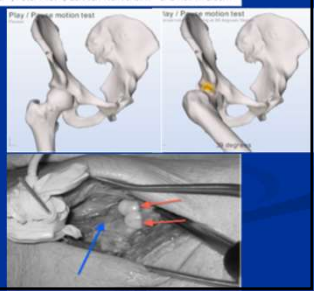


Morphology Assessment Manner

A quantitative non-invasive assessment of femoroacetabular impingement with CT-based dynamic simulation - cadaveric validation study

Maarten A Röling[1*], Monique I Visser[1], Edwin HG Oei[2,3], Peter Pilot[1,3], Gert-Jan Kleinrensink[2,3] and Rolf M Bloem[1,3]

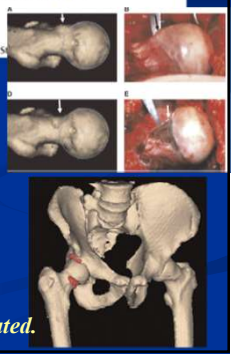
- Cadaveric validation study.
- 3D simulation imaging software.
- **Specific marked spots** reproducible electromagnetic tracking system registration points.
- Concluded for as clinically diagnostic tool for preoperative planning.



Morphology Assessment Manner

Noninvasive Three-Dimensional Assessment of Femoroacetabular Impingement

Moritz Tannast,[1,2] Monika Kubiak-Langer,[1] Frank Langlotz,[1] Marc Puls,[1] S



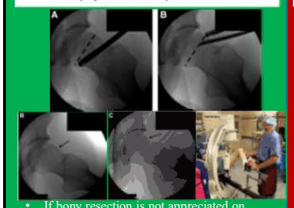
- **In 2007, *J.O.R.*:**
  - The software "HipMotion": CT-based 3D kinematics analysis of a hip joint.
  - Calculates the native osseous ROM at the impingement point.
- 150 normal (control group) and 31 impingement hips (study group).
- Reliability and reproducibility were excellent.

◆***Soft tissue tension was not simulated.***

Fluoscopy vs Dynamic Test

Arthroscopy: 2009. Christopher M. Larson

Intraoperative Fluoroscopy for Evaluation of Bony Resection During Arthroscopic Management of Femoroacetabular Impingement in the Supine Position



- If bony resection is not appreciated on fluoroscopic imaging, further resection should be guided by **direct arthroscopic visualization.**
- The superolateral synovial fold is the site of **the superolateral retinacular vessels** and should be carefully protected.

Arthroscopy Techniques, 2016: Marc J. Philippon

Dynamic Hip Examination for Assessment of Impingement During Hip Arthroscopy

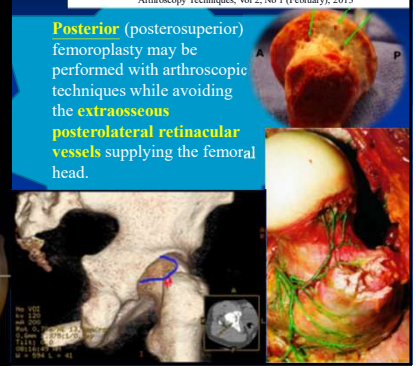
- **Isolation or in combination with the use of fluoroscopy depending on physician comfort and experience.**
- **Minimizes the use of fluoroscopy.**

Posterior CAM

Hip Arthroscopy for Challenging Deformities: Posterior Cam Decompression

Dean K. Matsuda, M.D., and Dylan Hanami, B.S.
Arthroscopy Techniques, Vol 2, No 1 (February), 2013

Posterior (posterosuperior) femoroplasty may be performed with arthroscopic techniques while avoiding the **extraosseous posterolateral retinacular vessels** supplying the femoral head.



Limitation of Study

- Small size of group.
- **Multiform Cases** (Fracture or not) .
- Static calculates only the osseous restricted ROM. Ignoring cartilaginous structures or soft-tissue contractures during calculation of ROM.
- Dynamic status not only bony movement.
- No data from soft tissue activation.

Conclusion

- First, arthroscopy treat traumatic FAI subsequent to hip dislocation with excellent result.
- Static 3D-CT pre-operative mapping ***help*** to assess the presence, location of abnormal bony morphology.
- Dynamic check procedure during osteoplasty allows a complete assessment.
- However, if 3D-CT mapping show bony pathology but dynamic check do not confirm the pathology, ***bony resection is not clearly indicated.***

Take Home Message

- **Besides INFH , consider Traumatic FAI.**
- **Early recognize traumatic FAI would eliminate early osteoarthritis happening.**
- **Arthroscopy treat traumatic FAI subsequent to hip dislocation with excellent result.**
- ***Posterior CAM* lesion may be "under-resection" part in some cases.**