CONSERVATIVA, ARTROSCOPIA E PEDIATRICA

1. Peri-acetabular osteotomy. Indications and Outcomes. Is it Joint Preserving?
2. A new mini open anterior-oblique approach for femoroacetabular impingement
3. Tranexamic Acid Reduces the Blood Loss and Transfusion Requirements following Periacetabular Osteotomy
4. Laser Osteoperforation. A Novel Minimally Invasive Technique for Treatment of Avascular Necrosis of the Femoral Head
5. Periacetabular Osteotomy: grey zones and limits of indication
6. Management of Osteonecrosis of the Femoral Head
7. Capsular detensioning in hip osteoarthritis
8. Arthroscopic Treatment of Femoroacetabular Impingement following Slipped Capital Femoral Epiphysis
9. Hip arthroscopy in Femoro Acetabular Impingement (FAI): Chondral Damage is a good predictor of outcome
10. Extracapsular vs standard approach in hip arthroscopy: our experience
11. Hip Arthroscopy – a new vision about the Hip Pathology. 3 years experience with the out-inside technique
12. Surgical dislocation for pediatric and adolescent hip deformity: clinical and radiographic results at 3 years fu
13. Proximal femur reconstruction in the first decade of life: the challenge of hip reconstruction in a growing patient
14. Late correction of neck deformity in healed severe SCFE – a reliable option with encouraging midterm clinical outcomes
15. Hip replacement in children
16. SCFE
17. Adolescent/Young Adult Sequelae of Perthes' Disease
18. Algorithm for surgical treatment of dislocated hip in Cerebral Palsy
19. Hip Arthroscopy in the Immature Skeleton

Peri-acetabular osteotomy Indications and Outcomes Is it Joint Preserving?

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Guy’s and St Thomas’ NHS Trust

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No Disclosures


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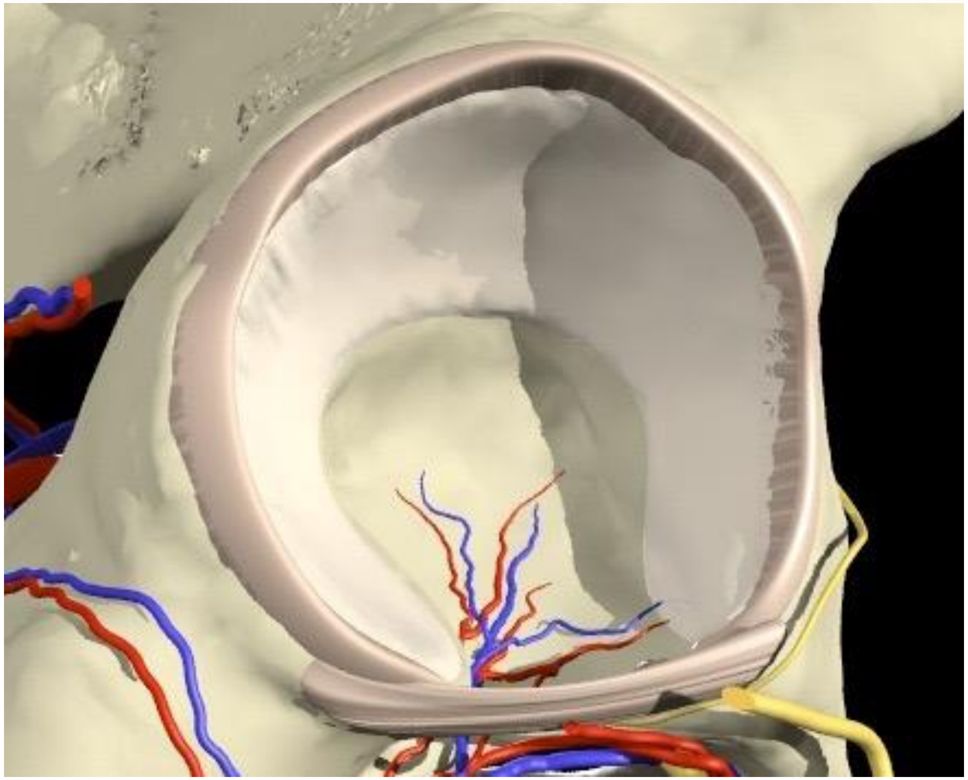
L

Anatomical abnormalities in hip dysplasia

- Shallow and/or upwardly sloping acetabulum
  - Abnormal slope may be lateral and/or anterior
- Increased femoral neck anteversion and/or coxa valga
- Mature skeleton
- Deformity induced by childhood surgery

Dysplastic hips develop symptoms well before degenerative change appears



Asymptomatic phase

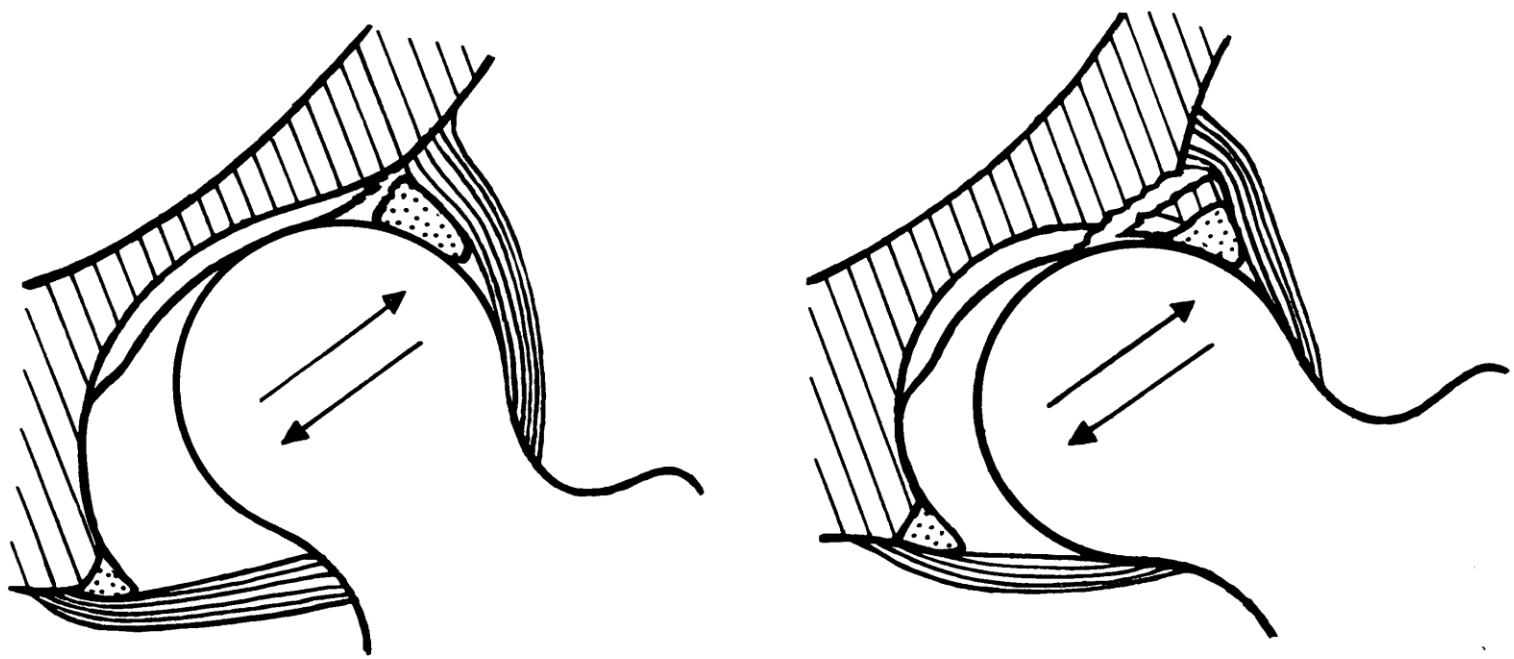
- Uncovered femoral head
- Hypertrophy of labrum
  - Response to chronic shear stress
- Muscular compensation

Symptomatic phase

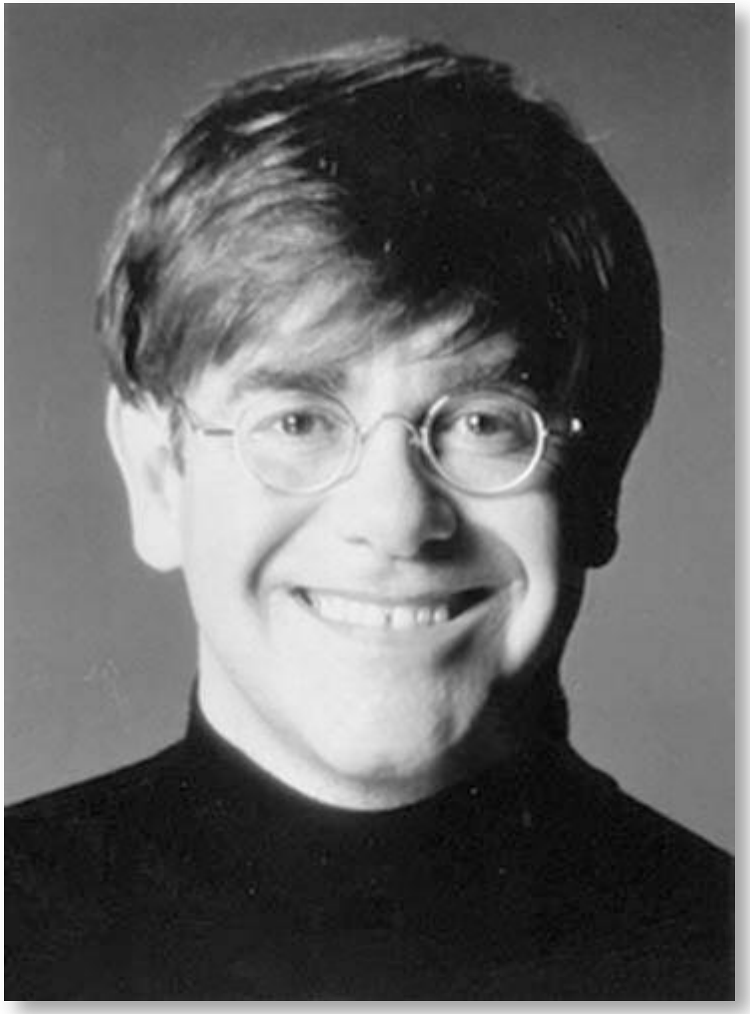
- Instability develops
  - Increased or unaccustomed activity
  - Increased body mass / pregnancy
  - Muscle weakness
- Labrum tears
  - Loss of joint sealing function
- Cyst formation
- Damage to articular cartilage

The “Acetabular Rim Syndrome”

- Klaue, Durnin and Ganz (1991) JBJS 73-B, 423



Improve cover

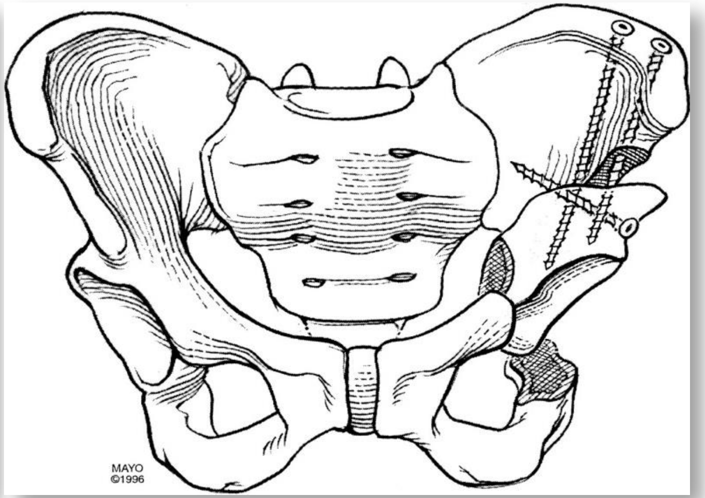


Rationale for osteotomy of the hip

- Improve cover of femoral head
- Increase load bearing area
- Offload areas of early damage
- Symptom relief
  - Better function
- Delay / arrest degeneration
  - No implants

Bernese Peri-acetabular osteotomy (PAO) is the best operation

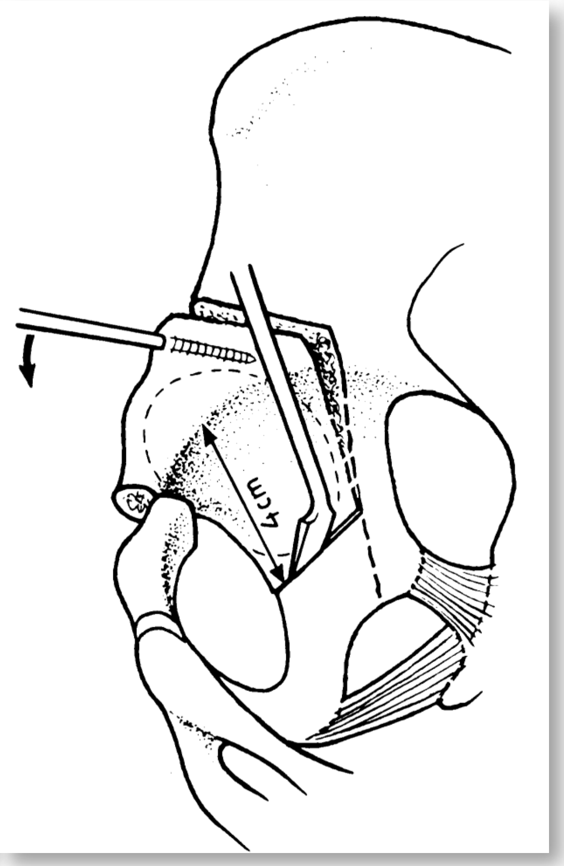
- PAO pioneered by Prof Reinhold Ganz 1980’s
- Good pain relief
- Low conversion to THR



- Siebenrock et al (2013) JBJS 95:749-755
- Ganz et al (2008) CORR 466:1633-1644

Advantages of PAO

- Single cosmetic incision
- Abductor sparing approach
- Straight reproducible cuts
- Pelvic ring intact
- Versatile correction
  - No ligament attachments to fragment
- Easy metal removal




SYNBONE 4061

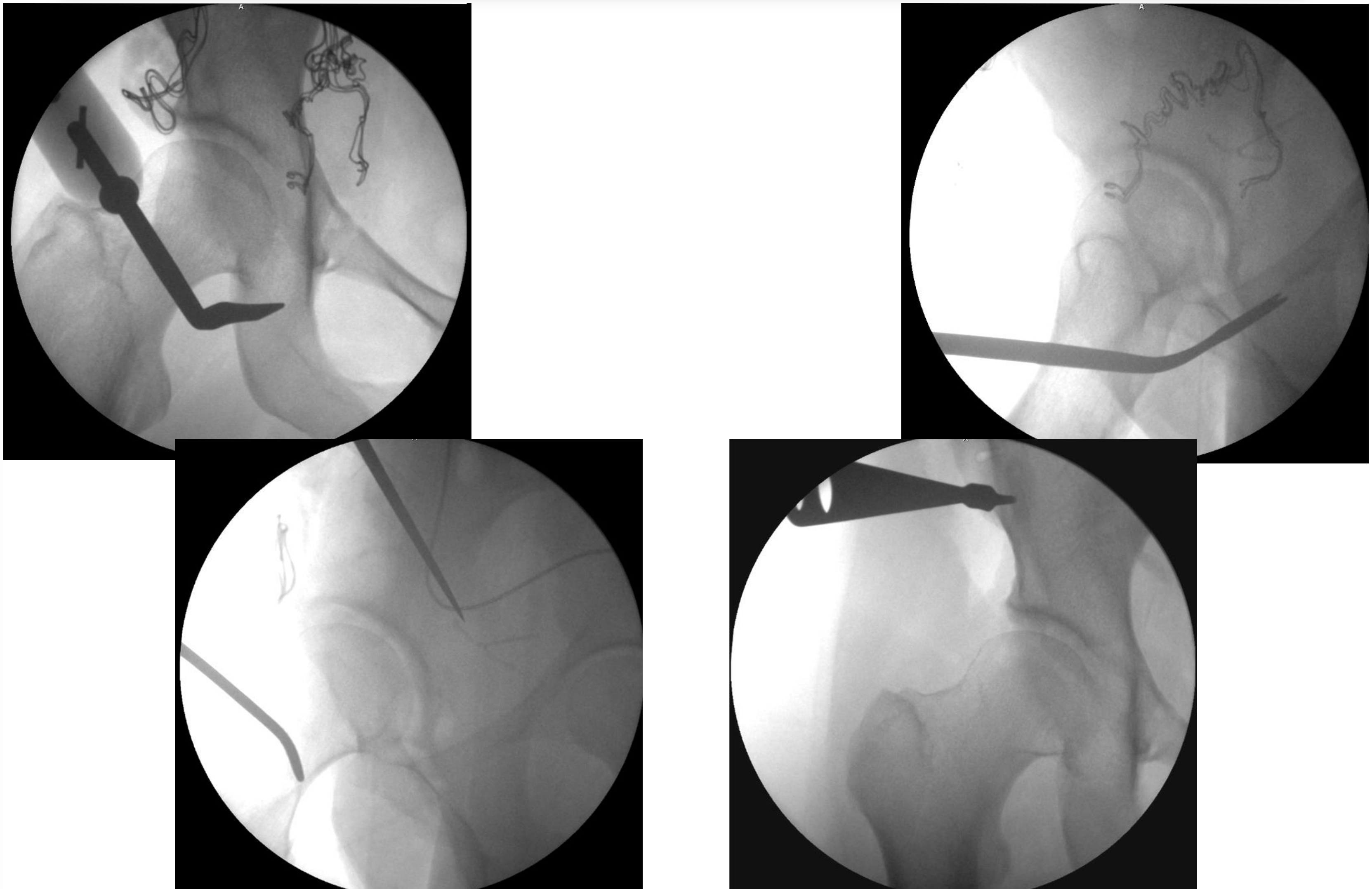

SYNBONE® 4061

Surgical treatment is not a spectrum

Hip Preservation

Arthroplasty

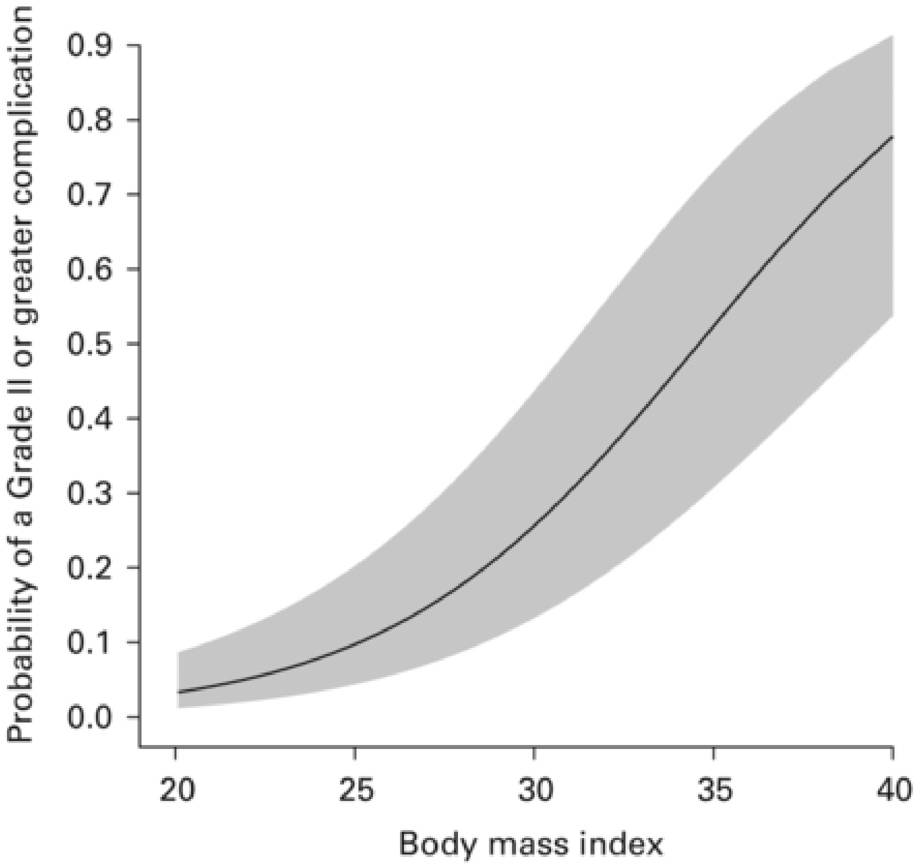
Indications for PAO



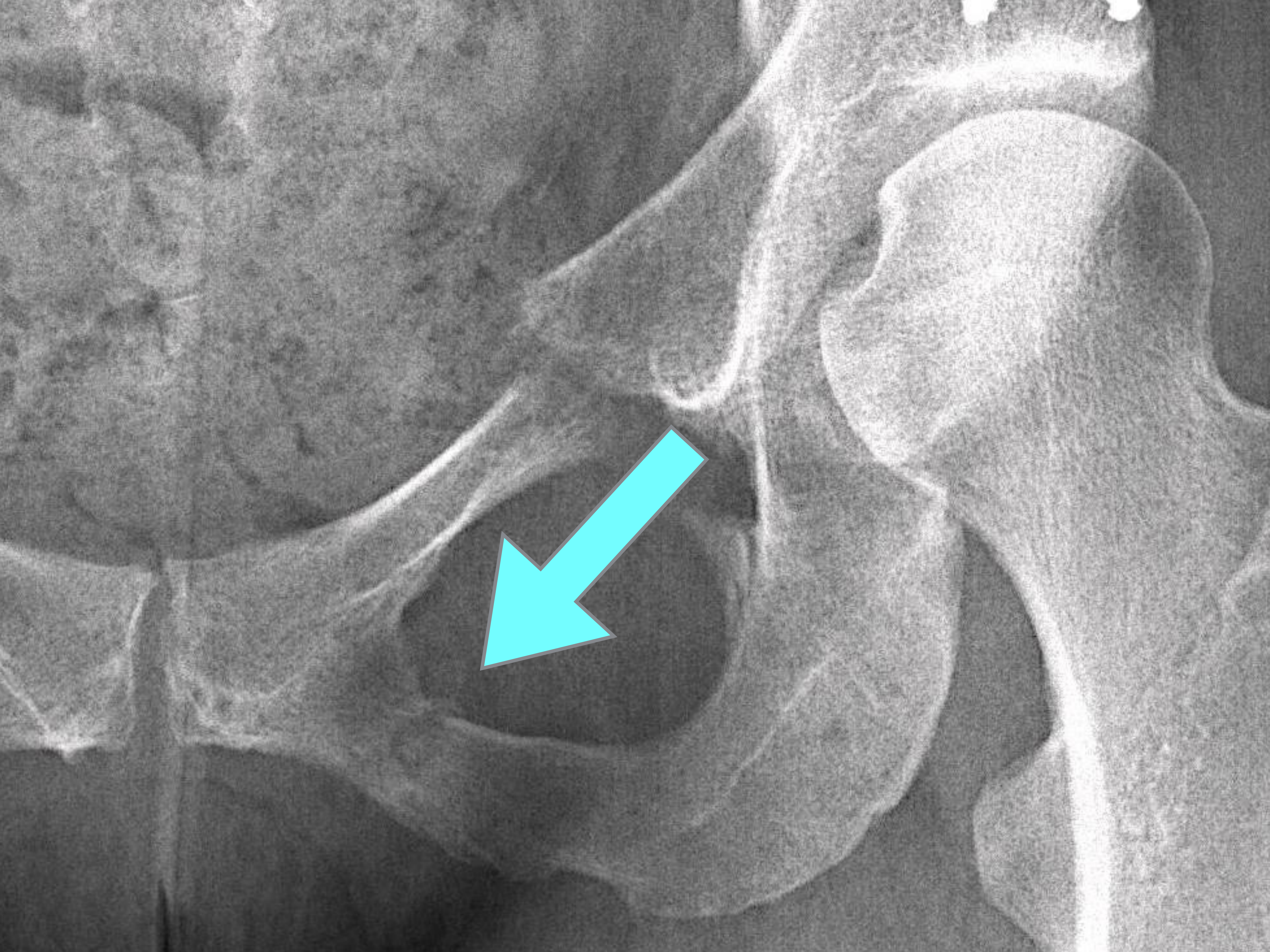
Factors predicting failure 4 to 12 years after periacetabular osteotomy

- Age >40yo
- Preoperative Tönnis grade of 2
- Incongruent hip
- Postoperative joint space width of 3 mm or less
- Postoperative center-edge angle of less than 30° or more than 40°
  - Hartig-Andreasen, Troelsen, Muncholm Thillemann & Søballe (2012) CORR 470:11, 2978-87

Obesity is a major risk factor for the development of complications after peri-acetabular osteotomy



- E N Novais, G D Potter, J C Clohisy, M B Millis, Y J Kim, R T Trousdale, P M Carry and R J Sierra (2015) BJJ 97-B:1, 29-34

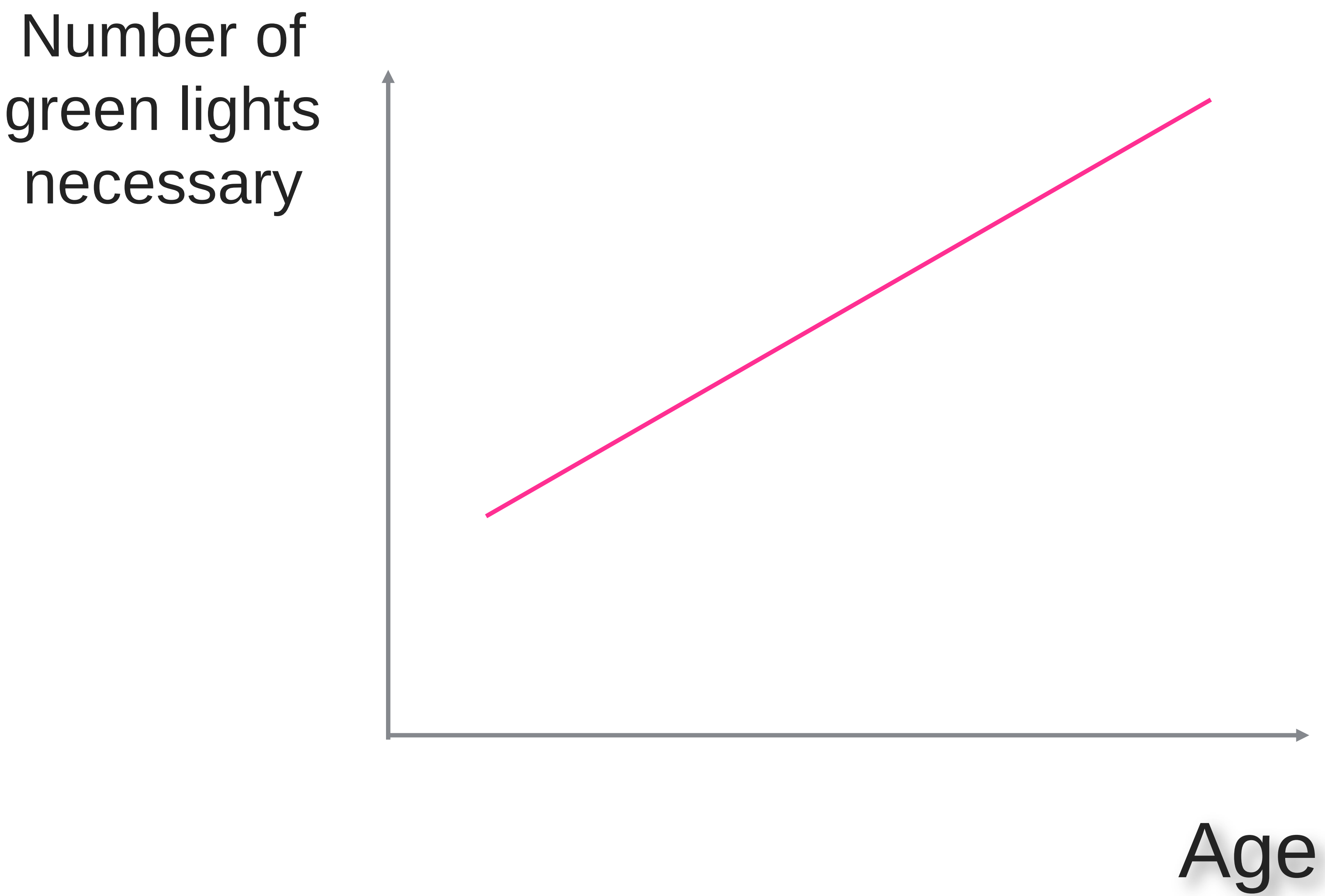


Factors associated with stress fractures after periacetabular osteotomy

- Older patients
  - Worse bone quality
- Severe dysplasia
  - Greater correction and displacement at pubic ramus osteotomy
- Superior pubic non-union
  - A Malviya, W Dandachli, Z Beech, M J K Bankes and J D Witt (2015) Bone Joint J 97-B:1, 24-8

Indications for PAO

- Good enough joint
  - Mobile, congruent, minimal or no degenerative change
- Good enough patient
  - Appropriate symptoms, <40yo, not overweight, athletic, motivated, few comorbidities, non-smoker, social support, realistic expectations


Number of
green lights
necessary
Age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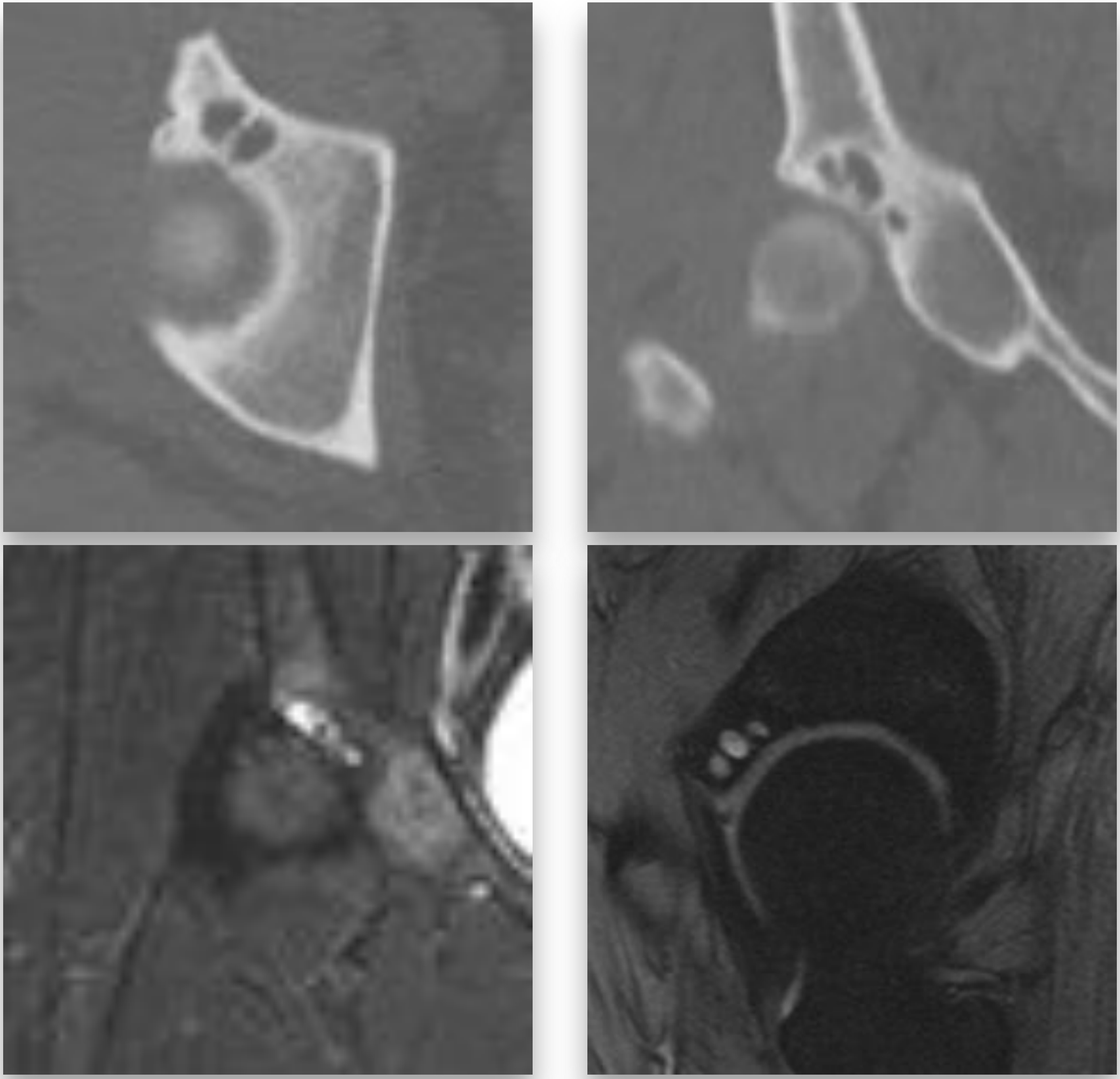

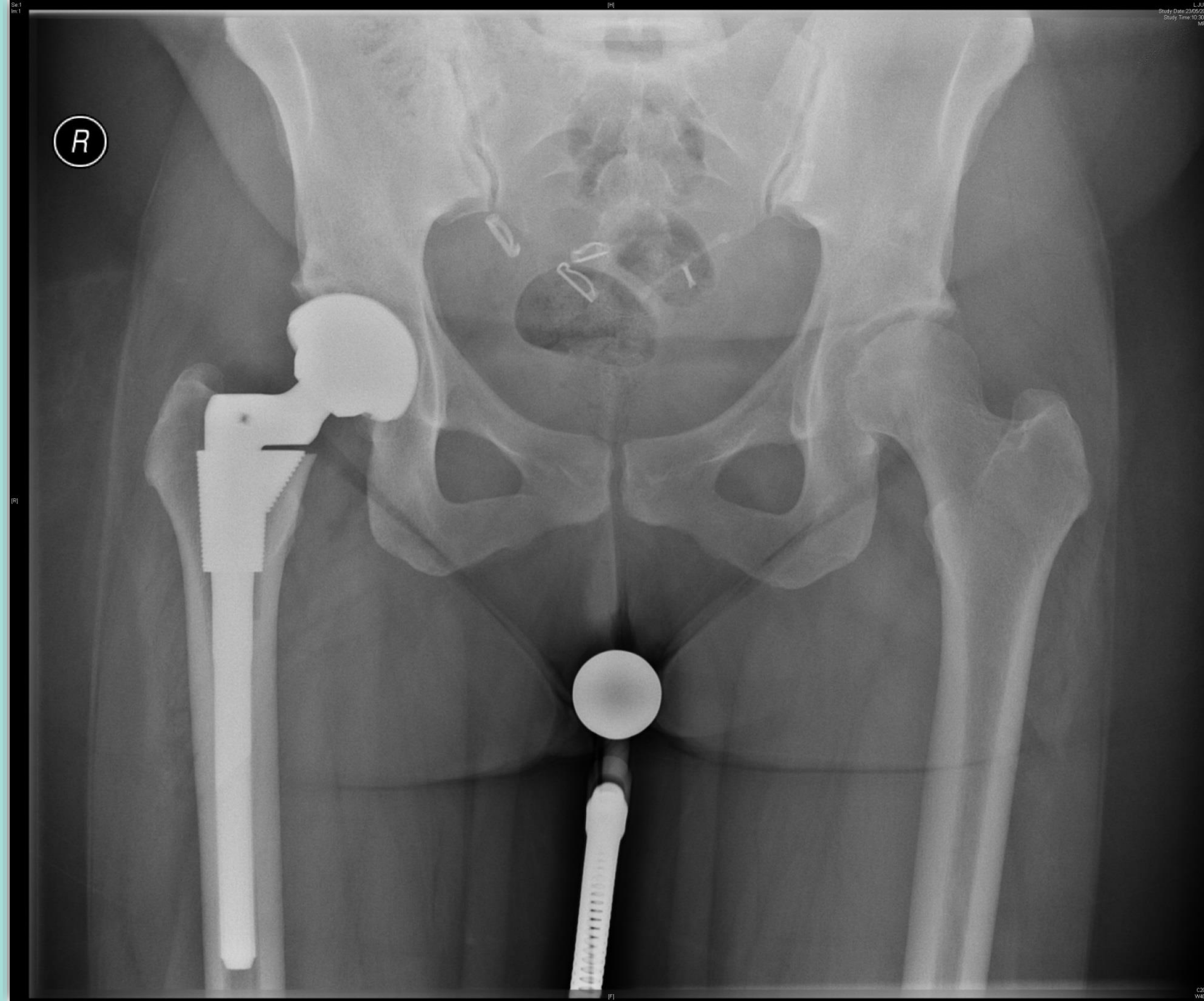
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Study Date:23/05/2014
Study Time:10:30:53
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Outcomes of PAO

- Symptom relief
  - Better function
- Delay / arrest degeneration
  - No implants

Large body of evidence favouring acetabular reorientation in dysplasia

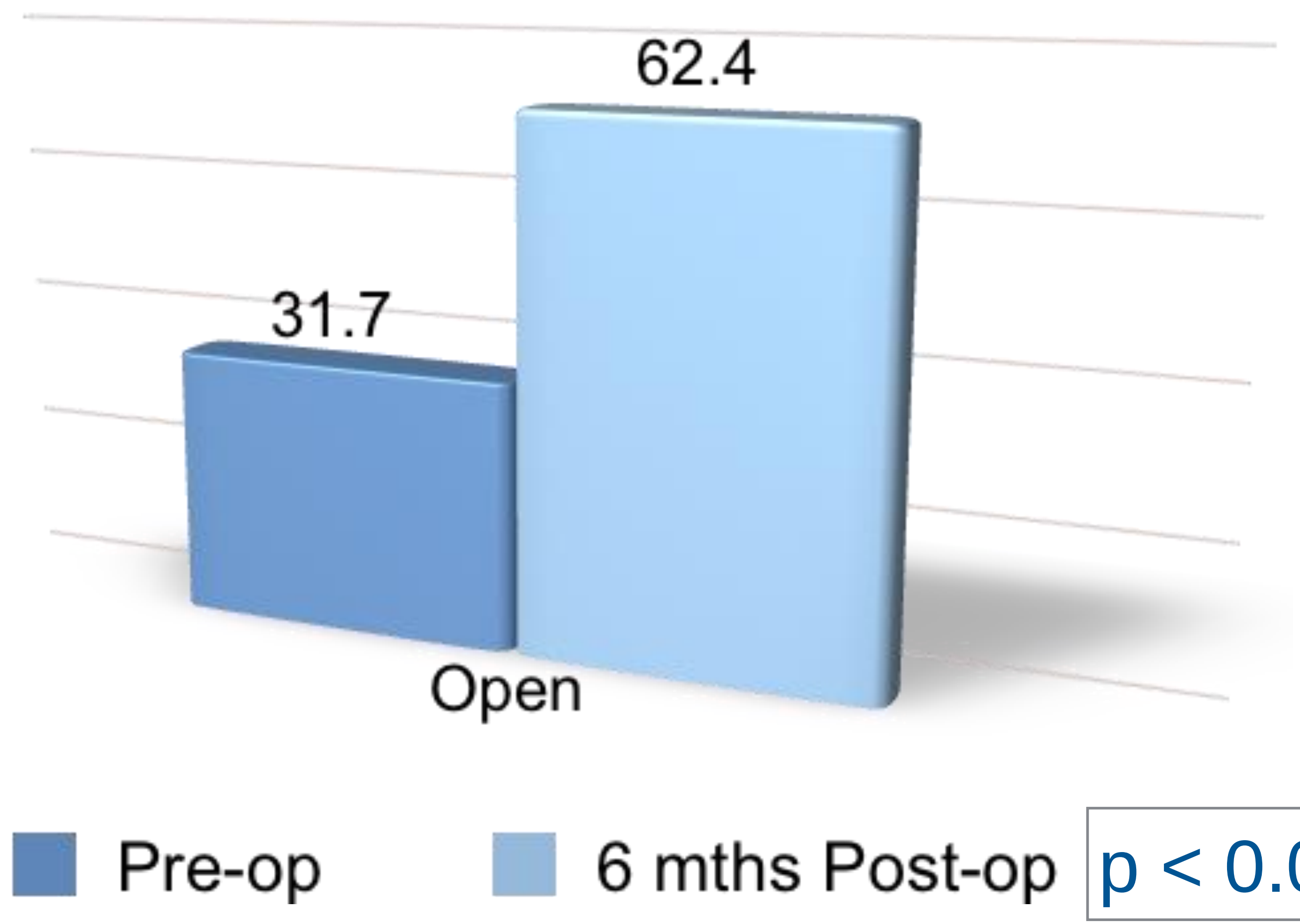
- "reduction of pain and enhanced hip function were noted in all studies"
  - Clohisy et al CORR (2009) 467:2041–2052
- Physical Activity Level Improves After PAO
  - Novais et al CORR (2013) 471:981–988

■ HIP

Comparison of contemporary periacetabular osteotomy for hip dysplasia with total hip arthroplasty for hip osteoarthritis

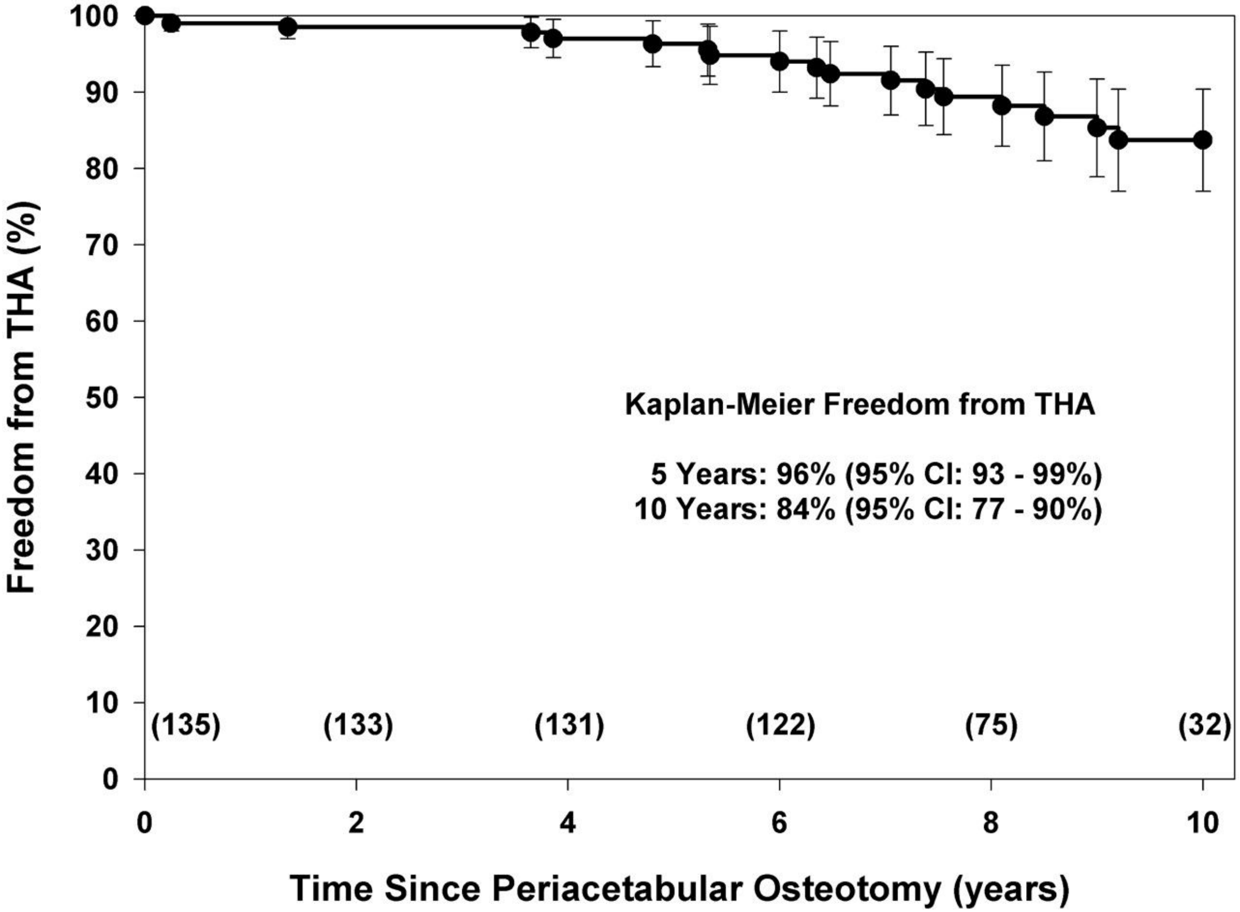
- "In correctly selected patients, and in the hands of experienced surgeons, PAO should be considered as safe and as clinically effective as THA"
  - B. L. Gray, J. B. Stambough, G. R. Baca, P. L. Schoenecker, J. C. Clohisy
  - Bone Joint J 2015;97-B:1322–7

iHOT-12 scores from open surgery using British Non Arthroplasty Hip Registry
https://www.britishhipsociety.com/main?page=NAHR



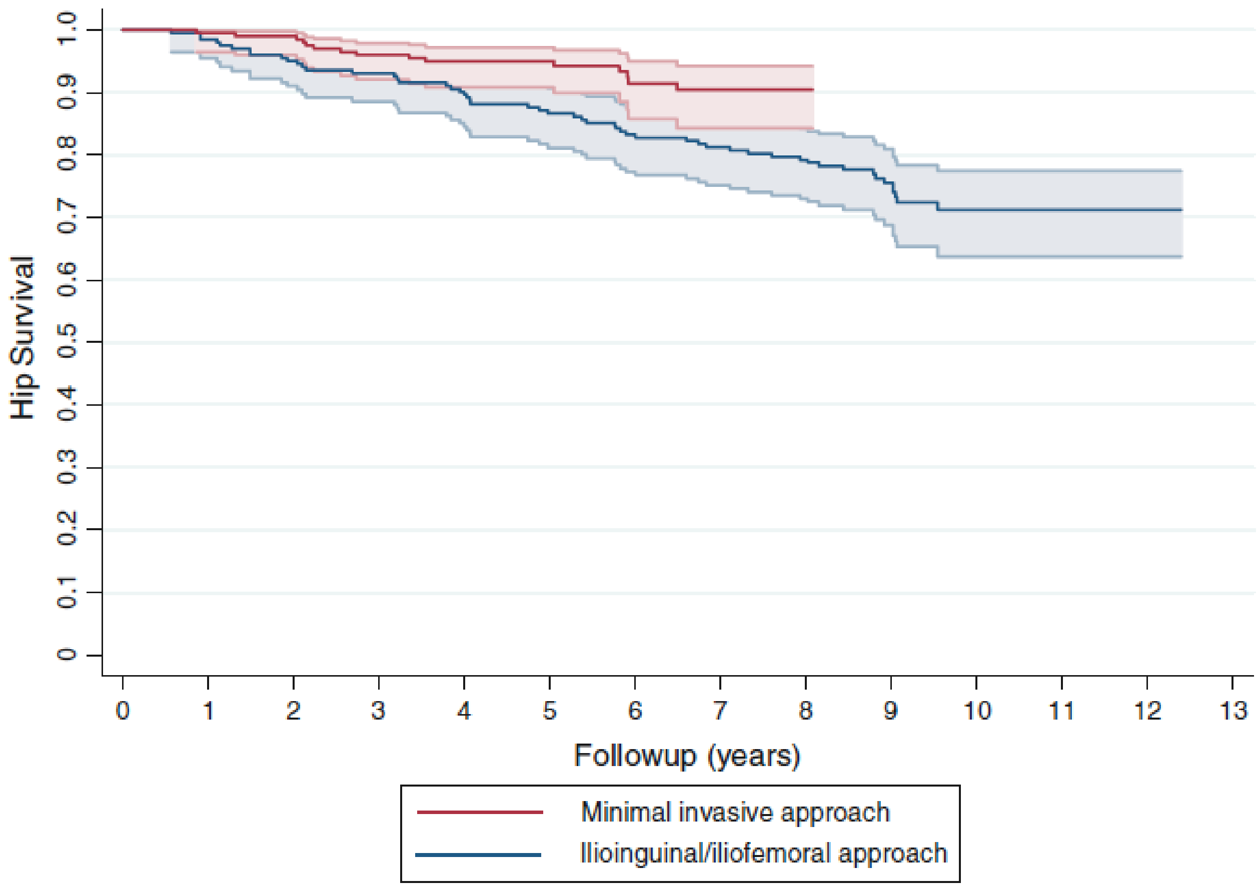
$p < 0.05$

PAO is a durable solution



•Matheney, Kim, Zurakowski, Matero & Millis (2009) J Bone Joint Surg Am 91:9, 2113-23

Results are improving



•Hartig-Andreasen, Troelsen, Thillemann & Søballe CORR (2012) **470**, 2978-2987

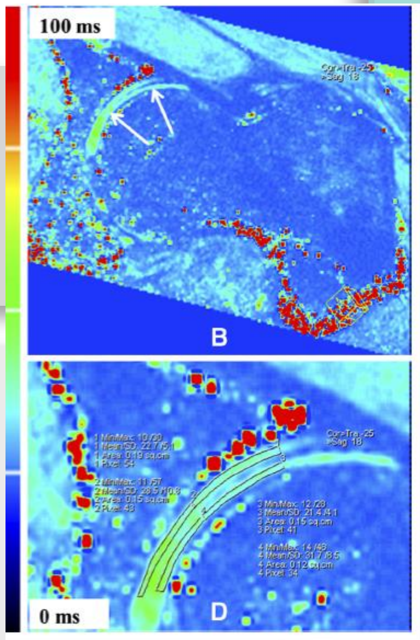
Hip arthroscopy and DDH

- Ideally suited for treatment and evaluation of post-operative symptoms
  - 27% (now 3% due to recognition of posts problems)
  - Hartig-Andreasen, Troelsen, Thillemann, Gelineck and Søballe (2015) J Hip Pres Surgery 1-11
- Unlikely to provide durable solution in isolation
  - 32% reoperations at 3.5 years
  - Fukui K, Trindade CA, Briggs KK, Philippon MJ. BJJ (2015) **97-B**:1316-21
- Medium term results of simultaneous arthroscopy and PAO awaited
  - Domb et al Arthroscopy (2015) 31, 2199

Conclusions

- PAO works best in “green light” cases
  - Avoid >40yo, degenerate, incongruent, overweight
- PAO provides durable symptom relief
- PAO preserves the hip
- PAO should be the default procedure for all but mildest cases of dysplasia
- Hip arthroscopy is best after PAO
  - Hip arthroscopists should establish network with regional open hip preservation service

Future challenges



- Evaluation of articular cartilage
  - Advanced imaging techniques dGEMRIC, T2*
  - Cunningham, Jessel, Zurakowski, Millis, & Kim. J Bone Joint Surg Am 88:7, 1540-8
  - Hesper et al Skeletal Radiol (2014) 43:1429–1445
- Refined indications for patients >35yo
- Define the role of arthroscopy
- Analgesia and rehabilitation

INTERNATIONAL COMBINED MEETING

BRITISH HIP SOCIETY
SOCIETÀ ITALIANA DELL'ANCA

26-27 NOVEMBER 2015

MILAN, ITALY

Peterborough and Stamford Hospitals NHS
NHS Foundation Trust

A new mini open anterior-oblique approach for femoroacetabular impingement

Mr Kemp Narayanasetty
Mr Araz Massraf

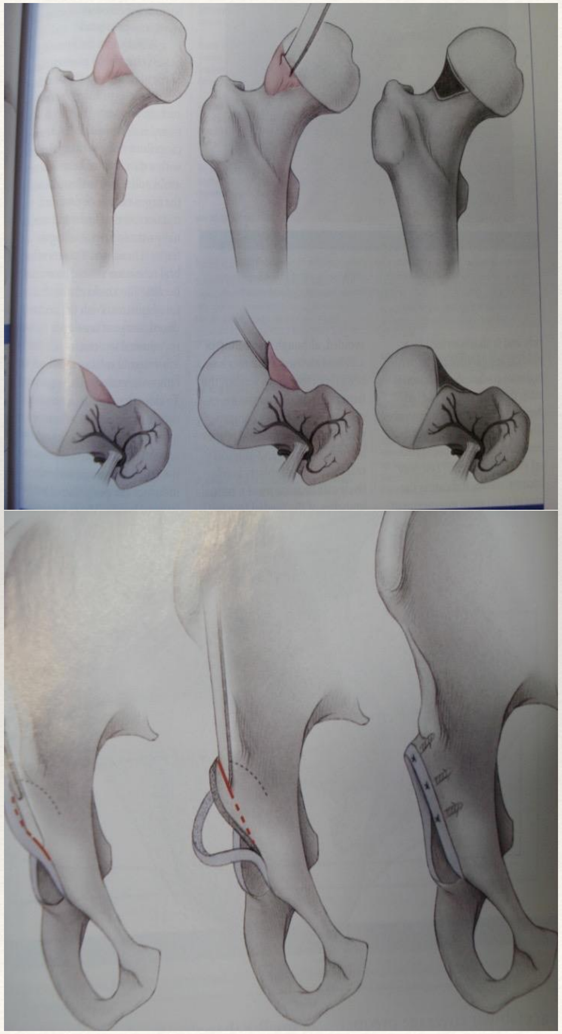
FAI Surgery

- The aim of femoro acetabular surgery is to improve hip range of movement and reduce pain.
- It may also help prevent hip arthritis in later life.

- Femoroacetabular impingement: a cause for osteoarthritis of the hip.
  Ganz R, Parvizi J, Beck M, et al. *Clin Orthop Relat Res* 2003;417:112-20
- Current concepts in the management of femoroacetabular impingement.
  Crawford JR, Villar RN. *J Bone Joint Surg [Br]* 2005;87-B:1459-62.
- Surgical treatment of femoroacetabular impingement: a systematic review of literature.
  Clohisy JC, St John LC, Schutz AL. *Clin Orthop Relat Res* 2009.
- Hip preservation surgery: surgical care for femoroacetabular impingement and the possibility of preventing hip osteoarthritis.
  Carl R. Freeman, Michael G. Azzam and Michael Leunig. *Journal of Hip Preservation Surgery October, 2014*

Treatment Principle

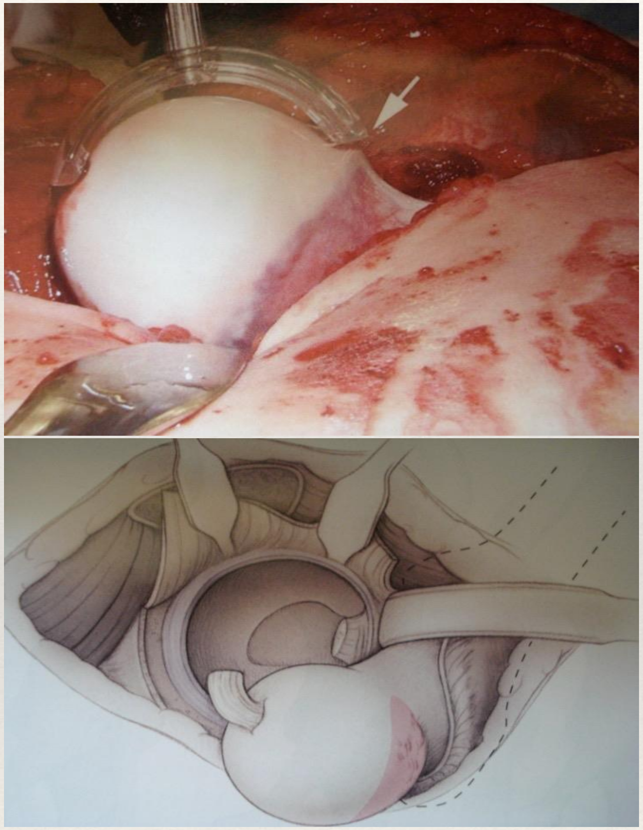
- Restore sphericity to the femoral head.
- Address the pathologic changes in the labrum.



By Open or Arthroscopic approach

Open approach (Ganz)

- Traumatic approach.
- Risk of AVN.
- Trochanteric non-union and pain.
- Avulsion of ligamentous teres.
- Prolonged operating time.
- Risk of fracture.
- Nerve injury

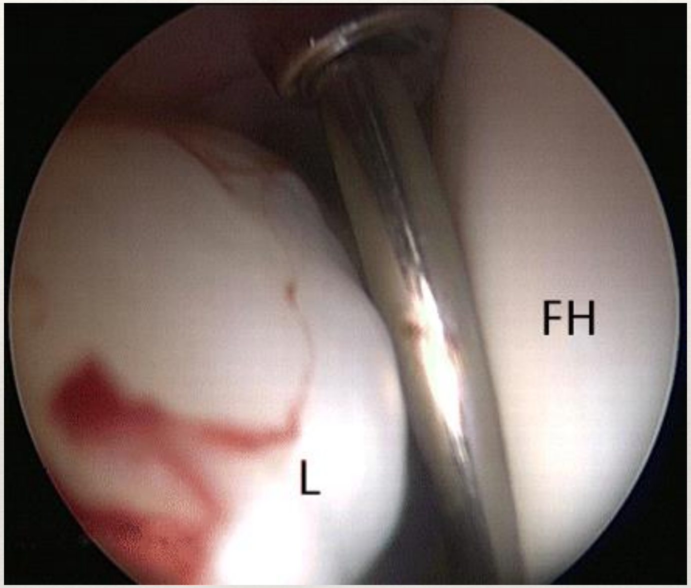


Open Surgical Dislocation Versus Arthroscopy for Femoroacetabular Impingement: A Comparison of Clinical Outcomes
Itamar B. Botser, M.D. et al. The Journal of Arthroscopic & Related Surgery: Volume 27, Issue 2, February 2011.

Treatment of Femoroacetabular Impingement in Athletes Using a Mini–Direct Anterior Approach
Steven B. Cohen, Javad Parvizi, et al. Am J Sports Med: Volume 40, July 2012

Arthroscopic approach

- Steep learning curve.
- Expensive.
- Time consuming.
- High incidence of revisions.
- Iatrogenic chondral and labral damage
- Limited panoramic views.
- Traction nerve injuries.



Complications of arthroscopic surgery of the hip.
A. V. Papavasiliou and N. V. Bardakos. Bone Joint Res: July 2012 1:131-144.

Hip Arthroscopy: Complications in 1054 Cases.
Clarke, M. T.; Arora, A.; Villar, R. N.
Clinical Orthopaedics & Related Research: January 2003 - Volume 406 - Issue 1 - pp 84-88

Aims and objectives

To find safe alternative approach that would provide adequate exposure to treat FAI.

- **Minimal complications and less recurrent symptoms.**
- **Cost effective.**
- **Short learning curve.**
- **Reproducible.**

Other open surgical approaches have shown good results but with complications such as

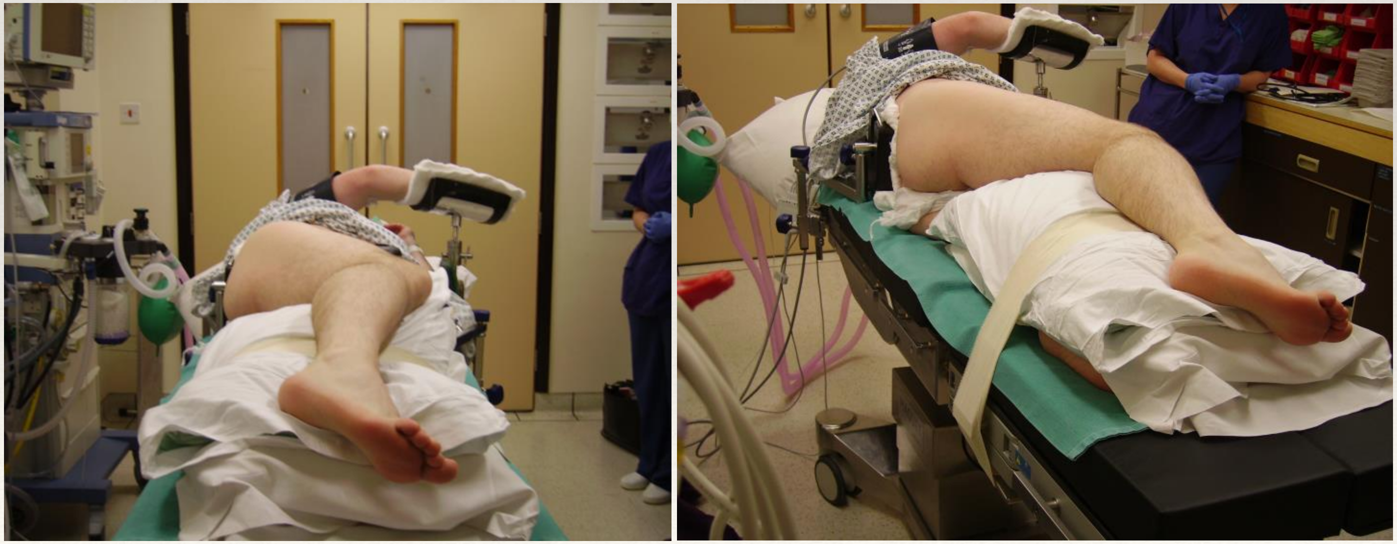
- nerve injuries, trochanteric non union, pain.
- femoral avascular necrosis.

Project Outline

- Selection based on central or peripheral hip symptoms and signs.
- Central hip problems include - labral tear, OA, loose bodies, synovitis and cartilage delamination.
- Peripheral hip problems include - FA impingement, IPS, bursitis & others.
- All should had MRI Arthrogram and fluoroscopic intra-articular injection.
- Patients with mainly central hip problems selected for hip arthroscopy.
- Patients with mainly peripheral hip problems for decompression and labral repair using mini open anterior - oblique approach.

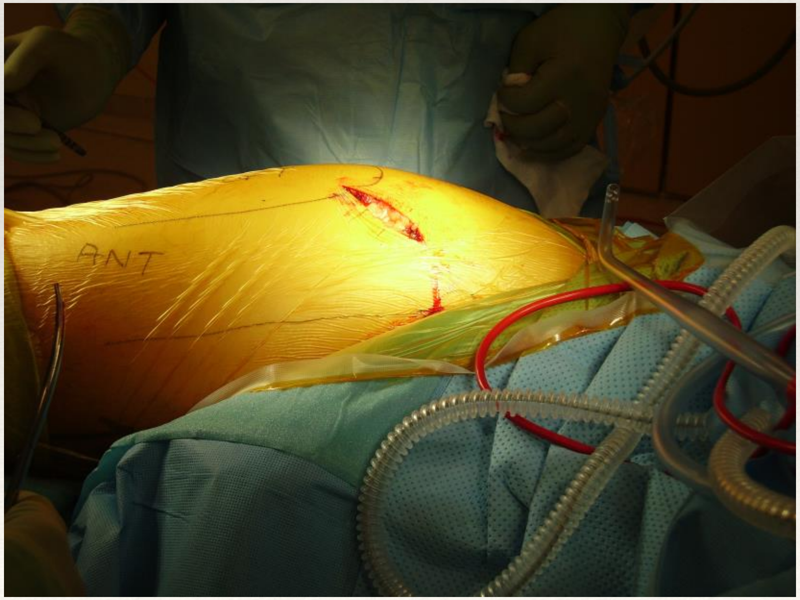
Mini open anterior-oblique approach

Semi-lateral position with hip abduction and no traction



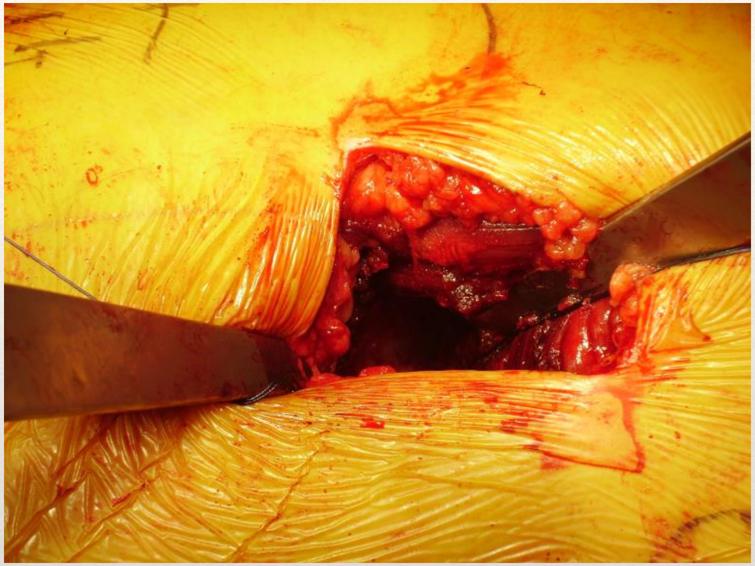
Mini open anterior-oblique approach

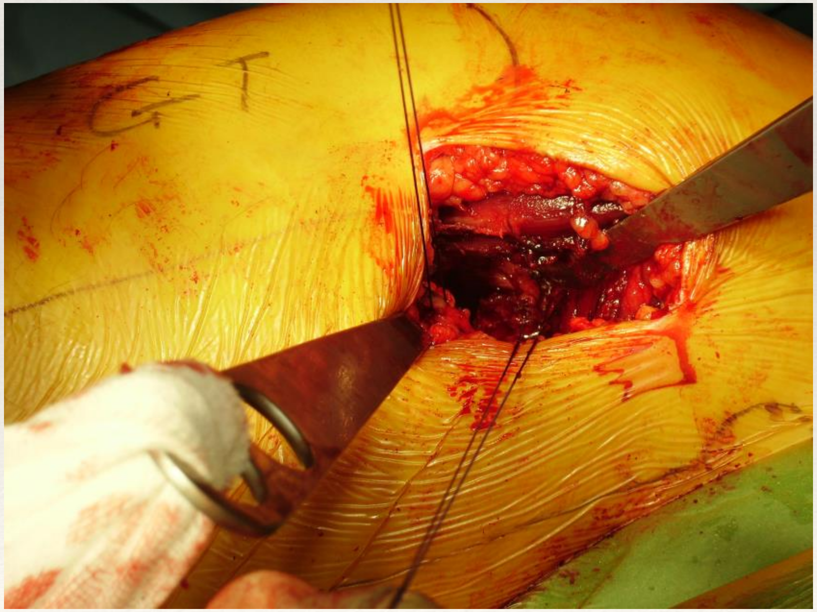
- Anterior - oblique approach.
- Small incision (6 CM)



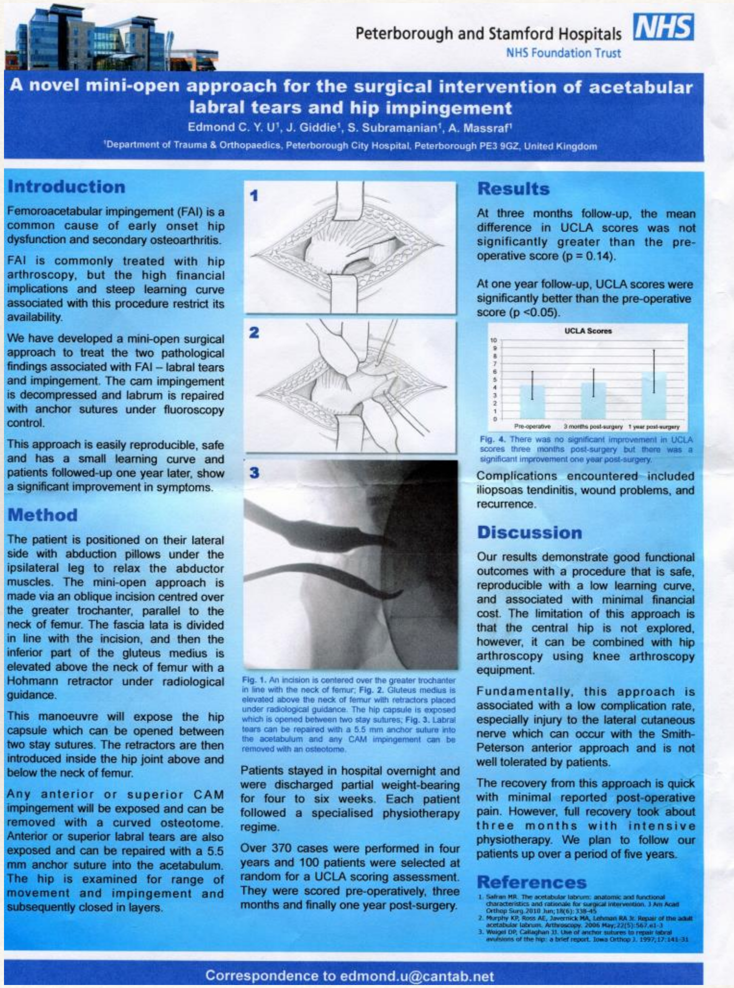
Mini open anterior-oblique approach

- Sub gluteus medius exposure.
- Controlled capsulotomy.





Mini open anterior-oblique approach



Peterborough and Stamford Hospitals NHS
NHS Foundation Trust

A novel mini-open approach for the surgical intervention of acetabular labral tears and hip impingement

Edmond C. Y. U[1], J. Giddie[1], S. Subramanian[1], A. Massraf[1]

[1]Department of Trauma & Orthopaedics, Peterborough City Hospital, Peterborough PE3 9GZ, United Kingdom

Introduction

Femoroacetabular impingement (FAI) is a common cause of early onset hip dysfunction and secondary osteoarthritis.

FAI is commonly treated with hip arthroscopy, but the high financial implications and steep learning curve associated with this procedure restrict its availability.

We have developed a mini-open surgical approach to treat the two pathological findings associated with FAI – labral tears and impingement. The cam impingement is decompressed and labrum is repaired with anchor sutures under fluoroscopy control.

This approach is easily reproducible, safe and has a small learning curve and patients followed-up one year later, show a significant improvement in symptoms.

Method

The patient is positioned on their lateral side with abduction pillows under the ipsilateral leg to relax the abductor muscles. The mini-open approach is made via an oblique incision centred over the greater trochanter, parallel to the neck of femur. The fascia lata is divided in line with the incision, and then the inferior part of the gluteus medius is elevated above the neck of femur with a Hohmann retractor under radiological guidance.

This manoeuvre will expose the hip capsule which can be opened between two stay sutures. The retractors are then introduced inside the hip joint above and below the neck of femur.

Any anterior or superior CAM impingement will be exposed and can be removed with a curved osteotome. Anterior or superior labral tears are also exposed and can be repaired with a 5.5 mm anchor suture into the acetabulum. The hip is examined for range of movement and impingement and subsequently closed in layers.

1

2

3

Fig. 1. An incision is centered over the greater trochanter in line with the neck of femur; Fig. 2. Gluteus medius is elevated above the neck of femur with retractors placed under radiological guidance. The hip capsule is exposed which is opened between two stay sutures; Fig. 3. Labral tears can be repaired with a 5.5 mm anchor suture into the acetabulum and any CAM impingement can be removed with an osteotome.

Patients stayed in hospital overnight and were discharged partial weight-bearing for four to six weeks. Each patient followed a specialised physiotherapy regime.

Over 370 cases were performed in four years and 100 patients were selected at random for a UCLA scoring assessment. They were scored pre-operatively, three months and finally one year post-surgery.

Results

At three months follow-up, the mean difference in UCLA scores was not significantly greater than the pre-operative score ($p = 0.14$).

At one year follow-up, UCLA scores were significantly better than the pre-operative score ($p < 0.05$).

UCLA Scores

0 1 2 3 4 5 6 7 8 9 10

Pre-operative | 3 months post-surgery | 1 year post-surgery

Fig. 4. There was no significant improvement in UCLA scores three months post-surgery but there was a significant improvement one year post-surgery.

Complications encountered included iliopsoas tendinitis, wound problems, and recurrence.

Discussion

Our results demonstrate good functional outcomes with a procedure that is safe, reproducible with a low learning curve, and associated with minimal financial cost. The limitation of this approach is that the central hip is not explored, however, it can be combined with hip arthroscopy using knee arthroscopy equipment.

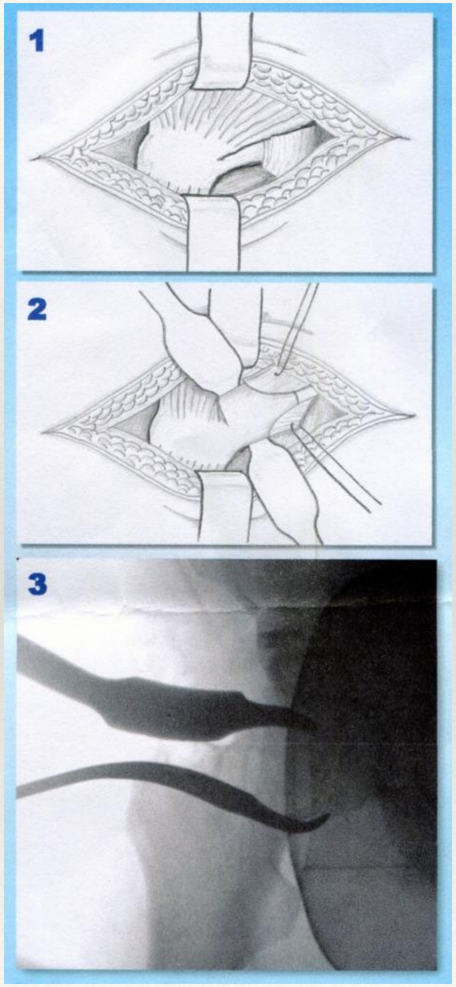
Fundamentally, this approach is associated with a low complication rate, especially injury to the lateral cutaneous nerve which can occur with the Smith-Peterson anterior approach and is not well tolerated by patients.

The recovery from this approach is quick with minimal reported post-operative pain. However, full recovery took about three months with intensive physiotherapy. We plan to follow our patients up over a period of five years.

References

1. Safran MR. The acetabular labrum: anatomic and functional characteristics and rationale for surgical intervention. J Am Acad Orthop Surg. 2010 Jun;18(6):338-45
2. Murphy KP, Ross AE, Javernick MA, Lehman RA Jr. Repair of the adult acetabular labrum. Arthroscopy. 2006 May;22(5):567.e1-3
3. Weigel DP, Callaghan JJ. Use of anchor sutures to repair labral avulsions of the hip: a brief report. Iowa Orthop J. 1997;17:141-3

Correspondence to edmond.u@cantab.net

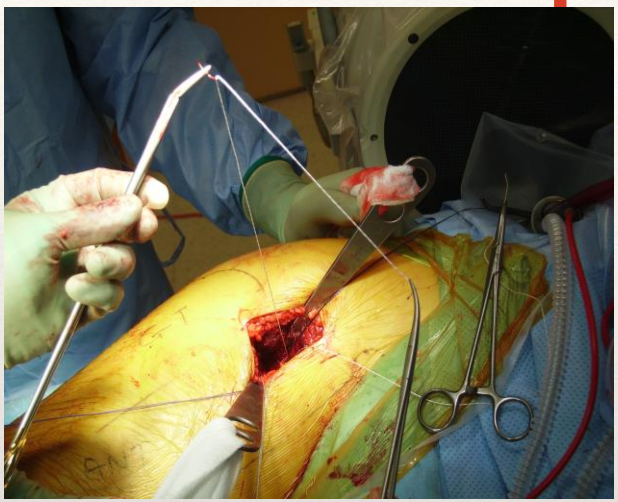


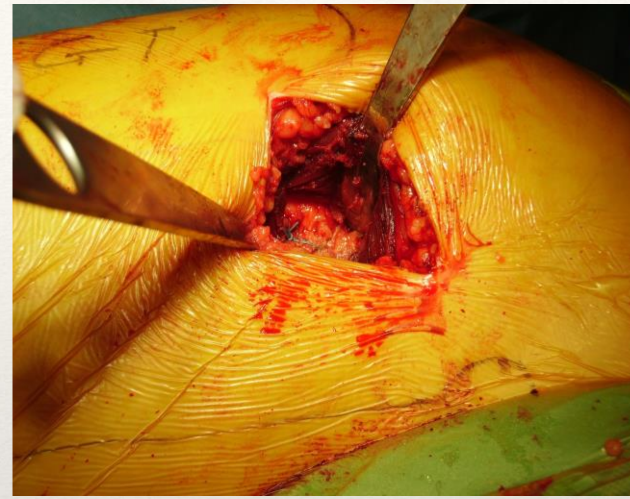
Mini open anterior-oblique approach

- Labral repair and cam resection done under fluoroscopy.
- Can combine hip arthroscopy if necessary

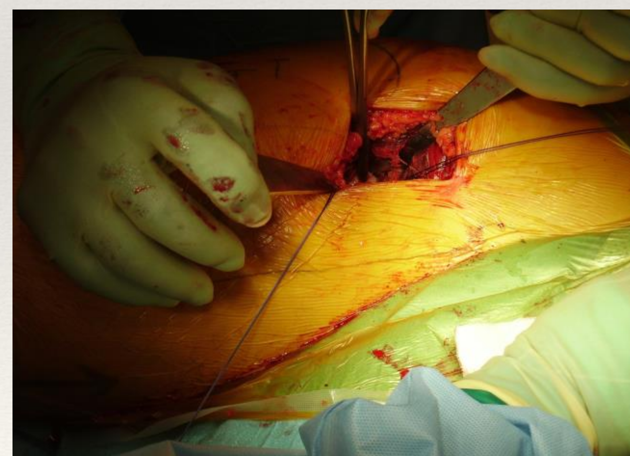
Insertion of Anchor

Mini open anterior-oblique approach



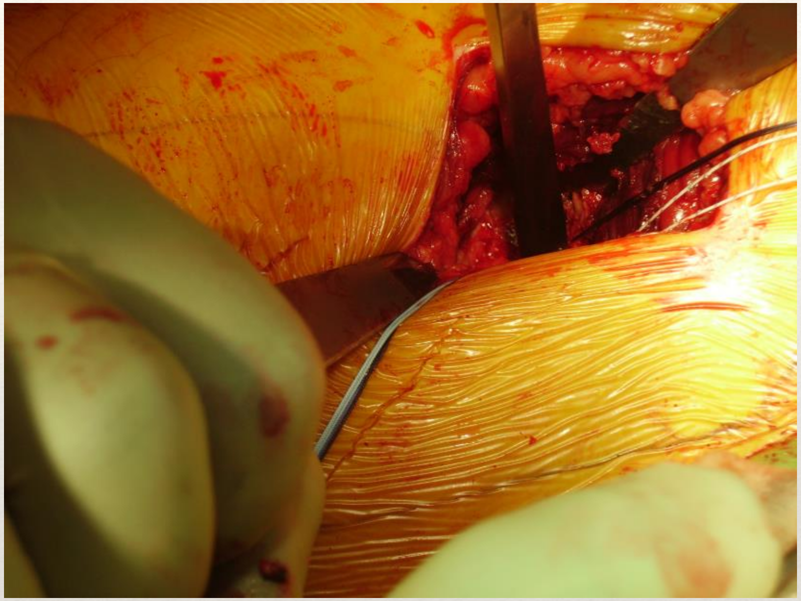


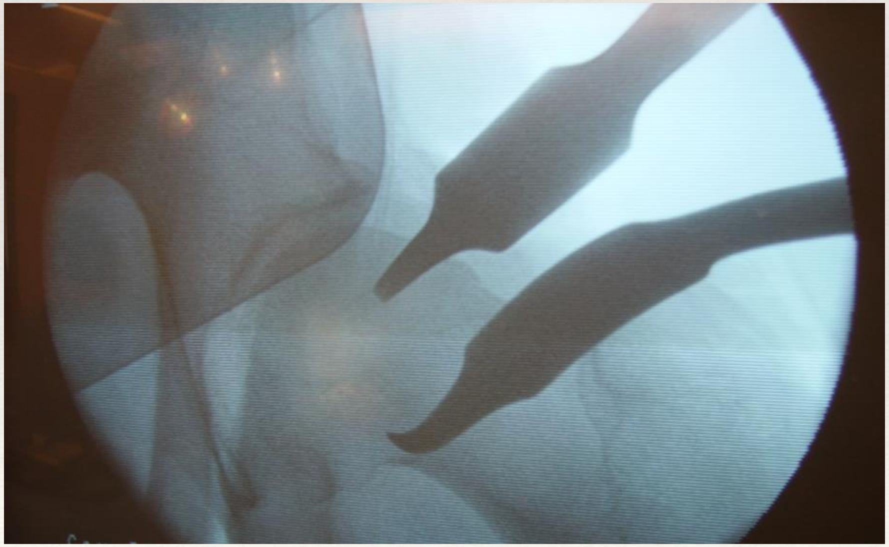
Labral Repair



Mini open anterior-oblique approach

Cam Resection





Radiological appearance

- before

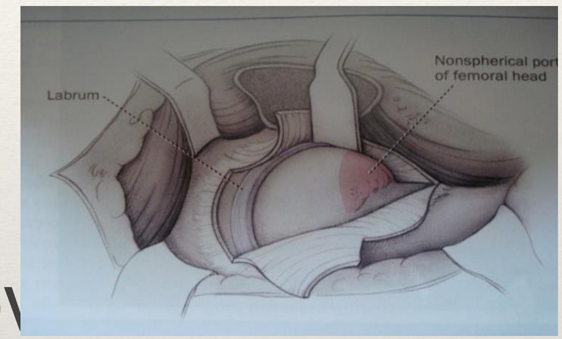


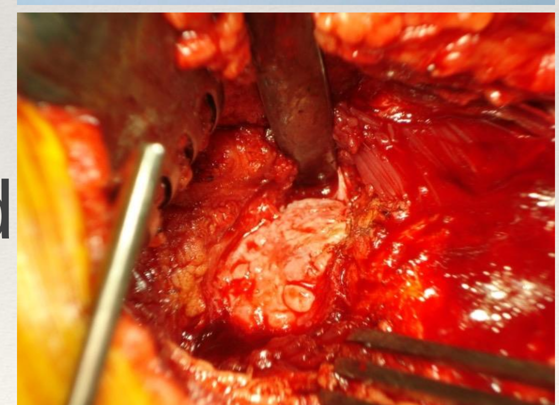
- after



Advantages of mini open approach

- Allows visualisation of the anterior - medial head neck junction
- No surgical hip dislocation.
- Minimal soft tissue stripping
- Preservative with bone remov
- Reduce risk of neck fracture.
- Preserve femoral head blood
- Able to check the ROM.





NAHR

- British Hip Society has set up the Non Arthroplasty Hip Register (NAHR) to monitor the outcome for patients of all other types of surgery on the hip.
- Clinicians should submit details of all patients undergoing this procedure to the register from both the NHS and the independent health care sectors.
- **A prime purpose of the register is to provide information about long-term outcomes.**

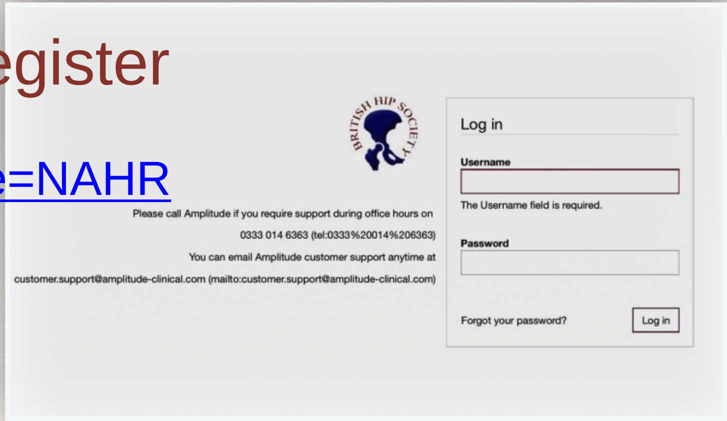
Peterborough Experience

Data collection

- Scope of the project
  - one operator
- Time Scale
  - From September 2012 to December 2014, min follow-up 12 months
- Method used in collecting the data
  - Clinical Notes, Database, Questionnaire, Clinic reviews

- NAHR - Non Arthroplasty Hip Register

https://www.britishhipsociety.com/main?page=NAHR

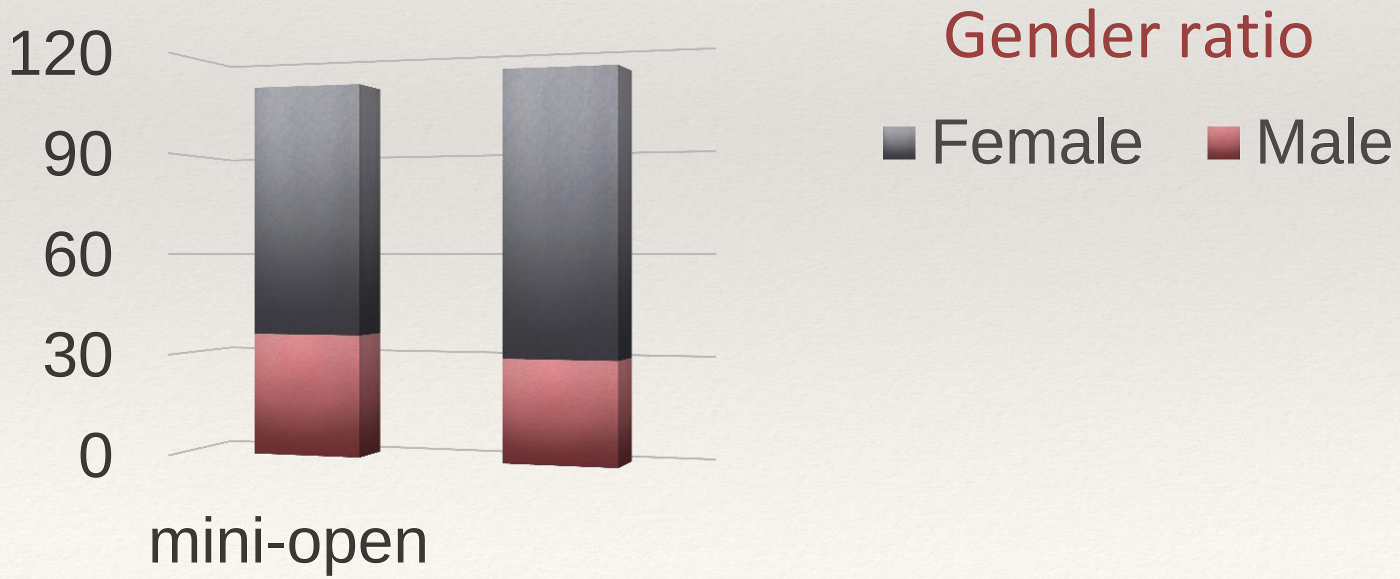


Peterborough Experience

Total 223 patients had surgical treatment

- 110 patients had more peripheral hip problems underwent hip decompression and labral repair using mini open anterior -oblique approach.

- 113 patients with central hip problems underwent hip arthroscopy.

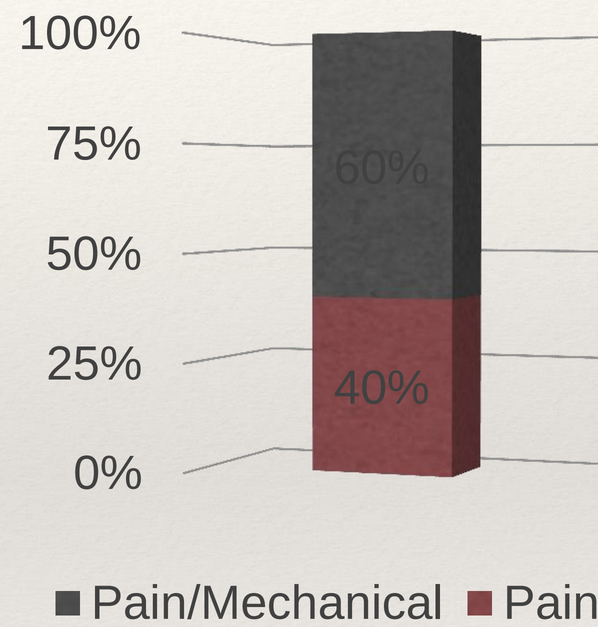


Peterborough Experience

- Between September 2012 - December 2014
- Total number of patients for **mini open approach** – 110
- Bilateral – 2 (in different sessions).
- Mean age - 36.
- All had labral changes and 78% had chondral lesions and alpha angle of more than 55 on MRI arthrogram.

Presentation

- 78% - Alpha angle more than 55 degree and demonstrated positive MR triad
- Commonest type – CAM
- Mean duration of symptoms – 2 years



Assessment

Patients were evaluated by

- University of California Los Angeles (UCLA) activity level

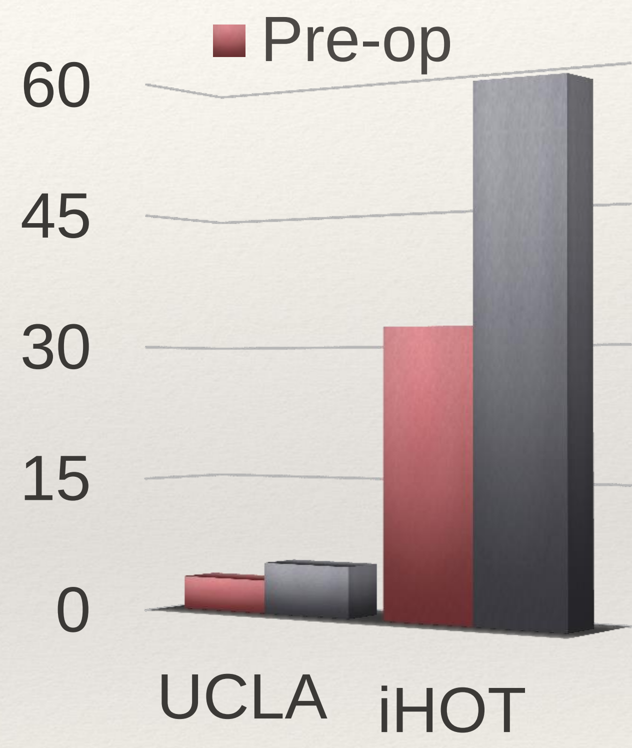
- International Hip Outcome Tool (iHOT-12) and EQ-5D survey.

- Data entry to Non Arthroplasty Hip Register (NAHR) was started from mid 2014.

Results

At 6 months after surgery

- UCLA activity level changed from 3.7 to 5.7
- iHot-12 score changed from 32 to 58
  - indicate reliable return to preoperative activity levels.
- 17 patients reported a return to their specific sports.
- At most recent evaluation,
  - 2 patients had been converted to total hip arthroplasty.
  - 7 had arthroscopic debridement for recurrent symptoms.

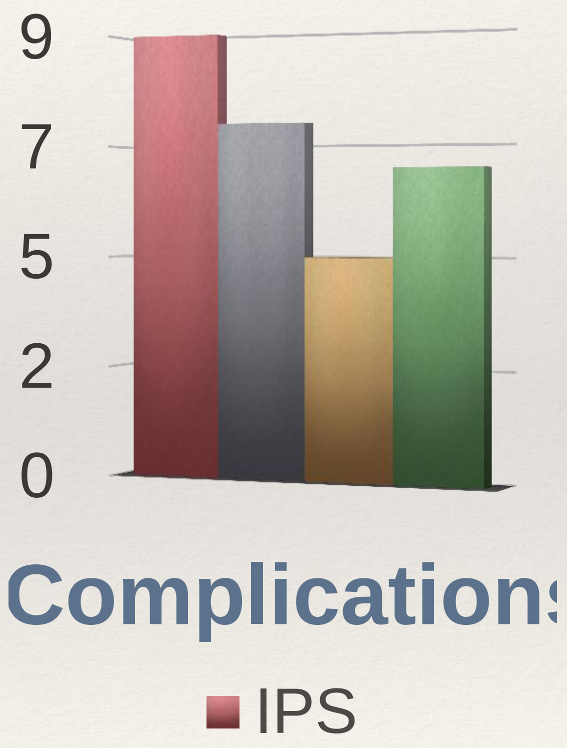


Hip Scores

Complications

Complications included iliopsoas tendinosis in 10 cases, trochanteric bursitis in 8 cases which resolved with simple measures. There were no nerve injuries.

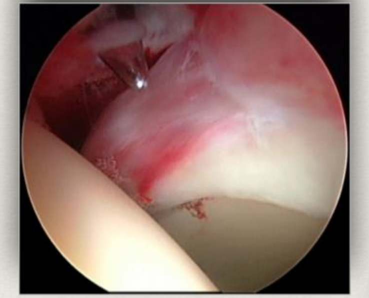
• IPS	10 (9%)
• trochanteric bursitis	8 (7.2%)
• chronic pain	5 (4.5%)
• recurrent symptoms at 6 months	7 (6.3%)
• THR	2 (1.8%)
• heterotrophic ossification	None
• nerve injury / AVN	None
• stress/neck fracture	None



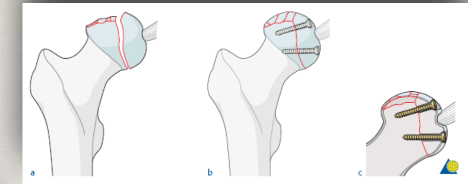
Conclusions

- The outcome is comparable with existing treatments of FAI .
- No risks of nerve injury and/or avascular necrosis.
- The mini-open anterior-oblique approach is a safe and effective procedure.
- Has quick recovery and allows successful return to high activity levels.
- The approach is reproducible and have low learning curve.
- It is very cost effective and could be used as an introduction to FAI surgery in small budget hospitals.
- Reduced recurrent symptoms after 6 months due to better patient selection by treatment algorithms and better awareness of outcome.

Other uses of mini open anterior - oblique approach



- Hip joint wash out.
- Femoral head fracture fixations.



- Synovial biopsies.
- Hip arthroplasty.

References

- Femoroacetabular impingement: a cause for osteoarthritis of the hip.
  Ganz R, Parvizi J, Beck M, et al. Clin Orthop Relat Res 2003;417:112-20
- Current concepts in the management of femoroacetabular impingement.
  Crawford JR, Villar RN. J Bone Joint Surg [Br] 2005;87-B:1459-62.
- Surgical treatment of femoroacetabular impingement: a systematic review of literature.
  Clohisy JC, St John LC, Schutz AL. Clin Orthop Relat Res 2009.
- NICE interventional procedure guidance [IPG403] Published date: July 2011
- NICE interventional procedure guidance [IPG408] Published date: September 2011
- Focus On Mini-open technique for femoroacetabular impingement.
  M. RIBAS, C. CARDENAS-NYLANDER, V. BELLOTTI, M. TEY, O. MARIN. J Bone Joint Surg 2012

Thank You

www.hipimpingement.co.uk

www.labral-tear.com

INTERNATIONAL COMBINED MEETING

BRITISH HIP SOCIETY
SOCIETÀ ITALIANA DELL'ANCA

26-27 NOVEMBER 2015

MILAN, ITALY

Tranexamic Acid Reduces the Blood Loss and Transfusion Requirements following Periacetabular Osteotomy

Georgi I. Wassilew, Viktor Janz, Carsten Perka

Center for Musculoskeletal Surgery

Orthopaedic Department

Charité – University Medicine Berlin

2015 Milano

CMSC
Centrum für Muskuloskeletale Chirurgie

CHARITÉ

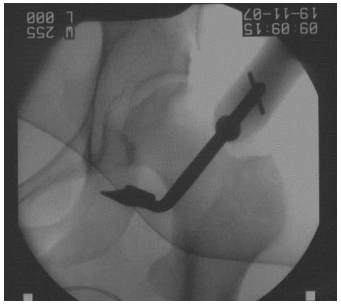
JULIUS WOLFF INSTITUT

Periacetabular osteotomy (PAO)

The major cause for postoperative morbidity after periacetabular osteotomy (PAO) is the intra- and postoperative blood loss.

Causes for blood loss after PAO

- Surgical trauma
- Procedure time
- Bleeding from the exposed cancellous bone after the osteotomies



Blood loss after PAO

- Mean blood loss is approximately 1L (can be up to 4L)

Lee et al. Hip Int. 2013

Transfusion rates after PAO

- 94% of all patients require a blood transfusion
- 20% allogeneic

Pulido et al. J surg orth adv 2008

With the use of standardized predonation protocol

- 92% autogenic transfusions were retransfused
- 16% of all patients still needed additional allogeneic blood transfusions

Atwal, N. S. et al. Hip Int. 2008

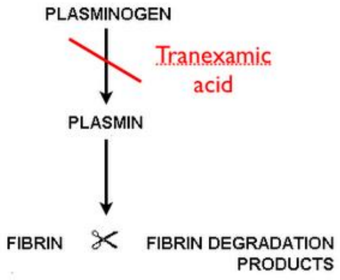
Blood loss and transfusion rates after PAO

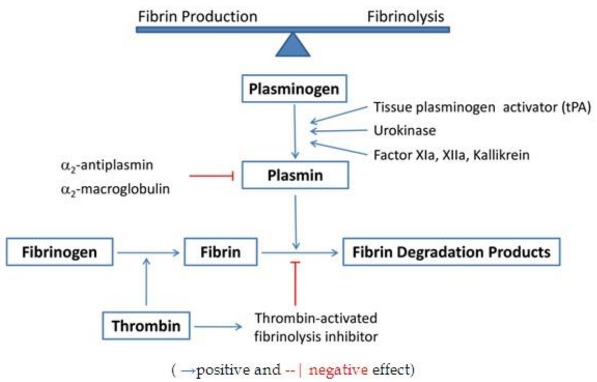
There are no recommended pharmacologic agents to address the blood loss in the perioperative management.

Agents for the reduction of blood loss

Tranexamic acid (TXA) can proactively reduce the blood loss

- Synthetic derivate of the amino acid lysine
- Competitive inhibitor of plasminogen activation
- Inhibitis fibrinolysis
- Supports retention of blood clots





Literature

Intravenous application of TXA effectively **reduces:**

1. Amount of blood transfusions after TKA or THA
2. Without increasing the risk of thromboembolic events

Levine et al. JOA 2014

Rajesparan et al. JBJS Br. 2009

Ralley et al. CORR 2010

However, there currently are no published studies, which investigate the effects of TXA on blood loss and thromboembolic events during PAO.

Objective

Can TXA reduce both perioperative blood loss and the rate of blood transfusions without increasing the incidence of thromboembolic events?

Material und methods

Propective randomized study

96 patients (48 each group) undergoing PAO because of DDH

TXA group

- continuous infusion of 10mg/min/kg TXA

from the time of skin incision to wound closure

Material und methods

Both groups

- Intraoperative blood loss was collected by a cell saver and retransfused postoperatively if an adequate volume was collected
- Standardized anticoagulation with low-molecular-weight heparin (fraxiparin according to weight)

Inclusion criteria:

- Age ranging from 18 to 45 years
- Clinically and radiologically verified DDH
    - Lateral center-edge (CE) angle <25°
    - Anterior center-edge (ACE) angle <25°
    - Acetabular inclination (AI) >10°
    - Femoral head extrusion index (FEI) >25%

Exclusion criteria:

- Preoperative anticoagulation therapy
- Hypersensitivity or allergy to TXA
- History of thromboembolic events
- Hemorrhage
- Hepatic and renal dysfunction (aspartate transaminase-alanine transaminase ratio > 60, creatinine greater than 1.5 mg/dL, or GFR less than 30 mL/minute)
- Seizure
- Coronary stents or prior coronary artery disease
- Congenital or acquired coagulopathy
- Hormone replacement therapy
- Hormonal contraceptive agent (within 7 days prior to surgery)
- Preoperative hemoglobin of less than 10 g/dL

Material und methods

Amount of blood loss was calculated according to a previously described formula

Gross Anesthesiology 1983

Indication for transfusion

- Clinically relevant symptoms of anemia
- Hemoglobin value below 8 g/dL

Results

Results

	Non-TXA group (N=48)	TXA group (N=48)	P value
Male/femal	6/42	6/42	1
Age (years)	31.7 ±10.1	27.4 ±7.0	0.65
BMI (kg/m^2)	23.5 ±4.0	24.2 ±4.7	0.8
Operation time (min)	92.4 ±20.7	85.4 ±15.7	0.1
Hb preoperative (g/dL)	13.4 ±1.1	13.5 ±1.0	0.6

Results

	Non-TXA group (N=48)	TXA group (N=48)	P value
Blood loss (L)	1.9 ±0.9	1.5 ±0.7	*0.01

Results

	Non-TXA group (N=48)	TXA group (N=48)	P value
Blood loss (L)	1.9 ±0.9	1.5 ±0.7	*0.01
Total transfusion rates	63%	13%	*<0.01

Results

	Non-TXA group (N=48)	TXA group (N=48)	P value
Blood loss (L)	1.9 ±0.9	1.5 ±0.7	*0.01
Total transfusion rates	63%	13%	*<0.01
Auto-/allogeneic transfusions rates	37%	11%	*<0.01

Results

	Non-TXA group (N=48)	TXA group (N=48)	P value
Blood loss (L)	1.9 ±0.9	1.5 ±0.7	*0.01
Total transfusion rates	63%	13%	*<0.01
Auto-/allogeneic transfusions rates	37%	11%	*<0.01
Autogenic	23%	11%	*<0.01

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Allogeneic	17%	0%	*<0.01

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	Non-TXA group (N=48)	TXA group (N=48)	P value
Blood loss (L)	1.9 ±0.9	1.5 ±0.7	*0.01
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Autogenic	23%	11%	*<0.01
Allogeneic	17%	0%	*<0.01
Retransfusion of cell saver blood	44%	2%	*<0.01

Results

	Non-TXA group (N=48)	TXA group (N=48)	P value
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Allogeneic	17%	0%	*<0.01
Retransfusion of cell saver blood	44%	2%	*<0.01
Duration of hospital stay in days	10.1 ±1.9	9.0 ±1.2	*0.05

Results

	Non-TXA group (N=48)	**TXA group (N=48)**	**P value**
Blood loss (L)	1.9 ±0.9	1.5 ±0.7	*0.01
Total transfusion rates	63%	13%	*<0.01
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Autogenic	23%	11%	*<0.01
Allogeneic	17%	0%	*<0.01
Retransfusion of cell saver blood	44%	2%	*<0.01
Duration of hospital stay in days	10.1 ±1.9	9.0 ±1.2	*0.05
Thromboembolic events	0	0	1

Summery

Positive effects of TXA are:

Reduced

1. Blood loss
2. Need for blood transfusions and
3. Duration of hospital stay

Thank you!

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INTERNATIONAL COMBINED MEETING

BRITISH HIP SOCIETY
SOCIETÀ ITALIANA DELL'ANCA

26-27 NOVEMBER 2015

MILAN, ITALY

Laser Osteoperforation

A Novel Minimally Invasive Technique for Treatment of Avascular Necrosis of the Femoral Head

International Combined Meeting

British Hip Society & Società Italiana Dell'Anca

Milan, Italy

26th November 2015

Authors

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Introduction

- Avascular necrosis or osteonecrosis of the femoral head is a potentially devastating condition
- Characterized by death of cellular elements of bone and/or marrow due to the interruption of blood supply
- Often leads to total hip arthroplasty in young patients
- No sole effective method in treating/halting AVN
- Key is to prevent disease progression to collapse of femoral head

References
1) JD Kelly et al. Femoral Head Avascular Necrosis. http://emedicine.medscape.com. Last accessed 24/11/ 15
2) C Cooper et al. The epidemiology of osteonecrosis: findings from the GPRD and THIN databases in the UK. Osteoporosis Int. 2010 Apr;21(4): 569-577

Epidemiology

- 1.1 – 2.3/100,000 per year in the UK
- Estimated 750 – 2000 new cases in the UK per year
- 10,000 – 20,000 new cases in the USA yearly
- 5-18% of more than 0.5 million Total Hip Arthroplasty in the USA
- Unknown incidence in Bangladesh and 3rd World Countries but tends to affect lower socioeconomic classes
- Usually between 20-50 years of age

References

1) JD Kelly et al. Femoral Head Avascular Necrosis. http://emedicine.medscape.com. Last accessed 24/11/ 15
2) C Cooper et al. The epidemiology of osteonecrosis: findings from the GPRD and THIN databases in the UK. Osteoporosis Int. 2010 Apr;21(4): 569-577
3) AVN Charity UK. http://avncharity.org.uk. Last accessed 24/11/15

Pathogenesis

- Multiple causes
- Final common pathway from decreased blood flow to femoral head
- Increased intraosseous pressure
- Results in cellular death, fracture and collapse of articular surface
- Healing poor due to poor osteoblastic activity
- 67% - 85% of untreated AVN shown to have collapse

References
1) Musso ES et al. Results of conservative management if osteonecrosis of the femoral head. A retrospective review. Clin Orthop Relat Res 1986;(207):209-215
2) Moya-Angeler J et al. Current concepts on osteonecrosis of the femoral head. World J Orthop 2015 Sept 18 ;6(8):590-601
3) Mont M, Hungerford D. Non-traumatic avascular necrosis of the femoral head. JBJS March 1995;77A(3):459-474

Laser Therapy

- Laser therapy has been shown to induce angiogenesis and stimulation of bone tissue in various studies
- Hypothesis is that the heat generated destroys necrotic tissue whilst stimulating the reparative process by angiogenesis and osteoblast activation
- Also decreases the intraosseous pressure at the same time

References

1) Cury V et al. Low level laser therapy increases angiogenesis in a model of ischemic skin flap in rats mediated by VEGF, HIF-1α and MMP-2. J Photochem Photobiol B 2013 August 5;125: 164-170

2) Effects of low level laser therapy on inflammatory and angiogenic gene expression during the process of bone healing: a microarray study. J Photochem and Photobiology B: Biology 154(2016): 8-15

3) Privalov VA et al. Laser osteoperforation for treatment of inflammatory and destructive bone diseases. Proc SPIE 2009;7373

4) Privalov VA et al. Hyperthermal effect of laser osteoperforation in treatment of experimental acute purulent osteomyelitis. Proc SPIE 1999;3565:72-9

Aim

- To assess the safety and efficacy of laser osteoperforation as a treatment for AVN of the femoral head.

Methods

- 40 patients with 62 hips (various stages)
- July 2009 to March 2013
- Informed consent and ethical approval
- Excluded unwilling patients, psychological disorders, acute fractures, chronic infection, uncontrolled diabetes mellitus

Methods

- Preoperative evaluation done using Harris Hip Score
- Anteroposterior and lateral radiographs of Hips
- Ficat and Arlet Staging
- Preoperative MRI in all cases

References

1) Harris W. Traumatic arthritis of the hip after dislocation and acetabular fractures: Treatment by Mold arthroplasty. JBJS June 1969;51A(4): 737-755

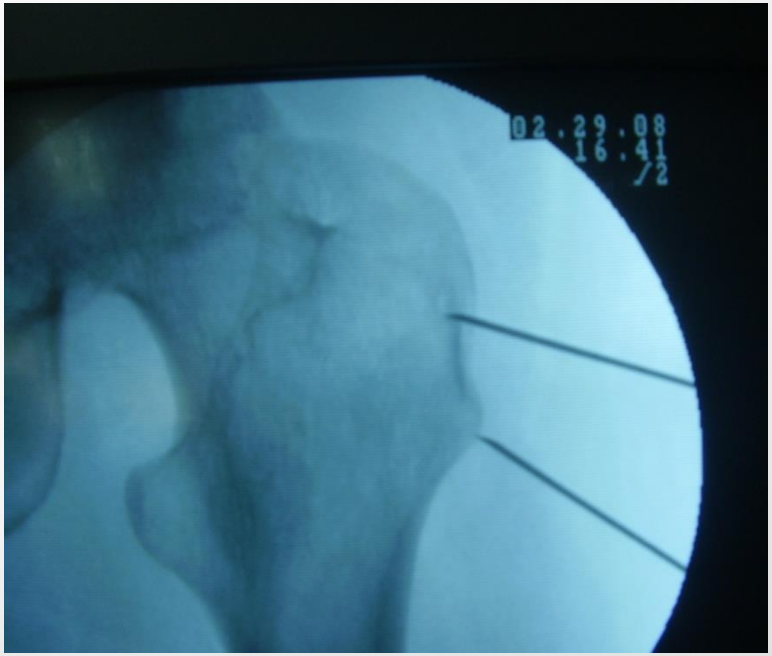
2) Ficat RP. Idiopathic bone necrosis of the femoral head – Early diagnosis and treatment. JBJS Br Jan 1985;67B(1): 3-9

Equipment Used

- Fluoroscopy unit (Siemens, Germany)
- Fluoroscopy compatible operating table (Siemens, Germany)
- Surgical Laser (970mm diode laser, type: LAHTA MILON; Milon Group, St Petersburg, Russia)
- Spinal Needles – 18G, 88mm (Spinocan, B Braun, Germany)
- Sterile WF 400/440/465P Poliimid with SMA-905 connector optical fibre for delivering laser energy (made in Russia)

Technique

- Spinal anaesthetic
- Aseptic cleaning and draping
- 1 - 3 18G needles from skin to bone
- 30 watts in continuous mode
- 3 - 5 minutes



- Trans-trochanteric osteoperforations – from bony cortex to centre of head using 970mm diode laser

Methods

- 3 – 5 18G spinal needles perforating anterior cortex of head
- 16-20 watts in 10 ms pulse mode
- 1 – 3 minutes

- Trans-capital laser osteoperforation

Post operatively

- Bed rest for 3 weeks
- NWB to FWB progressively
- All followed up at 3 weeks, 3 months, 6 months and 12 months
- Only those with minimum 3 follow up visit included
- HHS and x-rays at every visit

Results - Demographics

- 28 male : 12 female
- 20 – 90 years (mean 37.4 years)
- 55% steroid
- 25% idiopathic
- 20% posttraumatic

Age Range (Years)	Number	Percentage (%)
20 - 30	14	35
31 - 40	14	35
41 – 50	5	12.5
51 - 60	5	12.5
61 - 70	1	2.5
> 70	1	2.5
Total	40	100

Table 1: Age Distribution of patients

Results - Demographics

Ficat & Arlet Stage	Number of Hips	Percentage (%)
Stage I	15	24.2
Stage II	10	16.1
Stage III	17	27.5
Stage IV	20	32.2
Total	62	100

Table 2: Distribution of involved hips according to radiological stage (Ficat & Arlet)

Results - Outcome

- Average preoperative HHS: 31.4
- Average postoperative HHS: 82.4

Stage (preop)	No. of Patients	HHS			
		Excellent	Good	Fair	Poor
I	15	12 (80%)	2 (13.3%)	1 (6.7%)	0
II	10	6 (60%)	2 (20%)	2 (20%)	0
III	17	4 (23.5%)	5 (29.4%)	7 (41.2%)	1 (5.9%)
IV	20	3 (15%)	4 (20%)	8 (40%)	5 (25%)
Total	62	25 (40.3%)	13 (21%)	18 (29%)	6 (9.7%)

Table 3: Outcome according to HHS. After a minimum of 3 follow up visits (at 10 months from surgery) onwards

Results

- No patient has needed a total hip arthroplasty as yet

Results – Case Example

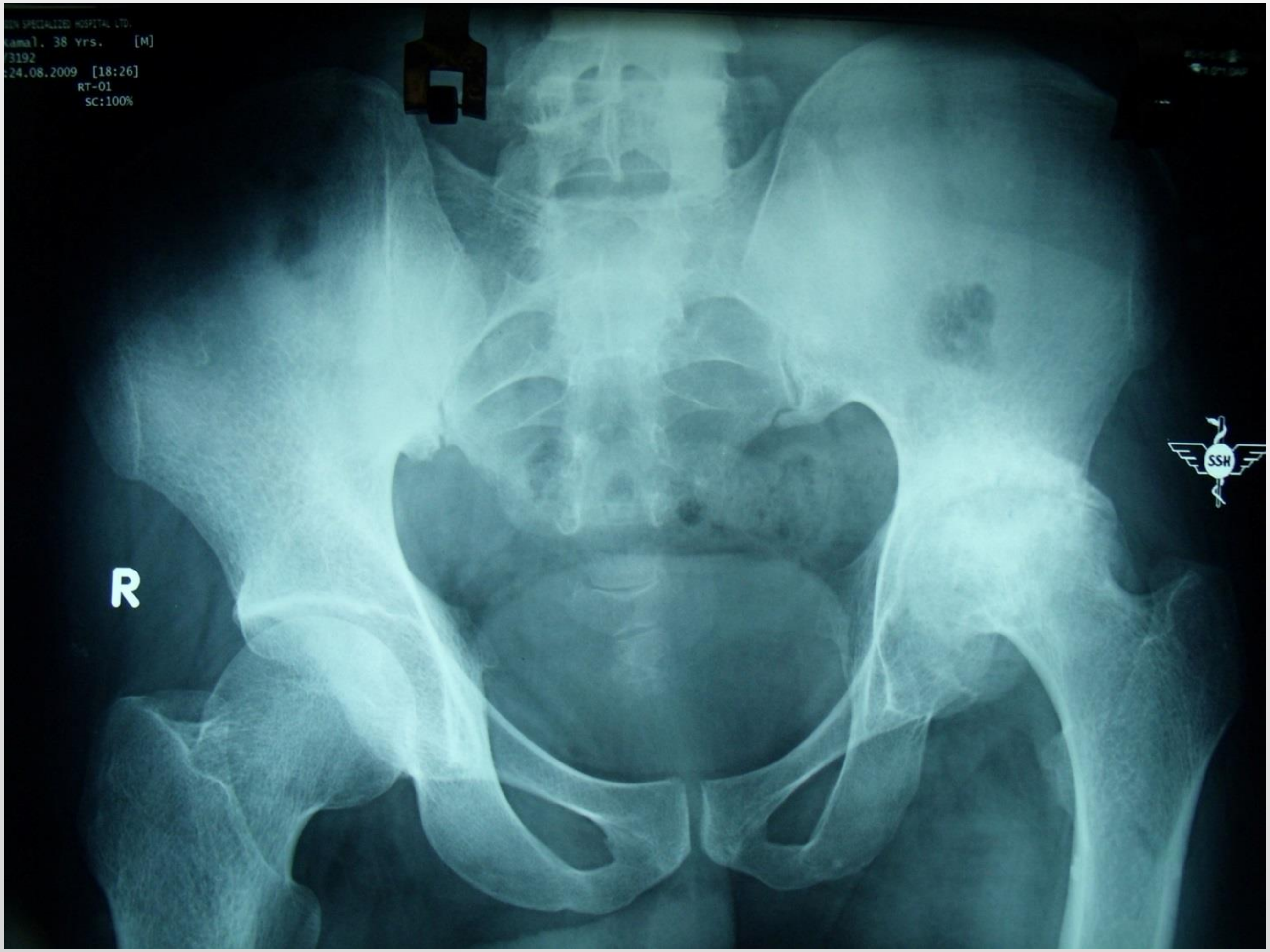


Fig 1: Preop xray of 38 year old male. Ficat IV. HHS 15

Results – Case Example

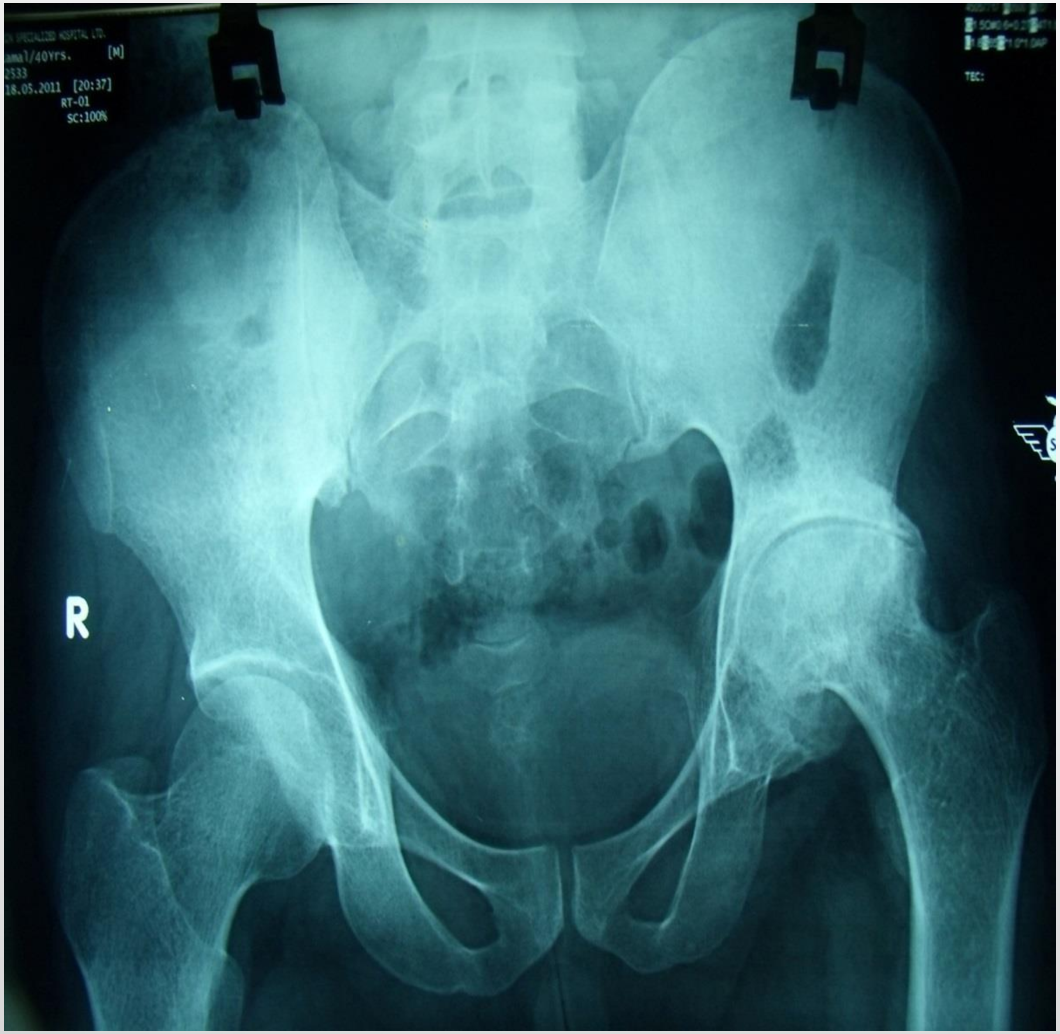


Fig 1: Post op xray of same patient 4 years later. Ficat II. HHS 85

Complications

- Only 2 complications observed in study (3.23%)
  - puncture site infection treated with oral antibiotics
  - breakage of needle which was retrieved via small incision along
- Potential other complications
  - Haemarthrosis
  - Femoral head fragmentattion
  - Neck of femur fracture
  - Soft tissue injury from malpositioning of needle
  - Damage to femoral nerves and vessel

Conclusion

- Laser osteoperforation is an effective treatment modality for AVN of the femoral head
- Minimally invasive
- Safe
- Effective at all stages, more so in stage I & II
- Cost effective (about USD$ 1000 including hospital stay)
- Can be done multiple times
- Delays need for THA

Limitations

- Non randomized trial
- Needs better recording of data
- Needs statistical analysis
- Did not look specifically at how many patients improved in Ficat & Arlet staging
- Did not calculate pre and post op difference in HHS for each individual patient
- Needs clearer definition of how many needles to put in per hip
- Limitations of Ficat & Arlet Classification

Recommendations

- Needs more long term follow up
- More numbers needed
- Needs proper randomized controlled trial if possible
- Collaboration with other centres/countries
- Consider MRI for all hips post operatively
- Needs documentation of downstaging of Ficat & Arlet classification
- Statistical analysis
- Better classification systems/diagnostic tools for AVN to pick up those in early AVN

INTERNATIONAL COMBINED MEETING

BRITISH HIP SOCIETY
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26-27 NOVEMBER 2015

MILAN, ITALY

Periacetabular Osteotomy:

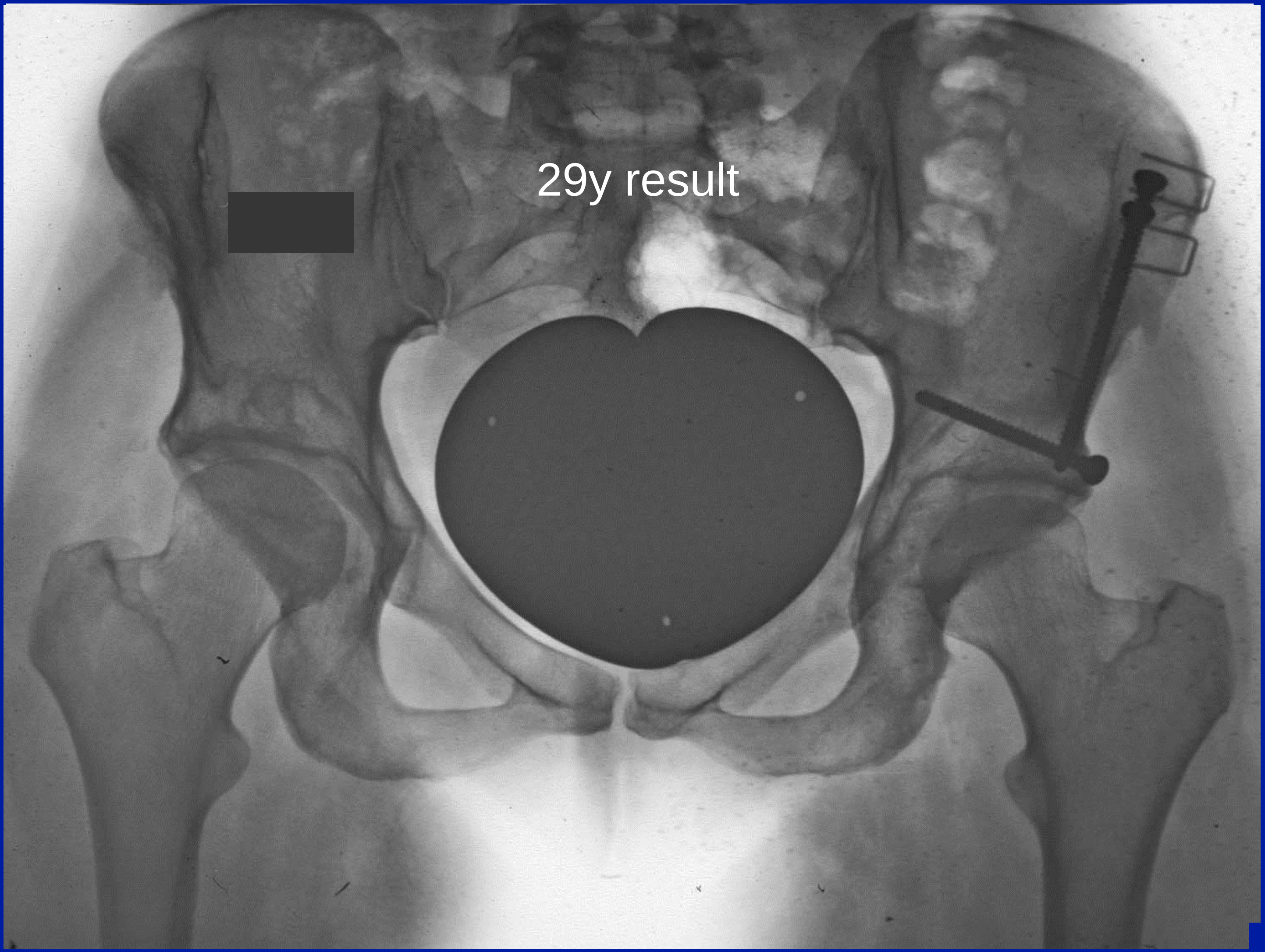
grey zones and limits of indication

Reinhold Ganz

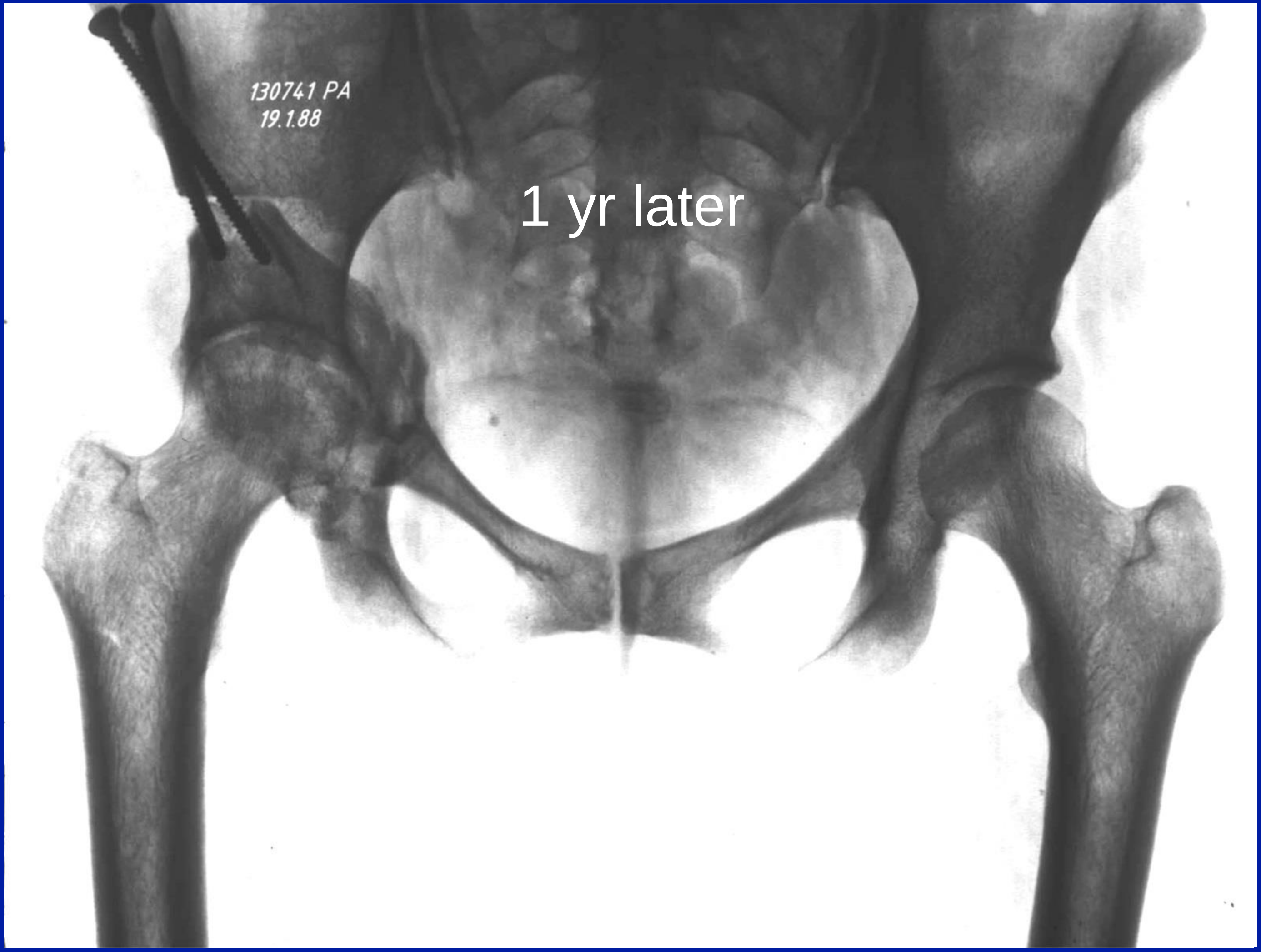
Emeritus

University of Bern, Switzerland

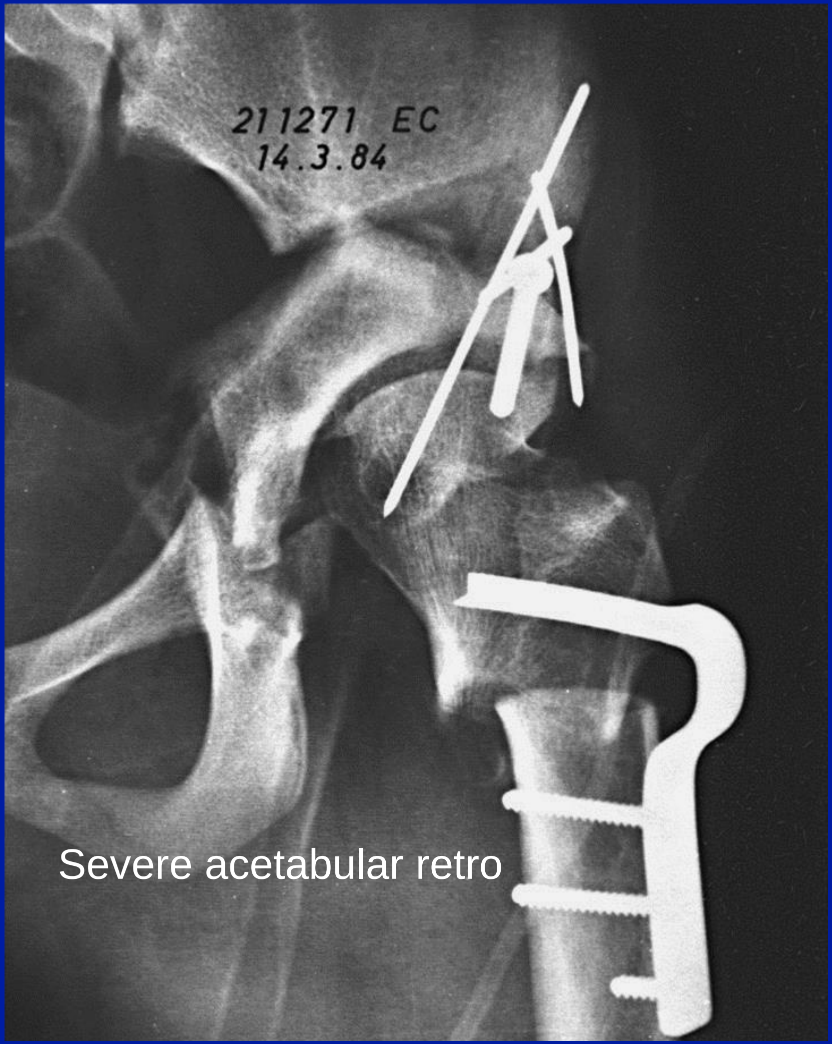
Good indication - good outcome

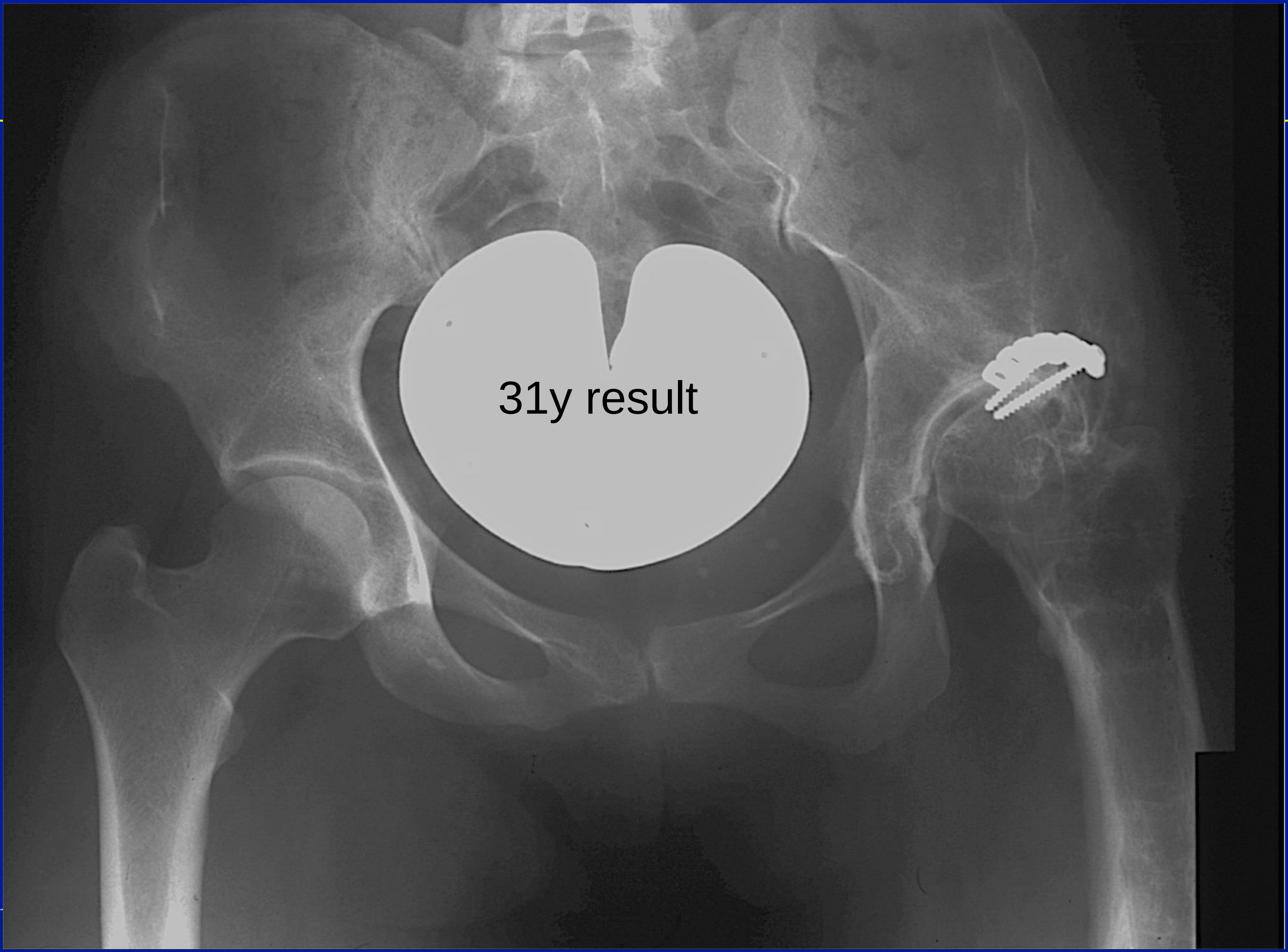


Poor indication - poor outcome



1984 - 1. clinical case after 25 cadaver trials




31y result

PAO: Predictors of failures

Sambandam SN et al. Int Orthop. 2009; 33: 148-8

Table 1 Studies included in this review

Study	Year	Number of hips	Average age	Follow-up	Number of THAs
Ganz et al. [7]	1988	75	29	NR	1
Trousdale et al. [20]	1995	42	37	48	6
MacDonald et al. [12]	1999	13	23	76	0
Murphy et al. [16]	1999	94	29	60	2
Murphy and Millis [15]	1999	130	27	45	5
Ganz et al. [19]	1999	75	29.3	135	13
Crockarell et al. [4]	1999	21	21	38	1
Davey and Santore [6]	1999	70	36.5	NR	0
Trumble et al. [14]	1999	19	30.9	45	2
Matta et al. [13]	1999	66	33.6	48	5
Trumble et al. [22]	1999	123	32.9	51	7
Trousdale et al. [21]	2002	9	34	NR	0
van Bergayk and Garbuz [23]	2002	25	32	33	0
Katz et al. [10]	2005	8	16.5	67	0
Armand et al. [1]	2005	12	35	24	0
Clohisy et al. [2]	2005	16	17.6	NR	0
Pogliacomi et al. [18]	2005	36	35	48	2
Kralj et al. [11]	2005	26	34	144	4
Peters et al. [17]	2006	83	28	46	4
Cunningham et al. [5]	2006	52	28.4	19	5
Hseih et al. [9]	2006	36	36	24	0
Clohisy et al. [3]	2007	24	22.7	53	0
Garras et al. [8]	2007	58	37.6	66.7	4

THA total hip arthroplasty

Methods

Studies	23
Patients	1113
Followup (years)	2 - 14
Failures (patients)	61 (5%)

Results

	ODDs
High OA grade	3.36
Preop. subluxation	1.22
Low M d ‘A score	1.59

Female, 42y

When in doubt: Arthro-MRI with radial cuts

Indication for PAO

Ideal indication

Young patient, round femoral head,

congruent but dysplatic acetabulum,

No cartilage or labrum damage

Good indication

Congruency in abduction, labral avulsion,

Minor acetabular cartilage damage,

Small acetabular rim ganglion

Moderate indication

Moderate joint incongruency in abduction,

Increasing joint space in abduction/ flexion,

More severe cartilage damage, young age,

Age over 40y

Contraindication

OA = > 2

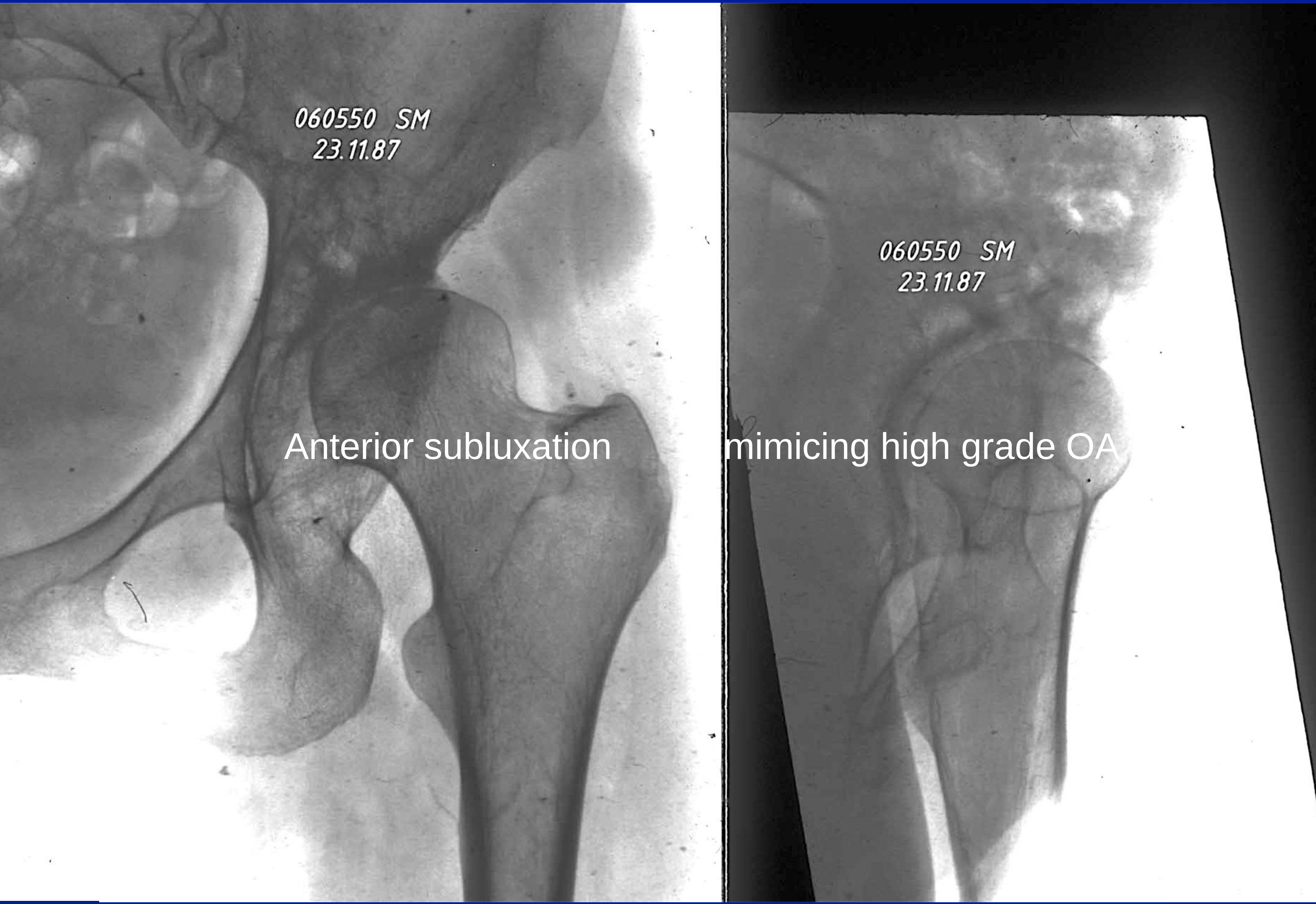
High subluxation/ dislocation

Limited acetabular perfusion

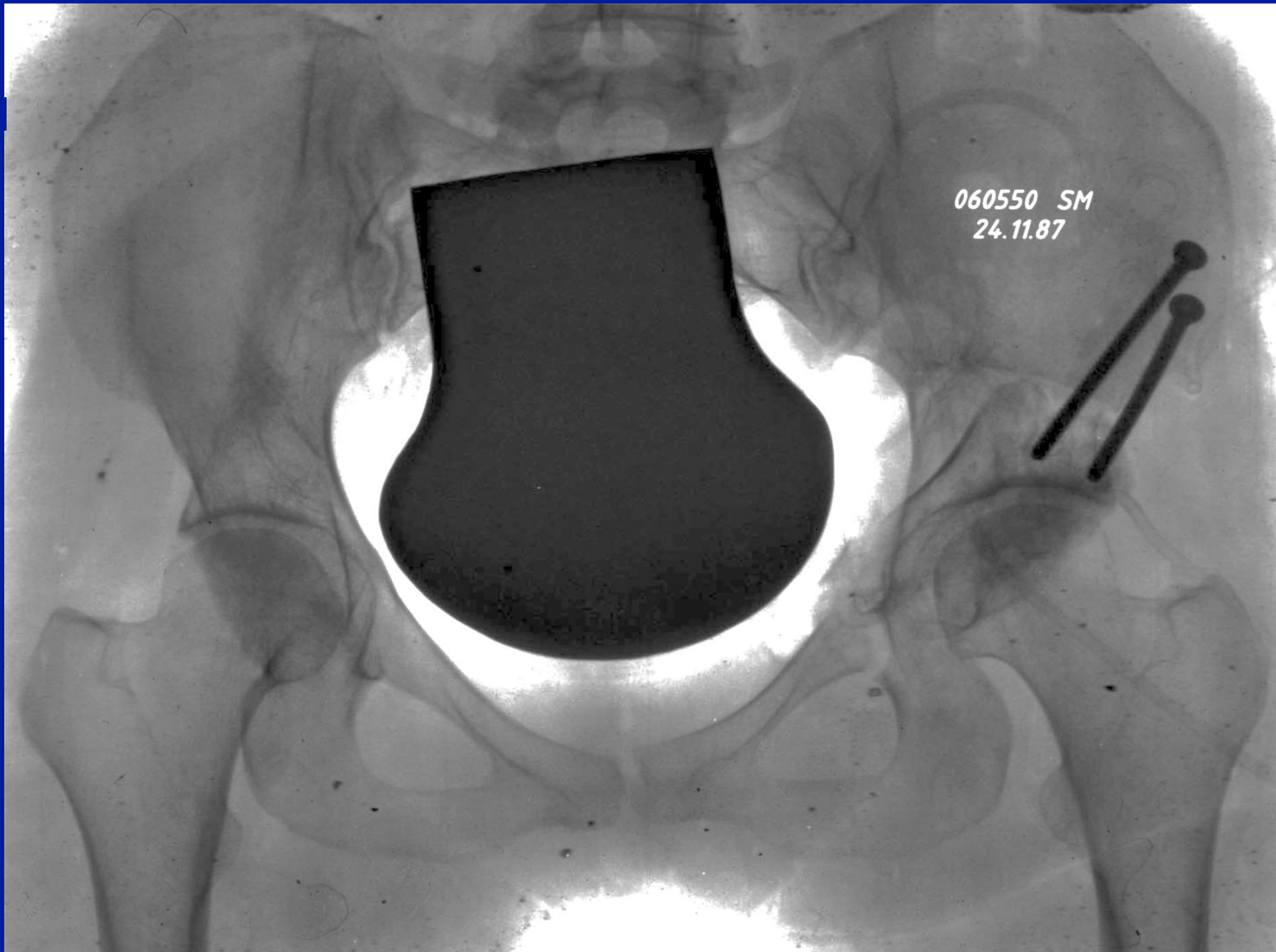
Severe incongruency

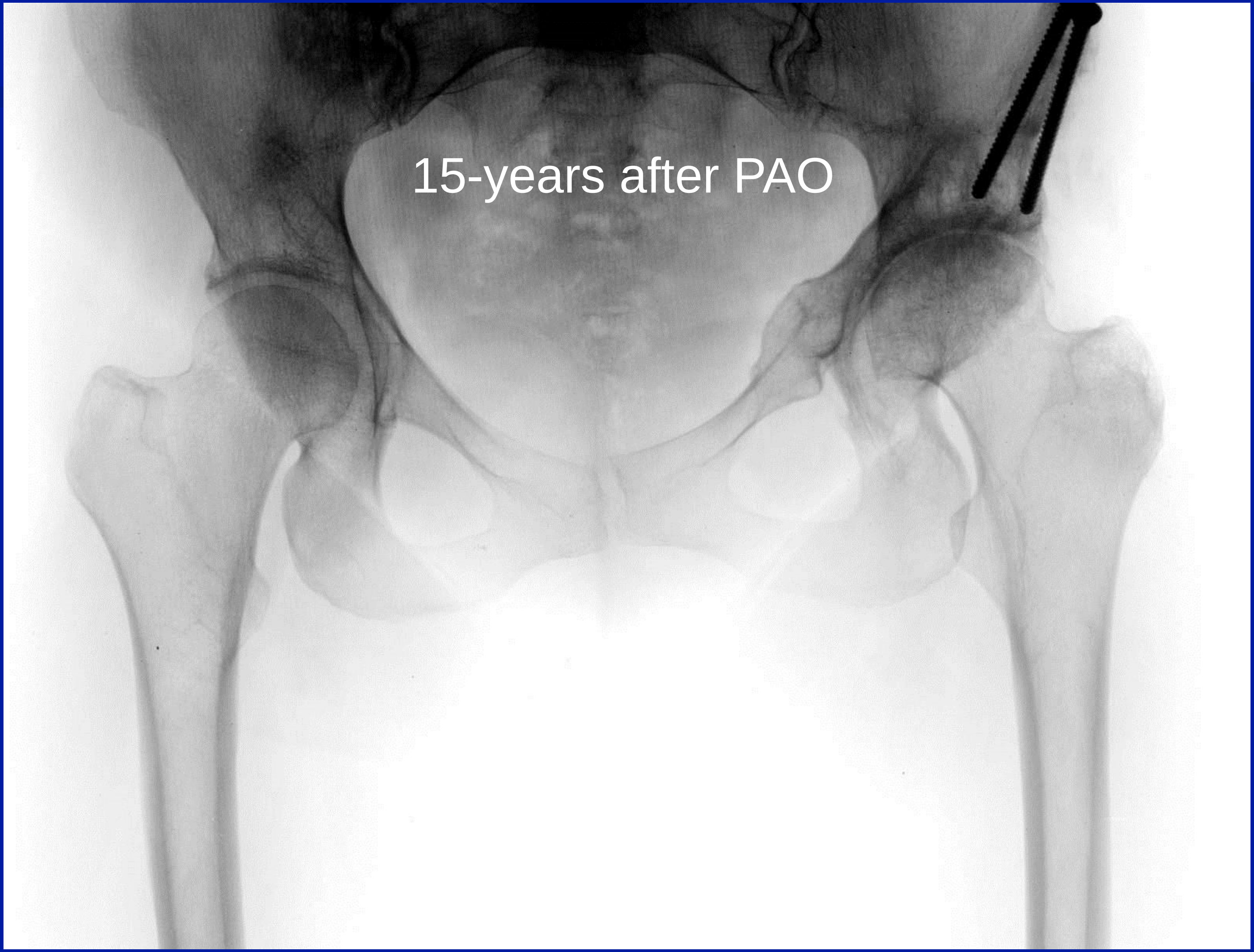
Extremely shallow acetabulum

Age < 5y



Anterior subluxation mimicing high grade OA


060550 SM
24.11.87

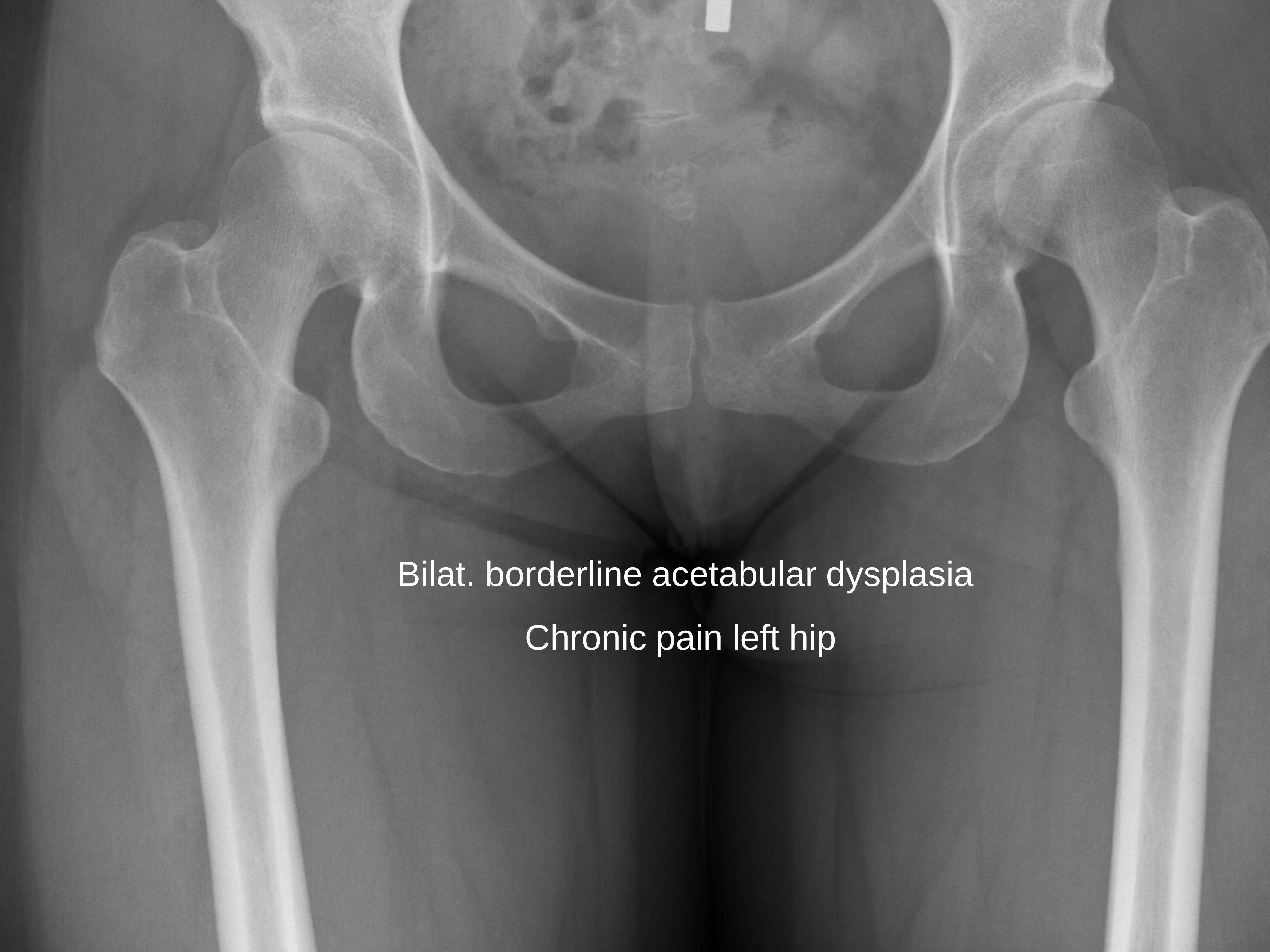

15-years after PAO

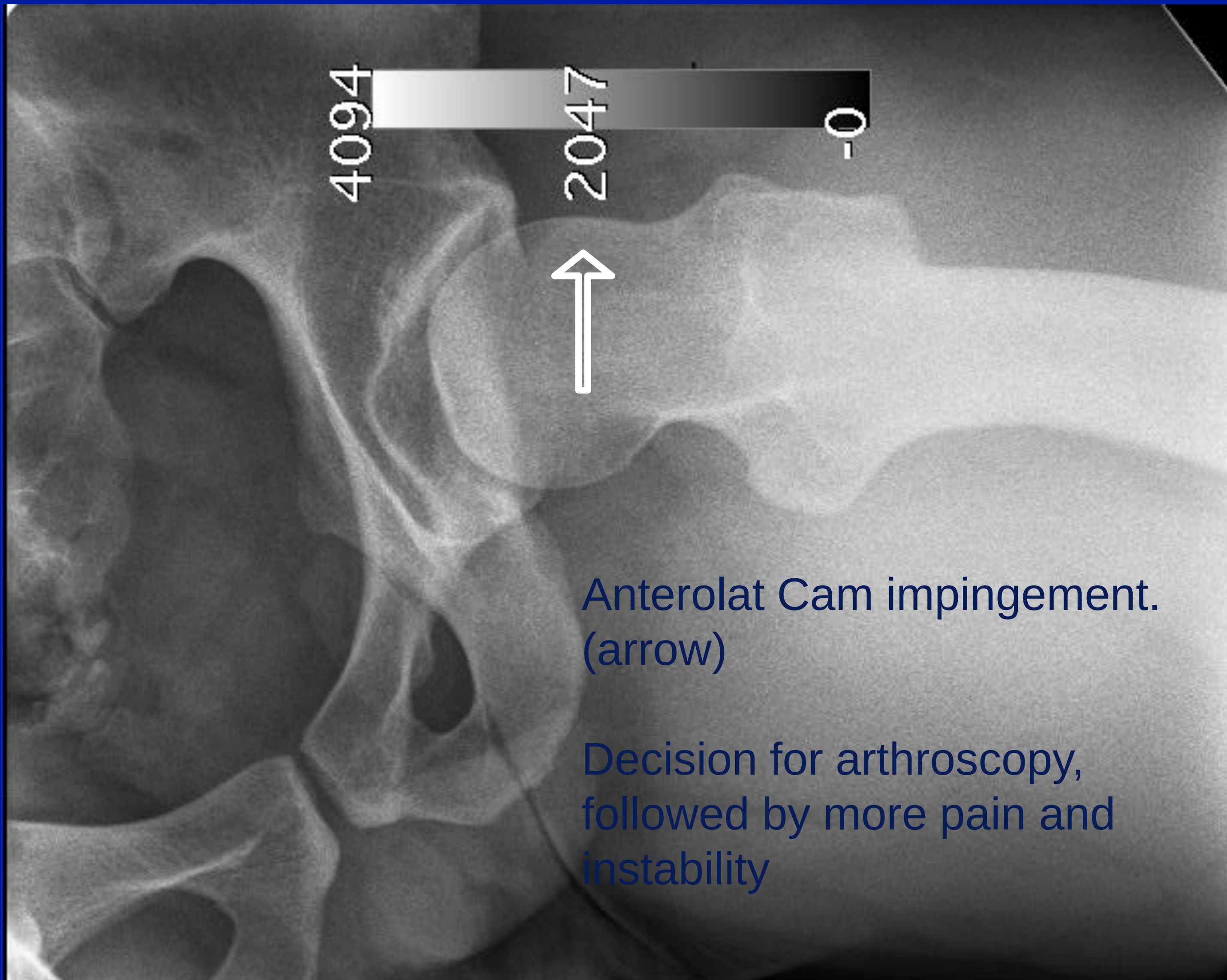
Indication for PAO

Special aspects

Borderline dysplasia but pain from impingement

Open triradiate cartilage

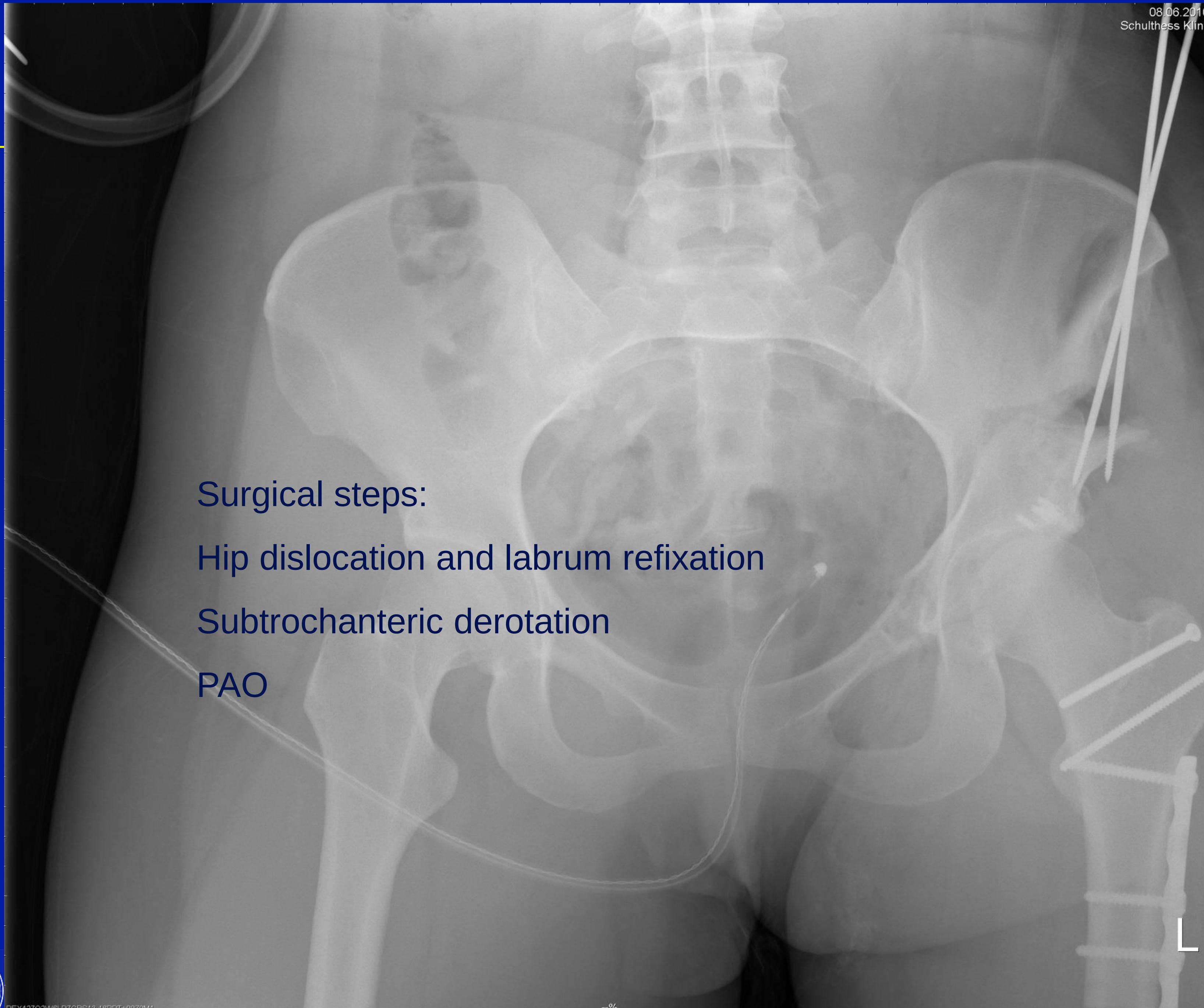

Bilat. borderline acetabular dysplasia
Chronic pain left hip



Anterolat Cam impingement.
(arrow)

Decision for arthroscopy, followed by more pain and instability


Anterior head migration



Surgical steps:

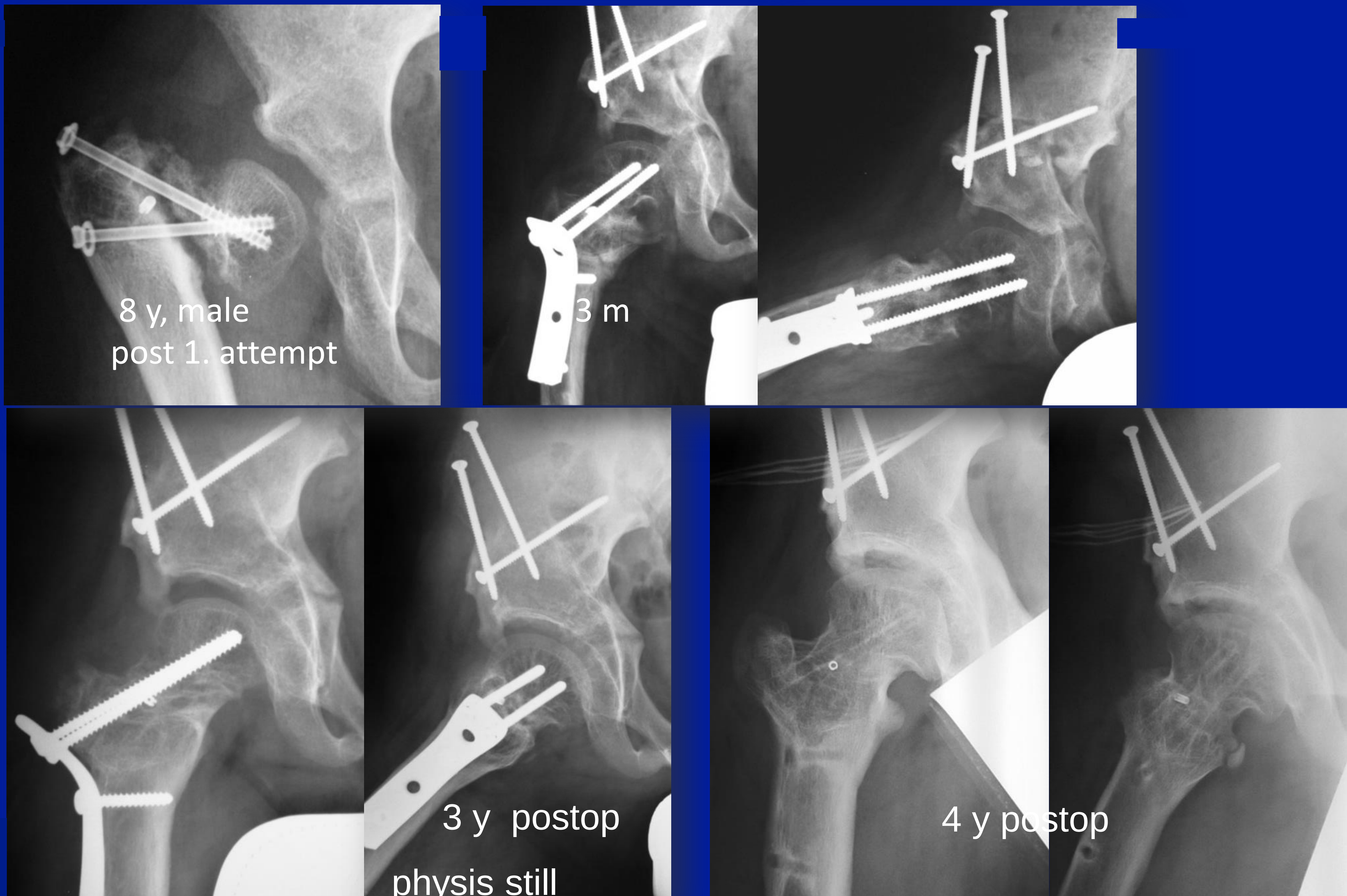
Hip dislocation and labrum refixation

Subtrochanteric derotation

PAO

4y result with painfree motion and loading congenital coxa vara, severe acetabular dysplasia: Subtroch valgus OT + PAO

PAO-injury to the growth plate too small to create growth related deformity



Indication for PAO

Increased risk factors

Limited vascularity of the fragment,

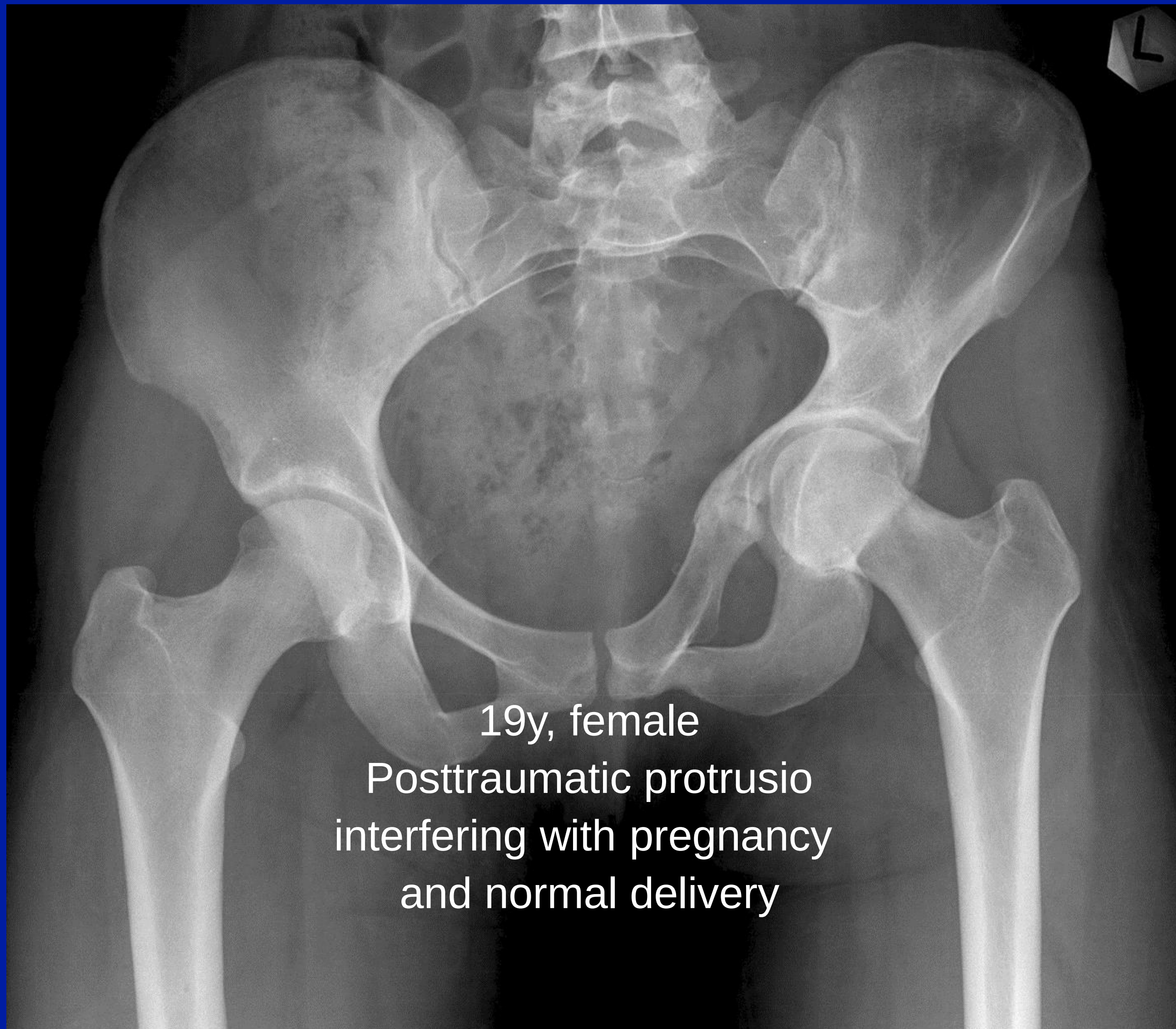
Scaring around the sciatic nerve

Arthrogryposis

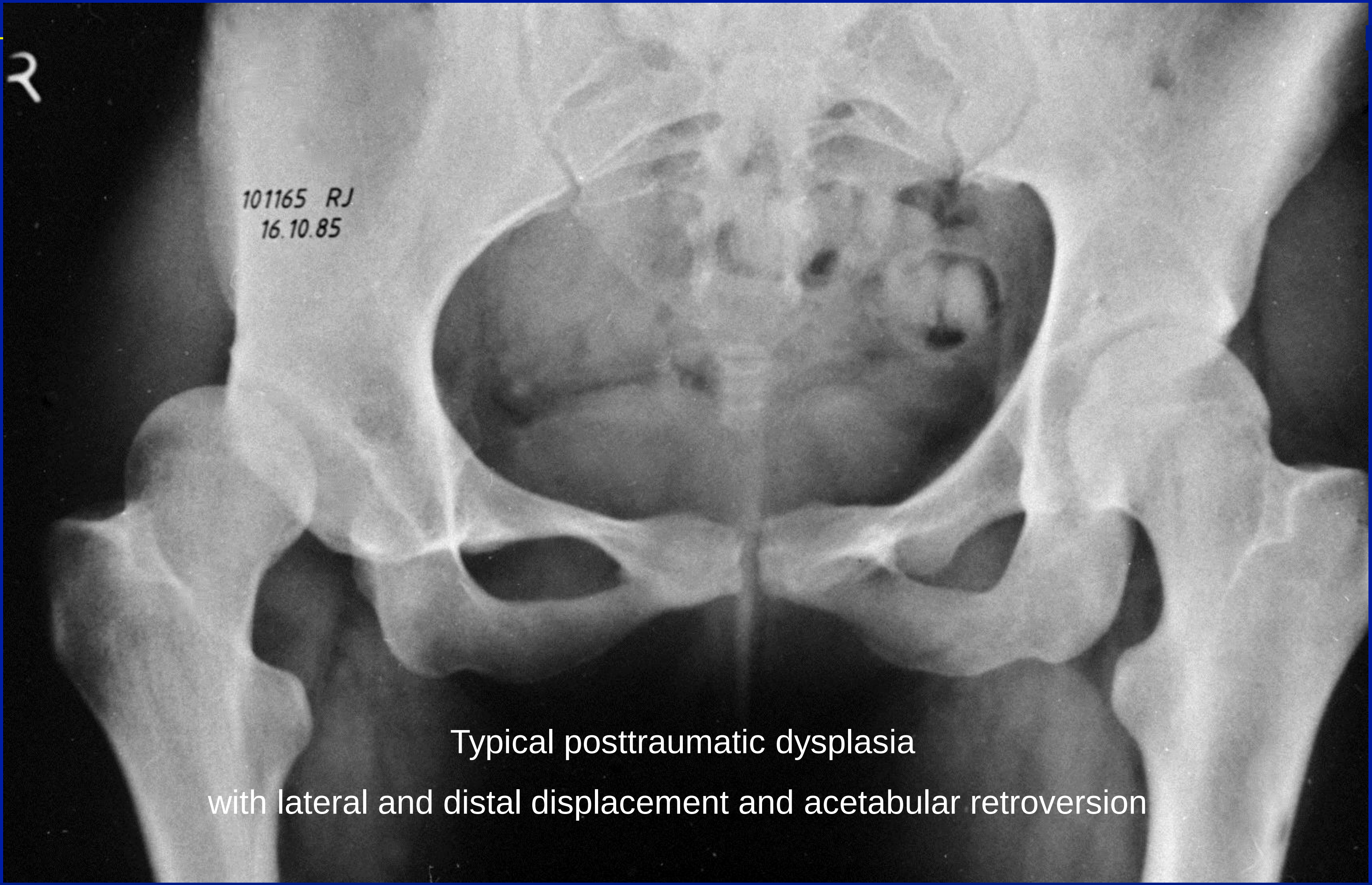
Extreme deformity


26y old female
Extreme retroversion after
two attempts of reorientation.
Recovered from sciatic nerve palsy
R
1b


First step: sciatic nerve release
Second step: anteverting PAO

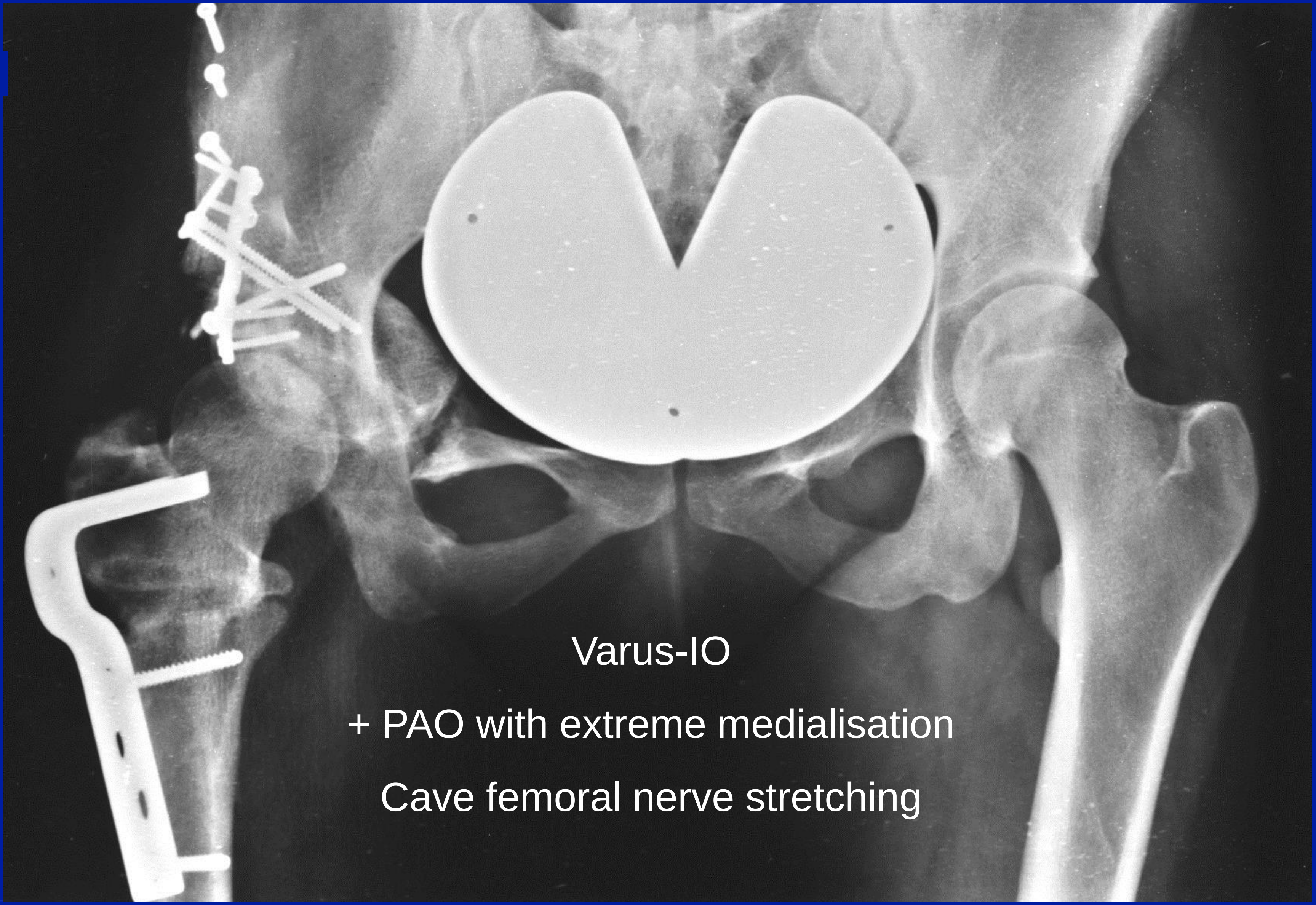

L
19y, female
Posttraumatic protrusio
interfering with pregnancy
and normal delivery


First normal delivery
13 months after reverse
periacetabular correction
L
OPS



Typical posttraumatic dysplasia

with lateral and distal displacement and acetabular retroversion


Varus-IO
+ PAO with extreme medialisation
Cave femoral nerve stretching

Indication for PAO

Contraindication

OA = > 2

Extremely shallow acetabulum

Severe incongruency

High subluxation/ dislocation

Limited acetabular perfusion

Age < 6y

Extremely shallow acetabulum

without anterior and posterior wall.

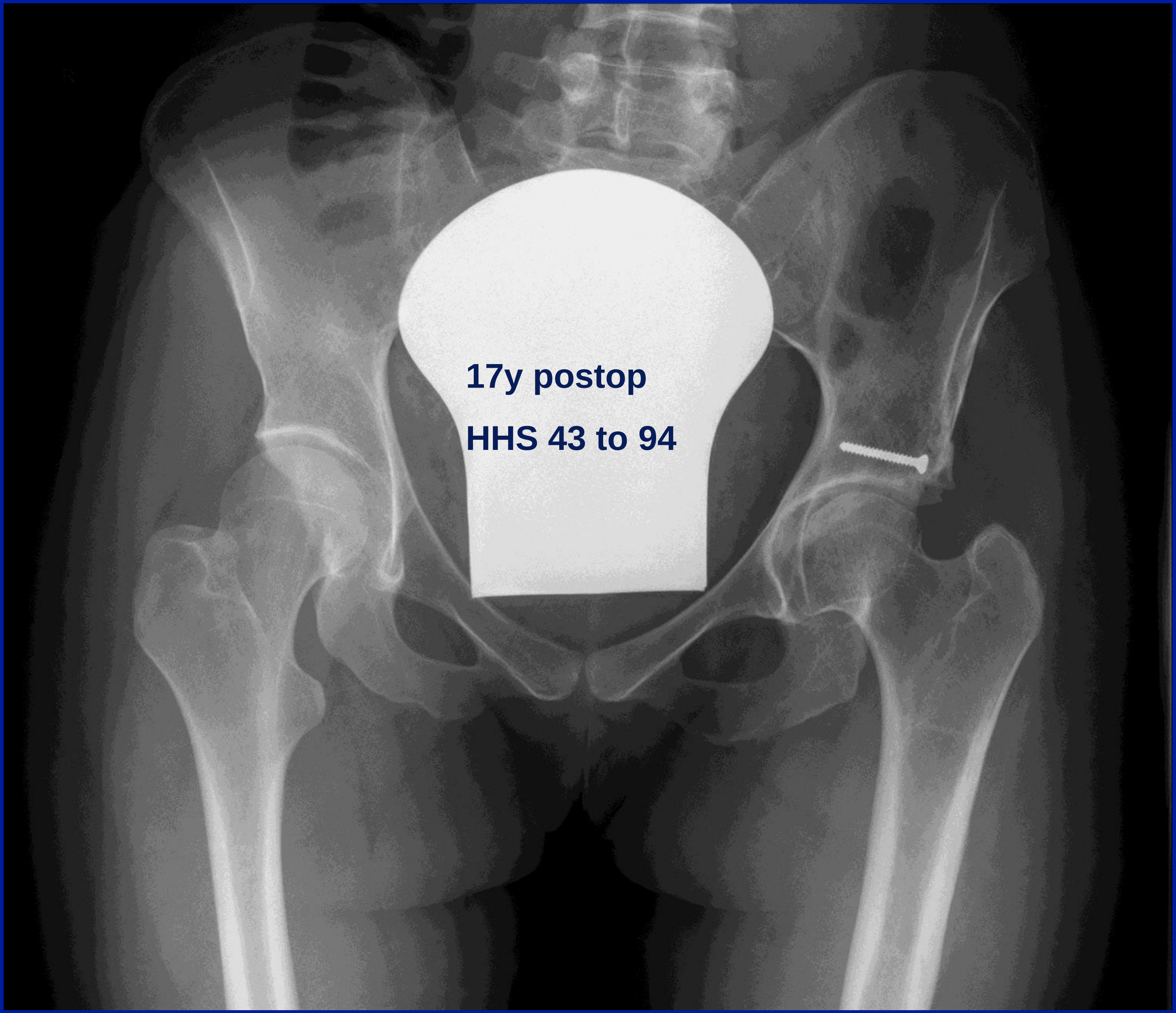
Candidate for a Codivilla-Colonna capsuloplasty

13y, female.

Dislocation with secondary acetabulum

Codivilla-Colonna procedure

with derotation and shelf



Patient is considering her hip as normal

Message

PAO is a versatile procedure in hip preservation surgery

Indication for PAO should be the result of an individualized evaluation

Decision making in borderline hips is always difficult; radial arthro-MRI may be helpful

Degree of cartilage degeneration together with age are the most frequent parameters for not to indicate a PAO

INTERNATIONAL COMBINED MEETING

BRITISH HIP SOCIETY
SOCIETÀ ITALIANA DELL'ANCA

26-27 NOVEMBER 2015

MILAN, ITALY

MANAGEMENT OF OSTEONECROSIS OF THE FEMORAL HEAD

Current practice of members of the British Hip Society 2015

H. Colaco[1], J. Davidson[2], D. Davenport[3], M. Norris[4], M. Bankes[5], Z. Shah[5]

St George's University Hospital[1], RNOH Stanmore[2], PRUH Bromley[3], Darent Valley Hospital[4], Guys & St Thomas' Hospital[5]

Introduction

- Incidence of new ONFH cases - 20,000/yr (USA)
- Typically affects patients aged 30-50 years
- Multifactorial cause

- Wide range of options for treatment
  - Risk factor modification
  - Non-operative therapy
  - Core decompression and 'joint preserving surgery'
  - Arthroplasty in advanced disease

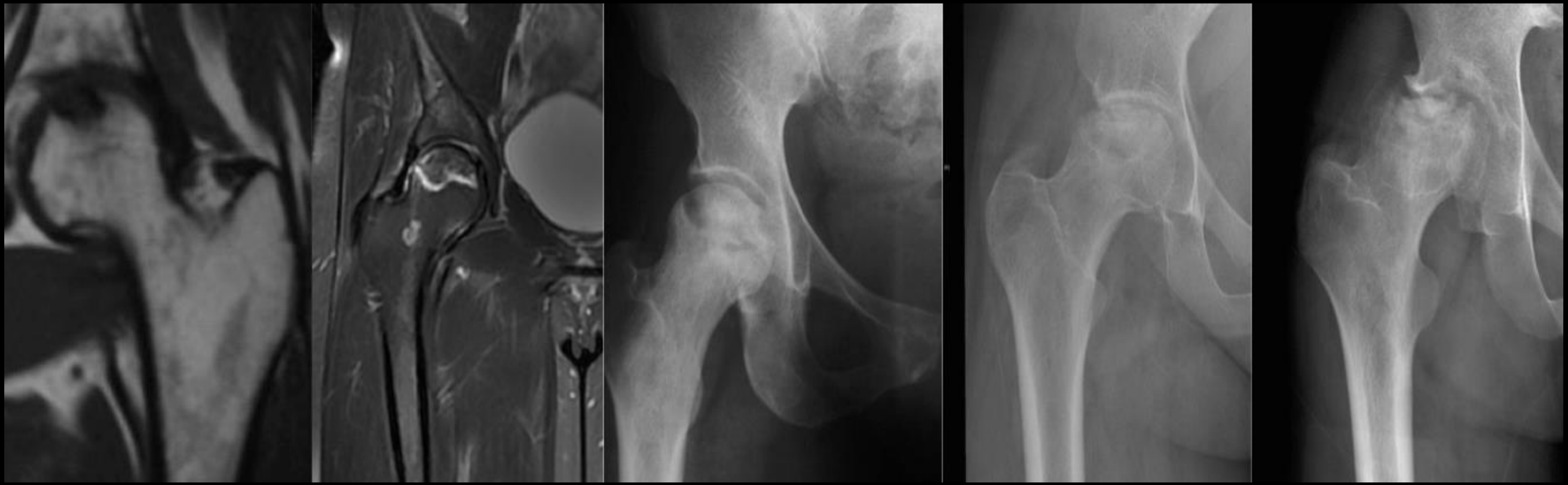
- **No national guidelines in UK for management**

Survey Method

- **Aim:** To report current practice of UK hip specialists regarding management of ONFH

- Single stage internet survey 2015
- 352 Consultant members of BHS (115 responses)
  - Demographics
  - Experience (years, fellowship, operations)
  - 8 scenarios of symptoms and stage of ONFH for a 24yr and 48yr old patient
    - Surgeons asked to indicate their preferred treatment from a list of interventions

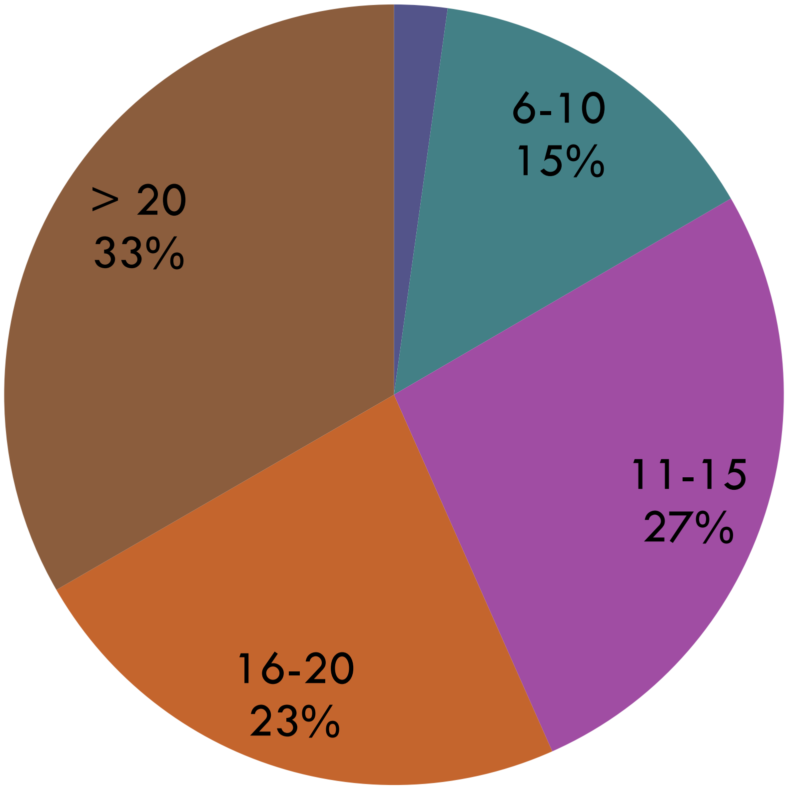
Scenarios covered each stage of osteonecrosis



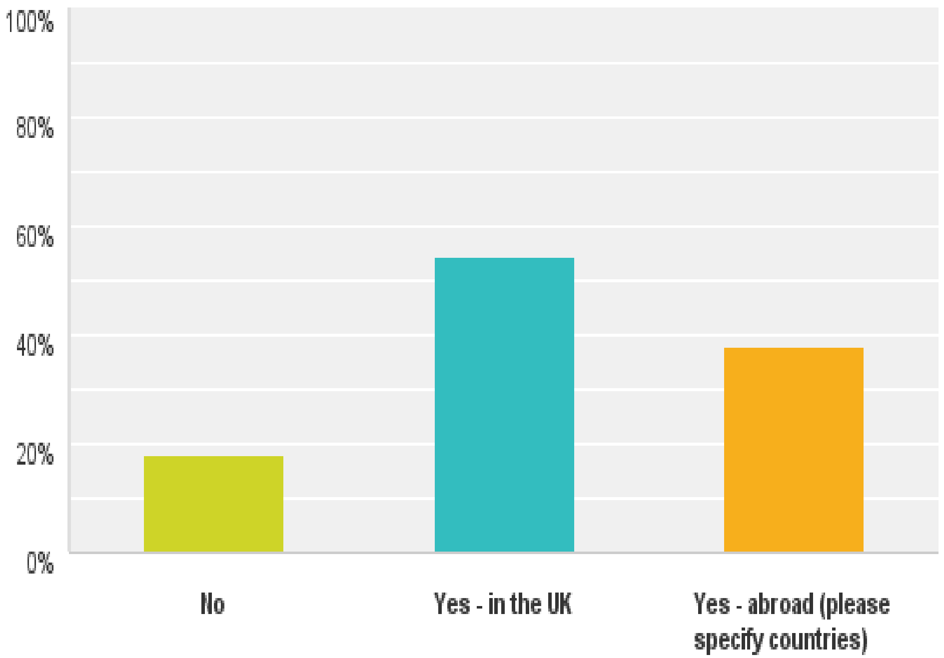
Provided by Mr M Bankes, FRCS(Tr&Orth)

RESULTS

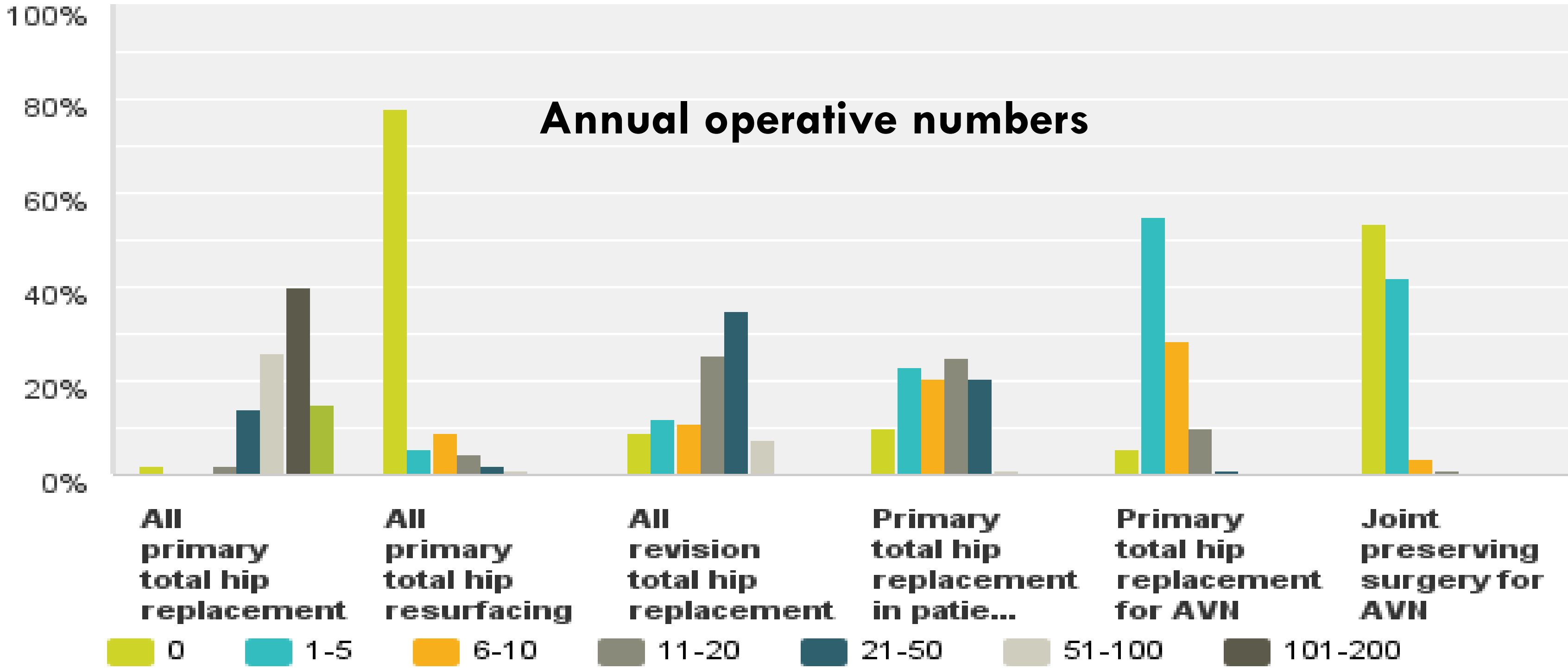
Demographics

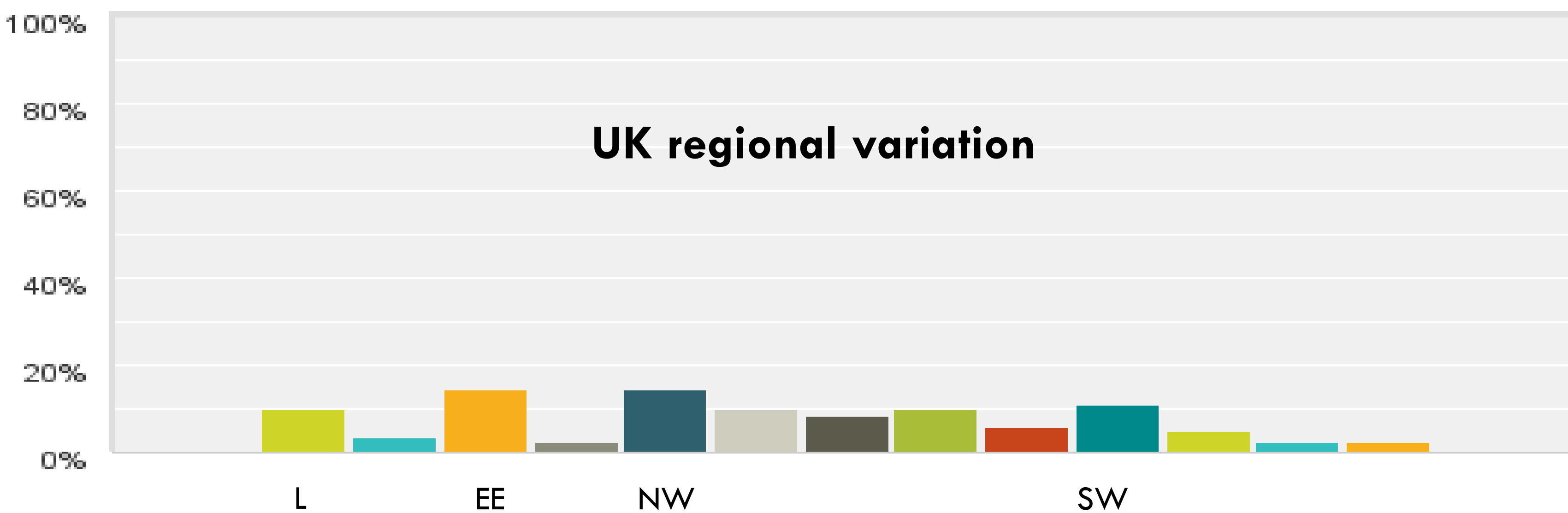


Number of years of orthopaedic experience



55% - Hip Fellowship UK
38% - Hip Fellowship abroad

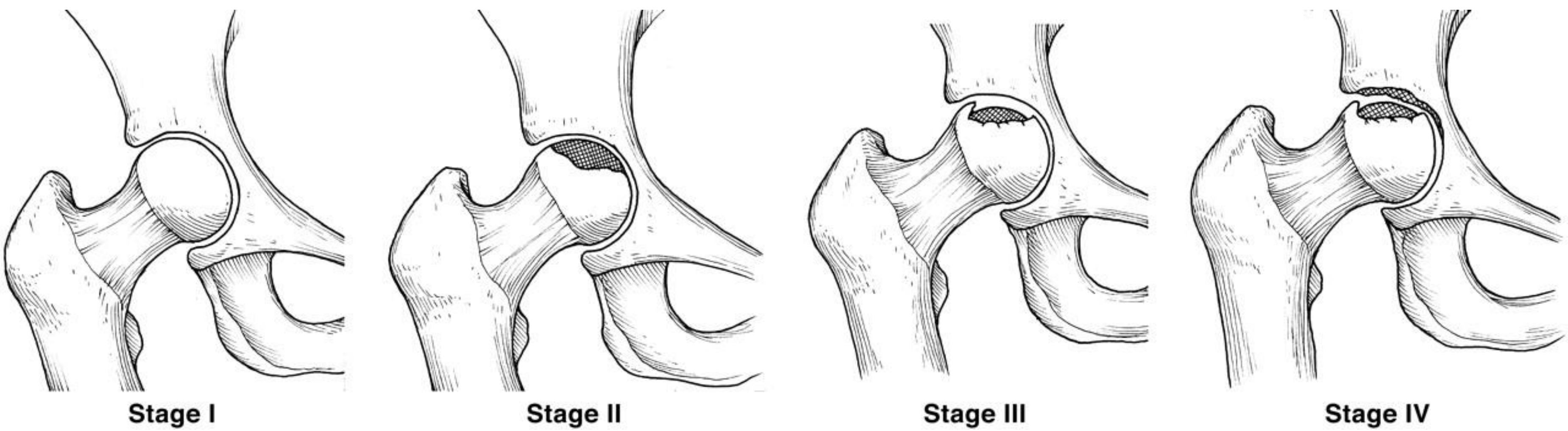

Annual operative numbers
100%
80%
60%
40%
20%
0%
All primary total hip replacement
All primary total hip resurfacing
All revision total hip replacement
Primary total hip replacement in patie...
Primary total hip replacement for AVN
Joint preserving surgery for AVN
0
1-5
6-10
11-20
21-50
51-100
101-200


UK regional variation
100%
80%
60%
40%
20%
0%
L
EE
NW
SW

RESPONSES TO CLINICAL SCENARIOS

Radiographic Classifications

- 89% of respondents used Ficat & Arlet classification to assess stage of ONFH
- 58 % used ‘pre-collapse’ and ‘post-collapse’ stages



Management of *symptomatic* pre-collapse ONFH

- 24yr patient
  - Non-operative = 41%
  - Core decompression = 52% (JPS = 54%)
  - THA = 4% (Arthroplasty = 5%)

- 48yr patient
  - Non-operative = 46%
  - Core decompression = 44% (JPS = 45%)
  - THA = 9% (Arthroplasty = 9%)

Management of post-collapse ONFH

- 24yr patient
  - Non-operative = 7%
  - Core decompression = 28% (JPS = 41%)
  - THA = 49% (Arthroplasty = 52%)

- 48yr patient
  - Non-operative = 9%
  - Core decompression = 22% (JPS = 25%)
  - THA = 63% (Arthroplasty = 65%)

Effect of patient age on intervention

- No difference in operative vs non-operative, regardless of stage
  - 24yr: 67.9% operative
  - 48yr: 63.2% operative

$P = 0.11$

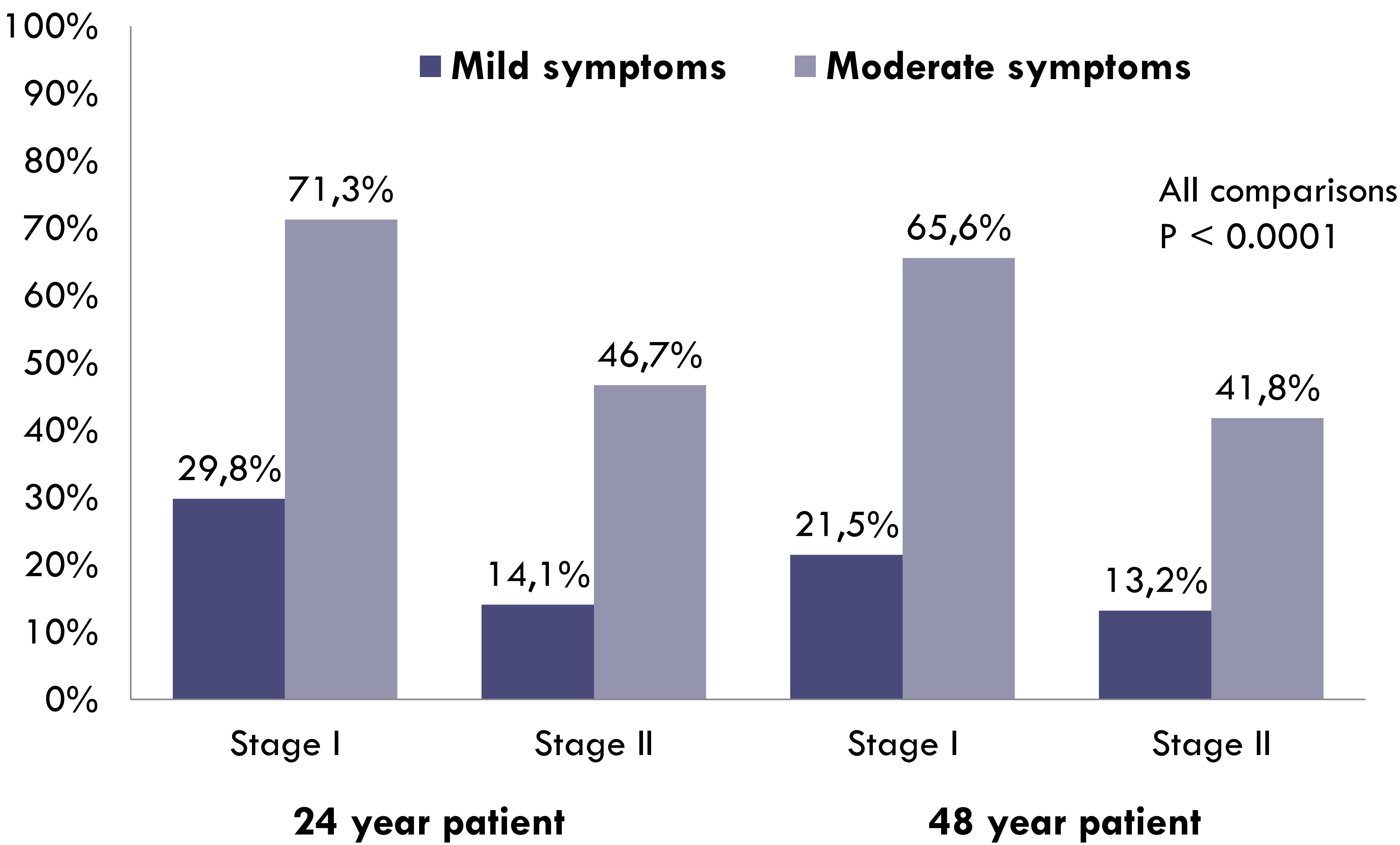
- Joint preserving procedures more commonly selected in 24yr old patient
  - 24yr: 58.6%
  - 48yr: 44.2%

$P < 0.0001$

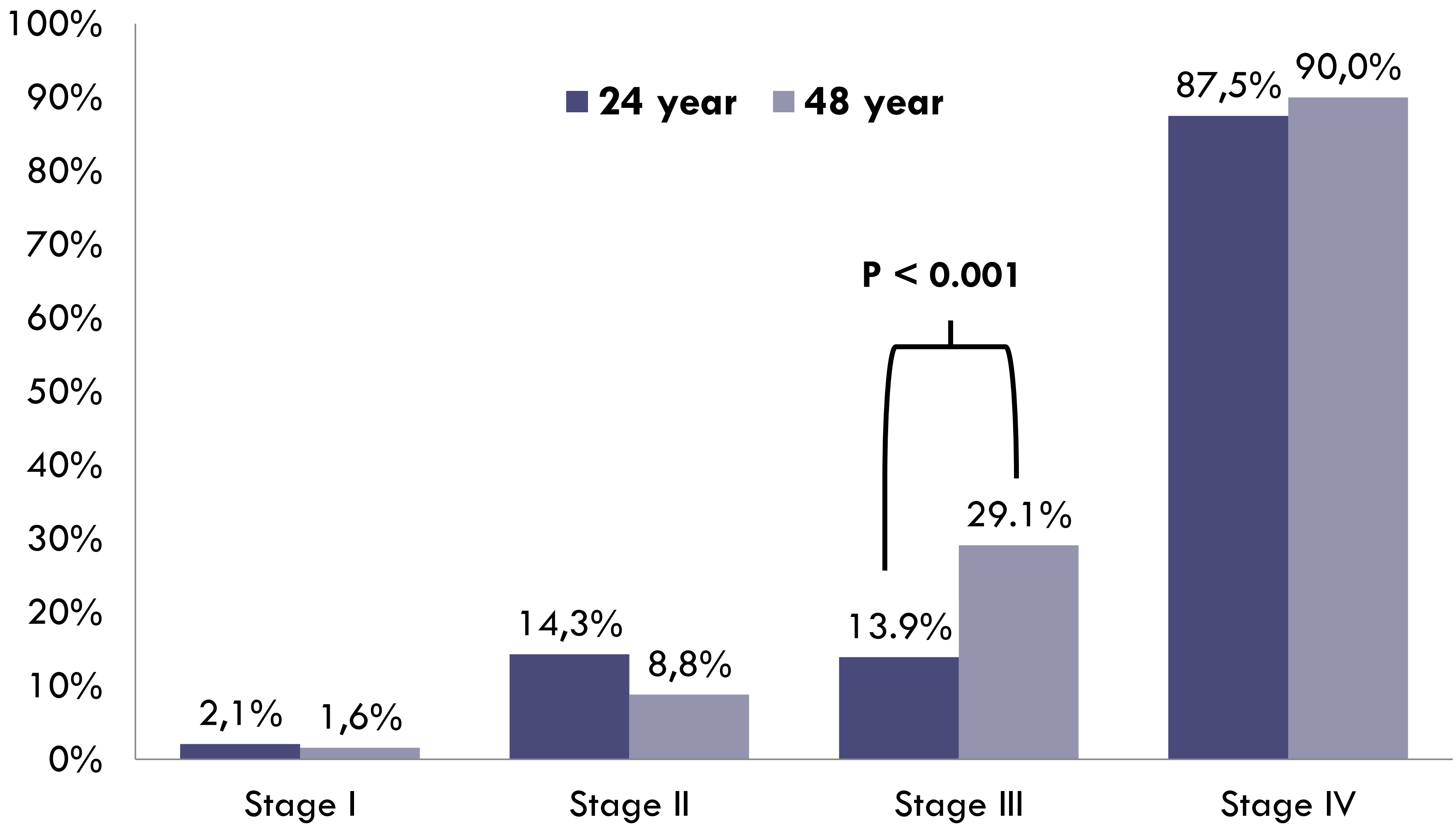
- Arthroplasty more commonly selected in 48yr old patient
  - 24yr: 41.3%
  - 48yr: 55.6%

$P < 0.0001$

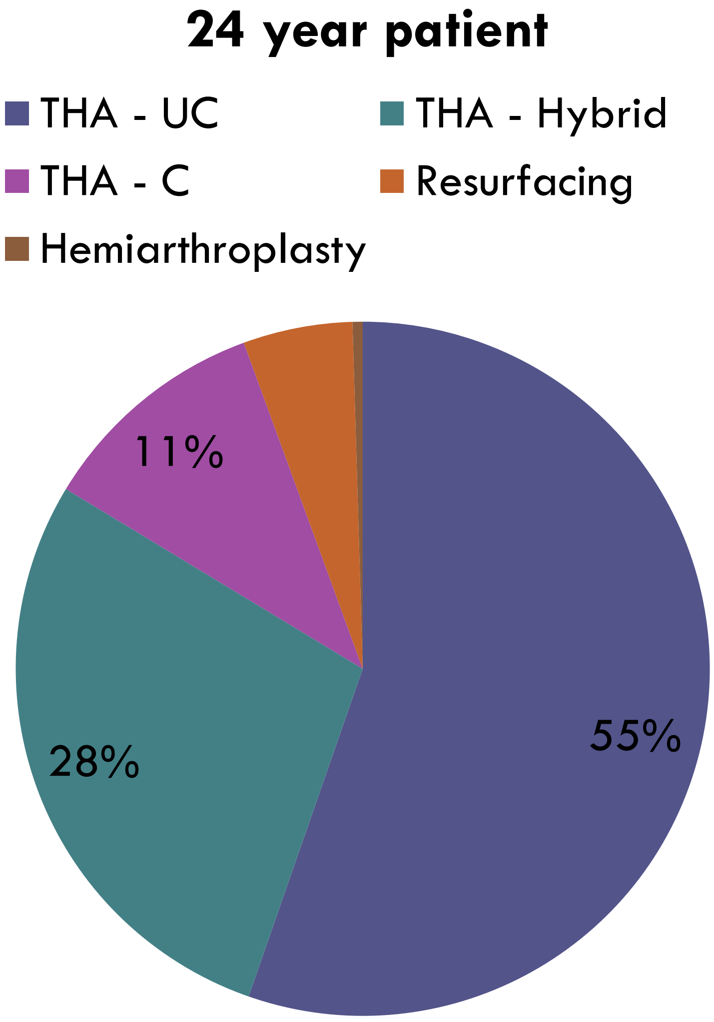
Effect of patient symptoms on intervention

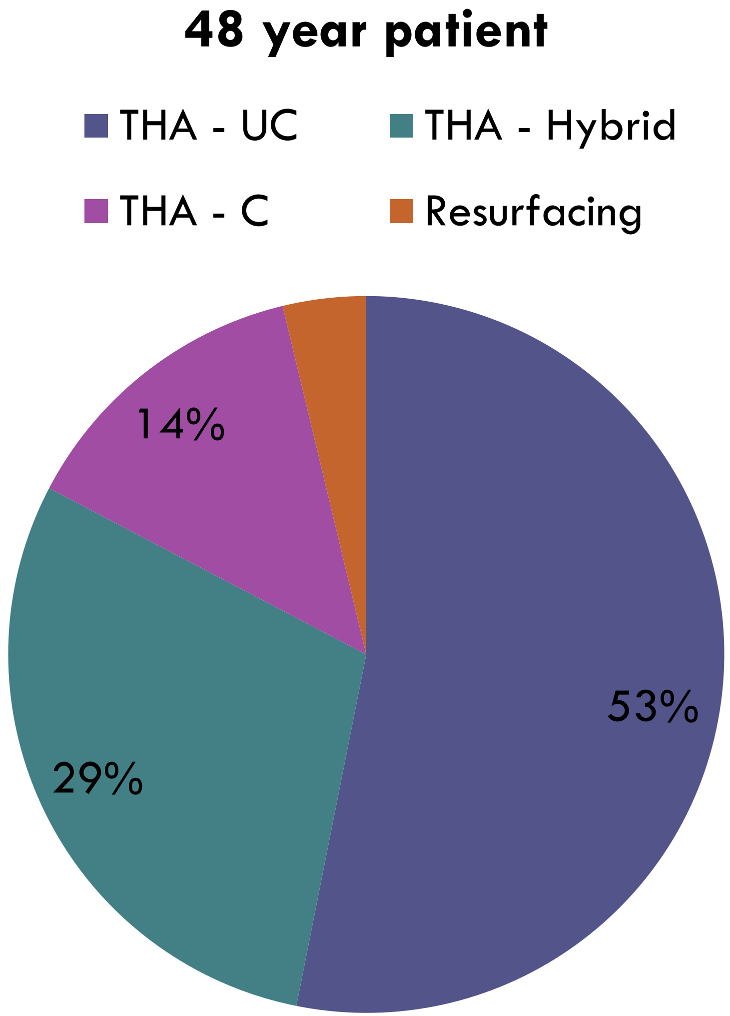


Stage at which arthroplasty offered



Trends in type of arthroplasty





Operation type by fellowship training status

- In pre-collapse ONFH
  - Trend for more operative intervention (41% vs 24%, $P = 0.05$)
  - No significant difference in:
    - Joint preserving procedures (42% vs 29%)
    - Arthroplasty (2% vs 6%)

- In post-collapse ONFH
  - No significant difference in:
    - Operative intervention (94% vs 91%)
    - Joint preserving procedures (30% vs 32%)
    - Arthroplasty (66% vs 68%)

Summary of findings

- **Patient age and symptoms important for operative decision making**

- **Core decompression & Joint preserving surgery**
  - Most common operative intervention in pre-collapse ONFH
  - More commonly used in younger patients than older patients

- **Total Hip Arthroplasty**
  - Most common operative intervention in post-collapse ONFH
  - More commonly used in older patient than younger patients
  - Arthroplasty used at earlier stage of disease in older patients
  - Uncemented THA most popular regardless of age

- **Fellowship training**
  - Small sample size limits power
  - Possible trend towards more operative intervention and JPS in pre-collapse ONFH

Thank you

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BRITISH HIP SOCIETY

SOCIETÀ ITALIANA DELL'ANCA

26-27 NOVEMBER 2015

MILAN, ITALY

Catholic Institute of Orthopedics & Traumatology

Gemelli

Chief: Prof. Cerulli

Capsular detensioning in hip osteoarthritis.

<u>Placella Giacomo</u>, Speziali Andrea, Chillemi Marco,
Tei Matteo Maria, Cerulli Giuliano.

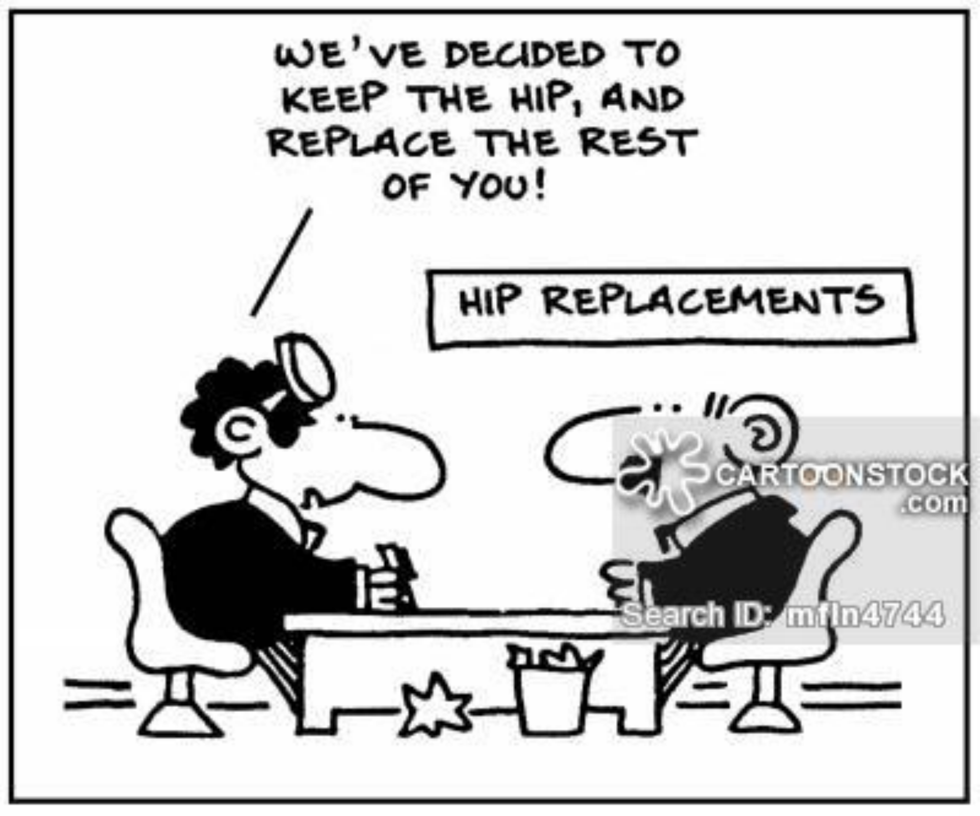
nicola's foundation onlus

Istituto di Ricerca Traslazionale per l'Apparato Locomotore - Nicola Cerulli - Lpmri

Every orthopaedic surgeon raises the question of how can manage symptomatic Hip OA in very elderly patients?

Hip replacement in Elderly patients imply:

- Longer recovery time
- High Costs ($ £ €)
- High clinical costs:
  - Dislocation (3% - 4,6%)
  - Thromboembolism
  - Infection
  - Femoral stem fracture
  - Polyethylene wear
  - Periprosthetic femur fracture
  - Acetabular component loosening
  - Heterotopic Ossification 0.6% to 61.7%



Main Cause: Comorbidities

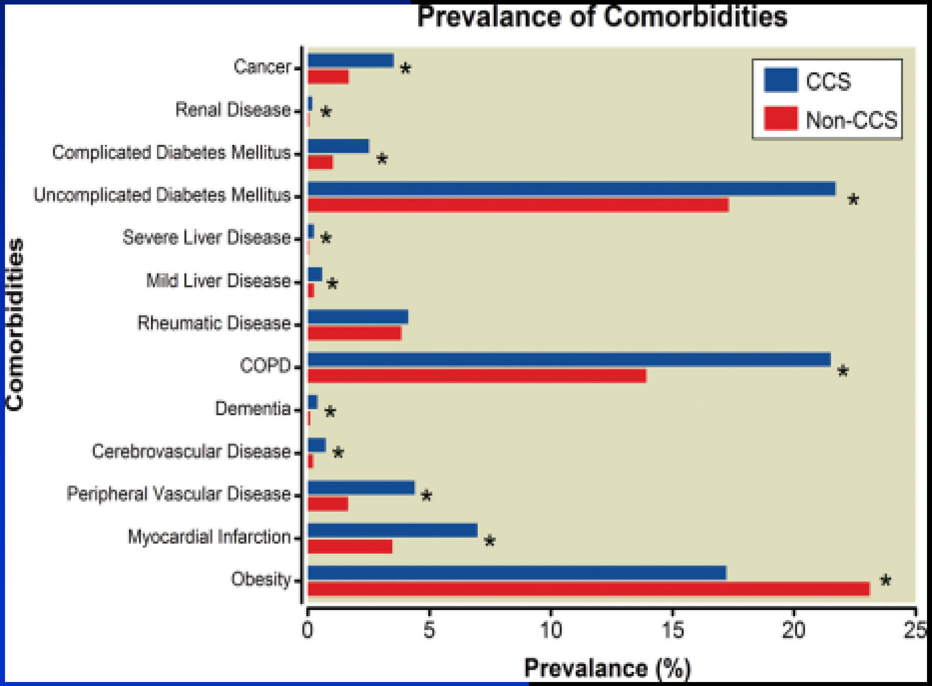
Cardiac failure

Neurological disease

BPCO

Renal failure

Obesity



Total Hip Replacement is the best solution in elderly ?

Not always

What literature says about?

Cochrane Database Syst Rev. 2014 Apr 22;4:CD007912. doi: 10.1002/14651858.CD007912.pub2

Exercise for osteoarthritis of the hip.

Fransen M[1], McConnell S, Hernandez-Molina G, Reichenbach S.

Oct 1, 2014 Table of Conte

POEMs

Physical Therapy No Better Than Sham Therapy for Hip Osteoarthritis

Am Fam Physician. Slawson D 2014 Oct.

JAMA. 2014 Bennell Kl et al

Joint lavage for osteoarthritis of the knee (Review)

Reichenbach S, Rutjes AWS, Nüesch E, Trelle S, Jüni P

THE COCHRANE COLLABORATION®

PLoS One. 2013; 8(9): e72714. PMCID: PMC3762823
Published online 2013 Sep 4. doi: 10.1371/journal.pone.0072714

Are Bisphosphonates Effective in the Treatment of Osteoarthritis Pain? A Meta-Analysis and Systematic Review

Alison J. Davis,[1] Toby O. Smith,[2] Caroline B. Hing,[3] and Nidhi Sofat[1,*]

Curr Rev Musculoskelet Med. 2008 Dec; 1(3-4): 227–233.
Published online 2008 May 17. doi: 10.1007/s12178-008-9029-0
PMCID: PMC2682414

Intraarticular cortisone injection for osteoarthritis of the hip. Is it effective? Is it safe?

David W. Kruse

Arthritis Res Ther. 2009; 11(6): R183. PMCID: PMC3003515
Published online 2009 Dec 9. doi: 10.1186/ar2875

Comparative, double-blind, controlled study of intra-articular hyaluronic acid (Hyalubrix®) injections versus local anesthetic in osteoarthritis of the hip

Alberto Migliore,[1] Umberto Massafra,[1] Emanuele Bizzi,[1] Francesca Vacca,[1] Severino Martin-Martin,[2] Mauro Granata,[3] Andrea Alimonti,[1] and Sandro Tormenta[4]

Current Alternative to Total Hip Replacement in elderly

Therapeutic Exercises	**Recommended**
Pharmacological therapies: bisphosphonates	**Limited evidence**
Pharmacological therapies: Corticosteroid	Short term pain relief
Pharmacological therapies: hyaluronic Acid	Short term pain relief
Joint Lavage	Not enough

Is there any space for Hip Arthroscopy ?

The role is still debated:

high expectations, limited evidence

Matsuda DK. Protrusio acetabuli: Contraindication or indication for hip arthroscopy? And the case for arthroscopic treatment of global pincer impingement. Arthroscopy 2012;

How to treat elderly patients?

Causes of pain in Hip OA

Intra-articular

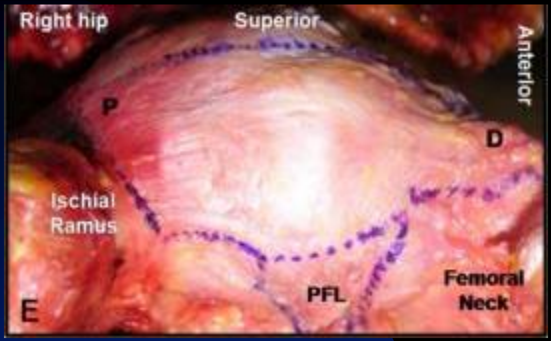
- Labrum
- Cartilage
- Subchondral Bone
- Lose bodies

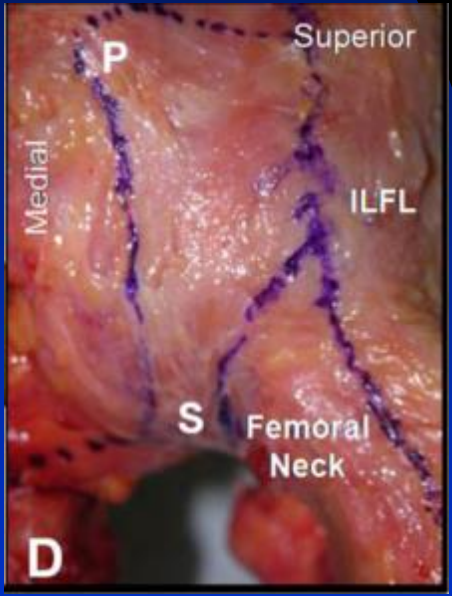
Extra-articular

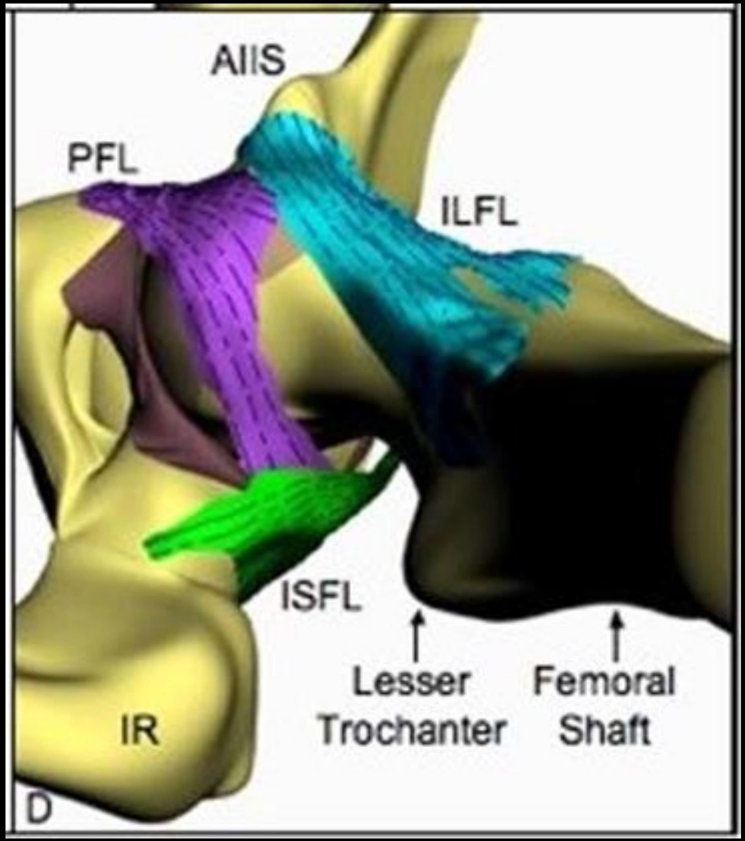
- Muscle
- Capsule

Hip Joint capsular ligaments

3 main ligaments:







Iliofemoral ligament

Pubofemoral ligament

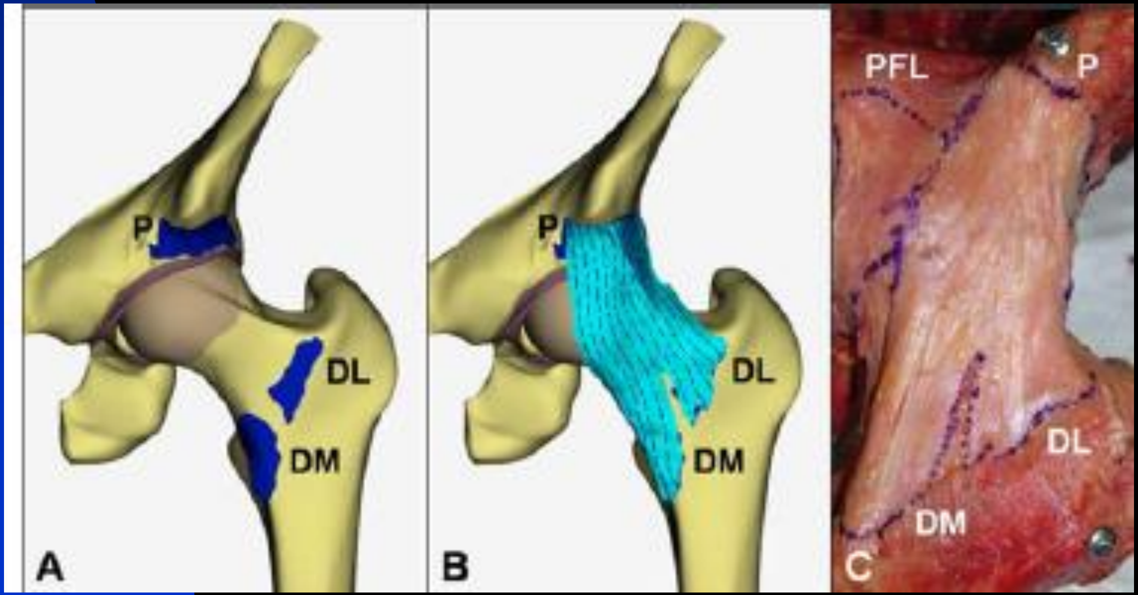
Ischiofemoral ligament

Joint capsule is richly supplied by somatic and autonomic nervous fibers

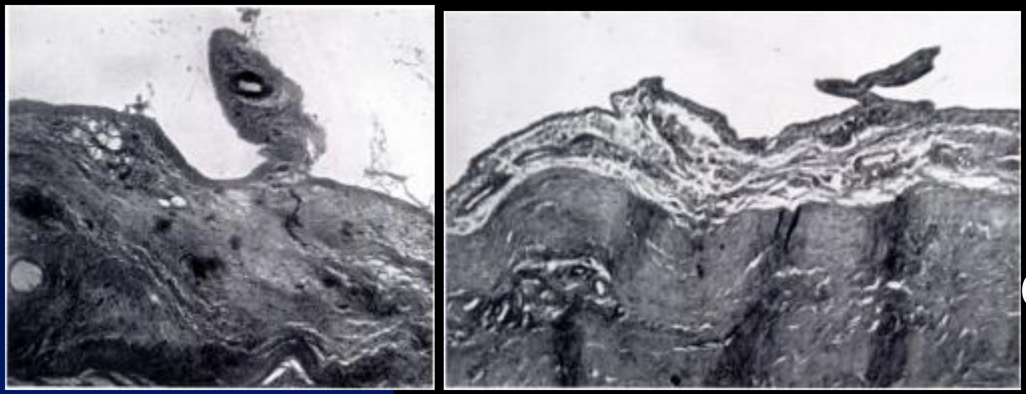
Telleria J 2013
Clinical Anatomy

What's the role of the capsule ?

In patients in whom movement is almost lost and deformity is predominat, the capsule surrounding the neck is *like a 'tight collar'*



Contracted capsule



- The capsule is thickened and shortened and lacks its normal pliability
- Sometimes fibrosis spreads to the adjacent muscles, especially the shorts rotators, so that these adhere to the outer surface of the capsule

Lloyd-Roberts JBJS 1953

Caused by

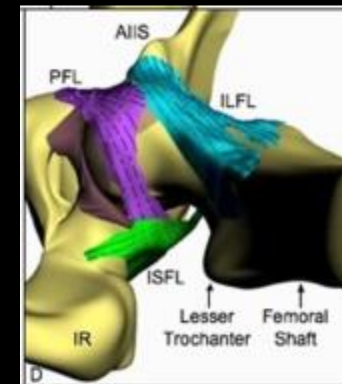
Progressive fibrosis of both the synovial membrane and the capsule

Causing

Progressive loss of movement and increase of Pain

CA.S.L.I. = Capsular-Stretching – Lavage - Injection

Capsular Stretching



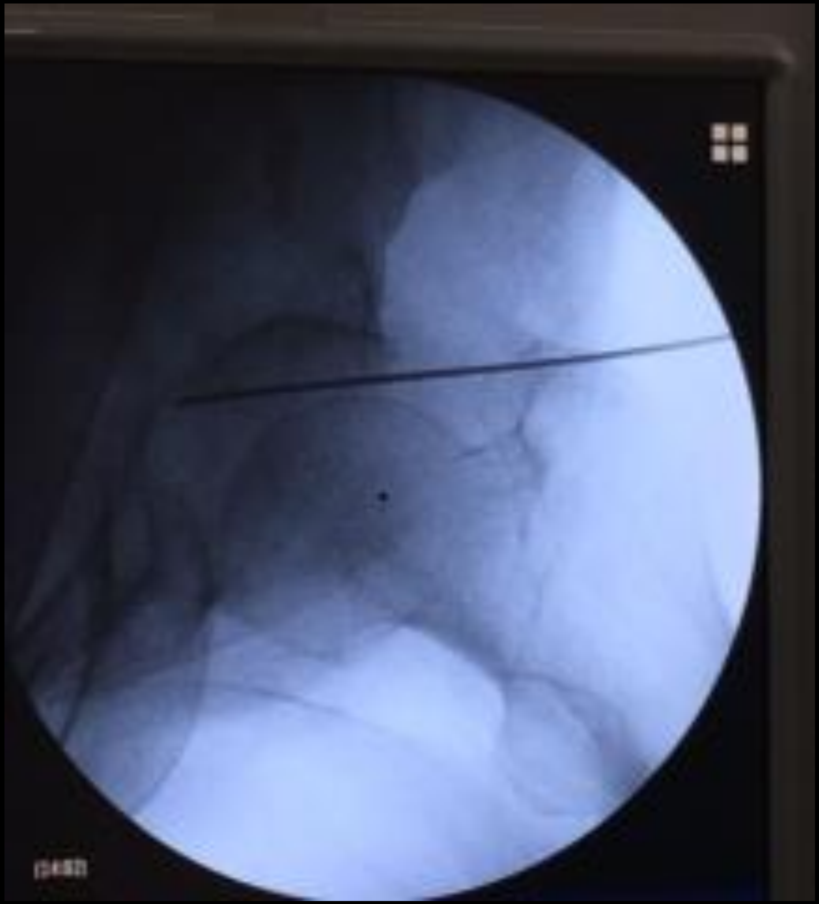
Our combined approach

Joint Lavage

Injections

CA.S.L.I. = Capsular-Stretching + Lavage + Injection

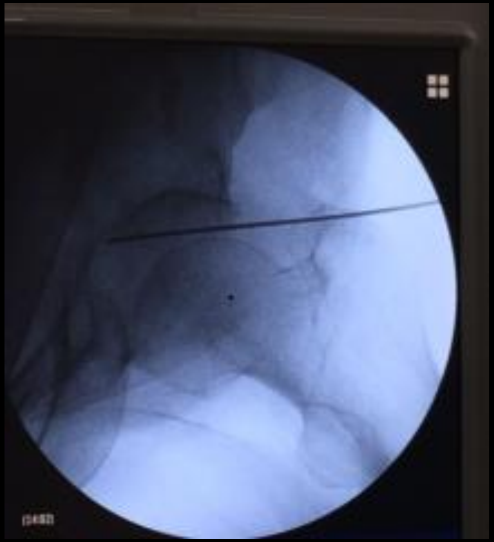
Cerulli in press 2015

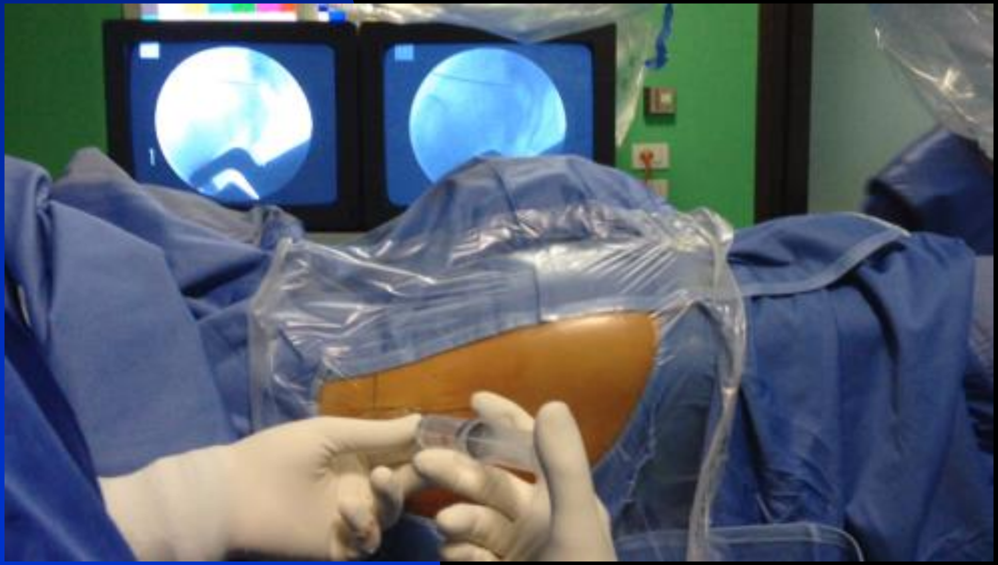


Patient in mild sedation is placed on fracture table: first of all we do 10 cycles of traction under fluoroscopic control to see a satisfying Capsular stretch

Joint lavage: saline solution

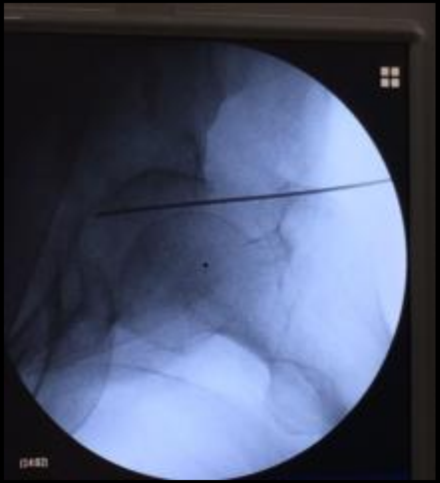
Anatomical landmarks





The procedure is X-ray guided

Joint injections



Corticosteroid + Hyaluronic acid injection

Preliminary results

Since 2014, to date we have used this procedure in 18 patients (range 78-89 yrs) with primary Hip OA

We reached good results at 12 months follow-up in terms of :

- < Pain (VAS decreased from 8 before to 4 after CASLI)
- < NSADs used every day for pain control
- > Function (R.O.M.)

Conclusion

Deformed bone
Fibrotic muscle
Contracted capsule

All play a part in Hip OA

"Hip replacement? He was never hip to begin with."

CA.S.L.I. can be a successful strategy in elderly

Thanck you for your kind attention

nicola's foundation onlus

Istituto di Ricerca Traslazionale per l'Apparato Locomotore - Nicola Cerulli - Lpm

Catholic Institute of Orthopedics & Traumatology

Policlinico Gemelli

Impegno per l'eccellenza

Universitas Catholica Sacri Cordis Iesu Mediolani

UNIVERSITÀ CATTOLICA del Sacro Cuore

giacomo.placella@gmail.com

INTERNATIONAL COMBINED MEETING

BRITISH HIP SOCIETY
SOCIETÀ ITALIANA DELL'ANCA

26-27 NOVEMBER 2015

MILAN, ITALY

Arthroscopic Treatment of Femoroacetabular Impingement following Slipped Capital Femoral Epiphysis

SZ Basheer, AP Cooper, B Balakumar, R Maheshwari, SS Madan

Centre for Hip Join Preservation

Sheffield Children's Hospital, Western Bank, Sheffield

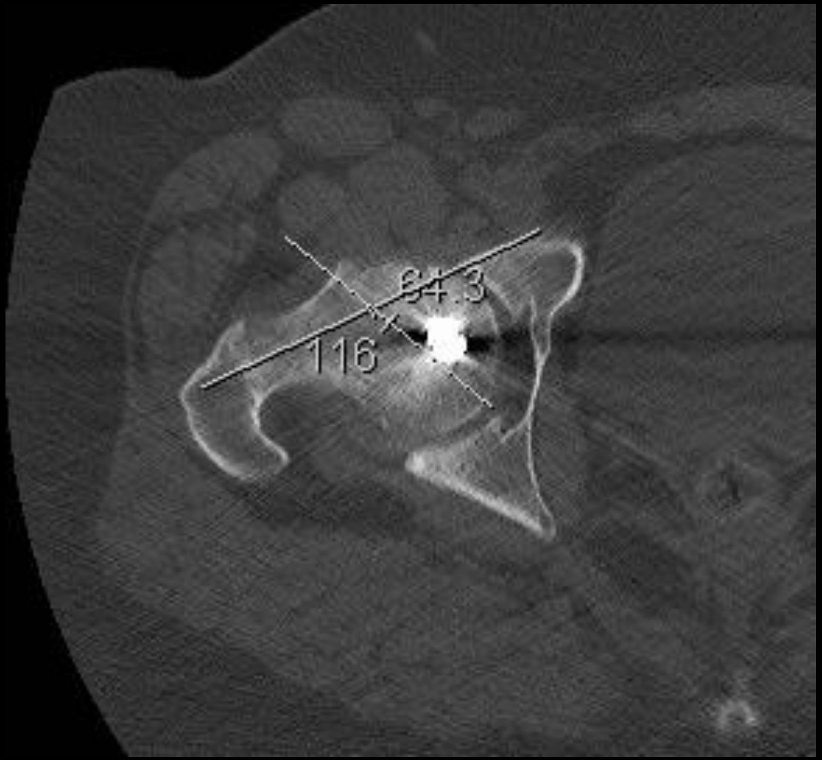
Doncaster Royal Infirmary, Armthorpe Road, Doncaster

Declaration

- None of the contributing authors have any conflicts of interest to declare

Background

- Complex deformity of proximal femur
- May lead to symptomatic femoroacetabular impingement (FAI)
  - Cam
  - Mixed – associated with acetabular retroversion
- Severity correlates with radiologic evidence of OA (Boyer, JBJS Am 1981)



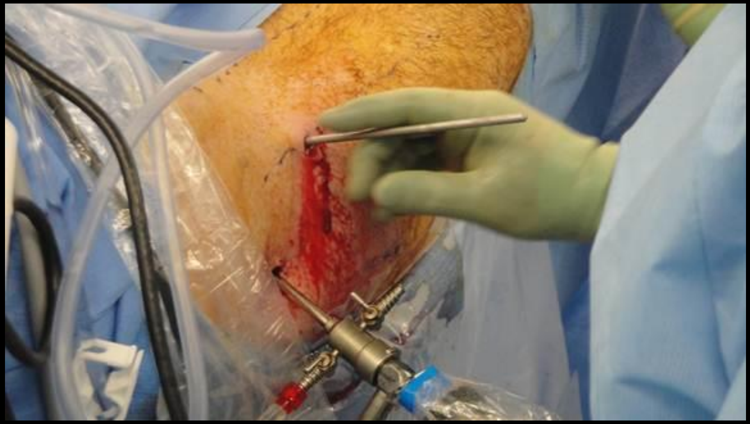
Methods

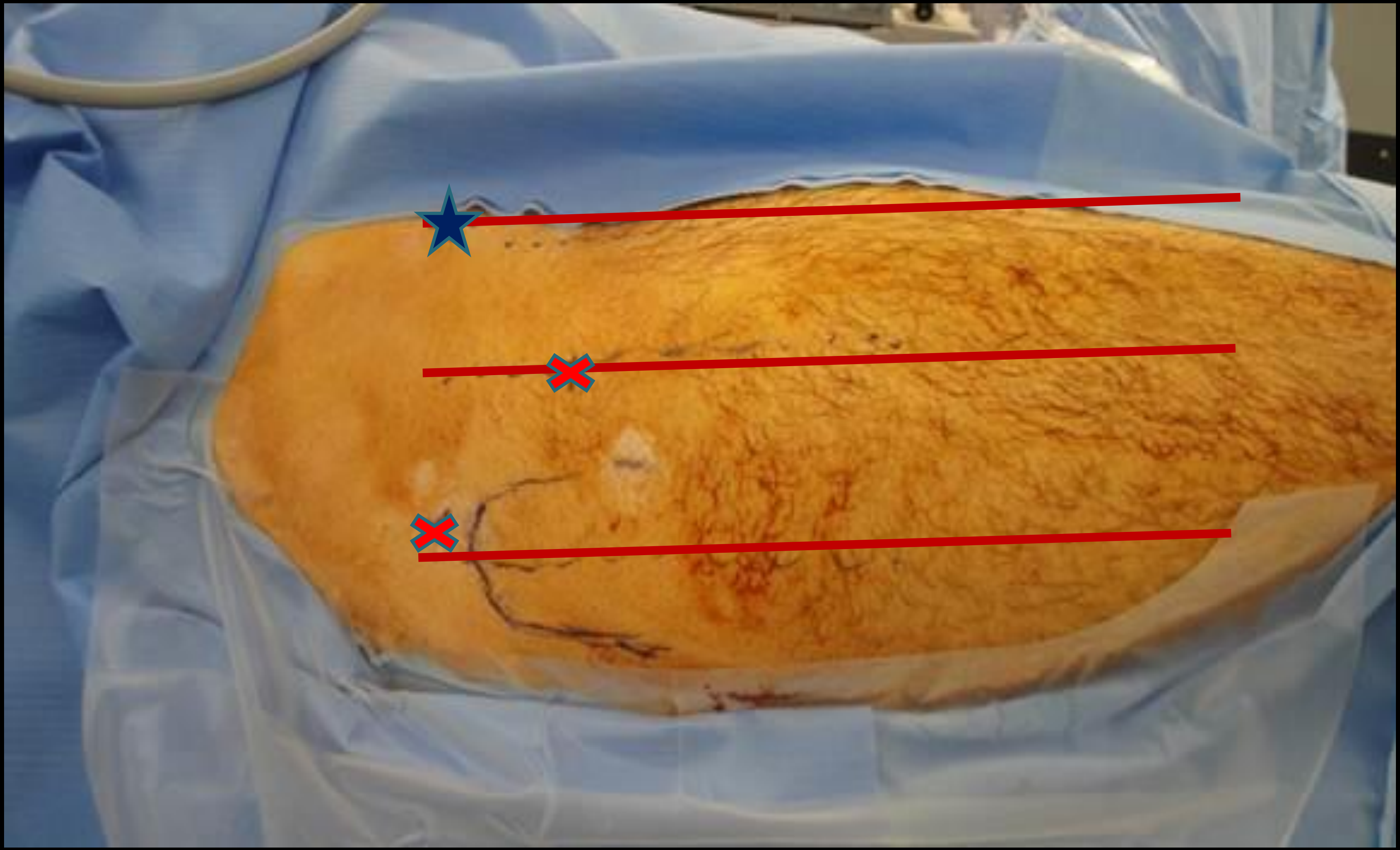
- Prospective data collection
  - Pts undergoing hip arthroscopy for sequelae of SCFE
  - March 2007 – Feb 2013
- Two sites:
  - ▫ Sheffield Children's Hospital (<18 years)
  - ▫ Doncaster Royal Infirmary (≥18 years)
  - ▫ Single surgeon
- Data analysed
  - MS Excel, SPSS

Patient assessment

- Clinical
- Radiological
  - Plain radiographs
    - Initial slip severity (Southwick)
    - Pre and post op α-angle and head-neck offset ratio
  - CT ± MRa
- Patient-reported outcome measures – pre- and postoperatively
  - Modified Harris Hip score (MHHS)
  - Non-arthritic Hip Score (NAHS)

Surgical technique



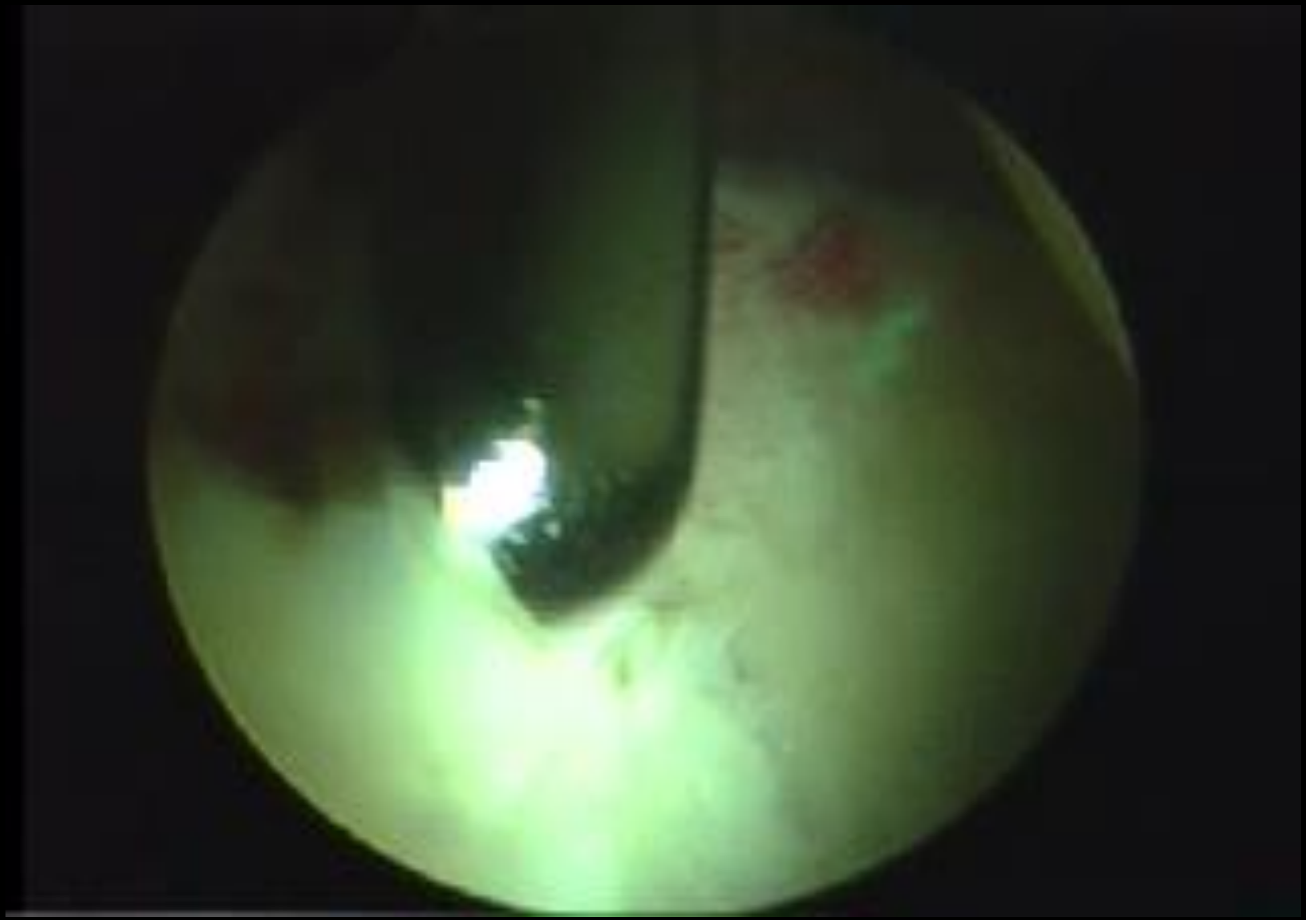


Demographics

- 18 patients (19 scopes, F:M = 1:1)
- Age range: 13-42 years (median 16 y)
- **Slip angle 19 - 65º** (median = 40.5º)
- Follow up: 23 - 56 months (median = 24 m)

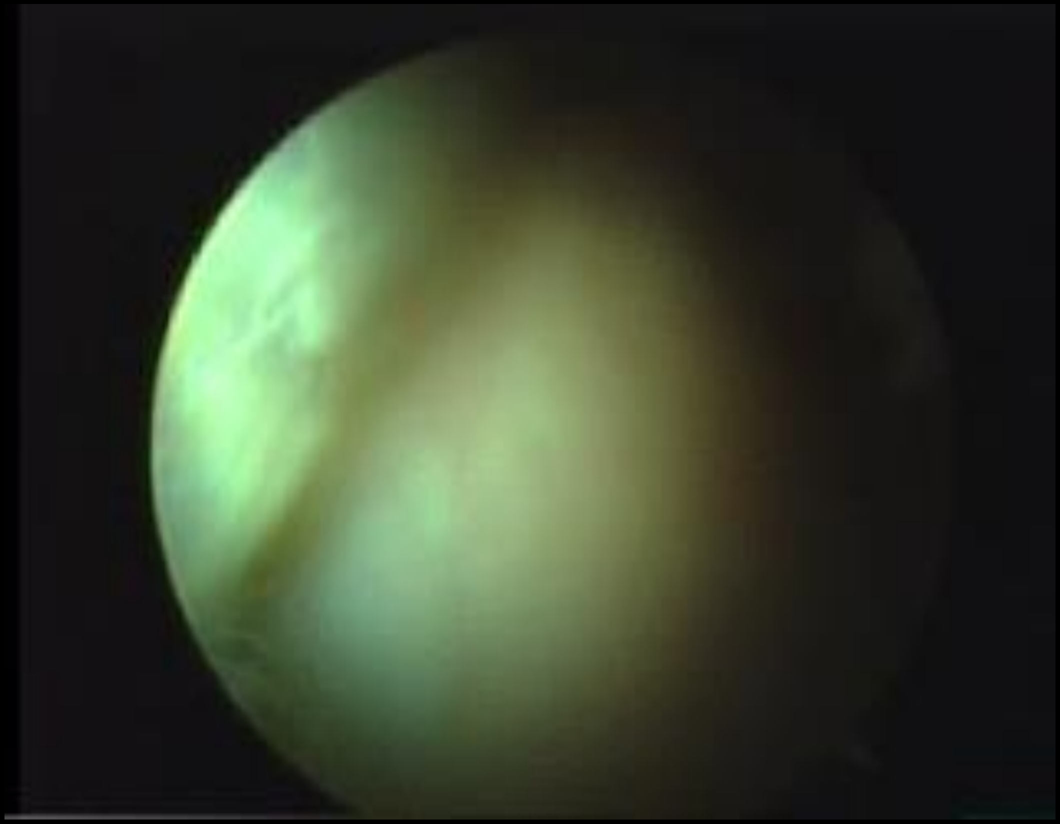
Indications

Diagnosis	**N**
FAI	**18**
Cam	9
Mixed	9
AVN	1
LABRAL TEAR	5



Procedures performed

Procedure	N = 19 scopes
Femoral head-neck osteoplasty	**18**
Acetabular recession	**9**
Labral repair	2
Chondrolabral debridement	10
Microfracture	4

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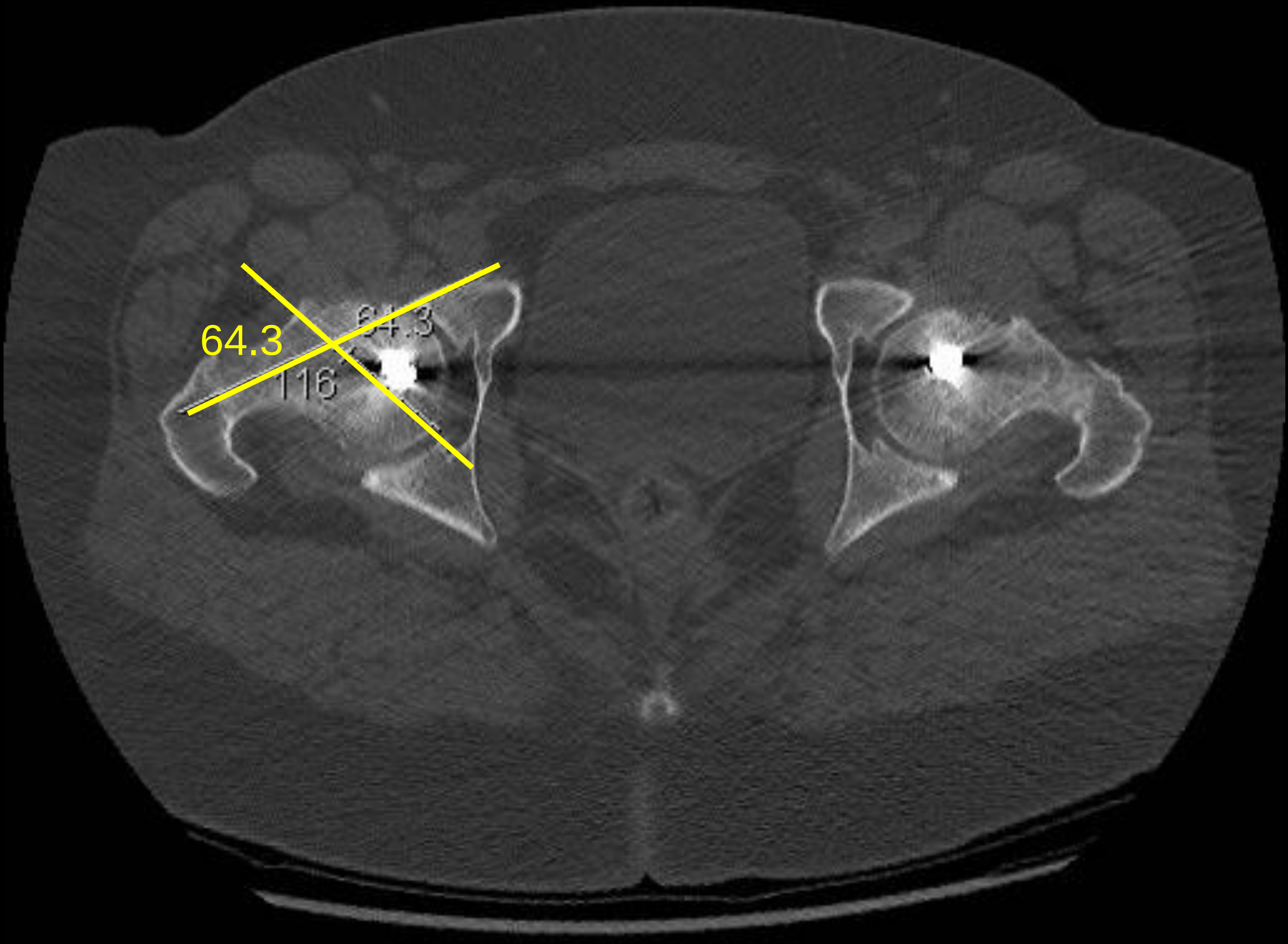
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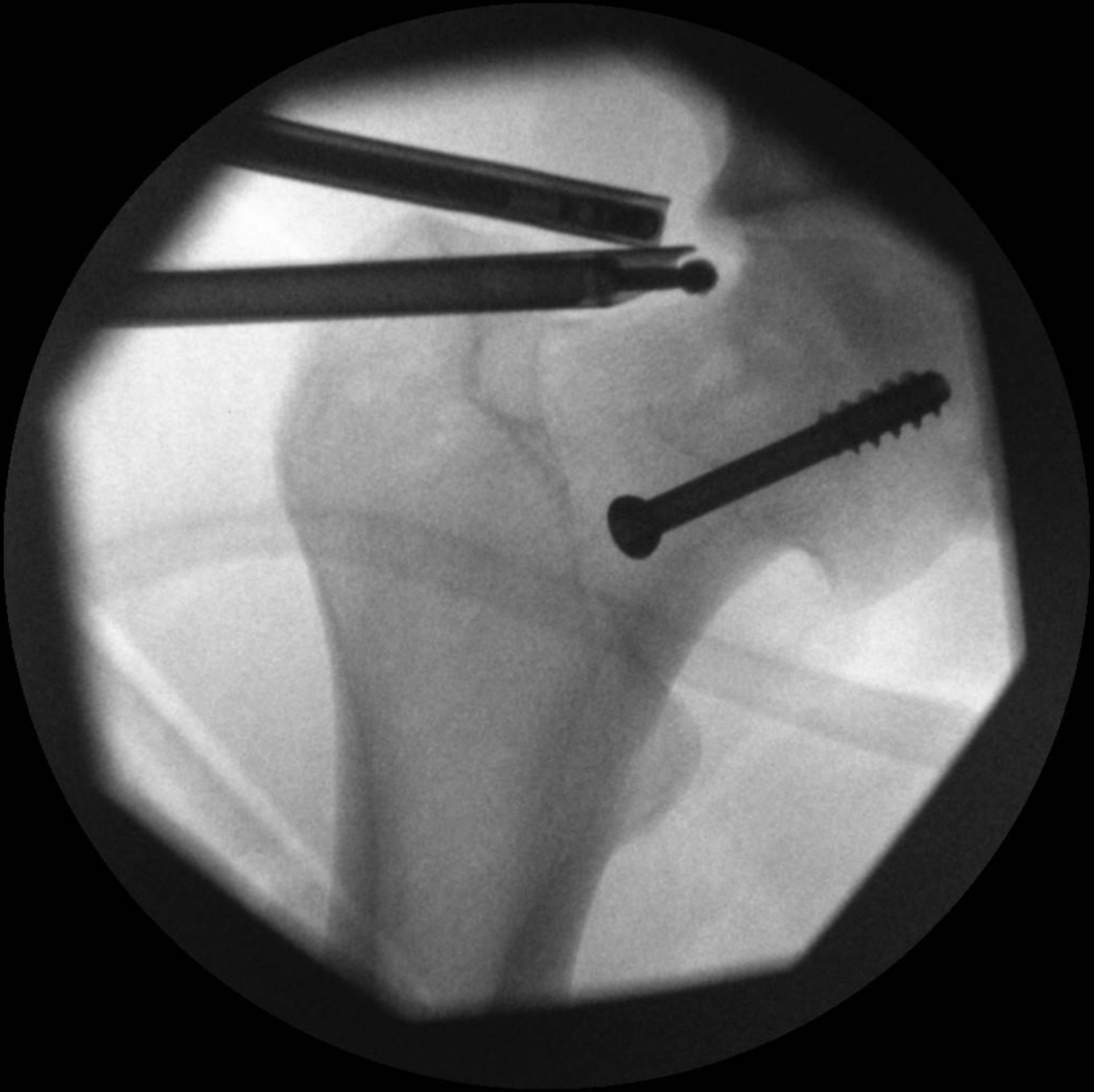
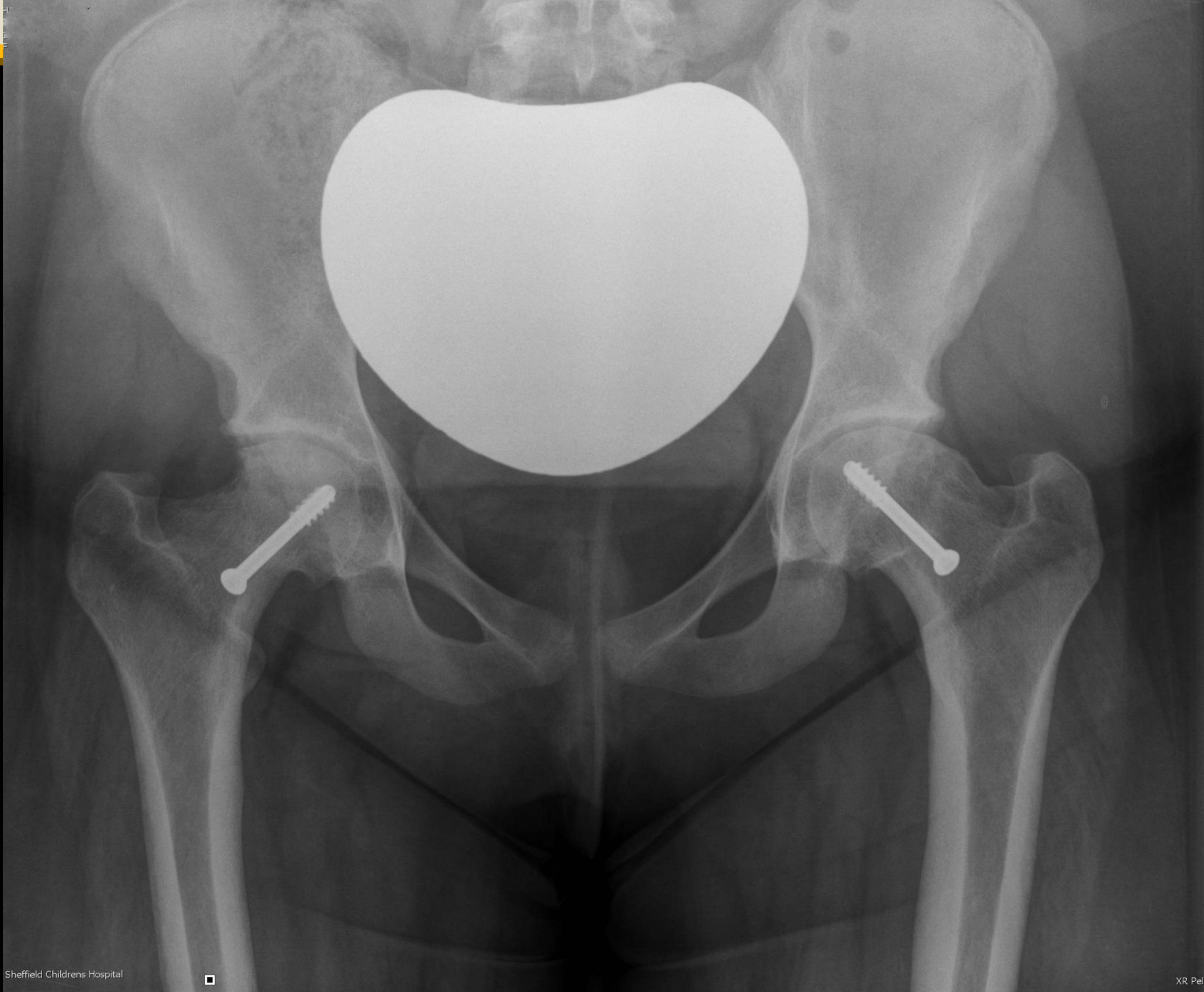



Sheffield Childrens Hospital
XR Pelvis

Clinical findings – pain & impingement

- All patients reported improvement in pain
  - 10/18 pts (56%) – complete resolution of pain
  - 6 pts – occasional mild pain on strenuous activity
  - 2 pts – residual pain on ADLS
- 14/18 pts (78%) – negative post-op impingement tests

Clinical findings – ROM

	Flexion	**Int rotation**	**Ext rotation**	**ER deformity**
Baseline	80 (50-90)	0	82.5 (50-90)	10 (0-30)
Post-op	110 (90-125)	10 (0-20)	80 (30-90)	-
p value	**<0.0001**	**0.0002**	0.06	-

Deformity

Initial slip severity	Number
Mild (<30º)	7
Moderate (30-50º)	6
Severe (>50º)	5

	Baseline	Postoperative	p value
α angle	91.61	51.73	**0.0001**
Head-neck offset ratio	-0.015	0.113	**<0.0001**

Outcome measures

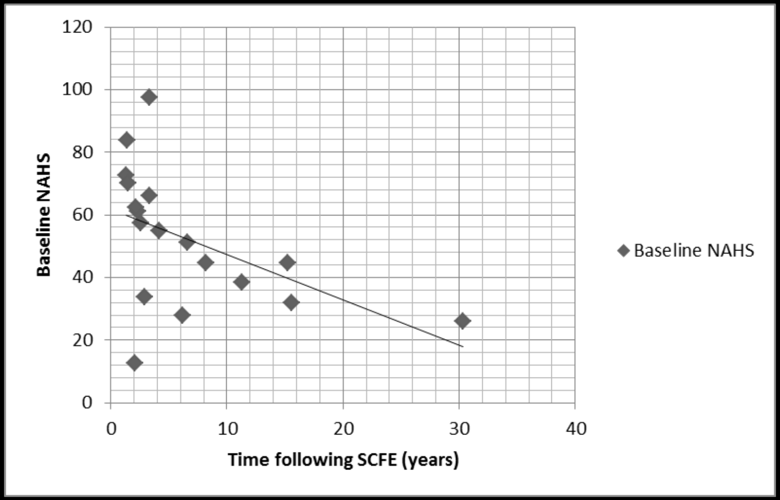
- MHHS

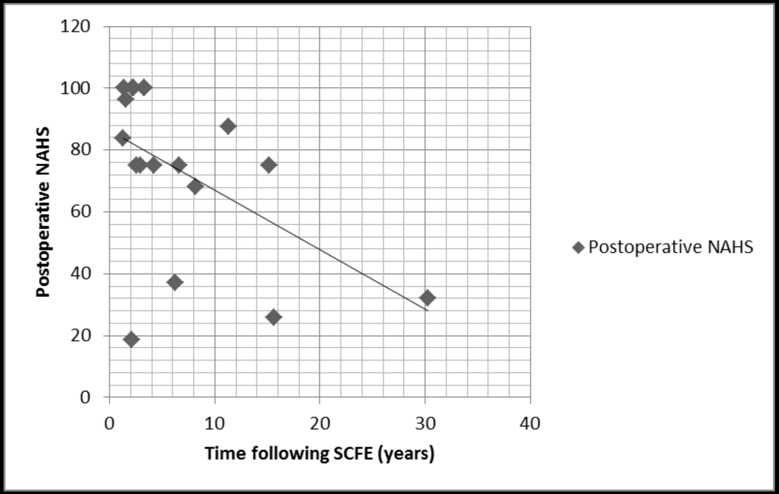
Baseline (mean±SD)	Post-op (mean±SD)	Improvement (p)
56.2 (±22.37)	75.06 (±21.05)	18.86 **(0.01)**

- NAHS

Baseline (mean±SD)	Post-op (mean±SD)	Improvement (p)
52.07 (±21.83)	72.03 (±27.32)	19.96 **(0.02)**

Time from SCFE vs outcome scores





	B-coefficient (slope)	**R^2**	**p**
Baseline MHHS	-1.37	0.21	0.05
Postoperative MHHS	-1.68	0.35	**0.01**
Baseline NAHS	-1.47	0.25	**0.03**
Postoperative NAHS	-1.97	0.28	**0.02**

Complications

- No nerve injury, fracture, thrombosis/embolism
- One patient required repeat arthroscopy within 24 months

Limitations

- Low numbers
  - Difficult to control for heterogeneity

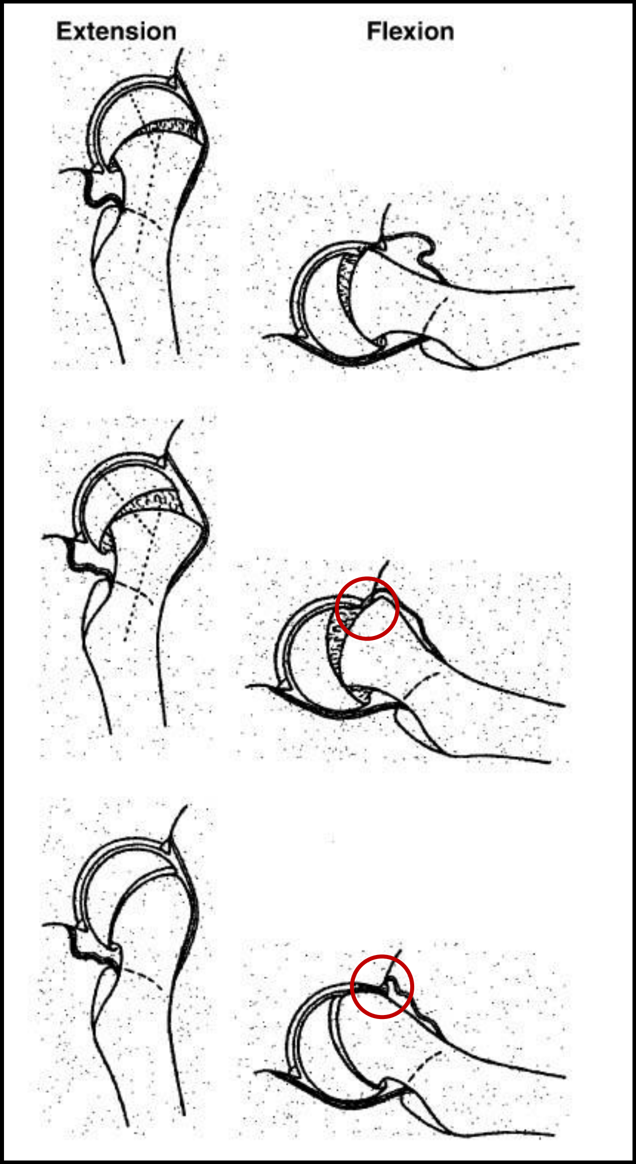
- Relatively short FU (23-56 months)

- Single surgeon series
  - Includes learning curve

Image adapted from Leunig et al, CORR 2010

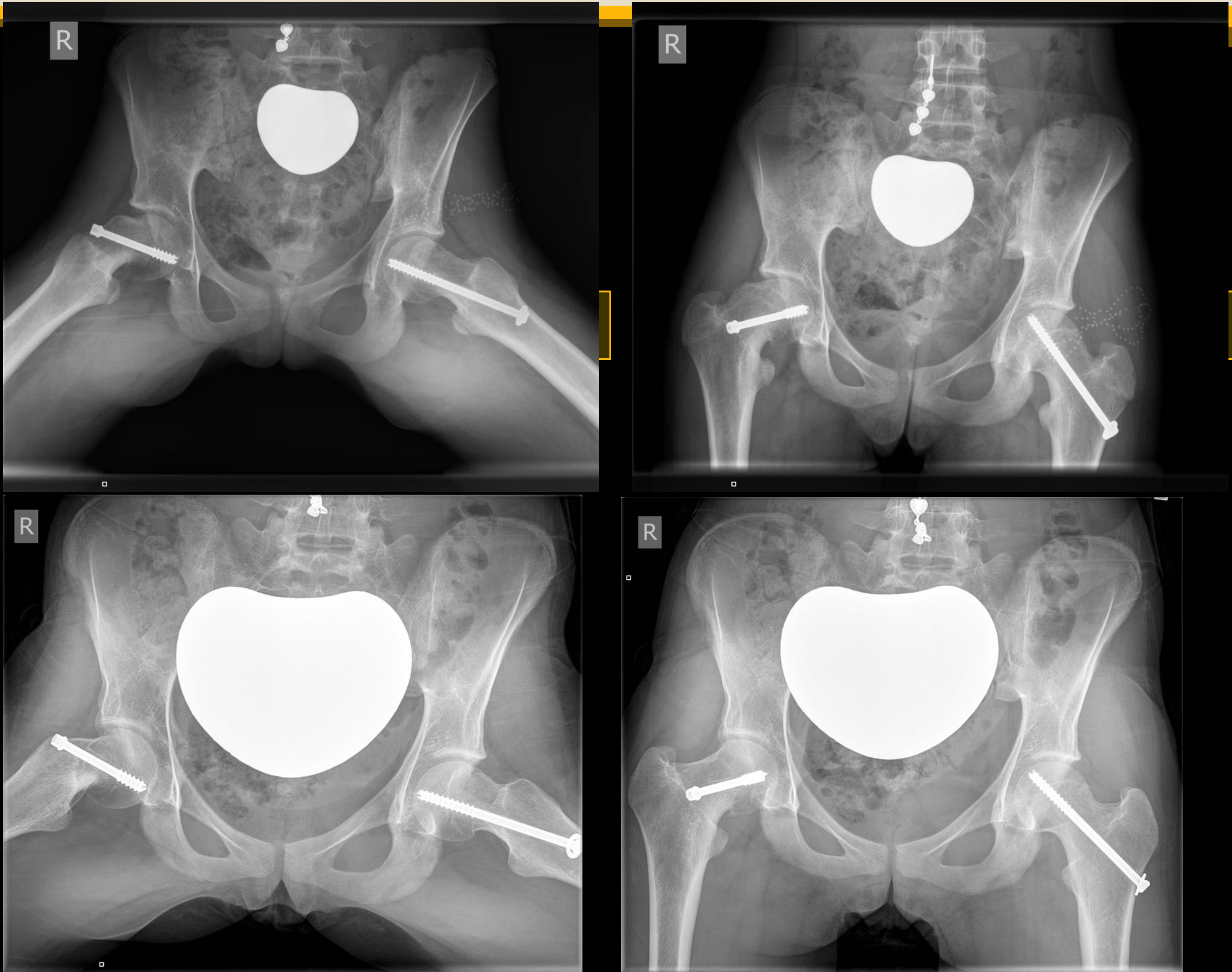
Discussion

- SCFE → Cam FAI → damage to labrum & cartilage
  - Begins shortly after slip (Leunig et al, CORR 2010)
- Damage progression over time → ?OA



Conclusion

- Arthroscopic osteoplasty improved pain, function and ROM
- Further studies with long term FU are needed
- Symptomatic FAI following SCFE should be treated promptly
  - Prevent progression to irreversible chondrolabral degeneration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In Press in BJJ Jan 2016

- Thank you

INTERNATIONAL COMBINED MEETING

BRITISH HIP SOCIETY
SOCIETÀ ITALIANA DELL'ANCA

26-27 NOVEMBER 2015

MILAN, ITALY

Hip arthroscopy in Femoro Acetabular Impingement (FAI): Chondral Damage is a good predictor of outcome

R. Tansey - Clinical & Research Fellow UCLH

T. Fayad, S. Konan and F.S. Haddad

NHS
University College London Hospitals
NHS Foundation Trust

INSTITUTE OF SPORT EXERCISE & HEALTH

Disclosures

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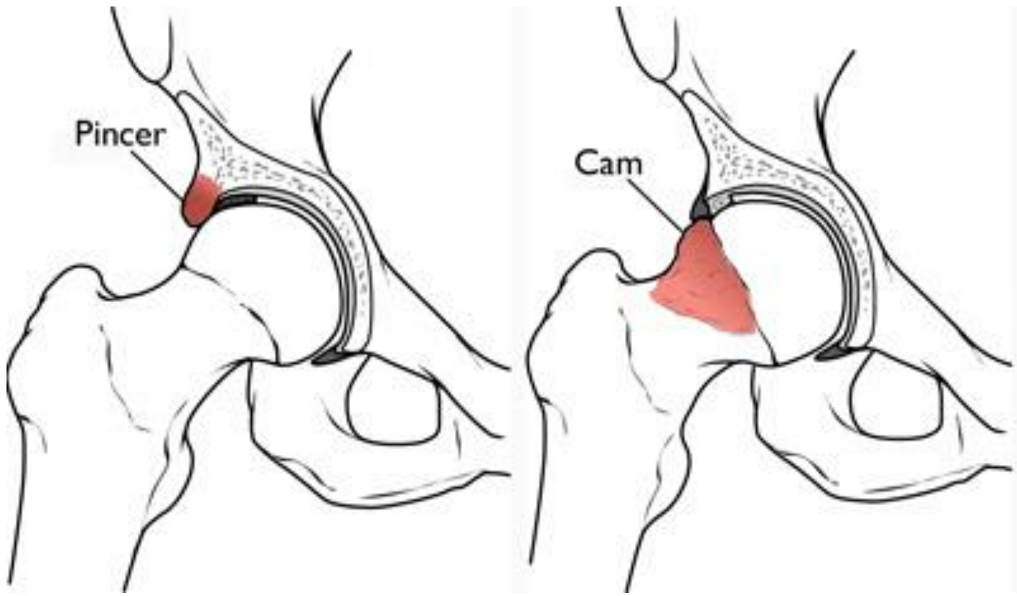
Corin

MatOrtho

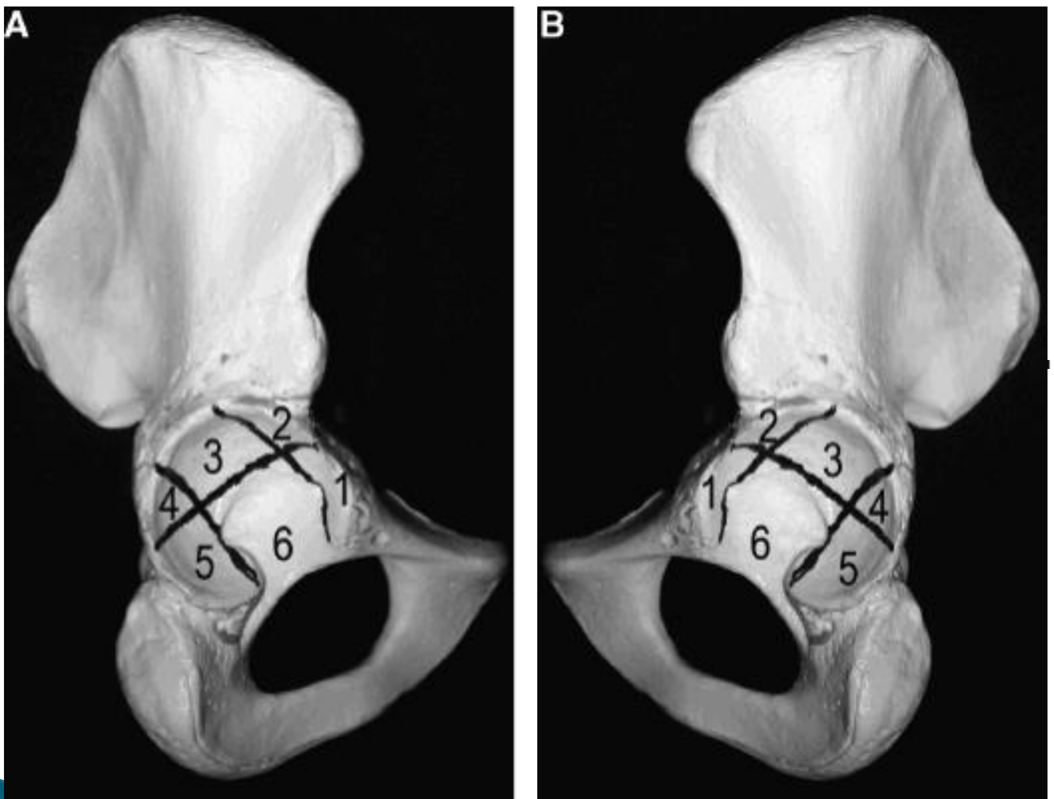
- Background
- Aim
- Method
- Results
- Conclusion

Background



Intraoperative assessment

- UCH grading system



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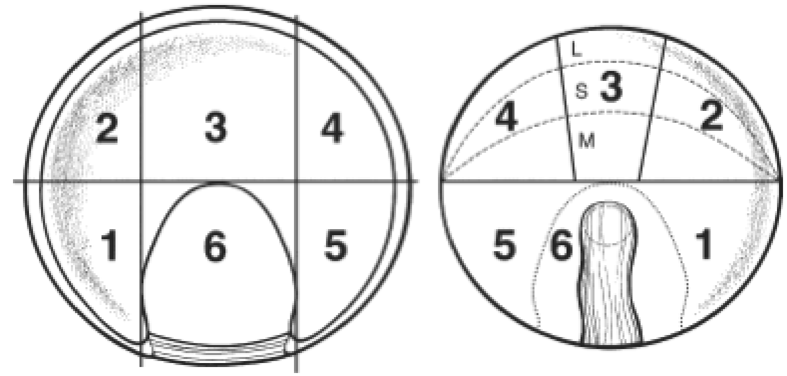

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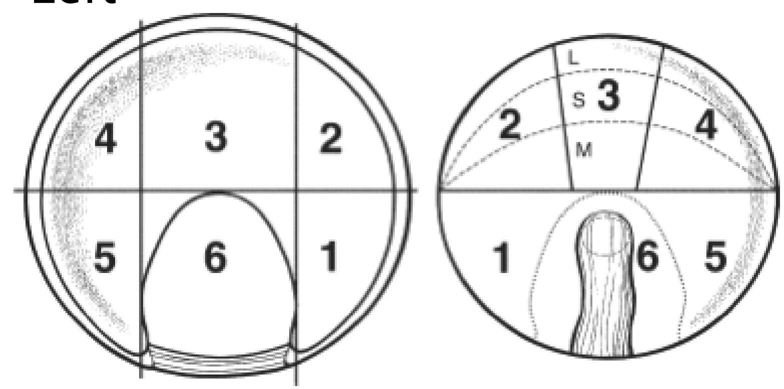
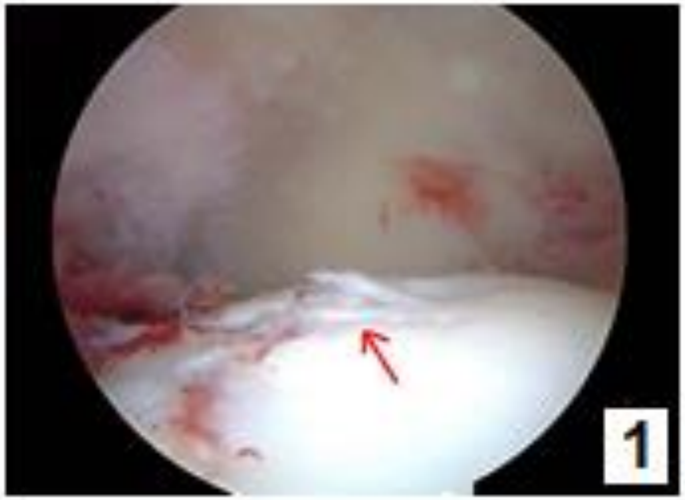


Zone 1-6


1

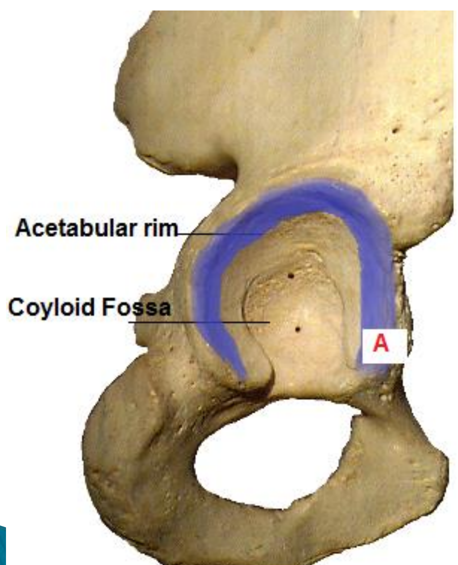

2

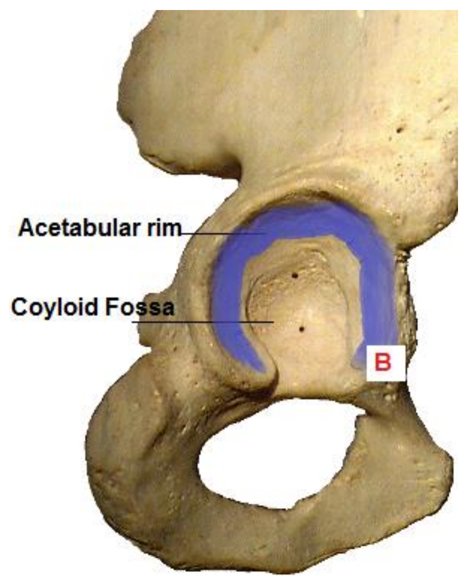

3

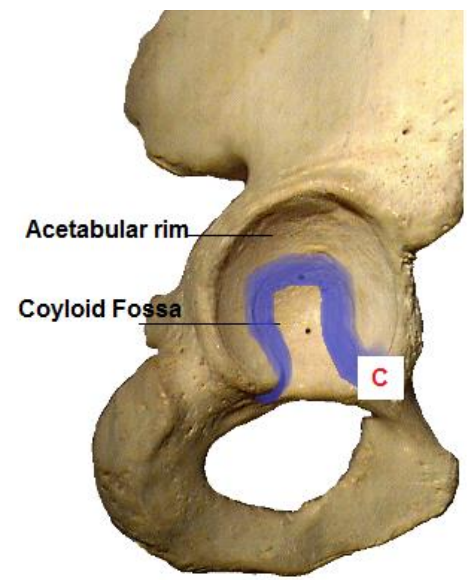

4

Grades 1,3 & 4 further grouped

- A - <1/3 distance from acetabular rim
- B - 1/3 to 2/3 distance from acetabular rim
- C >2/3 distance from acetabular rim







Aim

- Prospectively review outcomes of arthroscopy for FAI
  - Patient Satisfaction
  - Quality of Life, Activity and Hip Scores
  - Complications
  - Re-operations

Methods

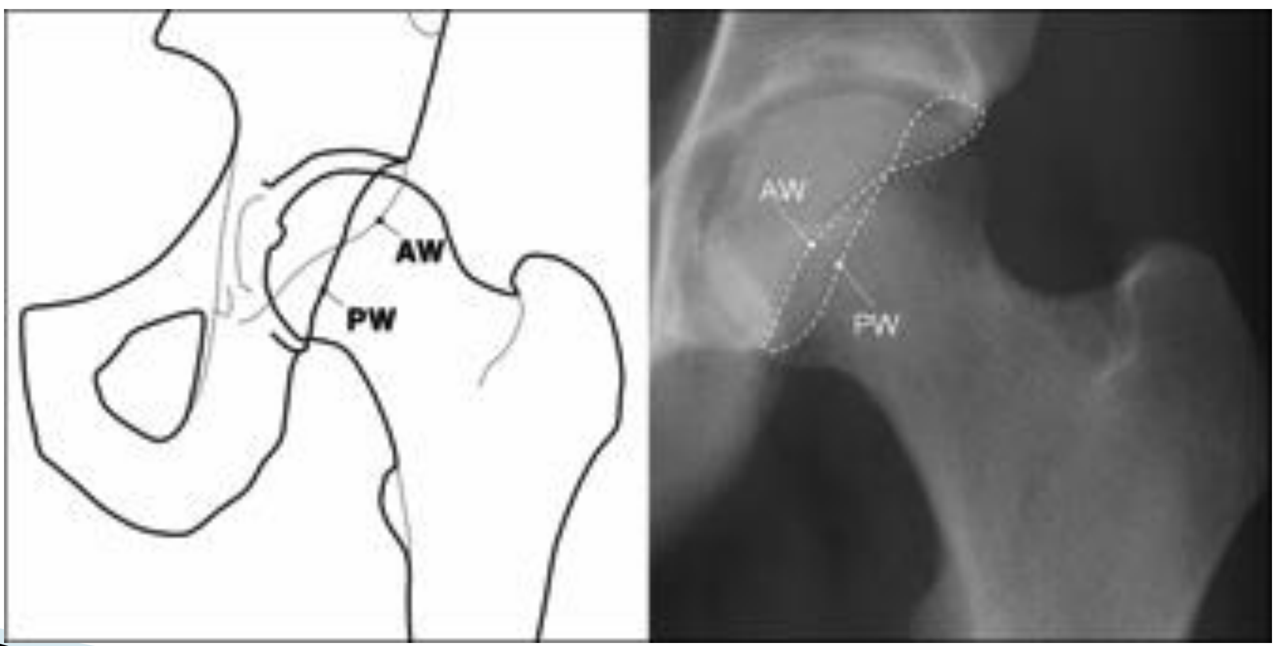
- 196 Patients
- 104M : 82F
- Age 32 (Range 27-46 years)
- Minimum 3 years data (36-64 months)
- UCH Classification
  - JBJS-B March 2011
- Independent review of outcomes

Methods

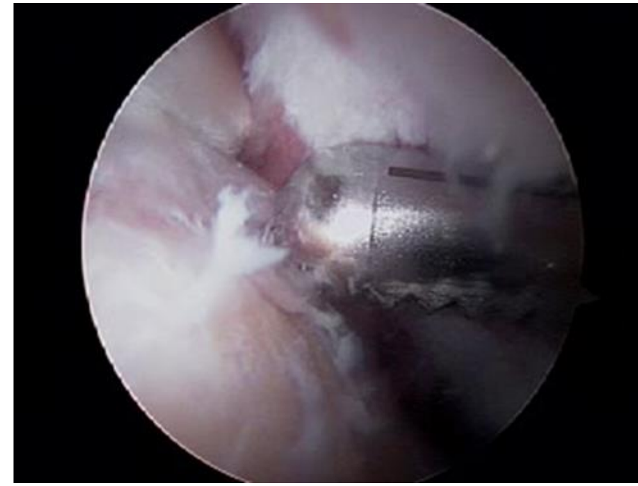
- Inclusion criteria
  - Symptomatic patients with CAM type FAI
  - ‘Pistol-grip’ deformity on plain (AP) radiograph of the pelvis
  - Or reduced anterior head-neck offset on lateral view
  - Proven over coverage on CT / MRI

Methods

- Exclusion criteria
  - Dysplasia
  - Osteoarthritis ≥ grade 2 (Tonnis classification)



Results



Intra-operative findings

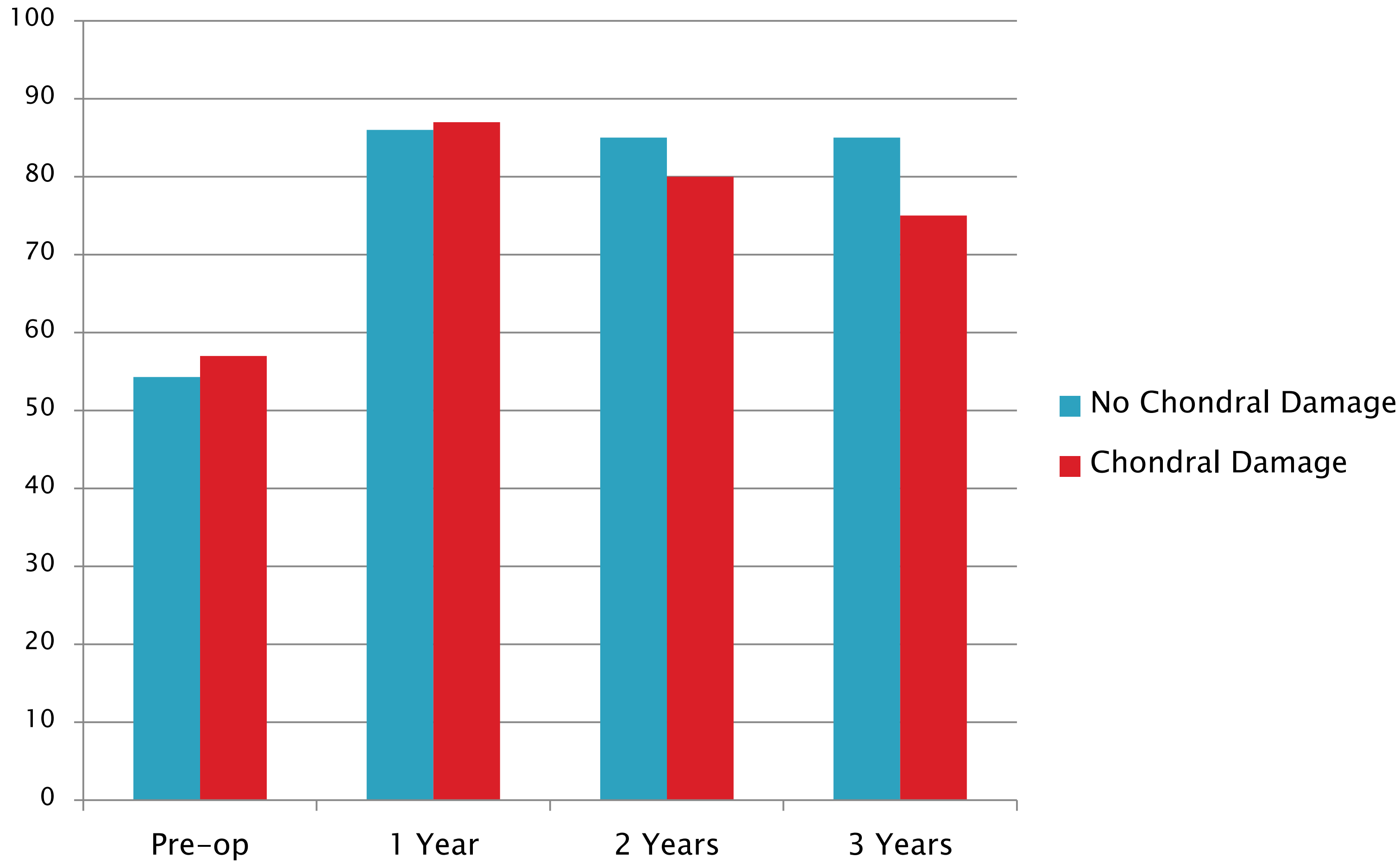
- CAM lesion
  - Mean 3.2 cm^2 (1.8 – 7.2cm^2)
- Labrum
  - Partial resection / stabilisation 68
  - Repair when pincer recessed in 36
- Chondral damage
  - Grade 2 or above in 86
  - >2cm (grade 3 B,C) of full thickness loss in 16

Results

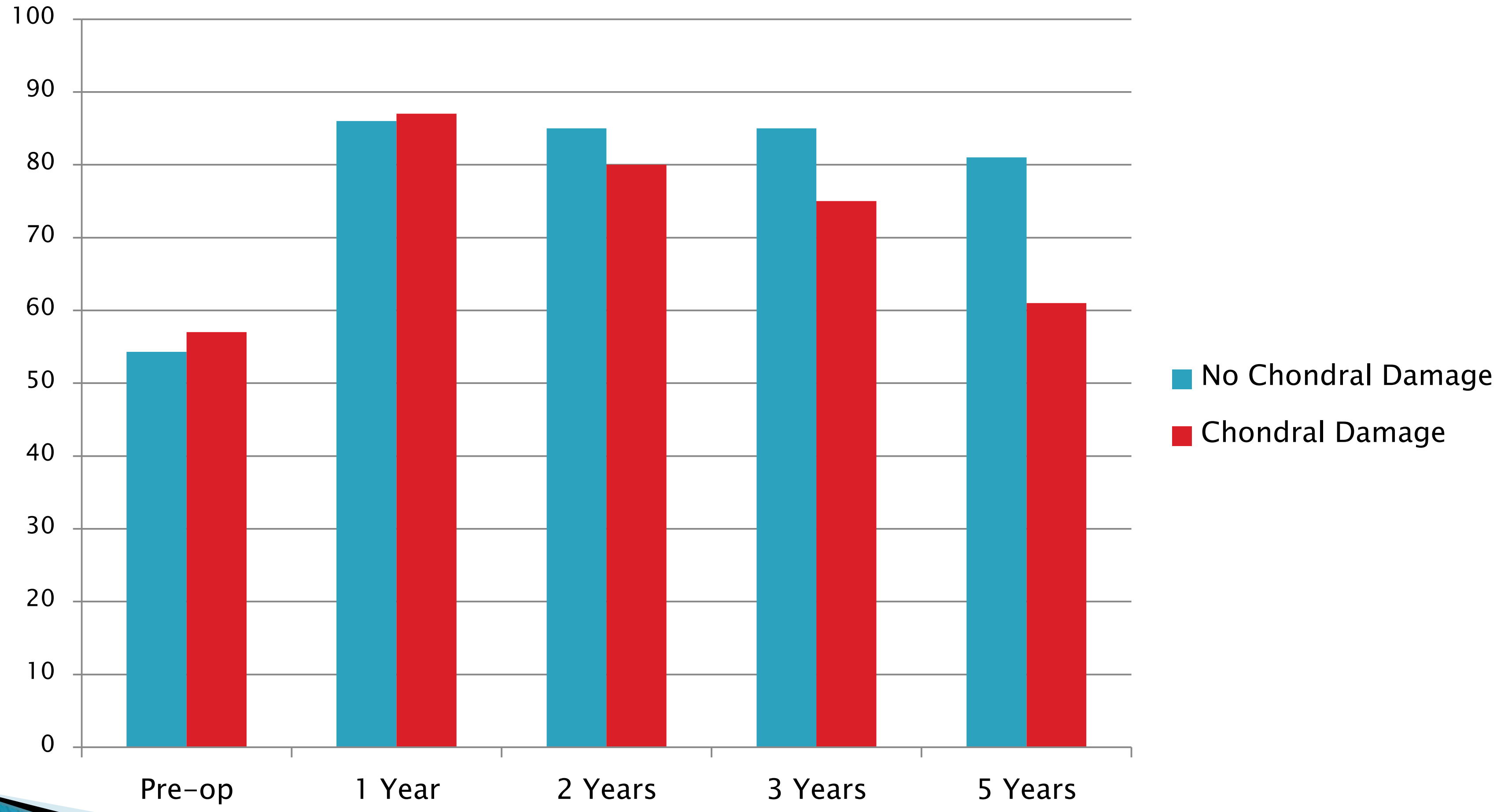
- Improved Range of movement in 157
- Hip impingement signs decreased
  - Time to symptom plateau over 6 months

- High patient satisfaction
- 149 would have the procedure again / consider other side if symptomatic

Results – NAHS 3 years



Results – NAHS 5 years

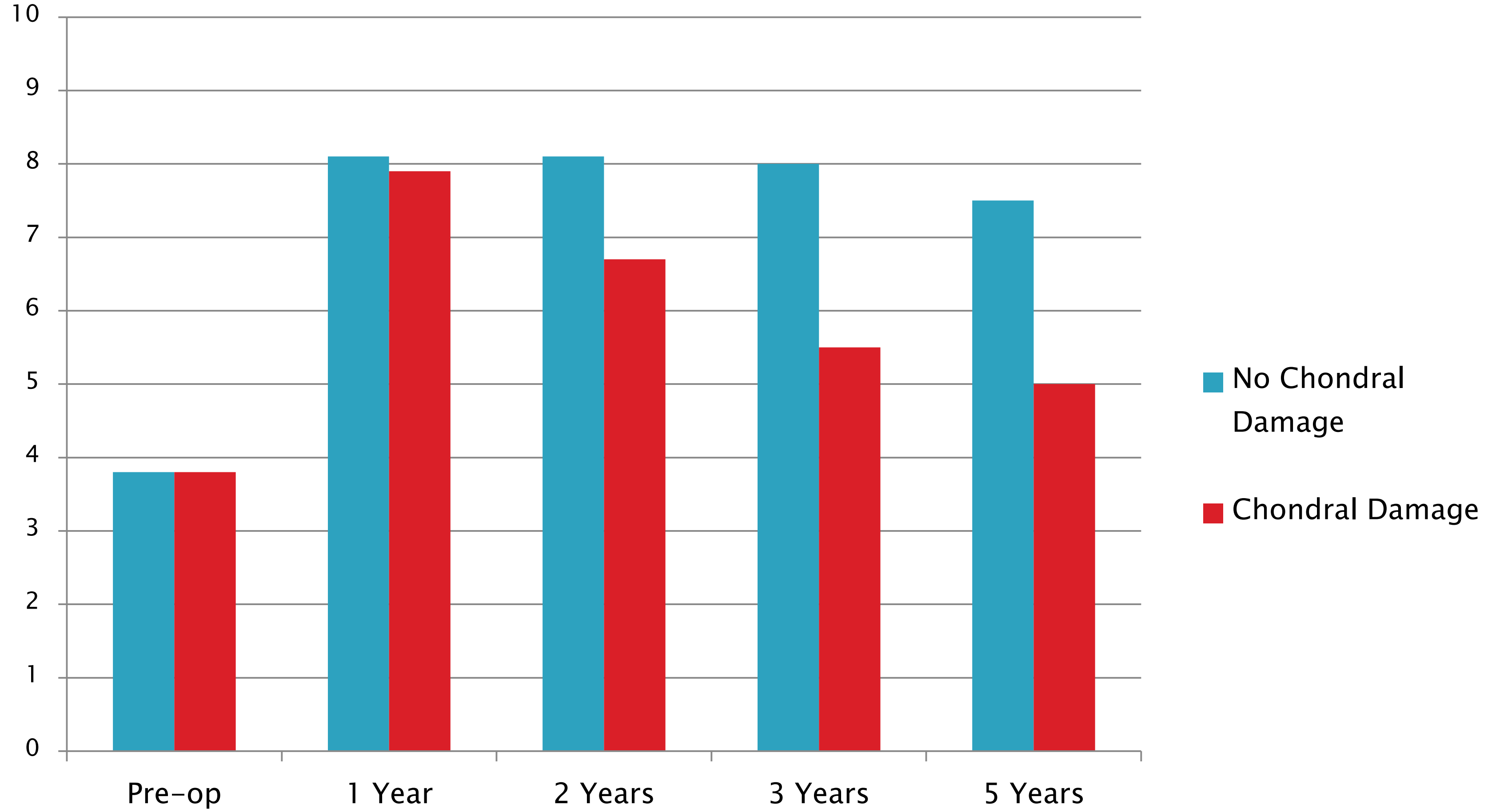


Results - UCLA score

- UCLA
  - 3.6 (2-7) to 7.9 (2-10)
  - P <0.01

- Majority return to sport
  - many in spite of minor residual symptoms

Results – UCLA score 5 years



Results

- Complications
  - No deep infections
  - No DVT/PE

- LFCN symptoms 41
  - Permanent 5

- Perineal numbness 16
  - All resolved

Results

- 22 equivocal/mild deterioration on all fronts
  - No correlation with age, symptom longevity, or size of CAM lesion
  - No correlation with labral preservation
  - **All had full thickness chondral defects**

- 6 deteriorated significantly
  - Hip Arthroplasty

Conclusion

- Hip arthroscopy is beneficial for FAI
- Chondral damage is a poor prognostic indicator

References

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- MacFarlane RJ, Konan S, El-Huseinny M, Haddad F.S.A review of outcomes of the surgical management of femoroacetabular impingement. Ann R Coll Surg Engl. 2014 Jul;96(5):331-8.

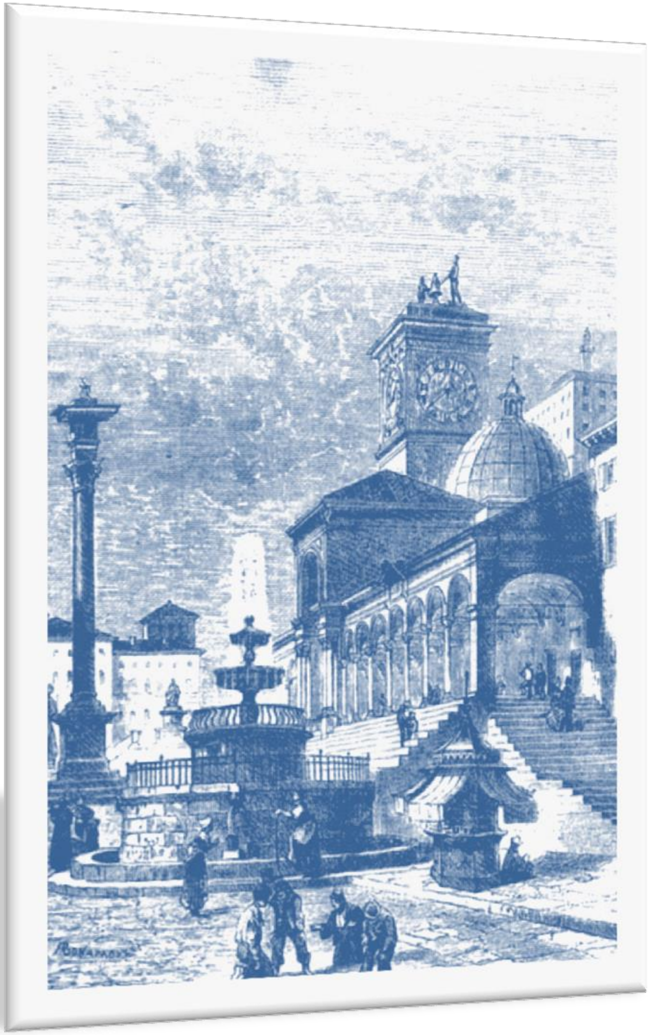
Thank you

INTERNATIONAL COMBINED MEETING

BRITISH HIP SOCIETY
SOCIETÀ ITALIANA DELL'ANCA

26-27 NOVEMBER 2015

MILAN, ITALY



Extracapsular vs standard approach in hip arthroscopy: our experience

Scorianz M., Di Benedetto P., Fiocchi A., Di Benedetto E., Causero A.

METHODS

April 2010 – March 2012

55 patients treated for FAI

54,5% male
45,5% female

Mean Age 35,8 yrs
(range 18-52)

Mean follow-up 18 months (range 10 – 26)

METHODS

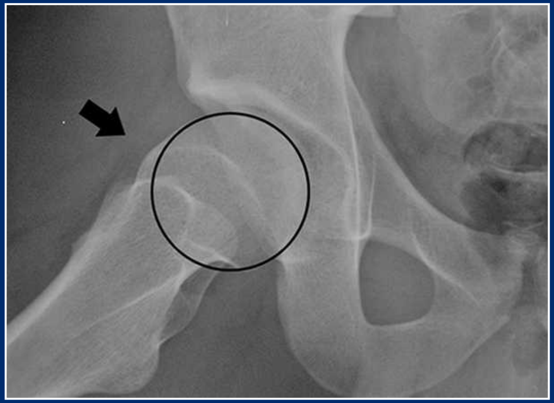
- Harris Hip Score: 62 (range 44-78)

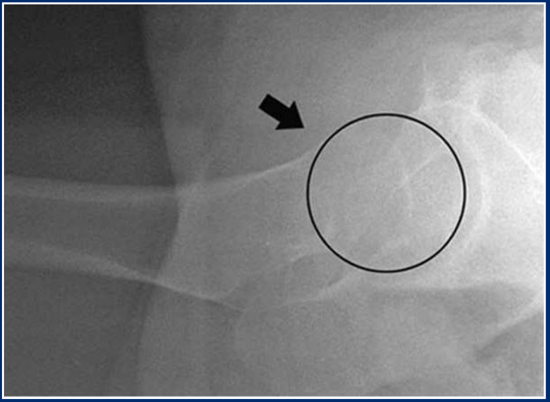
- Hip flexion: 97° (range 78° -114)

- Positive impingement sings (FADDIR e FABER test)

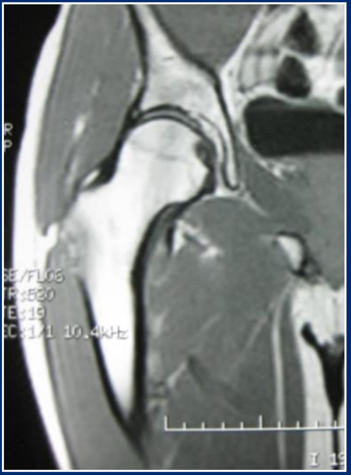
METHODS

X-ray





MR / Arthro-MR



APPROACH

Extracapsular

30 patients (54%)

Average surgery duration 108 minutes

Intracapsular

25 patients (46%)

Average surgery

duration 147 minutes

APPROACH

Extra capsular

APPROACH

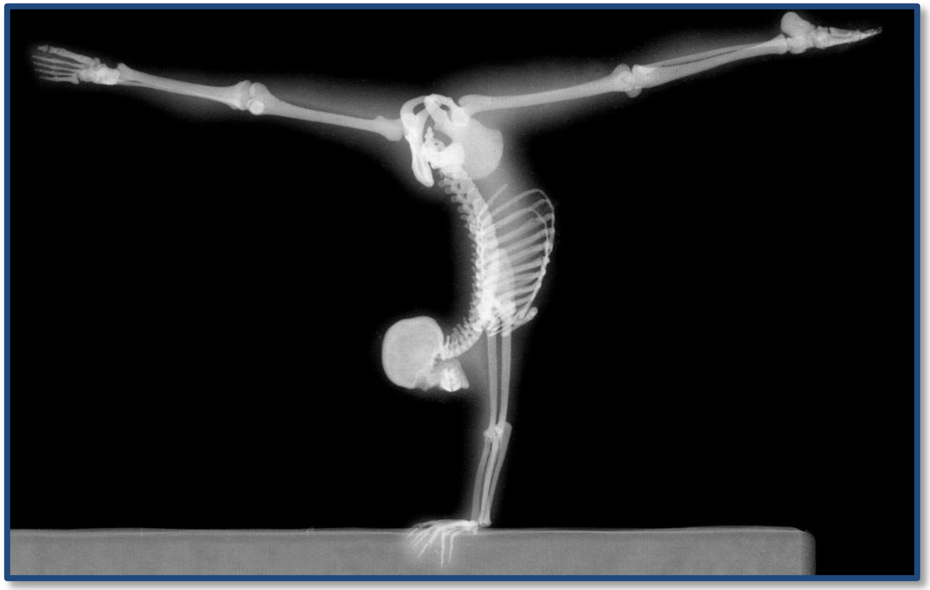
Extra capsular

APPROACH

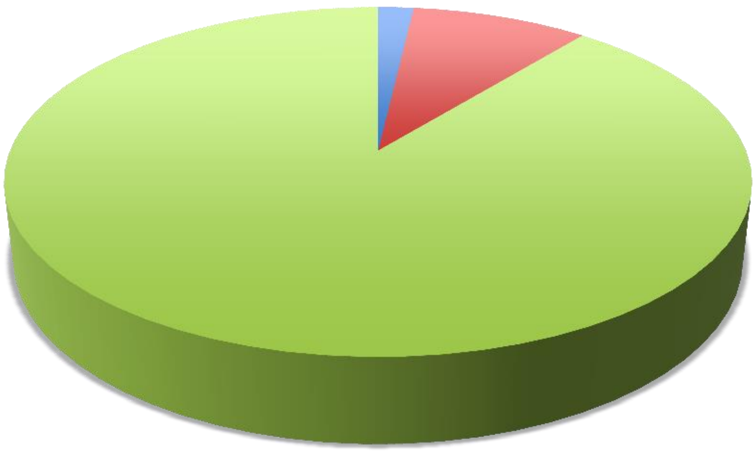
Extra capsular

RESULTS

- Harris Hip Score: 91 (range 84-98)
- Flexion: 125° (range 110° -135°)
- Impingement signs: negative
- Any significant difference between the two groups
- Any micro instability or laxity in the two groups

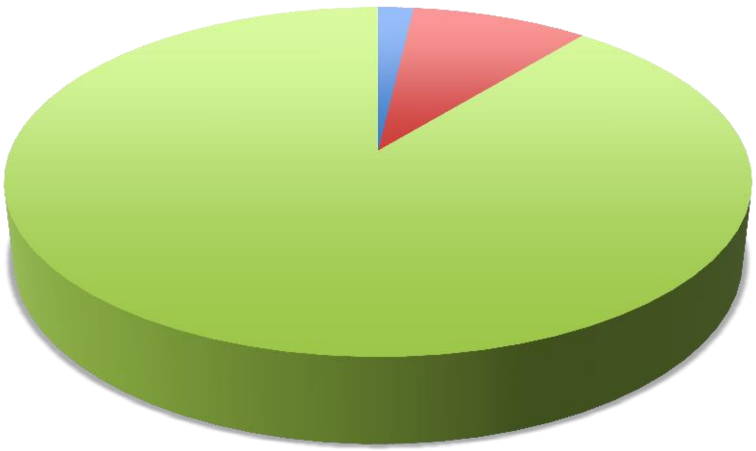


RESULTS



RESULTS

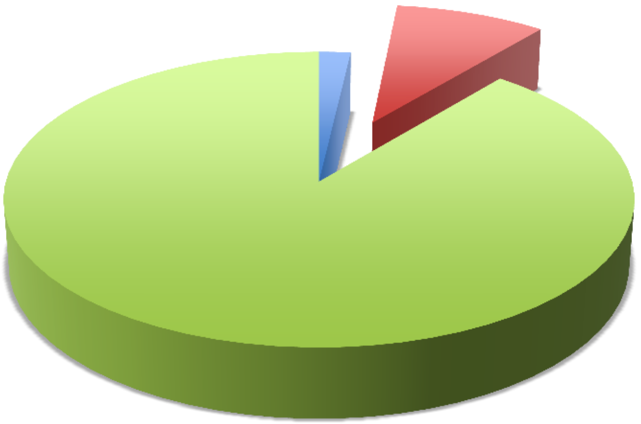
49 patients: no complications



RESULTS

49 patients: no complications

5 iatrogenic lesions: 3 cartilage lesions, 2 labral lesions



RESULTS

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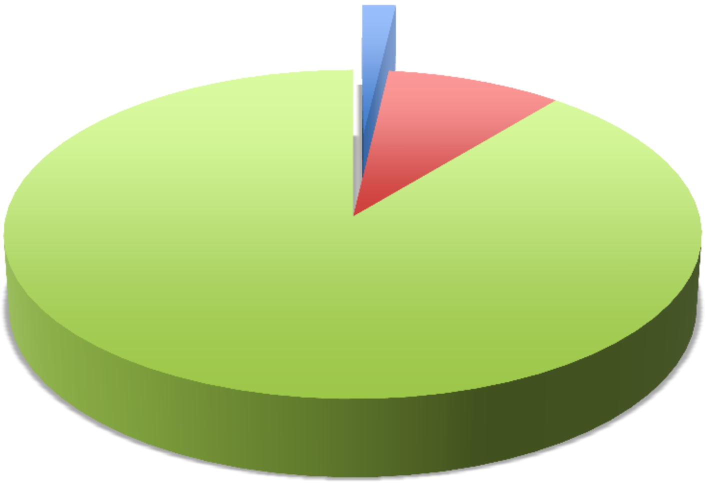
1 patient: transitory neurapraxia of sciatic nerve (10 days)



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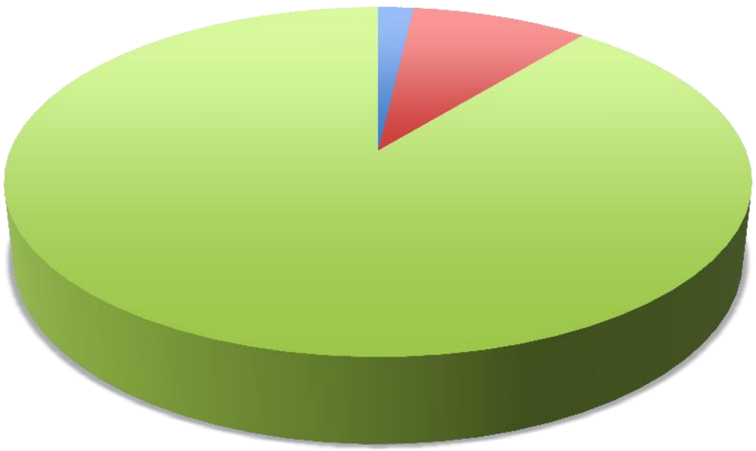


Intra capsular

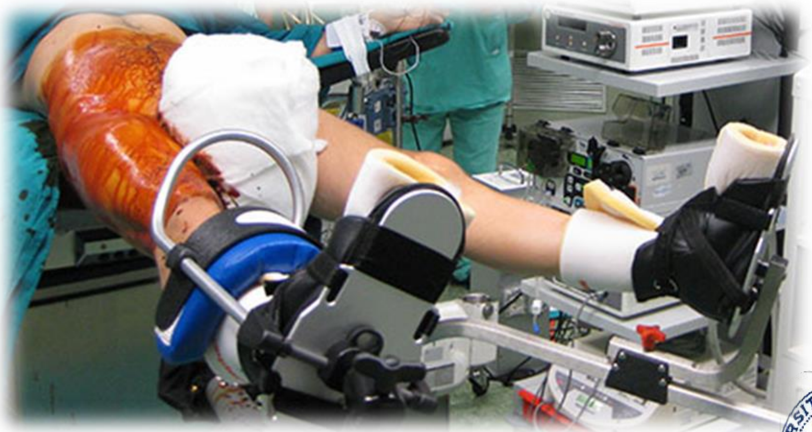
RESULTS

Extra capsular

Average traction time 16 minutes

Intracapsular

Average traction time 98 minutes

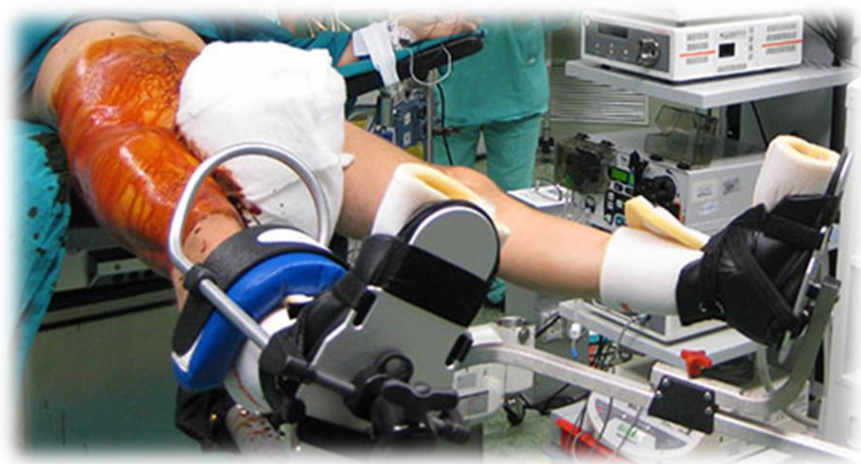


RESULTS

Table 4 Comparison of complications (n (% incidence)) in series of arthroscopic treatment of femoroacetabular impingement.

Authors (date)	Number of hips	Total complications (%)[a]	Ectopic ossification (%)	Femoral neck fracture	Neurologic complications	Perineal skin complications (%)
Byrd and Jones [29]	207	3 (1.4)	1 (0.5%)	0	2 (1%) 1 lateral femoral cutaneous, 1 pudendal	0
Gédouin et al. [34]	38	0				
Horisberger et al. [30]	105	12 (11)	0	0	9 (8%) lateral femoral cutaneous and pudendal	1 (0.9)
Ilizalituri et al. [26]	19	0				
Larson and Giveans [27]	100	7 (7)	6 (6%)		1 (1%) (sciatic)	
Philippon et al. [28]	122	0				
Sadri [25]	32	1 (3)			1 (3%) lateral femoral cutaneous	
Sampson [23]	120	1 (0.8)		1 (0.8%)		
Present series	110	7 (6)	3 (2%)	1 (0.9%)	2 (1.8%) (1 femoral[b], 1 pudendal)	1 (0.9)

[a] Not considered as complications: revision for osseous under-correction or implant; benign hematoma.
[b] Following crossover to open surgery.



Sampson, Clin.Sport. Med. 2001

Gedouin JE – Orthop Traum Surg Res 2010

CONCLUSIONS

- Less invasive
- Reduced traction time
- Viable alternative

Thank you for your attention

INTERNATIONAL COMBINED MEETING

BRITISH HIP SOCIETY
SOCIETÀ ITALIANA DELL'ANCA

26-27 NOVEMBER 2015

MILAN, ITALY

Hip Arthroscopy – a new vision about the Hip Pathology

3 years experience with the out-inside technique

Orthopaedics and Traumatology Service of Hospital Garcia de Orta, Almada
Hip Arthroplasties and Arthroscopy Unit

Clínica Lambert, Lisboa
Hip Pathology Unit

INTERNATIONAL COMBINED MEETING
BRITISH HIP SOCIETY
SOCIETÀ ITALIANA DELL'ANCA

João Sarmento Esteves[1], Pedro Simas[2], José Pinto[1], Ricardo Ferreira[1], David Pinto[1], Mário Tapadinhas[3]

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Medical doctor[2] of Clinica Lambert: Orthopaedics, Traumatology and Sports Medicine
Medical doctor[3] of Orthopaedics and Traumatology Service of Hospital Garcia de Orta

AIM

Review the clinical, functional and radiographic short-term results of patients with hip disease that underwent hip arthroscopy

METHODS

- Retrospective review of 3 years (May 2011 to May 2014)

- Number of patients: 36 cases

- Exclusion criteria:

  - other surgeons
  - loss of follow-up
  - adjuvant technique for treating other hip pathologies

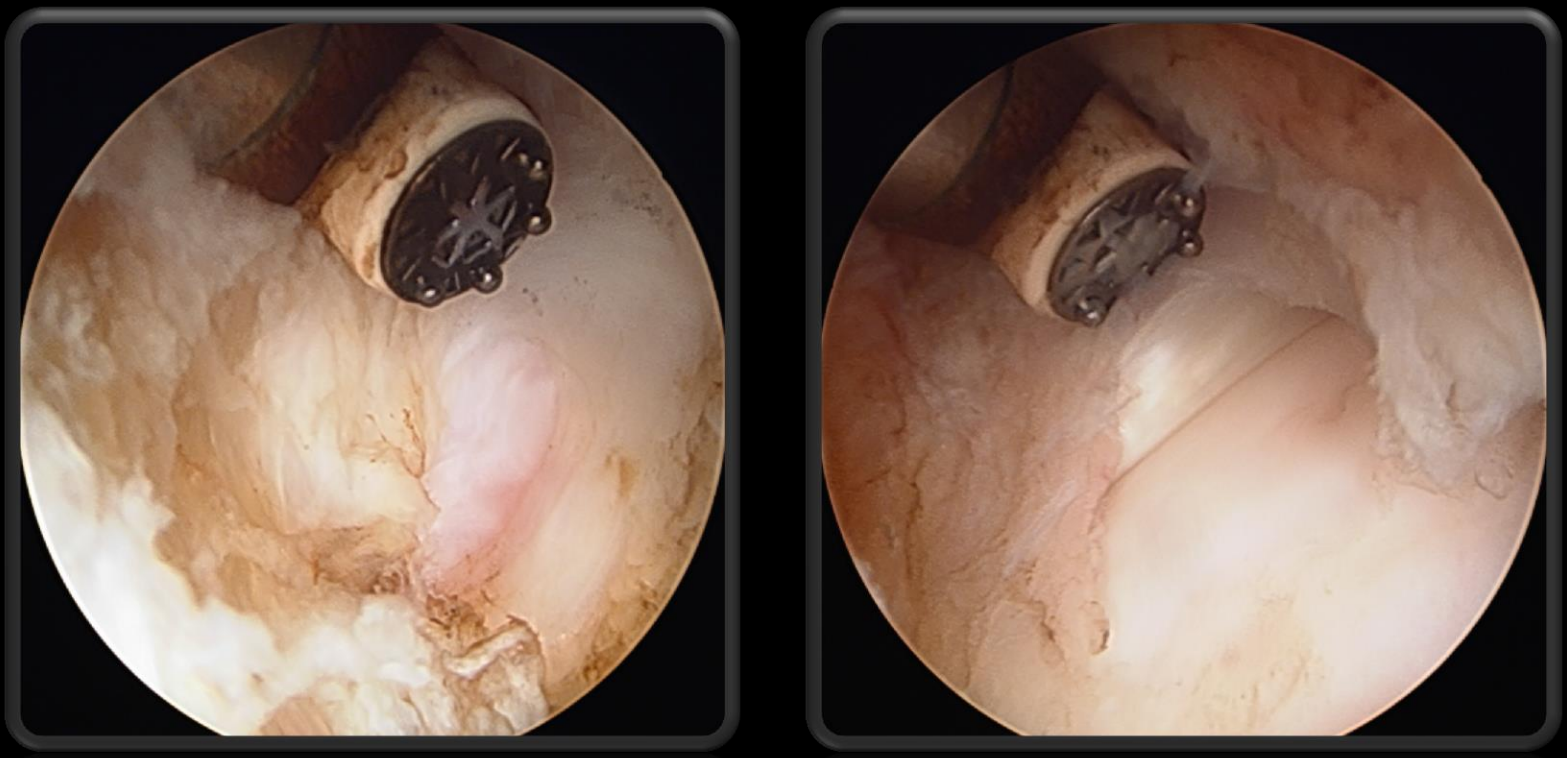
METHODS

- 36 patients (18M & 18F)
- 28 FAI
- 7 Snapping hip
- 1 Chronic trocanteritis
- Average age 41Y (16-62Y)
- Average Follow-up 7.81M (1-18M)

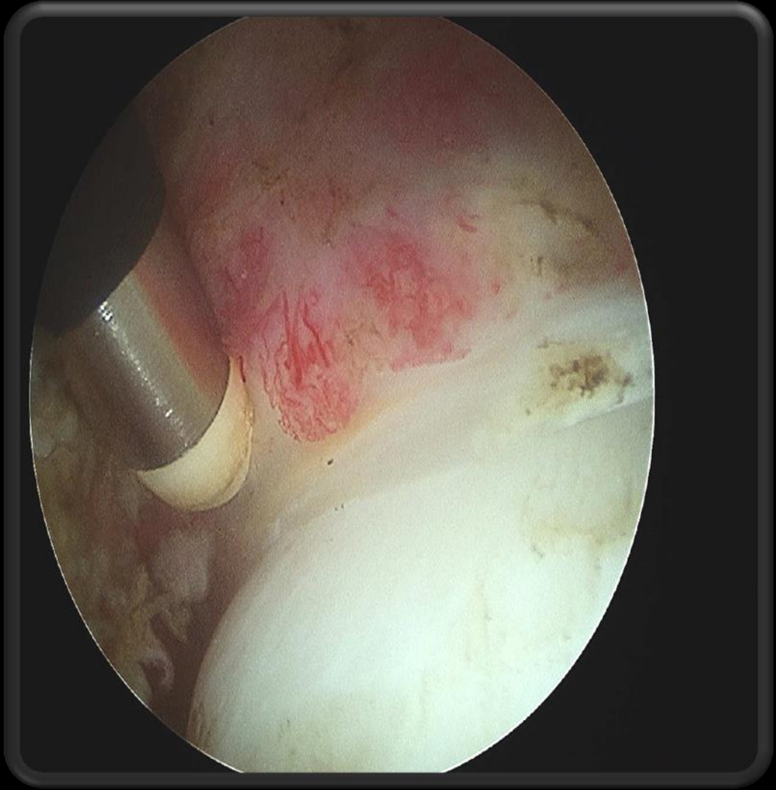
- Clinical and radiologic evaluation
- Tönnis and Ganz classification
- Modified HHS and modified Merle d'Aubigne score

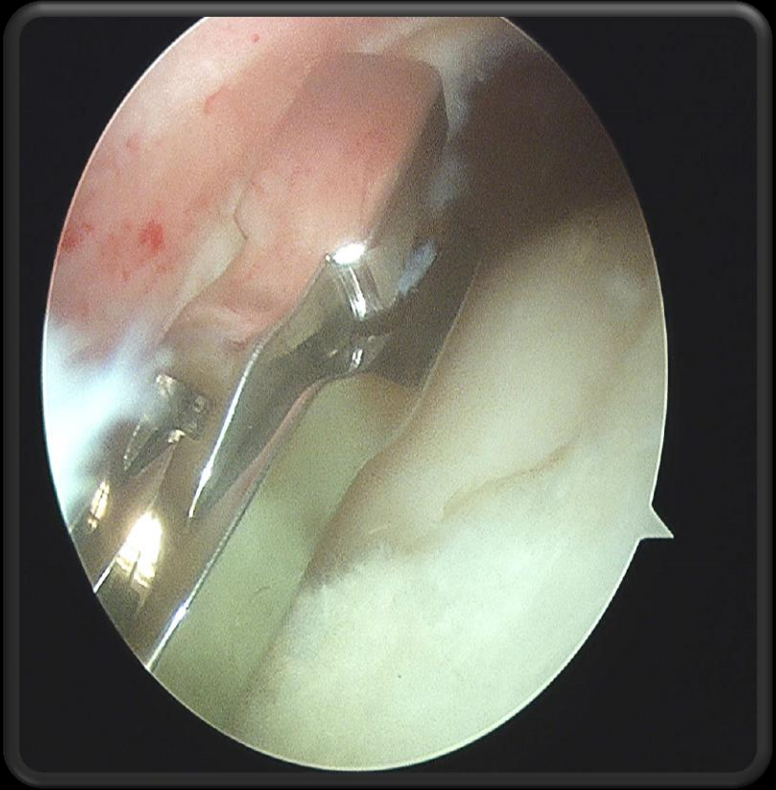
SURGICAL TECHNIQUE

SURGICAL TECHNIQUE



SURGICAL TECHNIQUE





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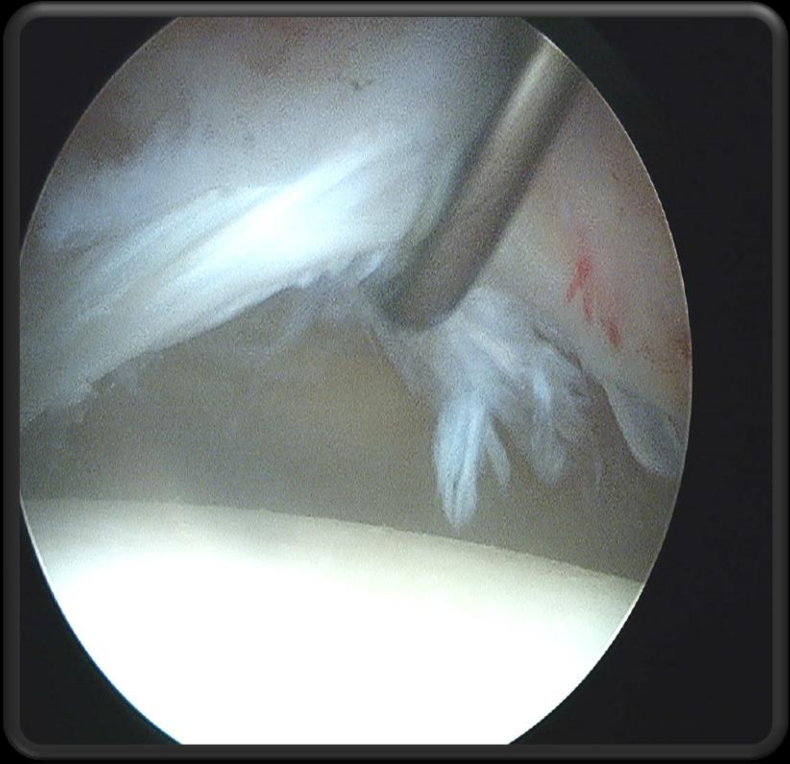

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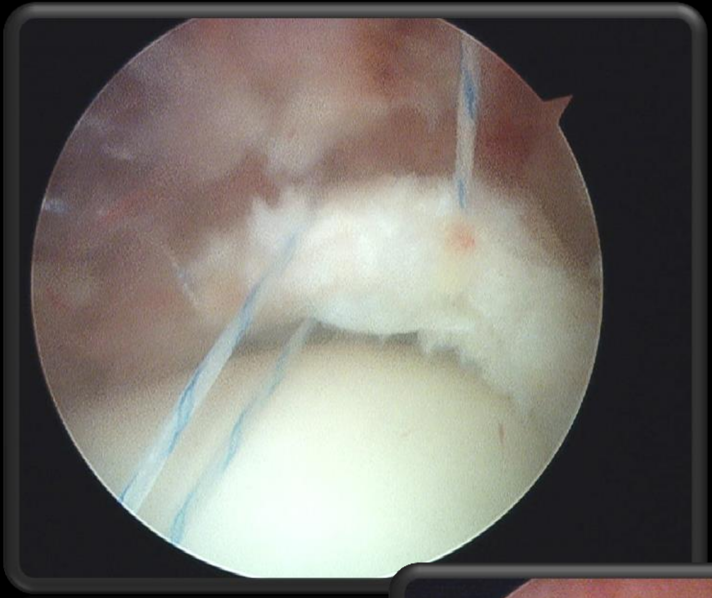
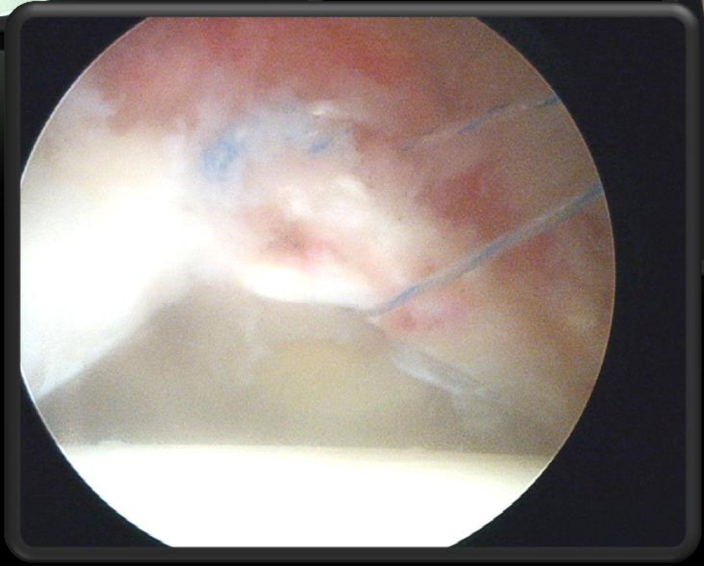
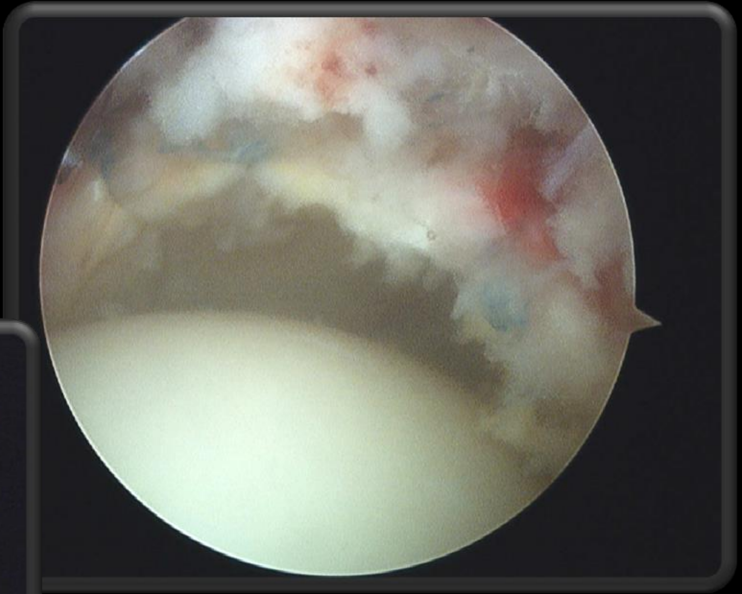
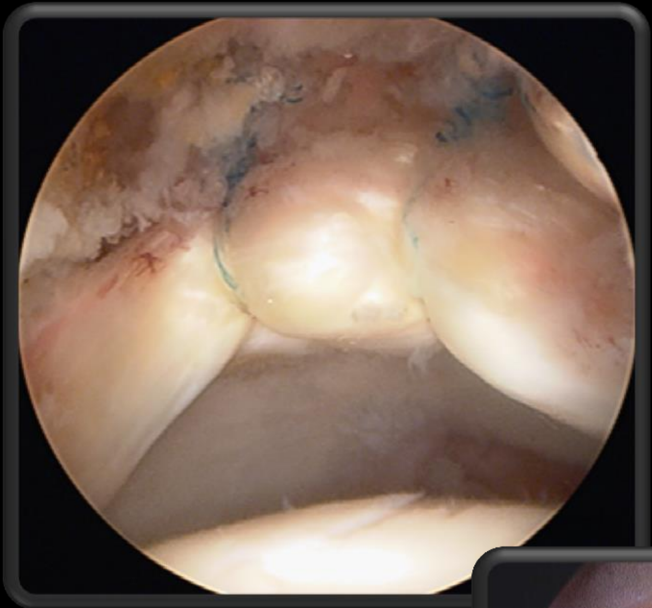
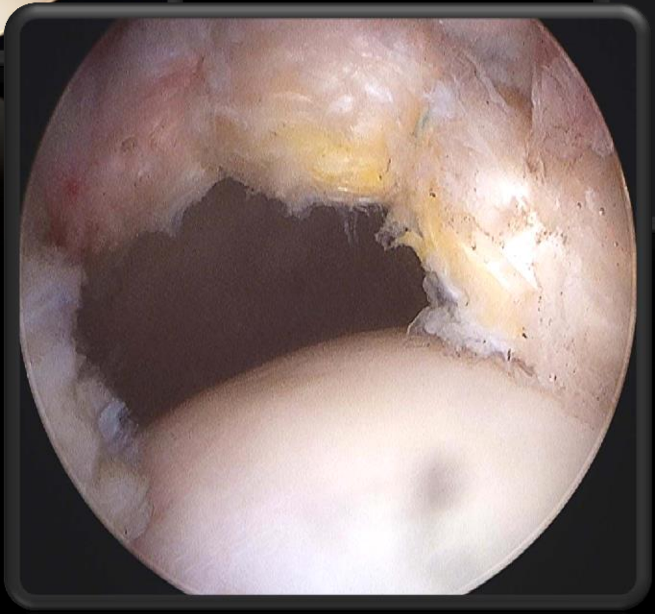


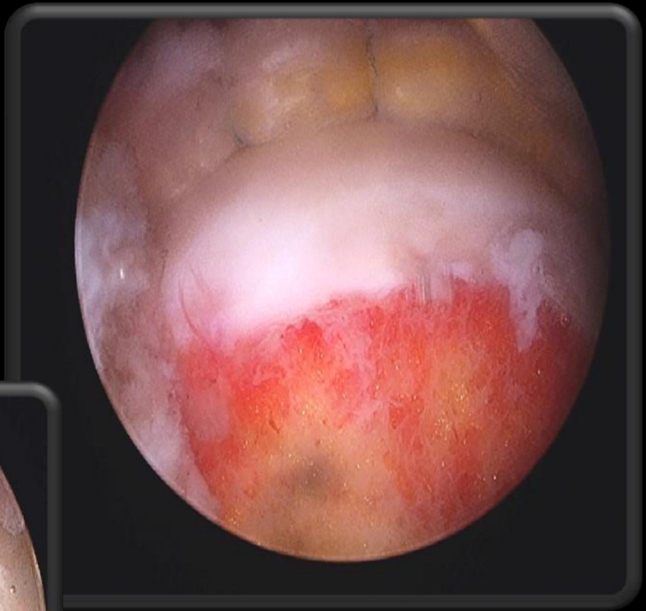




SURGICAL TECHNIQUE







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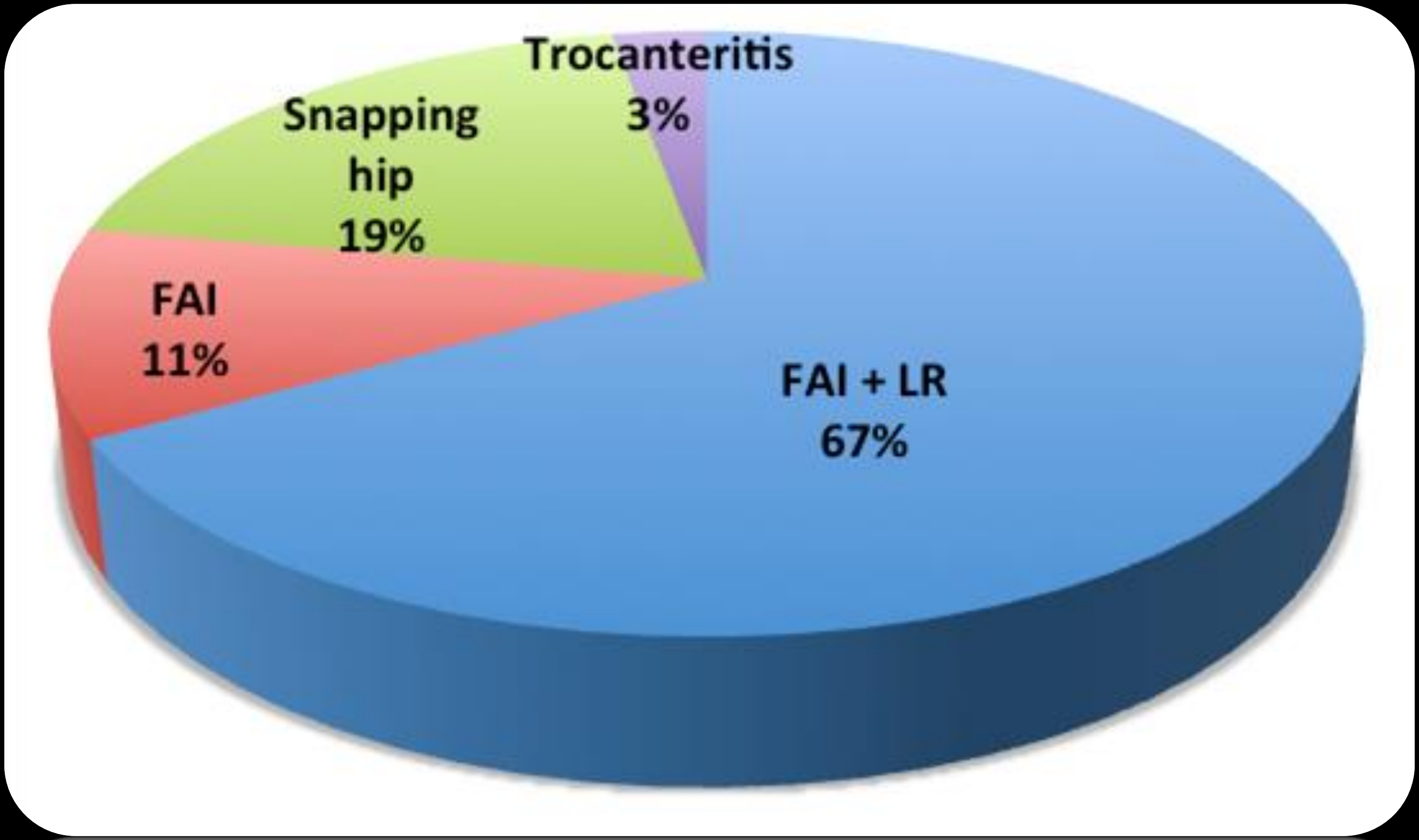
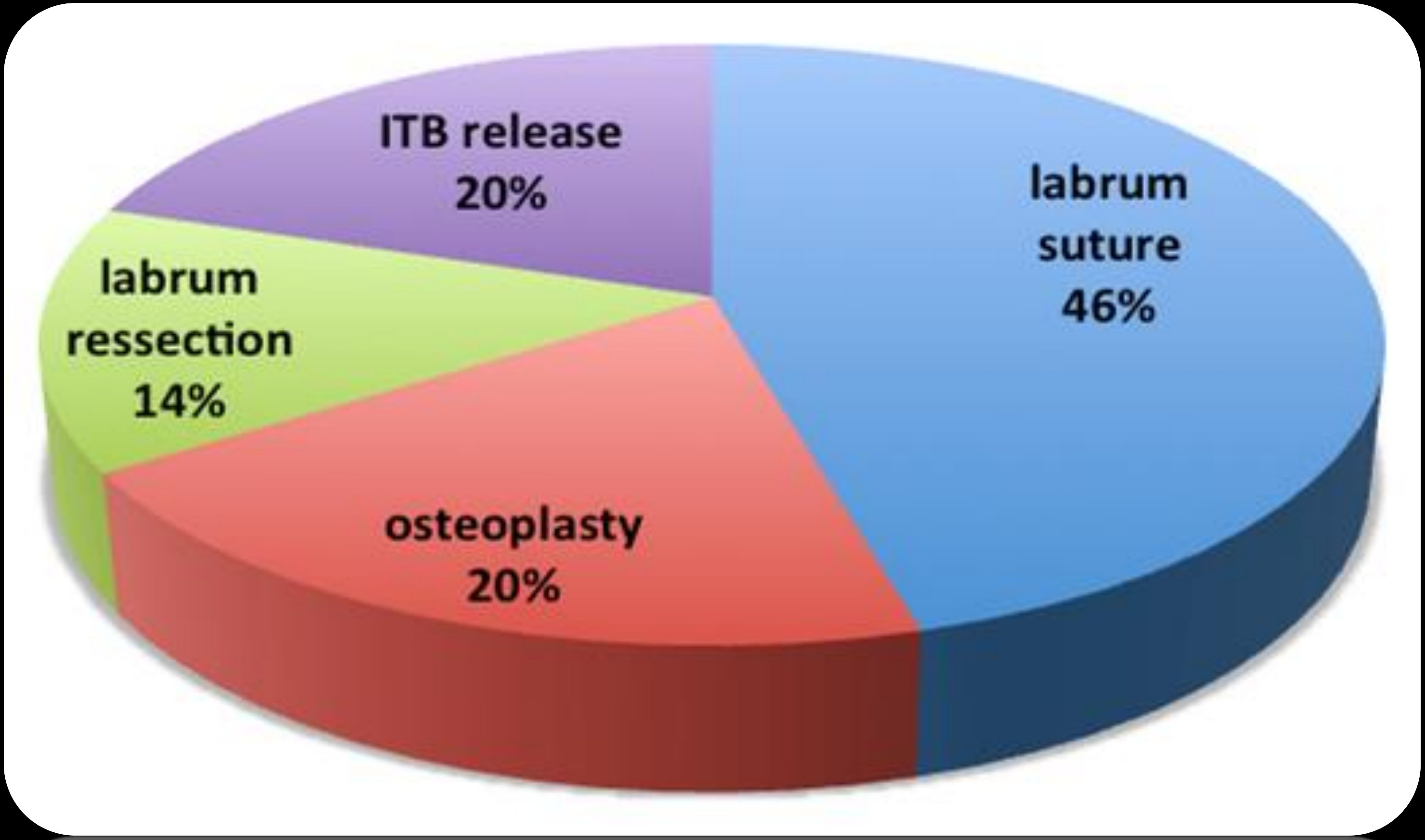
RESULTS

Hip Pathology



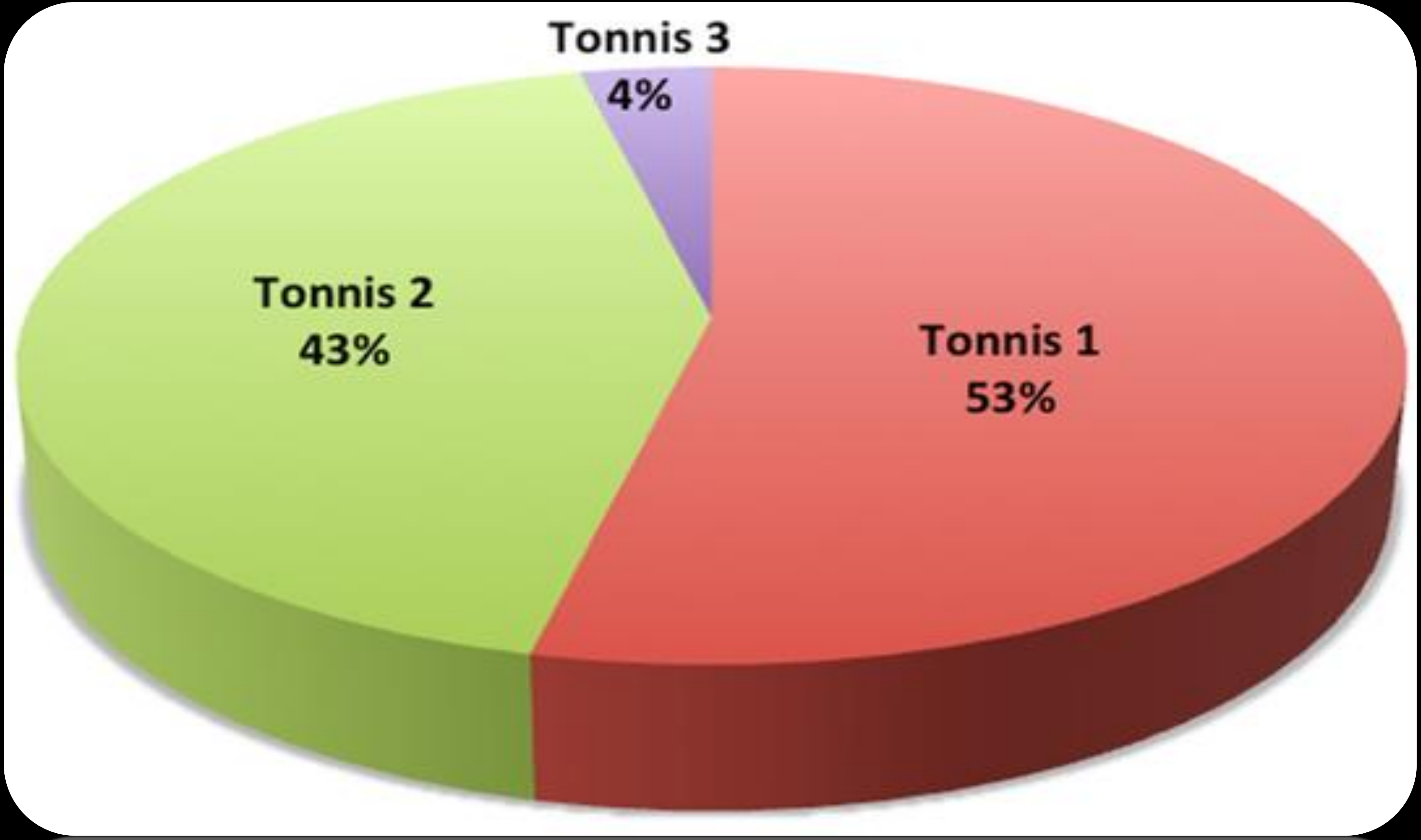
RESULTS

Technique type



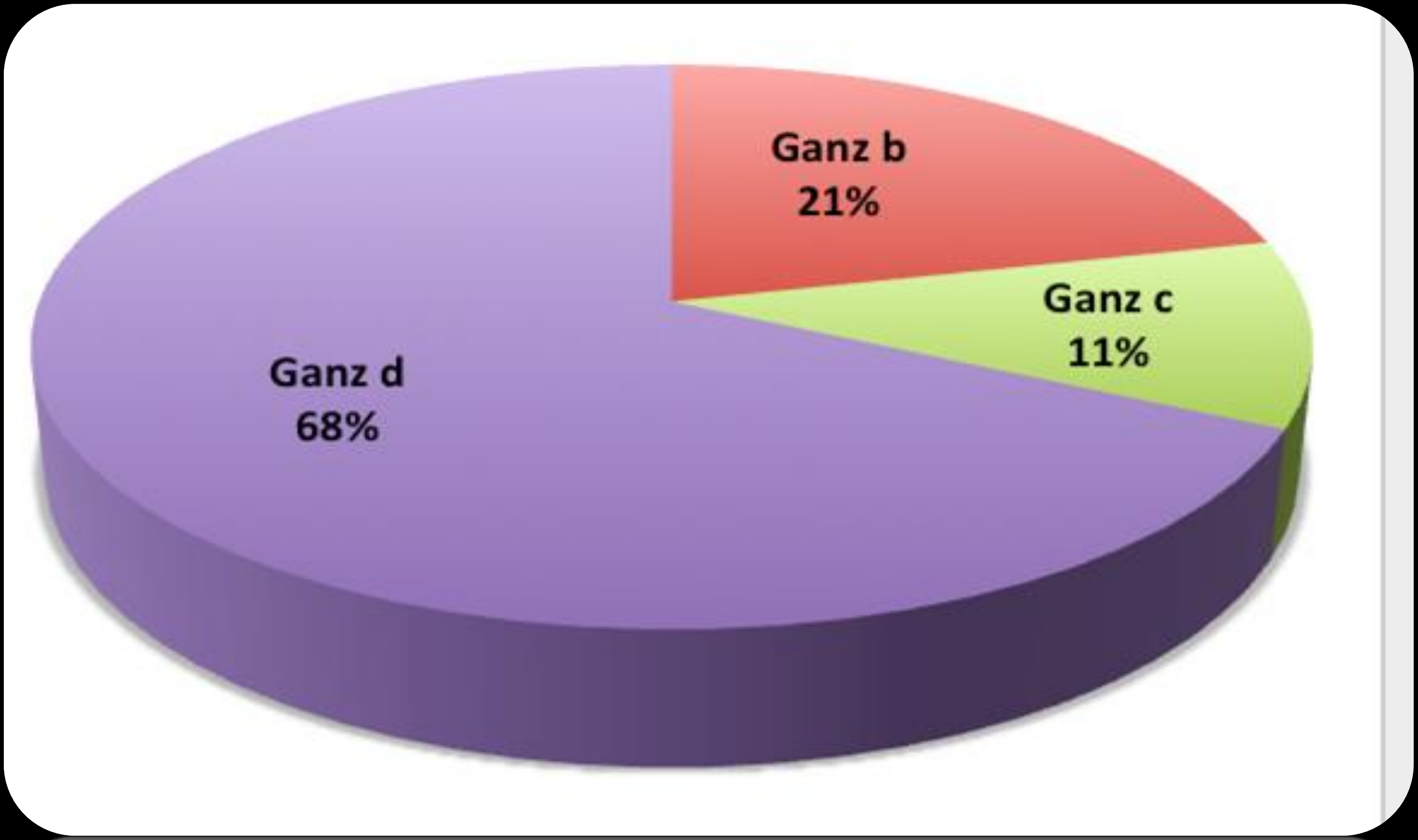
RESULTS

Tönnis classification



RESULTS

Ganz classification



RESULTS

Modified Merle d'Aubigne Score

Modified Merle d'Aubigne Scale

Criteria	Points
Pain	
None	
Slight or intermittent	5
After walking but resolves	4
Moderately severe but patient is able to walk	3
Severe, prevents walking	2
Walking	
Normal	
No cane but slight limp	
Long distance with cane or crutch	
Limited even with support	3
Very limited	2
Unable to walk	1
Range of motion	
95-100%	6
80-94%	5
70-79%	4
60-69%	3
50-59%	2
<50%	1
Clinical grade	
Excellent	18
Good	15, 16, or 17
Fair	13 to 14
Poor	<13

From: Matta JM. JBJS 1996;78A:1632

89% FAI with good – excellent results

100% SH with good – excellent results

RESULTS

Modified Harris Hip Score

DOR

Não tem, ou é ignorada		44
Discreta, ocasional (sem comprometer a actividade física)		40
Ligeira (não compromete actividade física normal, só a mais intensa)		30
Moderada, tolerável (mas com limitação clara da actividade)		20
Marcada (limitação séria da actividade física)		10
Incapacitante (dor em repouso, imobilizado na cama)		0
	TOTAL DOR	

FUNÇÃO

Marcha	Claudicação	Não tem	11
		Ligeira	8
		Moderada	5
		Severa ou com Incapacidade de marcha	0
	Auxiliares de marcha	Nenhum	11
		1 Bengala em caminhadas longas	7
		1 Bengala a maior parte do tempo	5
		1 Canadiana	3
		2 Bengalas	2
		2 Canadianas ou Incapacidade de marcha	0
	Perímetro de marcha	Ilimitado	11
		1000 metros	8
		250-500 metros	5
		Deambula só em casa	2
		Só Cama e Cadeira	0
Actividade Funcional	Escadas	Normalmente, sem corrimão	4
		Normalmente, mas apoiado no corrimão	2
		Com grande dificuldade	1
		Incapaz de usar escadas	0
	Atar os sapatos / Calçar Meias	Facilmente	4
		Com dificuldade	2
		Incapaz	0
	Sentar-se	Em cadeira normal (1 hora ou mais)	5
		Cadeira alta (até 1/2 hora)	3
		Incapaz de sentar-se em cadeira (1/2 hora)	0
	Transportes públicos (autocarro)	Pode utilizador	1
		Não Consegue utilizar	0
		TOTAL FUNÇÃO	

85% FAI with good – excellent results

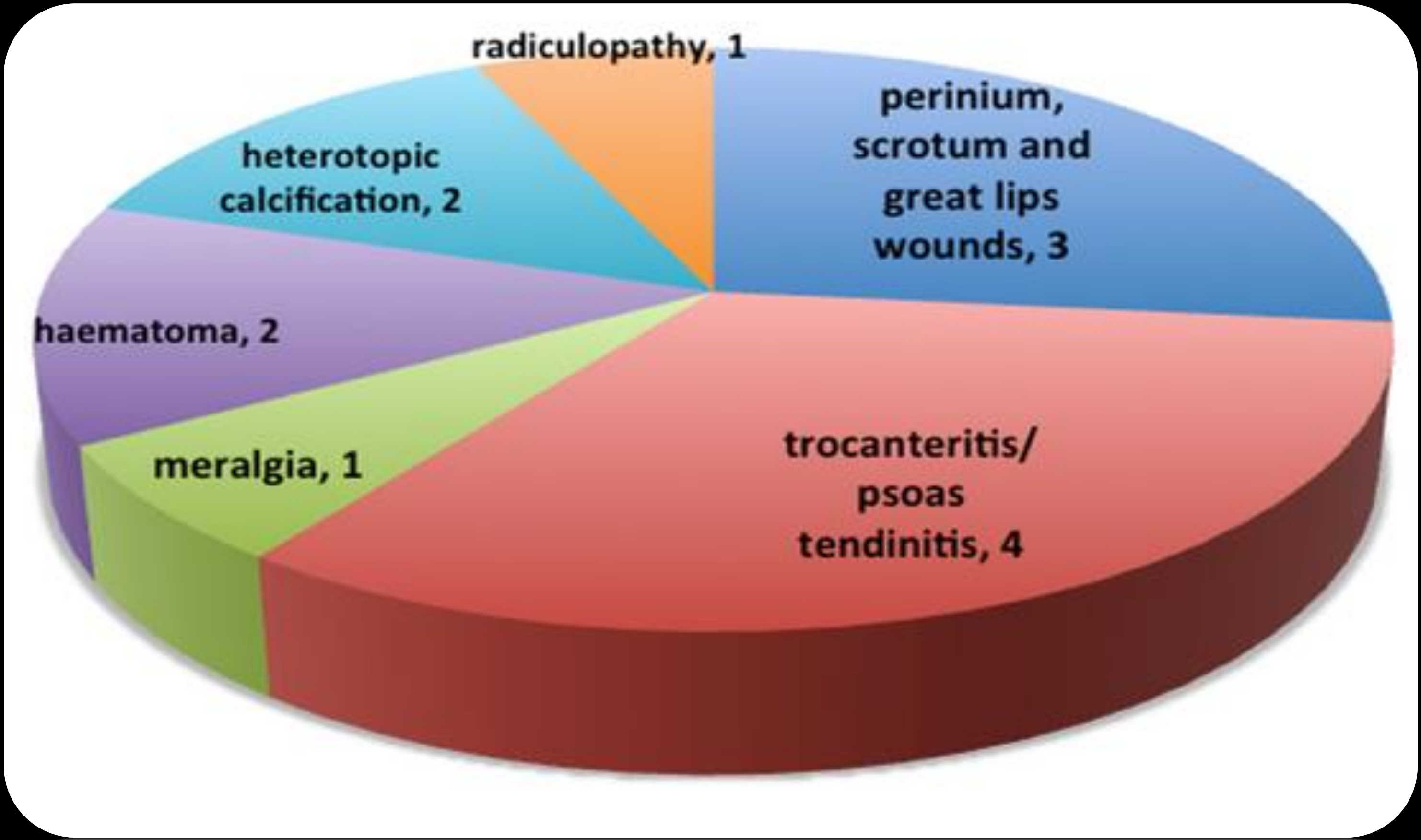
100% SH with good – excellent results

POST OP PROTOCOL

- Partial weight bearing with crutches – 2weeks
- Flexion <80º – 4weeks
- Rivaroxaban – 2weeks
- Celecoxib – 2weeks
- <u>Early mobilization</u>!!!
  - •Artromotor
  - •Assisted passive and active exercises
  - •Weighing commuters

COMPLAINTS

Post-op complaints



CONVERTION TO THR

THR

2 cases (7.14%)

Lesion progression to coxarthrosis

(Tönnis 2 e 3)

Without "instability" cases

Without vasculo-nervous injuries

CONCLUSIONS

- Small and with short follow-up series
- Missing pre-op scores to compare the real improvement
- Hip joint easy to access this way
- Inside-out technique easy to implement
- Low complications rate associated with traction
- Demystify the development of hip arthroscopy


THANK YOU

INTERNATIONAL COMBINED MEETING

BRITISH HIP SOCIETY
SOCIETÀ ITALIANA DELL'ANCA

26-27 NOVEMBER 2015

MILAN, ITALY

SURGICAL DISLOCATION FOR PEDIATRIC AND ADOLESCENT HIP DEFORMITY:
CLINICAL AND RADIOGRAPHIC RESULTS AT 3 YEARS FU

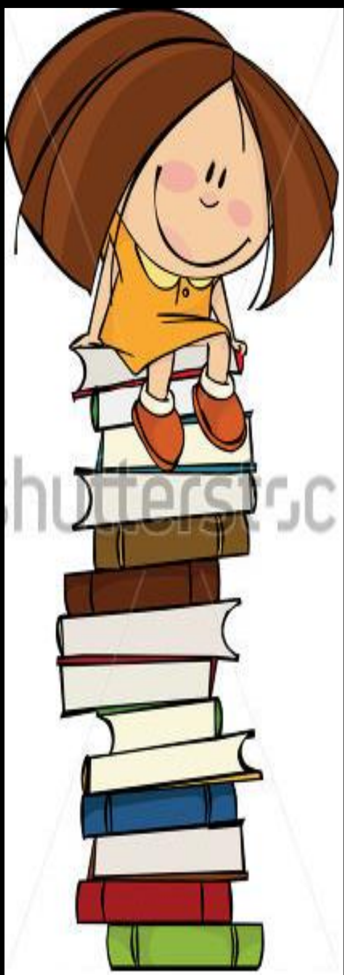
Guindani N[1], Eberhardt O[1], Surace MF[2], Cherubino P[2], Wirth T[1], Fernandez FF[1]

1.Orthopädische Klinik – Olgahospital - Klinikum Stuttgart (DE)

2.Dipartimento Di Biotecnologie e Scienze Della Vita, University of Insubria, Varese (IT).

SIOT Grant - 2013/2014

SURGICAL TECHNIQUE



Clin Orthop Relat Res (2009) 467:704–716
DOI 10.1007/s11999-008-0687-4

SYMPOSIUM: FEMOROACETABULAR IMPINGEMENT: CURRENT STATUS OF DIAGNOSIS AND TREATMENT

Capital Realignment for Moderate and Severe SCFE Using a Modified Dunn Procedure

Kai Ziebarth MD, Christoph Zilkens MD, Samantha Spencer MD, Michael Leunig MD, Reinhold Ganz MD, Young-Jo Kim MD, PhD

Surgical dislocation of the adult hip

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R. Ganz, T. J. Gill, E. Gautier, K. Ganz, N. Krügel, U. Berlemann
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Gleeson Rebello MD, Samantha Spencer MD, Michael B. Millis MD, Young-Jo Kim MD, PhD

Original Article Clinics in Orthopedic Surgery 2009;1:132-137 • doi:10.4055/cios.2009.1.3.132

Application of Ganz Surgical Hip Dislocation Approach in Pediatric Hip Diseases

Sung Jin Shin, MD*, Hong-Seok Kwak, MD, Tae-Joon Cho, MD, Moon Seok Park, MD, Won Joon Yoo, MD, Chin Youb Chung, MD, In Ho Choi, MD
Department of Orthopaedic Surgery, Seoul National University College of Medicine, Seoul,
**Department of Orthopaedic Surgery, Jeju National University College of Medicine, Jeju, Korea*

HSSJ (2013) 9:60–69
DOI 10.1007/s11420-012-9323-7
HOSPITAL FOR SPECIAL SURGERY

REVIEW ARTICLE

Surgical Dislocation of the Hip: Evolving Indications

James R. Ross, MD • Perry L. Schoenecker, MD • John C. Clohisy, MD

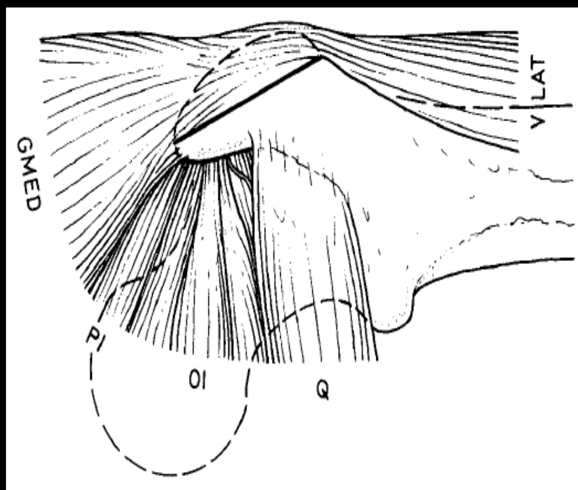
ORIGINAL ARTICLE

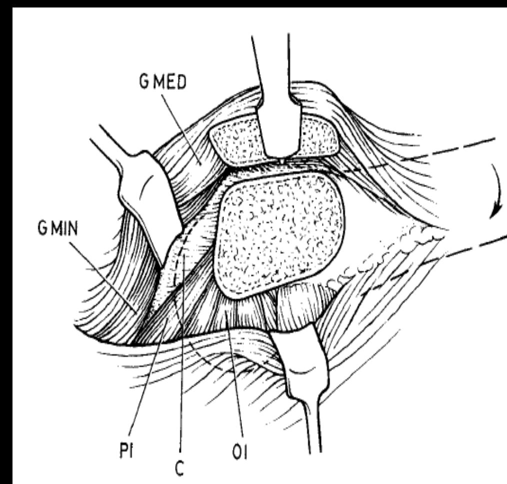
Surgical Hip Dislocation for Removal of Intraarticular Exostoses

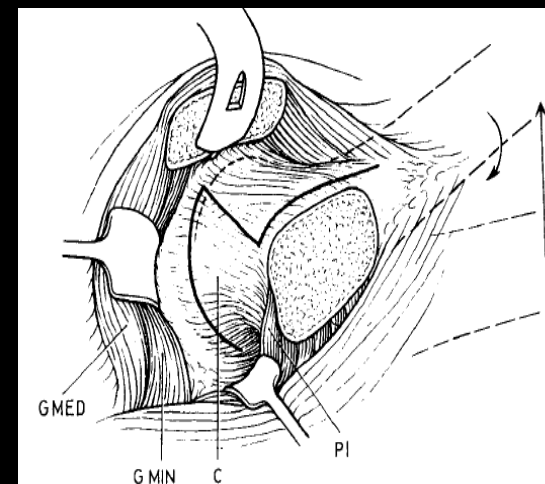
Report of Two Cases

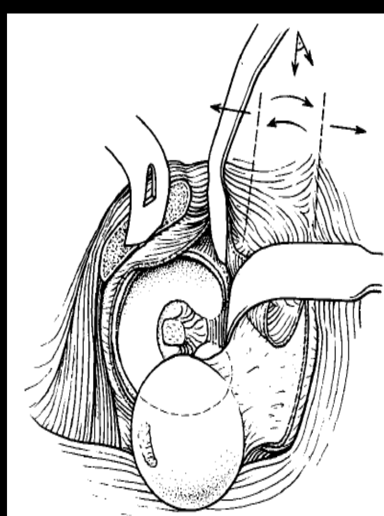
Paul Jellicoe, FRCS, Jochen Son-Hing, MD, FRCS(C),† Sevan Hopyan, MD,* and George H. Thompson, MD†‡*

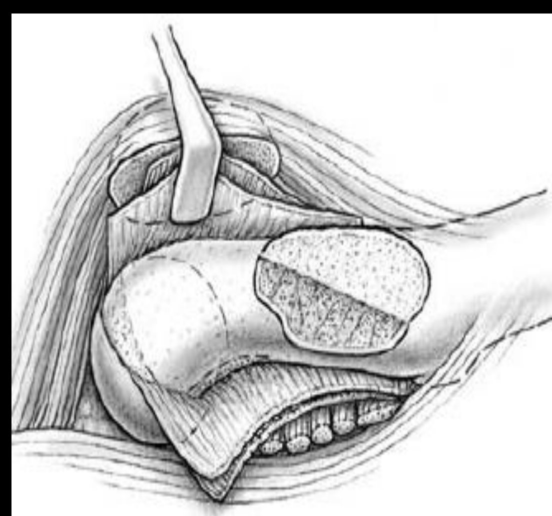
SURGICAL TECHNIQUE











THE JOURNAL OF BONE & JOINT SURGERY (Br)

Surgical dislocation of the adult hip

A TECHNIQUE WITH FULL ACCESS TO THE FEMORAL HEAD AND ACETABULUM WITHOUT THE RISK OF AVASCULAR NECROSIS

R. Ganz, T. J. Gill, E. Gautier, K. Ganz, N. Krügel, U. Berlemann
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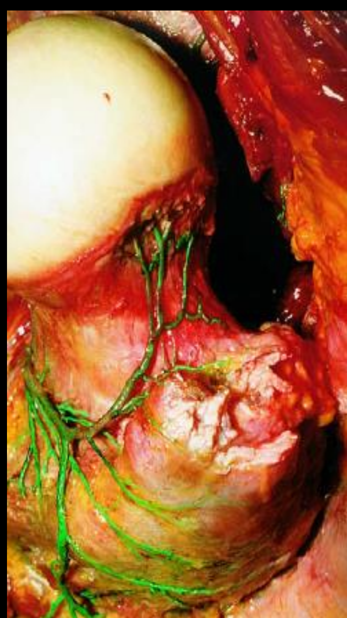
Kai Ziebarth MD, Christoph Zilkens MD,
Samantha Spencer MD, Michael Leunig MD,
Reinhold Ganz MD, Young-Jo Kim MD, PhD

SURGICAL TECHNIQUE


Anatomy of the medial femoral circumflex artery and its surgical implications

Emanuel Gautier, Katharine Ganz, Nathalie Krügel, Thomas Gill, Reinhold Ganz

From L'Hôpital Cantonal, Fribourg, Switzerland



Deep branch of A. circumflexa femoris medialis

SURGICAL TECHNIQUE

MODIFIED DUNN SUBCAPITATE OSTEOTOMY

Clin Orthop Relat Res (2009) 467:704–716
DOI 10.1007/s11999-008-0687-4

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Samantha Spencer MD, Michael Leunig MD,
Reinhold Ganz MD, Young-Jo Kim MD, PhD

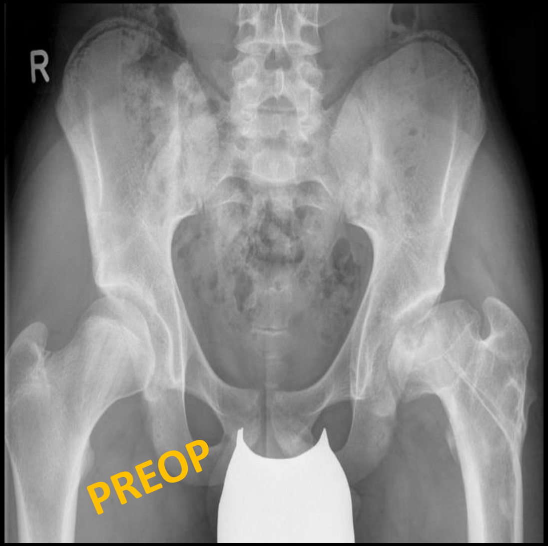
SURGICAL TECHNIQUE

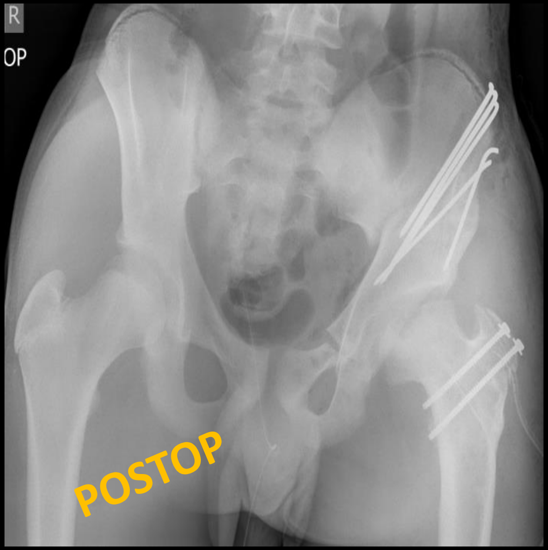
MOSAICPLASTY

Osteochondral mosaicplasty of the femoral head. **Girard J, Roumazeille T, Sakr M, Migaud H.** Hip Int. 2011 Sep-Oct;21(5):542-8. doi: 10.5301/HIP.2011.8659.

SURGICAL TECHNIQUE

ASSOCIATED PELVIC / FEMUR OSTEOTOMY





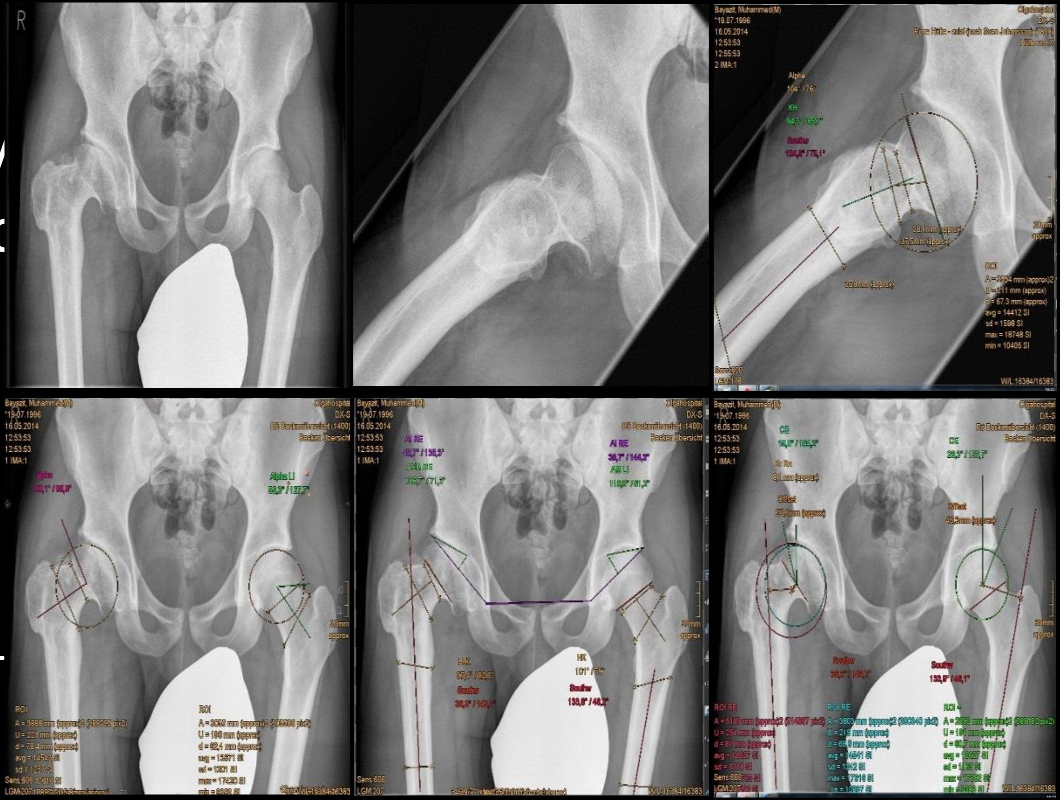
MATERIALS AND METHODS

✓Retrospective clinical study

✓All SHD < 18 Y from 2008 t

✓Clinical Evaluation:
- ROM, Trendelemburg sign
- Personal satisfaction, SF-12
- mHHS and NAHS

✓Rö Evaluation:
- Pelvis AP + Lauenstein (pre+
- OA: Tönnis
- Stulberg
- SDS*
- α-angle, Reimer index, Sharp, CE(Wiberg), ACM, C



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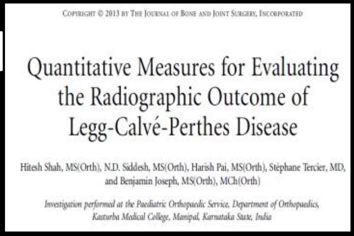
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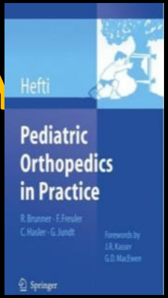
Quantitative Measures for Evaluating the Radiographic Outcome of Legg-Calvé-Perthes Disease

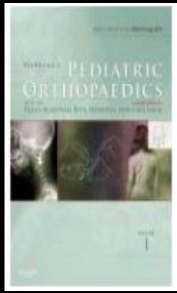
Hitesh Shah, MS(Orth), N.D. Siddesh, MS(Orth), Harish Pai, MS(Orth), Stéphane Tercier, MD, and Benjamin Joseph, MS(Orth), MCh(Orth)

Investigation performed at the Paediatric Orthopaedic Service, Department of Orthopaedics, Kasturba Medical College, Manipal, Karnataka State, India

TREATED PATHOLOGY

PATHOLOGY	PREVALENCE		THIS STUDY
✓ FAI*	2÷3	x10	34 $\times10^{-2}$
✓ LCPD	4	$\times10^{-5}$	28 $\times10^{-2}$
✓ ECF	2	$\times10^{-5}$	24 $\times10^{-2}$
✓ MHE	5	$\times10^{-4}$	8 $\times10^{-2}$
✓ SEPT.ART. (St.Aft.)	3÷8	$\times10^{-5}$	2 $\times10^{-2}$
✓ PVNS (Intrartic.)	2	$\times10^{-6}$	2 $\times10^{-2}$
✓ SYN.CHONDR.	Rare - unknown		2 $\times10^{-2}$
✓ [...]	***		***





Medscape

* FAI ≡ $\alpha > 55$ V LCEA

?!


ORIGINAL ARTICLE

Prevalence of Femoroacetabular Impingement Morphology in Asymptomatic Adolescents

Ying Li, MD,* Peter Helvie, BS,* Matthew Mead, BS, BA,* Joel Gagnier, MSc, PhD,* Matthew R. Hammer, MD,† and Nahbee Jong, BS*

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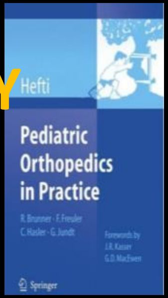

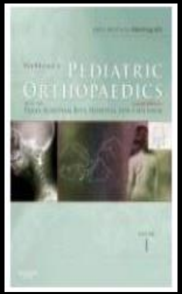

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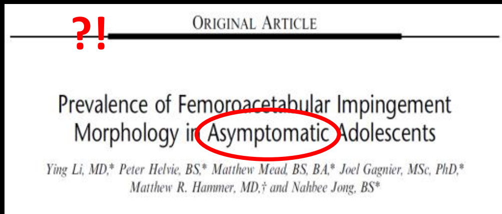
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RESULTS

CHARACTERISTICS	DATA ± SD (RANGE) or [%]
Nr. of patients Nr. of hips Female Male	51 53 22 [43%] 29 [57%]
Follow – up [Years]	3 ± 1,3 (0,5 - 6)
Mean age at surgery [Years]	14,2 ± 2,3 (8-18)
Mean age at follow-up [Years]	17,4 ± 2,5 (11 - 23)
Drop off [%]	8 [14%]

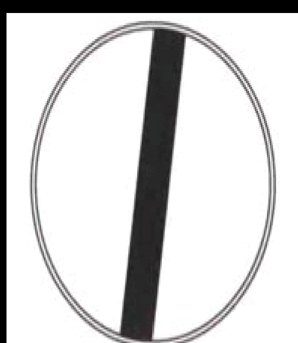
RESULTS

PROCEDURES

Femoral head-neck junction osteoplasty/bump	34
resection	[66%]
Femoral neck osteotomy (Dunn)	10
Labrum repair	[18%]
Extracapsular femur osteotomy	5 [9%]
Pelvic Ost/Acetabuloplasty (Tönnis or	4 [8%]
Pemberton)	3 [6%]
Femoral head mosaicplasty (for MLCP)	2 [4%]
Cartilage lesions / flakes fixation	2 [4%]
Synoviectomy	2 [4%]
Femoral neck osteotomy	1 [2%]
ORIF of SCFE (acute on chronic)	1 [2%]

LIMITS & STRENGHT

- ✓ Variety of treated pathologies
- ✓ Limited number of patients
- ✓ Drop off 14%
- ✓ Limited FU with growing skeleton
- ✓ No further imaging analysis (MR…)



- ✓ Compare results of different pathologies
- ✓ Same technique & same surgeons for SHD
- ✓ Overall good sample for comparison with other studies

RESULTS

- ✓ **No difference of ROM**
- ✓ **Improvement of NAHS, mHHS and SF-12**
- ✓ **Better roundness (↓SDS), without association of SDS with outcome scores**
- ✓ **90% personal overall satisfaction (Y/N)**

OUTCOME		MEAN (± SD)		MEAN DIFFERECE |pre-post| (95% CI)	p
		PREOPERATIVE	FU		
ROM[°]	IR	15 (21)	16 (15)	1,4 (-8,4 to 5,5)	0,68
	FL	93 (32)	100 (24)	5,4 (-14,4 to 3,6)	0,23
	ER	29 (27)	28 (17)	2,3 (-6,1 to 10,7)	0,59
	ES	2 (7)	1 (8)	1,1 (-4,5 to 2,3)	0,52
	AB	28 (16)	27 (15)	1,3 (-6,3 to 8,8)	0,73
NAHS		73(13)	86 (16)	12,4 (-17,1 to -7,6)	0,00
mHHS		73 (20)	92 (6,3)	18,8 (-27,1 to -10,4)	0,00
SF-12		47 (3)	50 (1,6)	2,4 (-3,2 to -1,6)	0,00
SDS	All	31 (26)	25 (22)	6,3 (-1,5 to 14,1)	0,12
	If Stulb.≥2	34 (26)	24 (23)	9,7 (1,7 to 17,6)	0,02

RESULTS

- ✓ **9% ON progression**
- ✓ **↑ ON progression with MDO** (p = 0,018, OR = 8,9 with $CI_{95\%}$ from 1,2 to 71,2)
- ✓ **↔ OA pre Vs postop** (pre 15% Vs post 29%, p=0,062)
- ✓ **6% THA***
- ✓ **↓ prevalence of OA with preop Stulberg class 1.**
- ✓ **No association between OA and outcome scores or SDS**

COMPLICATION or FURTHER PROCEDURES	DIAGNOSIS				
	SCFE	LCPD	FAI	MHE	Miscellanea
THA	1^d	2	-	-	1^b
ASK and shaving	-	-	1	-	-
Partial implant removal	1	-	-	-	-
Fixation failure	1	-	-	-	-
Heterotopic calcifications removal	-	1	-	-	-
IDVO	1^d	1	-	1^a	-
POT	-	-	1^a	1^a	-
Mobilization under anesthesia	-	1	-	-	-
ON progression	3^c	-	-	-	-
Transient ischiatic nerve paralysis	-	1	-	1	-
Functional arthrodesis	-	1	-	-	-
Perioperative blood transfusion	-	-	-	1	-
Postoperative fever	-	1	-	-	-
SSI	-	1	-	-	-

RESULTS

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*** Preop plain radiographs of patients with THA (or scheduled for) at FU**

RESULTS

- ✓ Results, frequency and quality of the complications :
  - are similar to those already described by in literature
  - vary depending on pathology, complexity and type of the procedure
- ✓ Relationship between dauer of pathology, cartilage damage, symptoms and outcomes. The SHD itself can be considered a safe* procedure

*

COMPLICATION or FURTHER PROCEDURES	DIAGNOSIS				
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IDVO	1^{d}	1	-	1^{a}	-
POT	-	-	1^{a}	1^{a}	-
Mobilization under anesthesia	-	1	-	-	-
ON progression	3^{c}	-	-	-	-
Transient ischiatic nerve paralysis	-	1	-	1	-
Functional arthrodesis	-	1	-	-	-
Perioperative blood transfusion	-	-	-	1	-
Postoperative fever	-	1	-	-	-
SSI	-	1	-	-	-

Clin Orthop Relat Res (2012) 470:2441–2449
DOI 10.1007/s11999-011-2187-1
Clinical Orthopaedics and Related Research®

SYMPOSIUM: LEGG-CALVÉ-PERTHES DISEASE: WHERE DO WE STAND AFTER 100 YEARS?

Low Early Failure Rates Using a Surgical Dislocation Approach in Healed Legg-Calvé-Perthes Disease

Benjamin J. Shore MD, FRCSC, Eduardo N. Novais MD,
Michael B. Millis MD, Young-Jo Kim MD, PhD

Clin Orthop Relat Res (2009) 467:724–731
DOI 10.1007/s11999-008-0591-y

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Surgical Dislocation in the Management of Pediatric and Adolescent Hip Deformity

Gleeson Rebello MD, Samantha Spencer MD,
Michael B. Millis MD, Young-Jo Kim MD, PhD

ORIGINAL ARTICLE

Early Results of Treatment for Hip Impingement Syndrome in Slipped Capital Femoral Epiphysis and Pistol Grip Deformity of the Femoral Head-Neck Junction Using the Surgical Dislocation Technique

Samantha Spencer, MD, Michael B. Millis, MD, and Young-Jo Kim, MD, PhD

SCFE and MDO

- ✓ Cumulative complications: 38%,
- ✓ ON progression: 23%; from those one patient(7%) needed a THA

<u>Other studies:</u>

- ✓ Cumulative complications: from 10% to 41% at short term FU
- ✓ ON: - from 0% and 26% ON after MDO
  - 24% (range, 0%-58%) after every treatment of unstable SCFE

<u>Indications limited! (>50% slipping angle, experienced & high volume centers</u>

JBJS FULL TEXT

J Bone Joint Surg Am. 2013 Apr 3;95(7):585-91. doi: 10.2106/JBJS.L.00203.

The modified Dunn procedure for unstable slipped capital femoral epiphysis: a multicenter perspective.

Sankar WN[1], Vanderhave KL, Matheney T, Herrera-Soto JA, Karlen JW.

HIP DISORDERS SUPPLEMENT

Risks and Benefits of the Modified Dunn Approach for Treatment of Moderate or Severe Slipped Capital Femoral Epiphysis

Lisa M. Tibor, MD and Ernest L. Sink, MD†*

ORIGINAL ARTICLE

Complications After Modified Dunn Osteotomy for the Treatment of Adolescent Slipped Capital Femoral Epiphysis

Vidyadhar V. Upasani, MD, Travis H. Matheney, MD, MLA, Samantha A. Spencer, MD, Young-Jo Kim, MD, PhD, Michael B. Millis, MD, and James R. Kasser, MD

JBJS FULL TEXT

J Bone Joint Surg Am. 2013 Apr 3;95(7):e47. doi: 10.2106/JBJS.M.00044.

It's not as easy as it looks: Commentary on an article by Wudbhav N. Sankar, MD, et al.: "The modified Dunn procedure for unstable slipped capital femoral epiphysis. a multicenter perspective".

Gordon JE[1].

SCFE and MDO

✓ Cumulativ

JBJS FULL TEXT

J Bone Joint Surg Am. 2013 Apr 3;95(7):585-91. doi: 10.2106/JBJS.L.00203.

The modified Dunn procedure for unstable slipped capital femoral epiphysis: a multicenter perspective.

Sankar WN[1], Vanderhave KL, Matheney T, Herrera-Soto JA, Karlen JW.

HIP DISORDERS SUPPLEMENT

Risks and Benefits of the Modified Dunn Approach for Treatment of Moderate or Severe Slipped Capital Femoral Epiphysis

Lisa M. Tibor, MD and Ernest L. Sink, MD†*

ORIGINAL ARTICLE

Complications After Modified Dunn Osteotomy for the Treatment of Adolescent Slipped Capital Femoral Epiphysis

Vidyadhar V. Upasani, MD, Travis H. Matheney, MD, MLA, Samantha A. Spencer, MD, Young-Jo Kim, MD, PhD, Michael B. Millis, MD, and James R. Kasser, MD

JBJS FULL TEXT

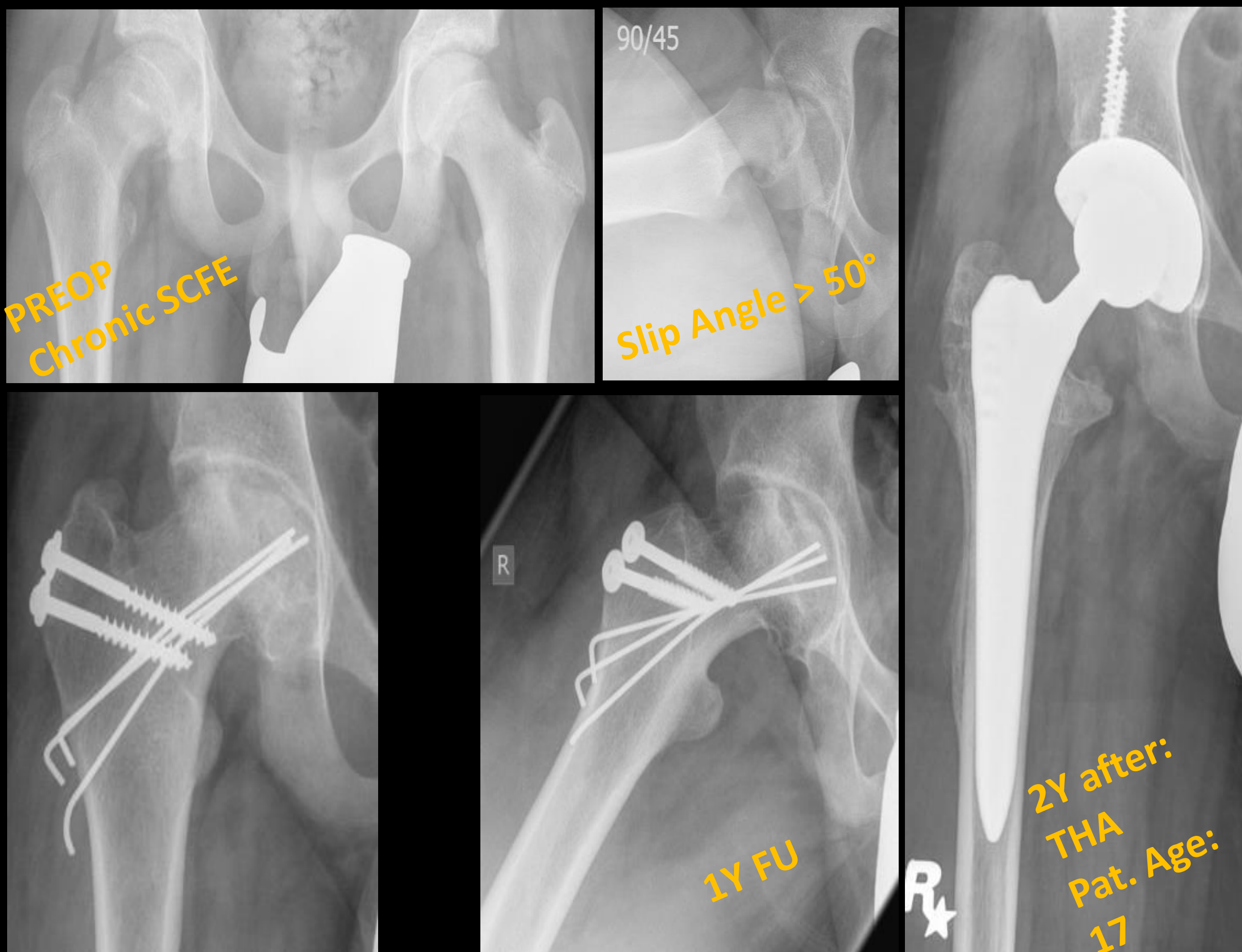
J Bone Joint Surg Am. 2013 Apr 3;95(7):e47. doi: 10.2106/JBJS.M.00044.

It's not as easy as it looks: Commentary on an article by Wudbhav N. Sankar, MD, et al.: "The modified Dunn procedure for unstable slipped capital femoral epiphysis. a multicenter perspective".

Gordon JE[1].

SCFE and MDO

✓ Cumulativ



LCPD

- ✓ In this study:
  - ✓ Survival rate : 80% (at 3 Y)
  - ✓ Failure: 20% (2 THA + 1 functional a losis)
- ✓ In literature:
  - ✓ survival rate of 86% at five years and 61% at 8 SHD
  - ✓ **Negative predictors:**
    - ✓ **Age (>40 Lj)**
    - ✓ **OA**
    - ✓ **Subluxation**
    - ✓ **Stulberg ≥ 3**
    - ✓ **OA progression: can we stop/slow it?**
- ✓ **Doubts about the long term results remain, however SHD is a versatile tool to address complexe deformation typical of LCPD.**

LCPD

- ✓ In this study:
  - ✓ Survival rate : 80% (at 3 Y)
  - ✓ Failure: 20% (2 THA + 1 functional a

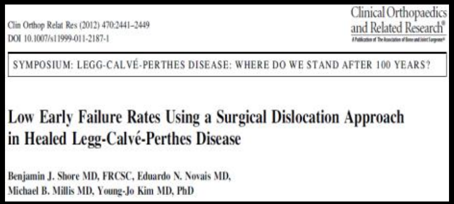
losis)

Clin Orthop Relat Res (2012) 470:2450–2461
DOI 10.1007/s11999-012-2345-0
Clinical Orthopaedics and Related Research®

SYMPOSIUM: LEGG-CALVÉ-PERTHES DISEASE: WHERE DO WE STAND AFTER 100 YEARS?

Joint-preserving Surgery Improves Pain, Range of Motion, and Abductor Strength After Legg-Calvé-Perthes Disease

Christoph Emanuel Albers MD,
Simon Damian Steppacher MD, Reinhold Ganz MD,
Klaus Arno Siebenrock MD, Moritz Tannast MD



Clin Orthop Relat Res (2012) 470:2441–2449
DOI 10.1007/s11999-011-2187-1
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SYMPOSIUM: LEGG-CALVÉ-PERTHES DISEASE: WHERE DO WE STAND AFTER 100 YEARS?

Low Early Failure Rates Using a Surgical Dislocation Approach in Healed Legg-Calvé-Perthes Disease

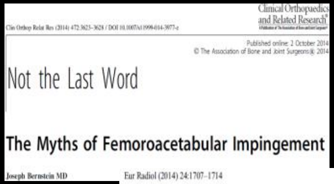
Benjamin J. Shore MD, FRCSC, Eduardo N. Novais MD,
Michael B. Millis MD, Young-Jo Kim MD, PhD

FAI

- ✓ In this study: All outcome scales of patients with FAI were improved at FU, without any major complication.

- ✓ In literature: resolution of symptoms in 68%-92% of patients, rare complications with SHD or arthroscopy.

- ✓ **In young patients :**
  - ✓ **The surgical indication for FAI is still debated! Risk of overtreatment!**
  - ✓ **FAI is more often associated with complex or previous pathologies. Attention is needed to address all the problems!**


Clinical Orthopaedics and Related Research

Not the Last Word

The Myths of Femoroacetabular Impingement

Joseph Bernstein MD


Eur Radiol (2014) 24:1707–1714

DOI 10.1007/s00330-014-3171-4

MUSCULOSKELETAL

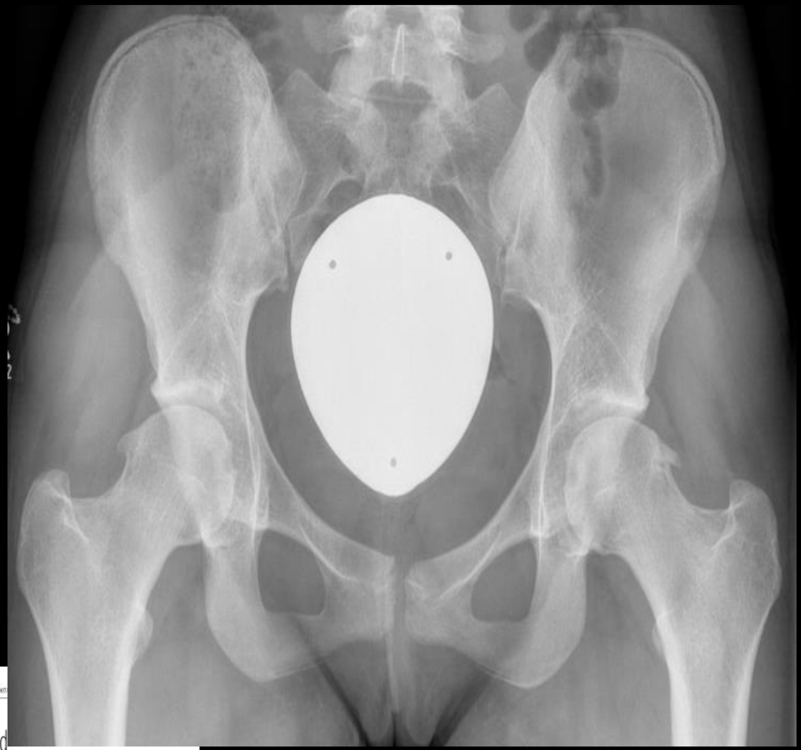
Femoroacetabular impingement: normal values of the quantitative morphometric parameters in asymptomatic hips

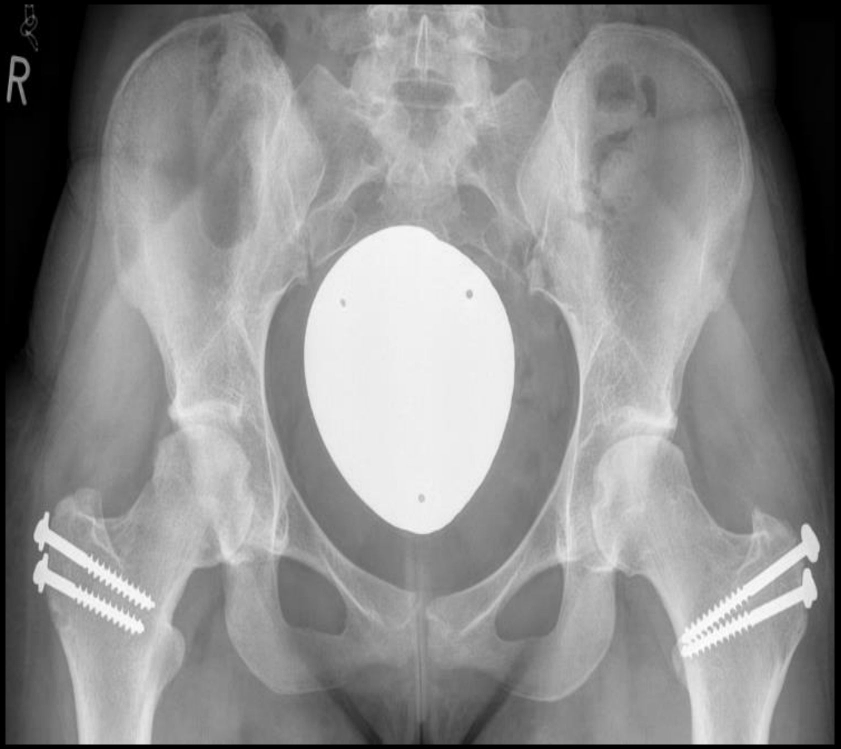
Marianne Lepage-Saucier · Cécile Thiéry · Ahmed Larbi · Frédéric E. Lecouvet · Bruno C. Vande Berg · Patrick Omoumi

FAI: ‘a condition where the bones of the hip are abnormally shaped. Because they do not fit together perfectly, the hip bones rub against each other and cause damage to the joint.”

American Academy of Orthopaedic Surgeons. Femoroacetabular impingement

FAI





Clin Orthop Relat Res (2014) 472:3623–3628 / DOI 10.1007

Not the Last Word

The Myths of Femoroacetabular Impingement

Joseph Bernstein MD

Eur Radiol (2014) 24:1707–1714
DOI 10.1007/s00330-014-3171-4

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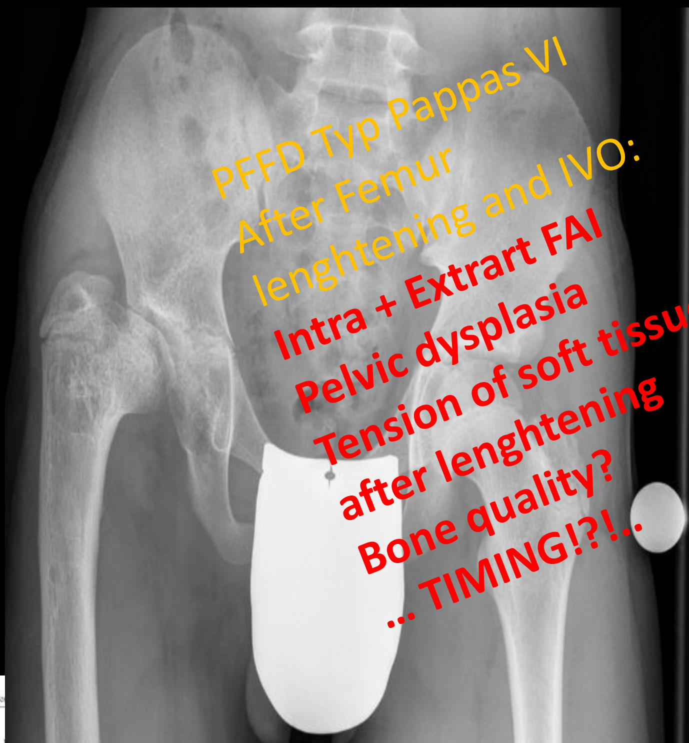
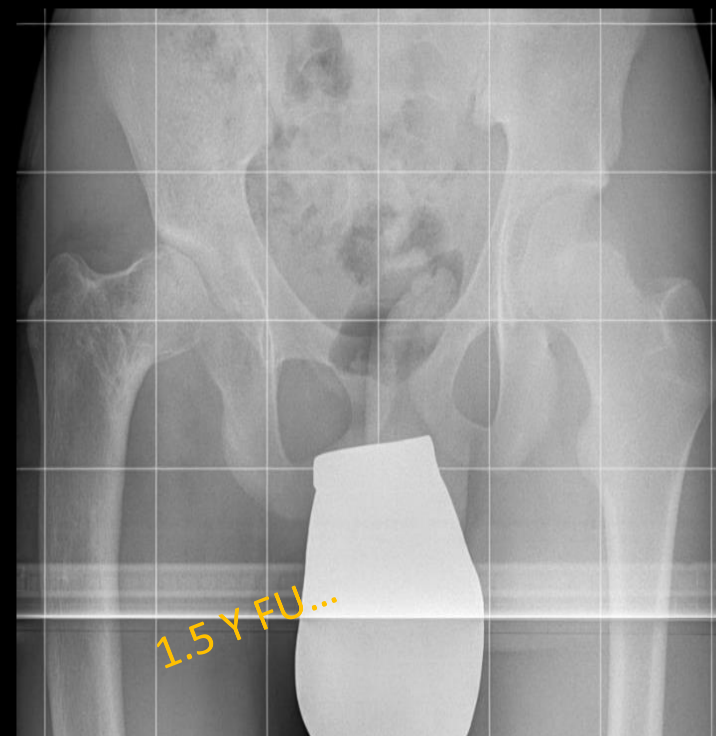
FAI



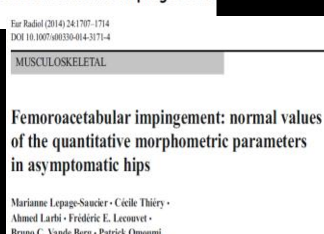



Clin Orthop Relat Res (2014) 472:3623–362

Not the Last Word

The Myths of Femoroacetabular Impingement

Joseph Bernstein MD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MUSCULOSKELETAL

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American Academy of Orthopaedic Surgeons. Femoroacetabular impingement

CONCLUSIONS

- ✓ After a 3Y FU the results and complications of SHD in young patients:
  - ✓ are comparable to previous studies and patients have a high rate of satisfaction
  - ✓ seem to be related with preoperative lesion(s) and type of treatment
  - ✓ particular risks and benefits of a MDO have to be carefully evaluated for underlying pathology and tailored to each patient, whilst
  - ✓ simple osteoplasty through a SHD seems to be safe and effective

- ✓ The effectiveness of those procedures have to be proved in the long term.

INTERNATIONAL COMBINED MEETING

BRITISH HIP SOCIETY
SOCIETÀ ITALIANA DELL'ANCA

26-27 NOVEMBER 2015

MILAN, ITALY

INTERNATIONAL COMBINED MEETING

BRITISH HIP SOCIETY

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26-27 NOVEMBER 2015

MILAN, ITALY

Proximal femur reconstruction in the first decade of life: the challenge of hip reconstruction in a growing patient

Marco Manfrini

Laura Campanacci & Davide Donati

MusculoSkeletal Tumor Center

Rizzoli Orthopaedic Institute

Bologna - Italy

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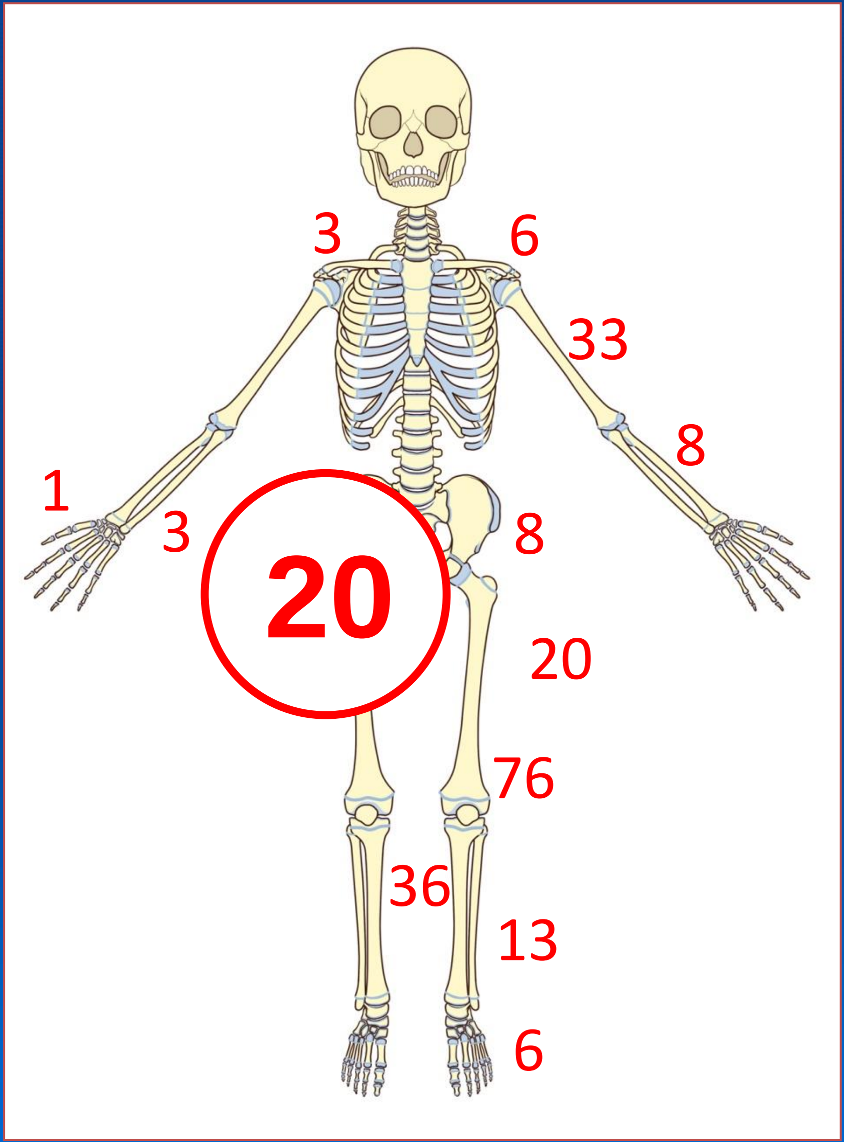
EMILIA-ROMAGNA

Istituto Ortopedico Rizzoli di Bologna

Istituto di Ricovero e Cura a Carattere Scientifico



1994-2013 IOR

in the last twenty years

238 children age 1-10

were surgically treated

for HG Bone sarcomas

only 20 cases (8,4%)

involved the PF

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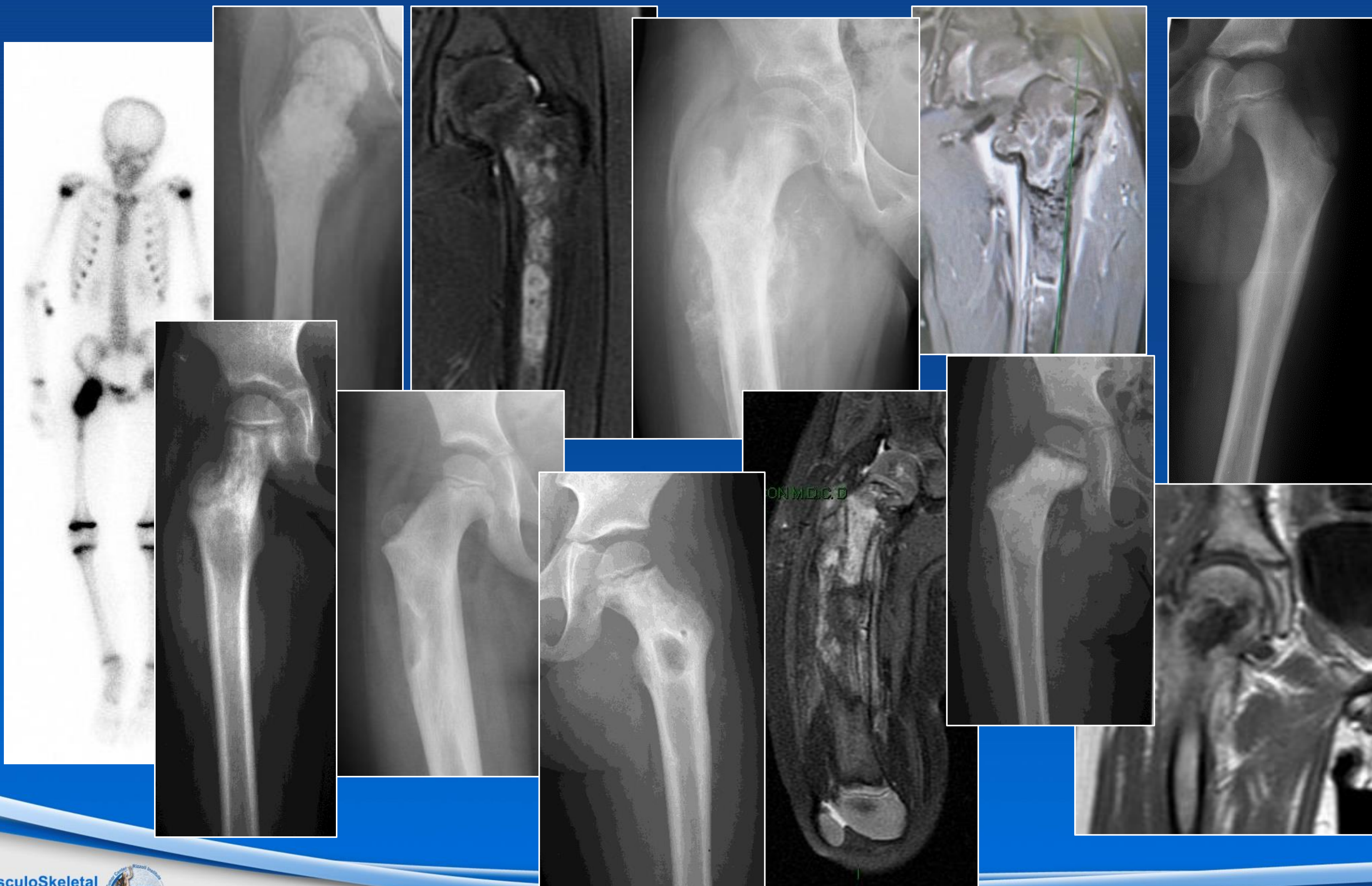
1994-2013 20 cases proximal femur age 1-10



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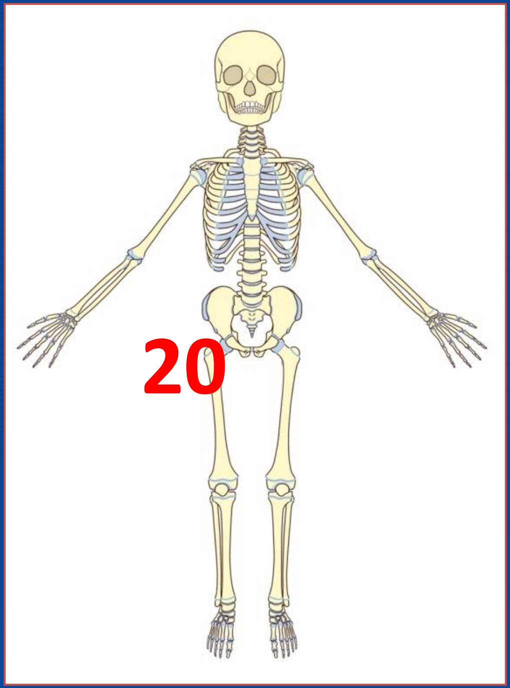
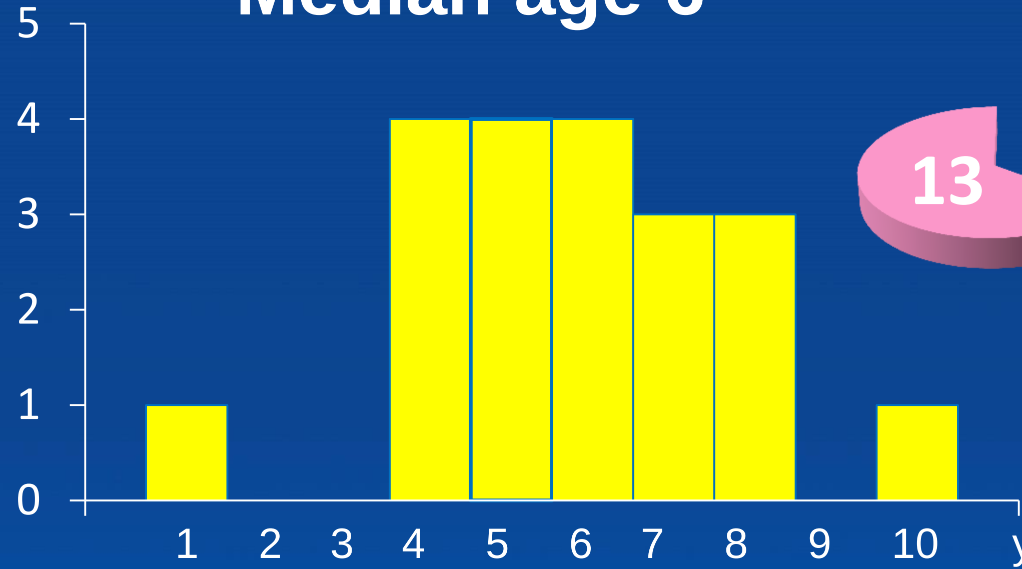
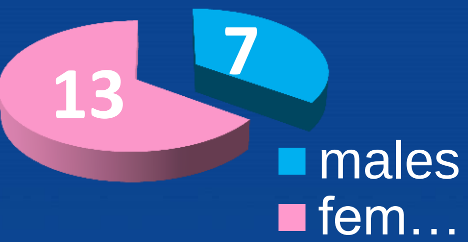
20 children



Median age 6



Sex



Diagnosis		
	OGS	7
	EFT	13

All intrarticular resections
All perioperative chemotherapy

- 17 months-old baby girl Ewing's sarcoma localized in the proximal femur after 6 cycles of chemotherapy Protocol AEWS00316

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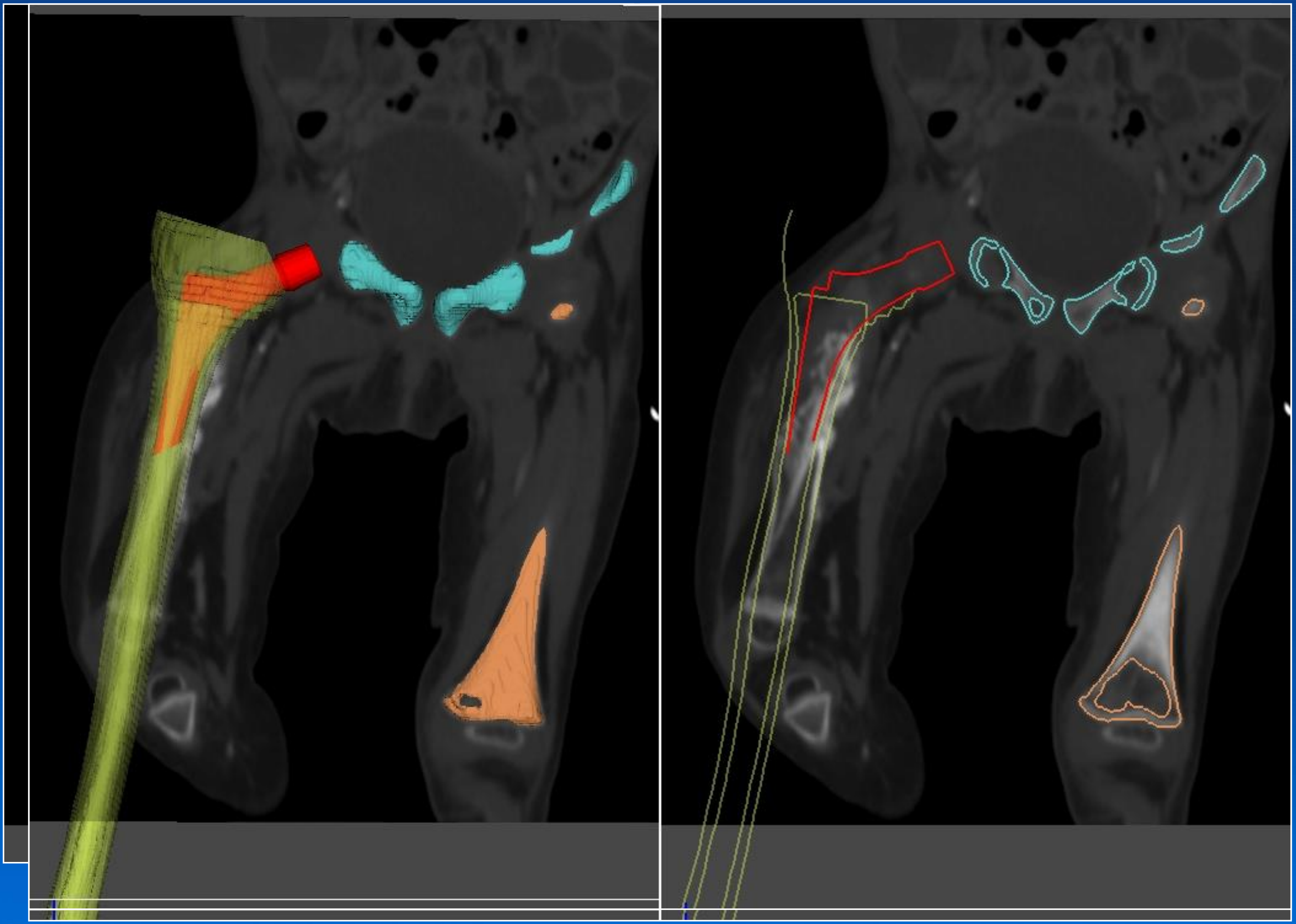

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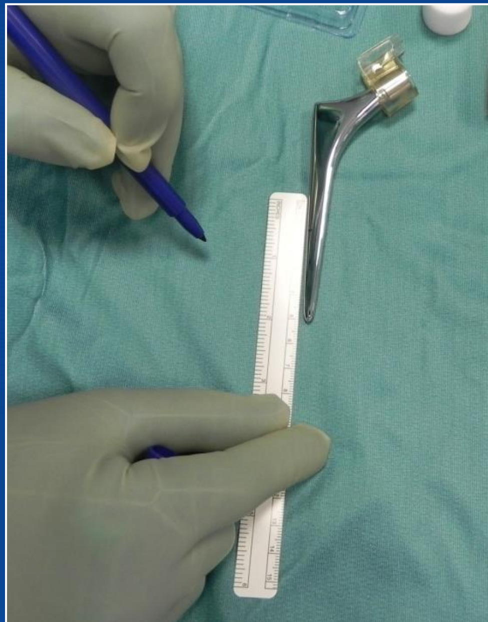
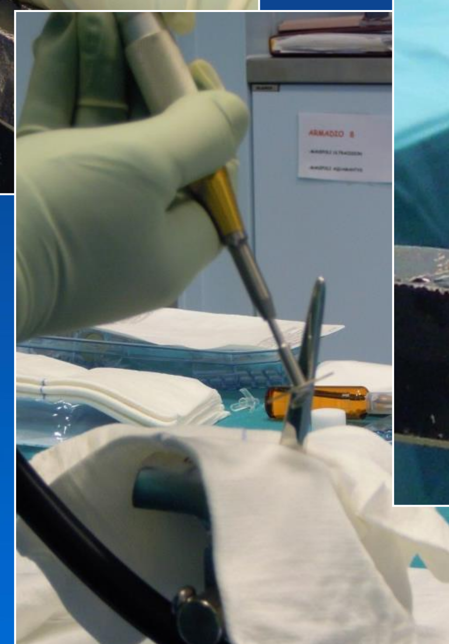
15-11-2013





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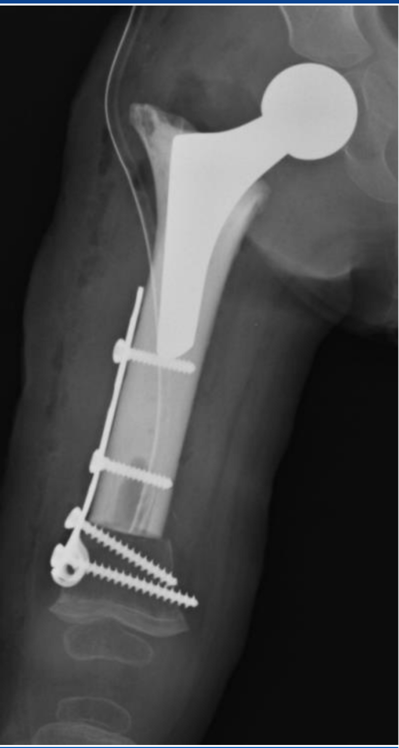
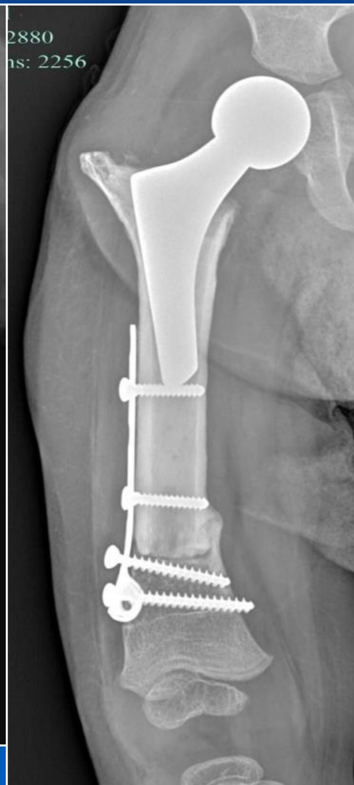


November 2013



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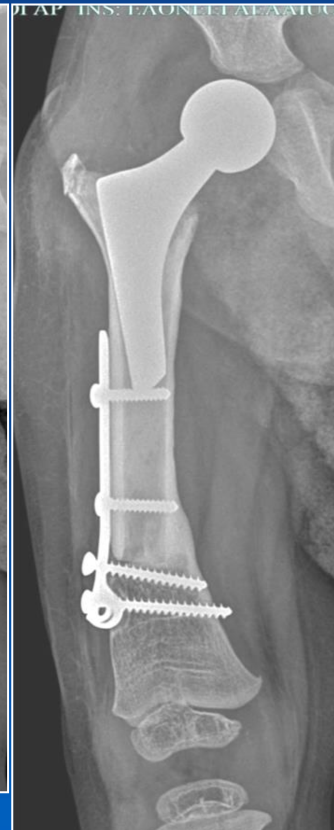
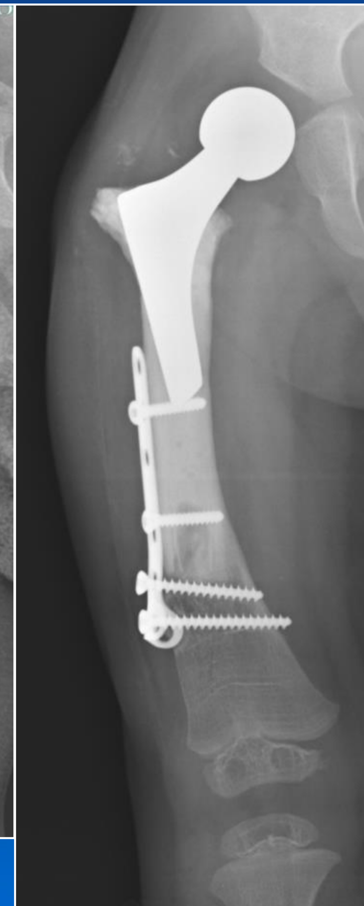
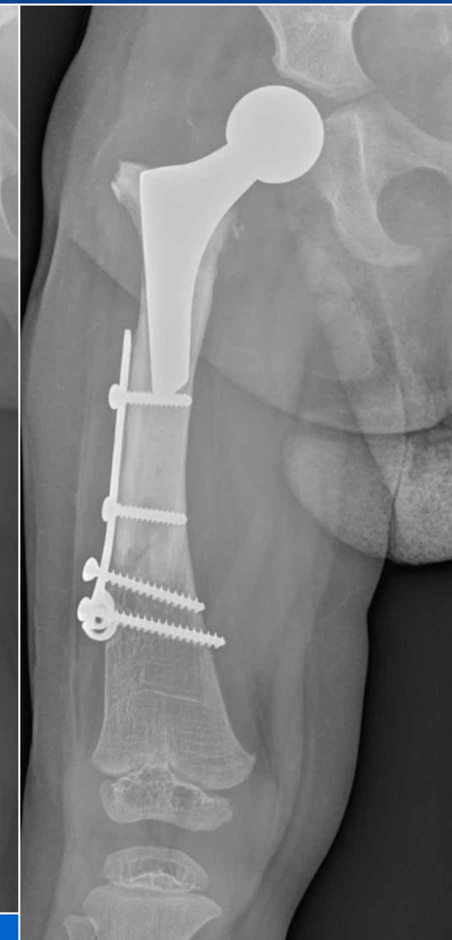


September 2014



December 2014



April 2015

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Functional Reconstruction of the Hip in Children

In 13 cases (median age 6 y/o) PF was reconstructed by an allograft/prosthesis composite (APC). with a stem cemented into the massive bone allograft (MBA), then fixed to the residual femur by a plate

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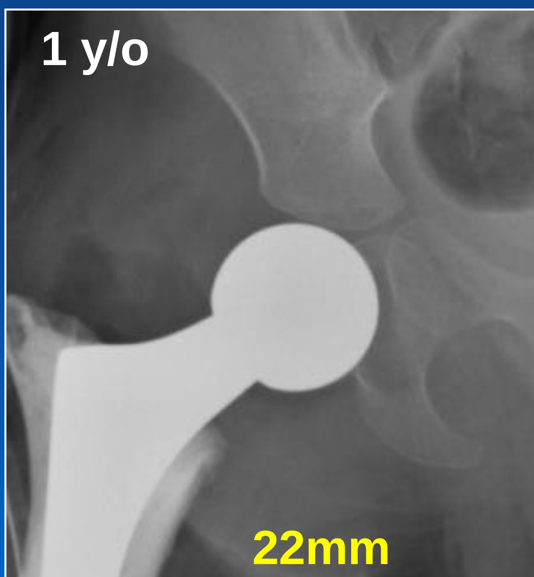
The femoral head was reconstructed
by fixed heads in 3 small children (1-4-6 y/o)
sized 22mm in one case and 32 mm ceramic in two



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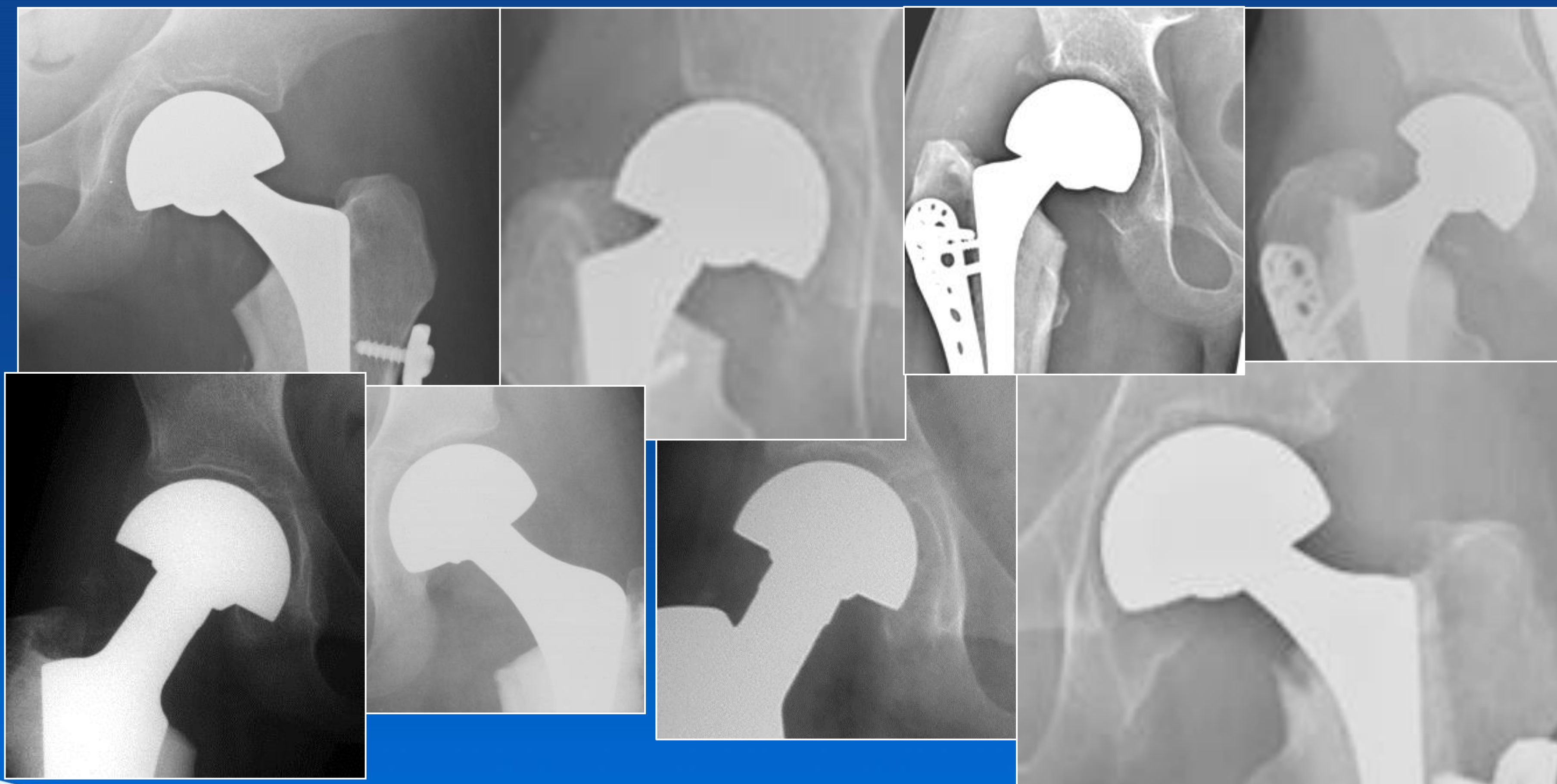
........and
by bipolar cups (36-44mm)
in 12 cases (age 6-10)



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In five small children (4-5 y/o)
an original reconstructive technique was applied

Fibula pro-Hip

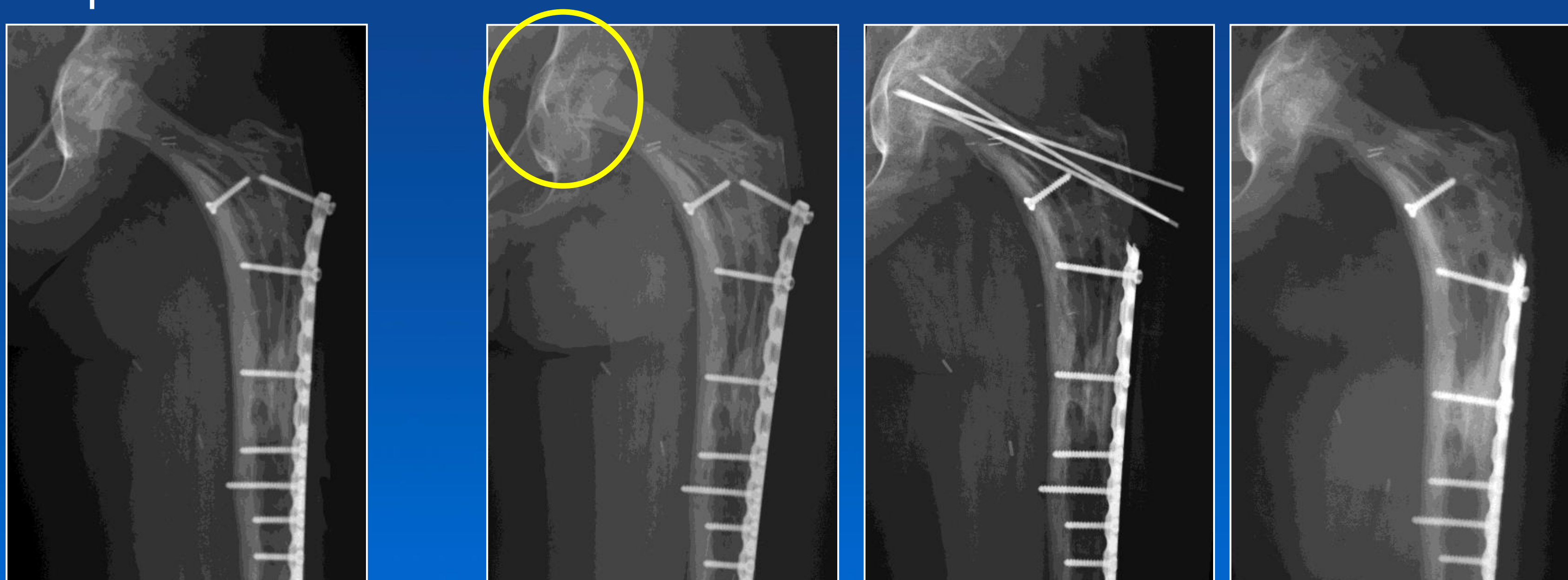
RESULTS

The first case of FIBULA PRO HIP reached the complete weigth bearing more than 4ys after surgery

April 2002

June 2002

August 2002



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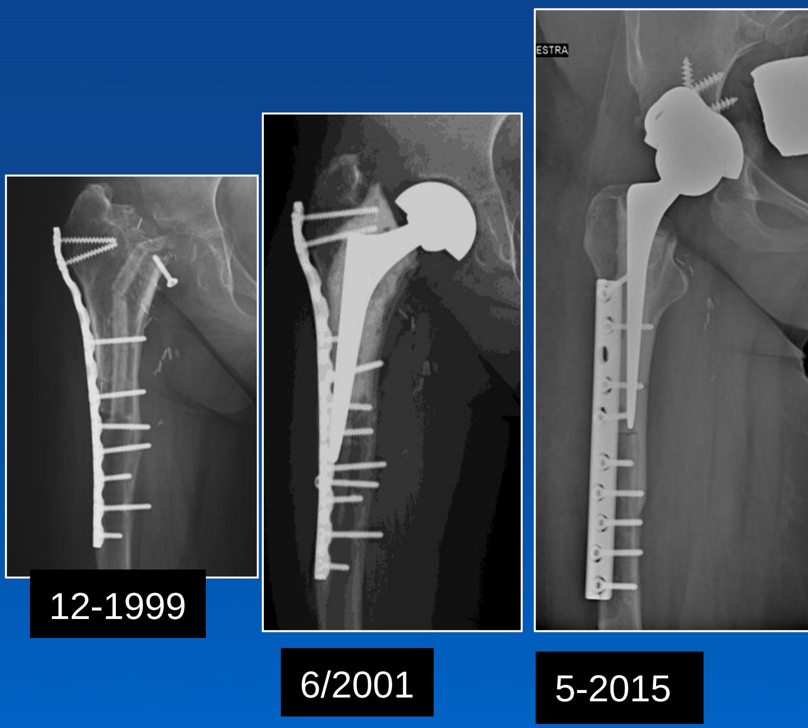
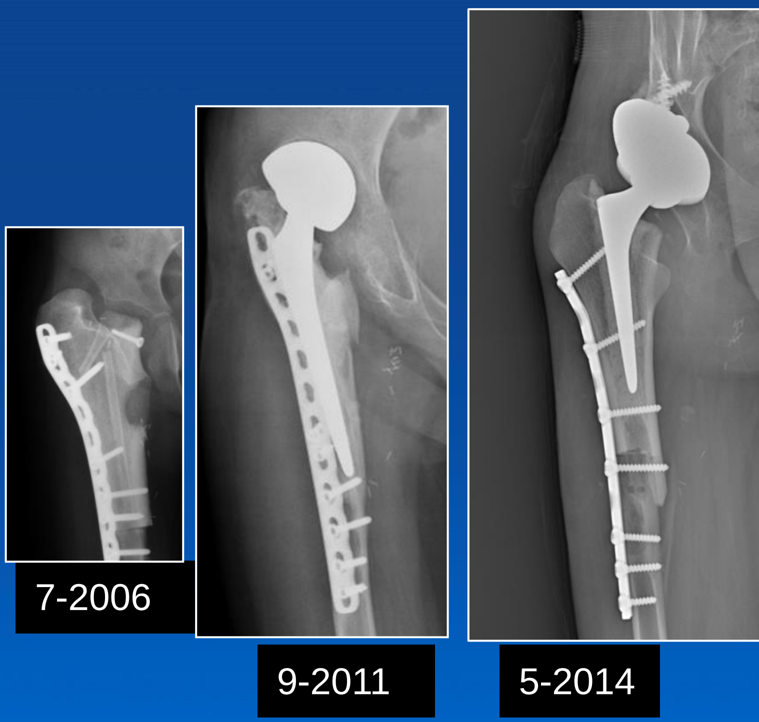
……..but it is still working almost 17 years after the implant

4-2014

RESULTS

All the other four cases failed..... SECONDARY APC





TWO were then revised in a THR

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12-2004

9-2015

3-2003

11-2015

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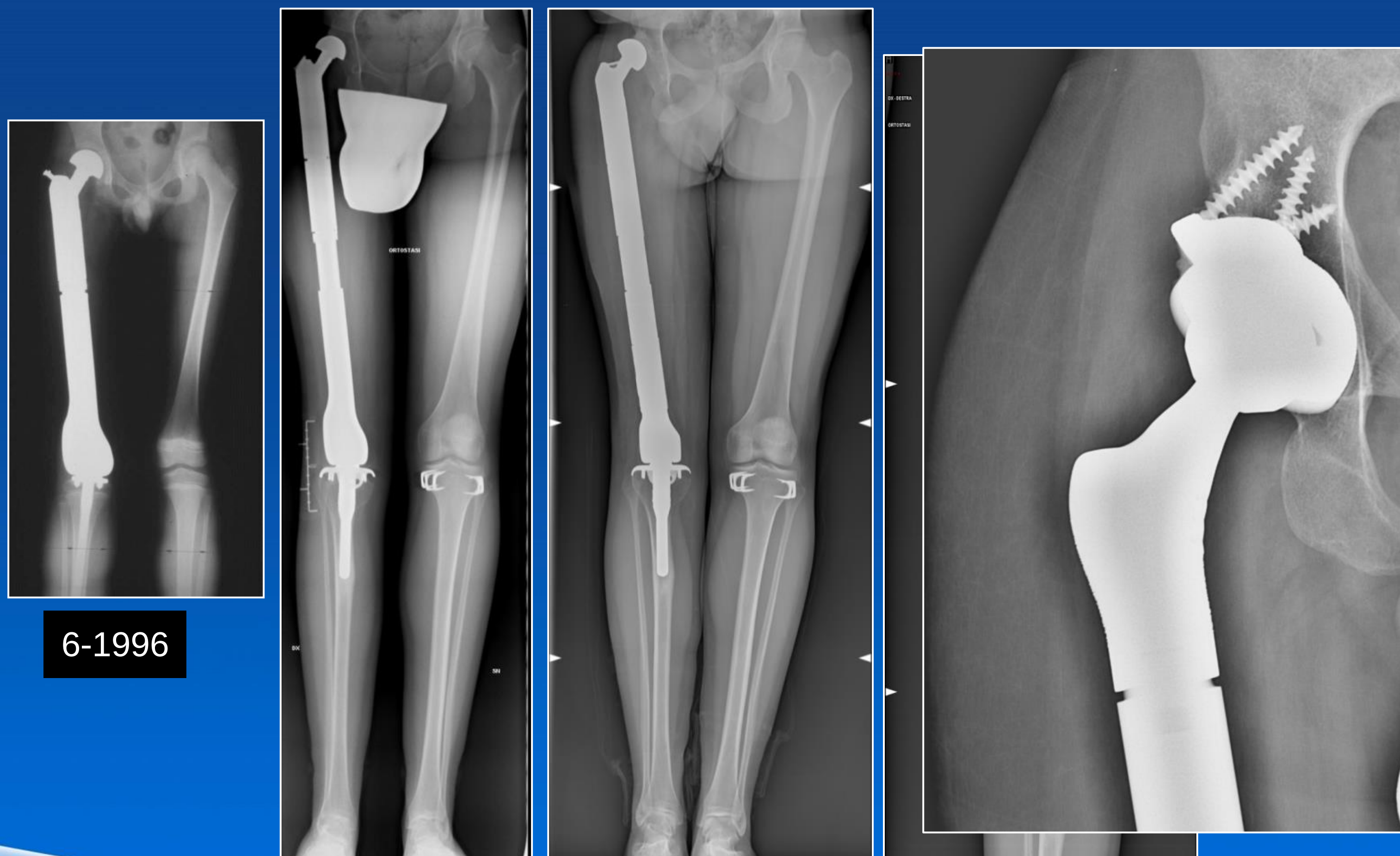
RESULTS

Only 2 of the 12 primary bipolar heads were revised with an uncemented acetabular cup , 5 and 17 years after the primary surgery



6-1996

12-2006

3-2013

5-2014

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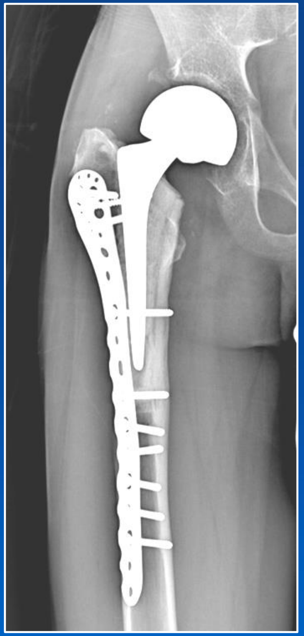
RESULTS

PRIMARY APC/ child (13 cases)

No infection, No delayed union, No revision



All children treated by APC/child, recovered walking autonomy in the first postop year

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Small fixed head

Girl 4 y/o EFT

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CONCLUSIONS

Fibula pro-Hip technique represents a fascinating biological solution that however was demonstrated to be effective up to the skeletal maturity only in 20% of the cases.

APCs adapted for childhood are confirmed as a satisfactory solution to reconstruct children bone stock

Bipolar Cup is a durable and efficient method that may preserve the acetabulum till the end of skeletal growth but it is easily available only over 36 mm of head diameter

Small fixed heads may represent the solution in small children

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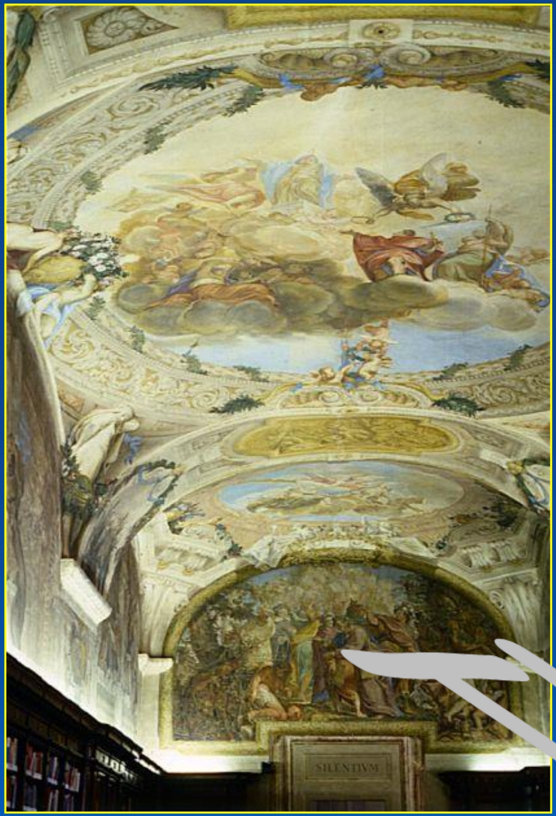

Thank You

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26-27 NOVEMBER 2015

MILAN, ITALY

Late correction of neck deformity in healed severe SCFE – a reliable option with encouraging midterm clinical outcomes

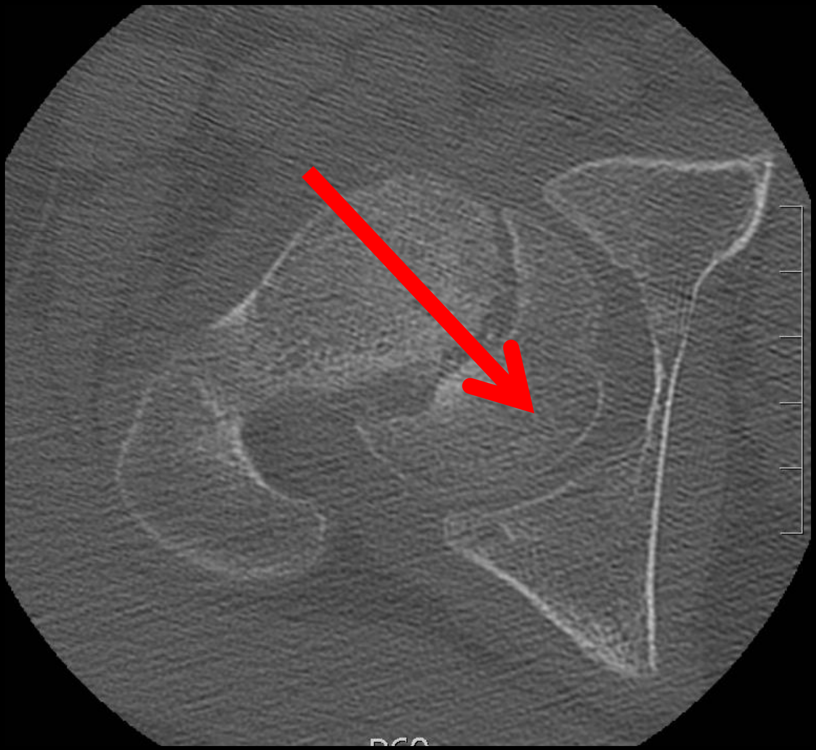
Balakumar Balasubramanian

Mr Sanjeev Madan

Centre for Hip Joint Preservation
Sheffield Children's hospital
Doncaster Royal Infirmary
United Kingdom

SCFE

- Postero-inferior displacement and retroversion
- In-situ pinning – current standard
- Femoroacetabular impingement



Chronic severe SCFE ?

Chronic SCFE

- Arthroscopic/open Osteochondroplasty **(<30°)**
- Intertrochanteric repositioning osteotomy **(<70°)**
- **Meagre data** regarding capital realignment for patients with chronic SCFE

- Madan et al BJJ 95-B 2013; 424-9

Anderson LA, Gililland J, Pelt C, Peters CL.Subcapital correction osteotomy for malunited slipped capital femoral epiphysis.*J Pediatr Orthop* 2013;33:345–52.

Bali K, Railton P, Kiefer GN, Powell JN. Subcapital osteotomy of the femoral neck for patients with healed slipped capital femoral epiphysis. *Bone Jt J* 2014;96-B:1441–8.

Aim

- Subcapital neck osteotomy Vs capital realignment osteotomy for chronic healed SCFE by surgical dislocation approach
- Compare the clinical and radiological outcomes

SCFE Database

- Retrospective review hip database from 2006 to 2013 **(SCH and Doncaster)**
- **187** – SCFE
- 41 – surgical dislocation
- 18 – chronic stable SCFE (1 – Pre Op AVN)
- 12 – closed physis neck osteotomy
- 5 – open physis capital realignment

Inclusion and exclusion criteria

- **Inclusion:**
  - Severe slip (>70°)
  - Minimum 3 yrs of follow-up
- **Exclusion:**
  - Pre operative AVN / arthritis

Pre-operative Assessment

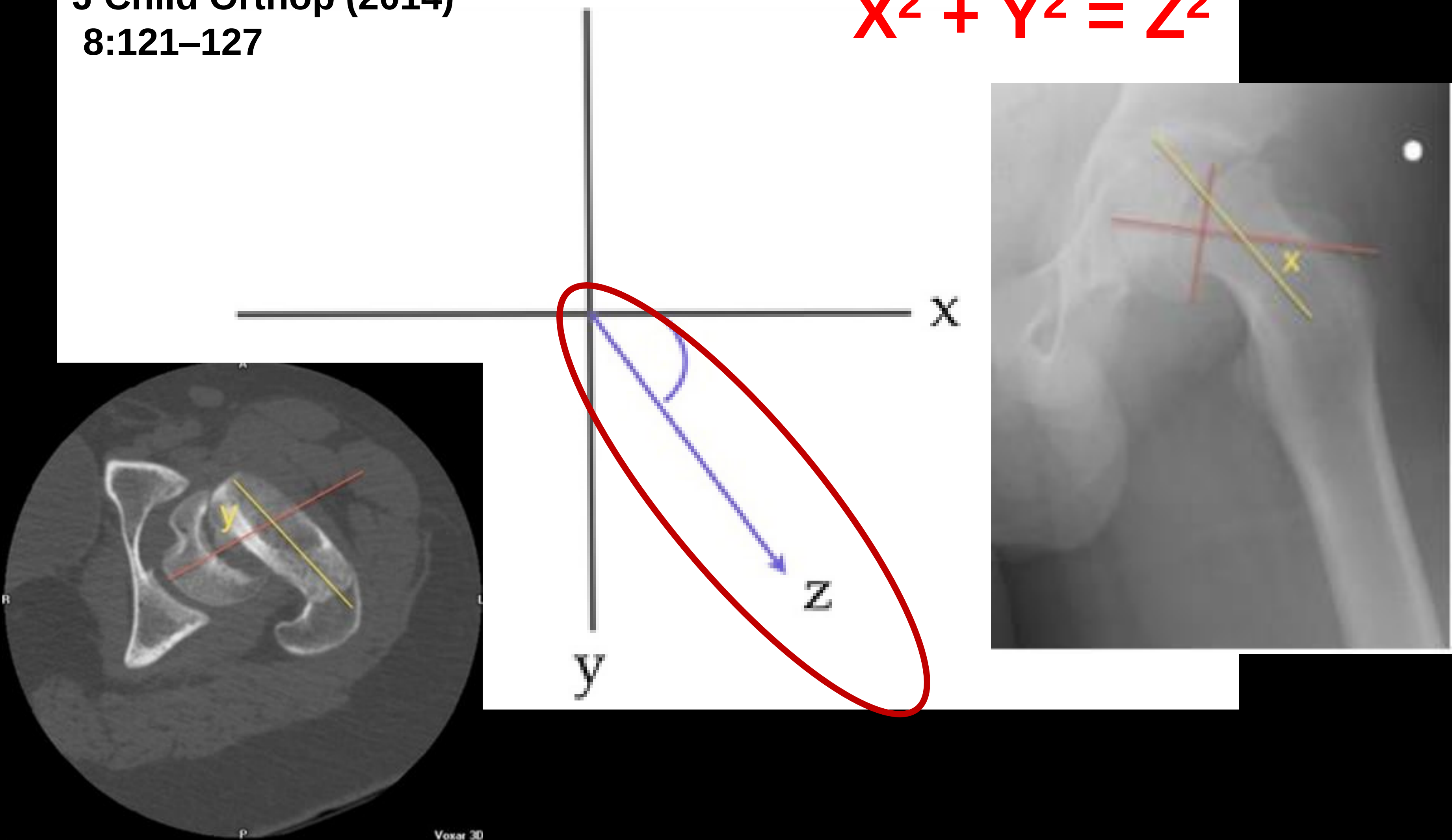
- Clinical and radiographic data
- **Indication for surgery**:
  - Gross restriction of motion
  - Severe external rotation deformity
  - Pain
  - Difficulty in walking
- **Radiographic assessment**
  - Alpha angle pre and post
  - Slip Angle(SA) AP, lateral and oblique plane – pre and post
  - Centro Trochanteric Distance (CTD)

The oblique plane deformity in slipped capital femoral epiphysis.

Cooper AP, Salih S, Geddis C, Foster P, Fernandes JA, Madan SS.

J Child Orthop (2014)
8:121–127

$$X^2 + Y^2 = Z^2$$



Surgical technique

- Surgical dislocation by Ganz technique
- Extended retinacular flap technique
- Capital realignment (n=5) /Sub capital neck osteotomy (n=12)
- Management of acetabular side lesions
- Reduction and fixation with 6.5mm x2 cancellous screws and 4.5 mm x2 cortical screws for trochanteric flip

Ganz R, Huff TW, Leunig M. Extended retinacular soft-tissue flap for intra-articular hip surgery: surgical technique, indications, and results of application. *Instr Course Lect* 2009;58:241–55.

Post operative protocol

- Touch weight bearing for **6 weeks**
- Full weight bearing based on radiographs
- Modified Harris Hip Score **(MHHS)** and Non Arthritic Hip Score **(NAHS)**

Results

- 11 boys and 6 girls (2:1)
- Mean age at surgery: 14 yrs (11-20 yrs)
- Prior pinning: 9
- Mean duration between pinning and surgery 14 months (11-24 months)

Comparison of groups

	Neck osteotomy n=12		Capital realignment n=5	
Age	14.6 (11-20yrs)		13.6(12-16yrs)	
Follow-up	4.08 (3-5yrs)		4.9 (3-6yrs)	
Prior pinning	8		1	
Alpha angle pre	81.6 (62.5 - 99)	p=0.001	82.26 (69.8-89.9)	W=0; p<0.05
α angle post	34.65 (23.2 – 45.6)		37.56 (21.6 – 43.9)	
AP SA pre	34.1 (3.9–51.6)	p=0.017	37.2^{o} (20.1^{o}-46.9^{o})	W =0; p<0.05
AP SA post	10.8 (1-17.9)		13.3^{o} (6.3^{o}-17.7^{o})	
Lat SA pre	51.4 (32.6-77)	p=0.001	57.12^{o} (34^{o}-84.9^{o})	W =0; p<0.05
Lat SA post	13.5 (1-28.5)		7.4^{o} (4.1^{o}-15.1^{o}).	
SA oblique plane pre	69.1 (58.6-88.9)	0.00288	71.7(52-93.7)	W =0; p<0.05
SA oblique plane post	1.4 (-3.8 to 10)		0.9 (-2 to 2.4)	

Comparison of groups

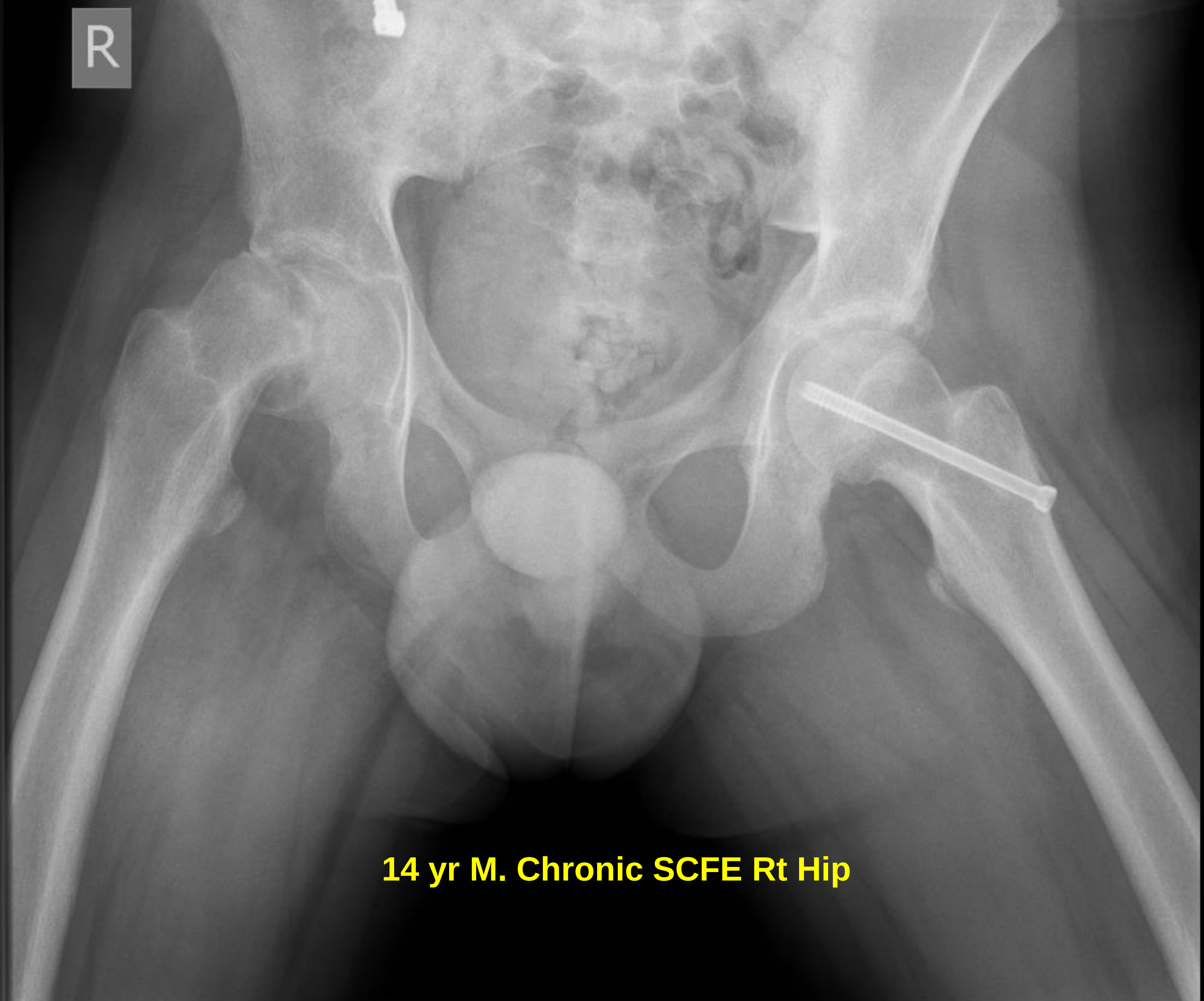
	Neck osteotomy n=12		Capital realignment n=5	
CTD pre	-7.7 (-33.6-1.8)	p=0.0139	-5.36mm (-11.9 - -0.2mm)	W =0; p<0.05
CTD post	-0.5(-20- 20)		5.76mm (0.2 – 8.4mm)	
MHHS pre	23.1 (0-46)		11 (0-20)	
NAHS Pre	42.3 (17.5 -74)		40.6 (0-63)	
MHHS	91.4(86.2-100)		90.9 (88-92.4)	
NAHS	92.1(81.25-100)		93.1(86.25-98.25)	
Complications	Non-union (1)		Chondrolysis (1)	

Acetabular side findings and interventions

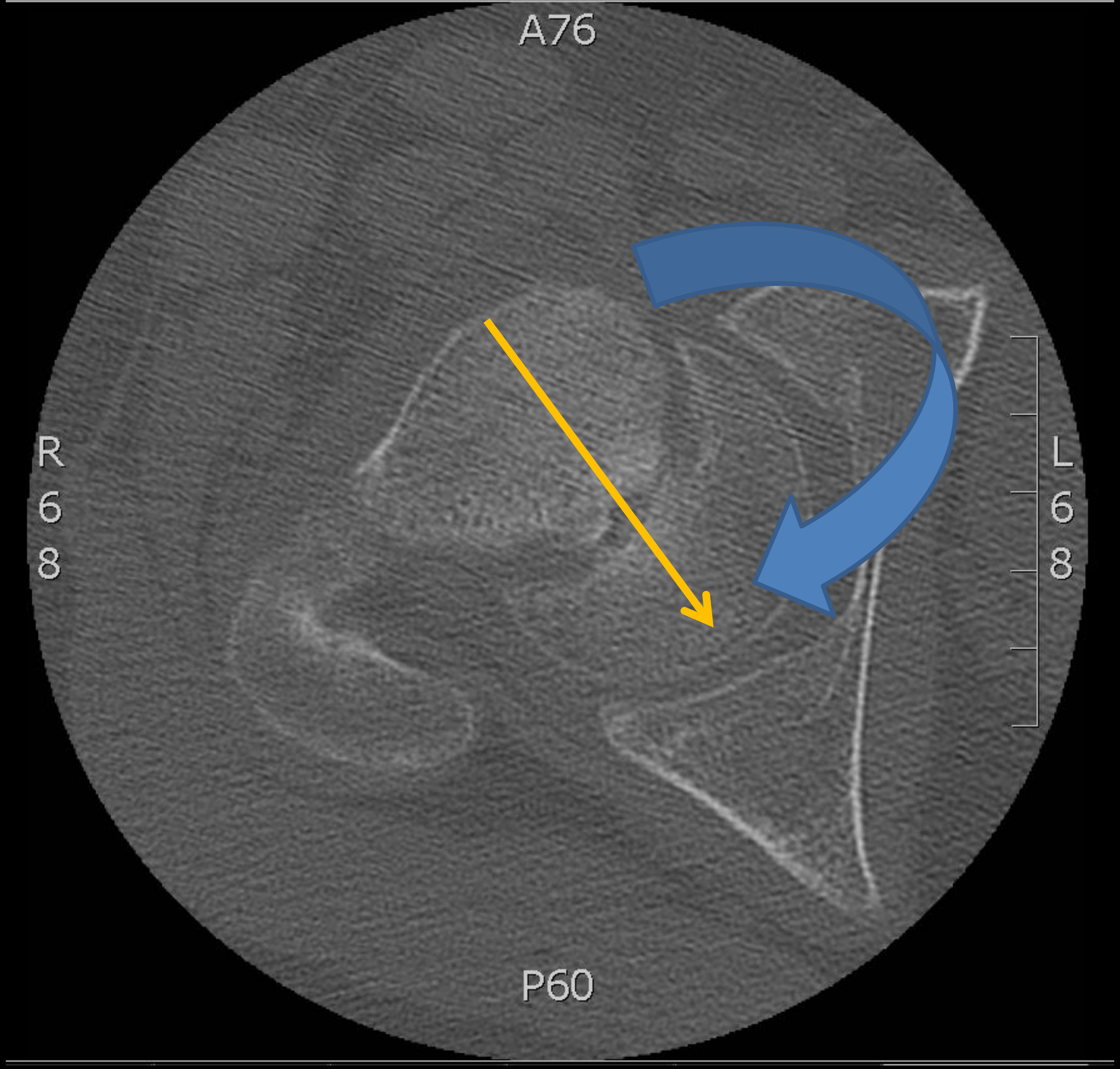
Acetabular procedure/intervention/findings	Number of cases
Partial labral tear (debridement)	1
Cartilage wear out and loss	3
Partial labral tear (repair)	1
Chondrolabral lesion	1

Mean Range of motion

	Neck osteotomy (n=12)		Capital realignment (n=5)	
	Pre op	Post op	Pre op	Post op
Flexion	62	120	56	120
Abduction	23	45	20	50
Adduction	22	30	30	30
Internal rotation	nil	50	nil	40
External rotation	47 fixed	48	50 fixed	57



14 yr M. Chronic SCFE Rt Hip


A76
R
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8
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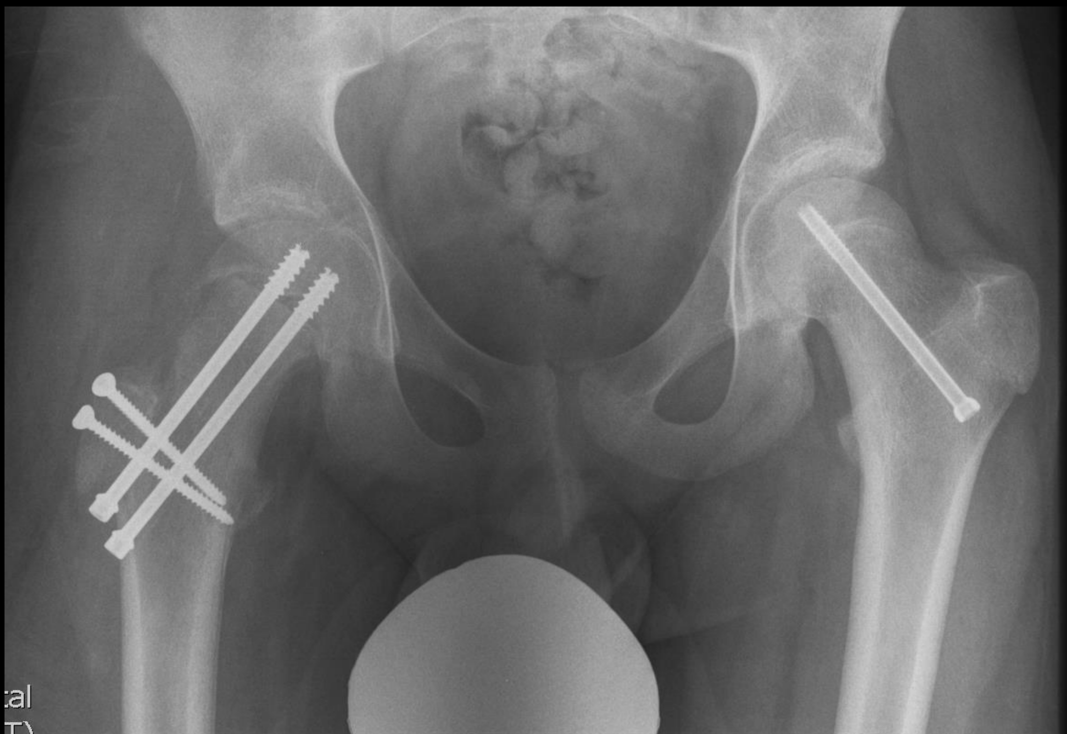
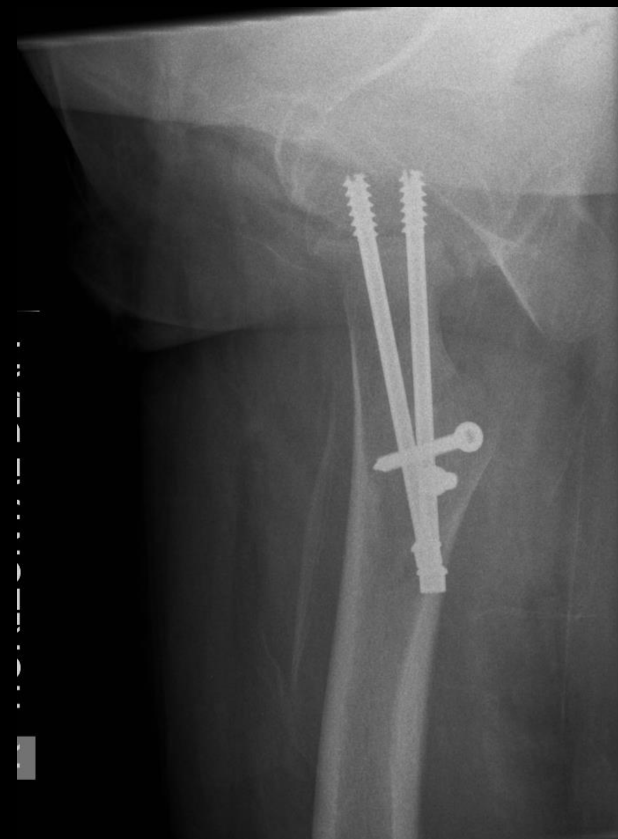
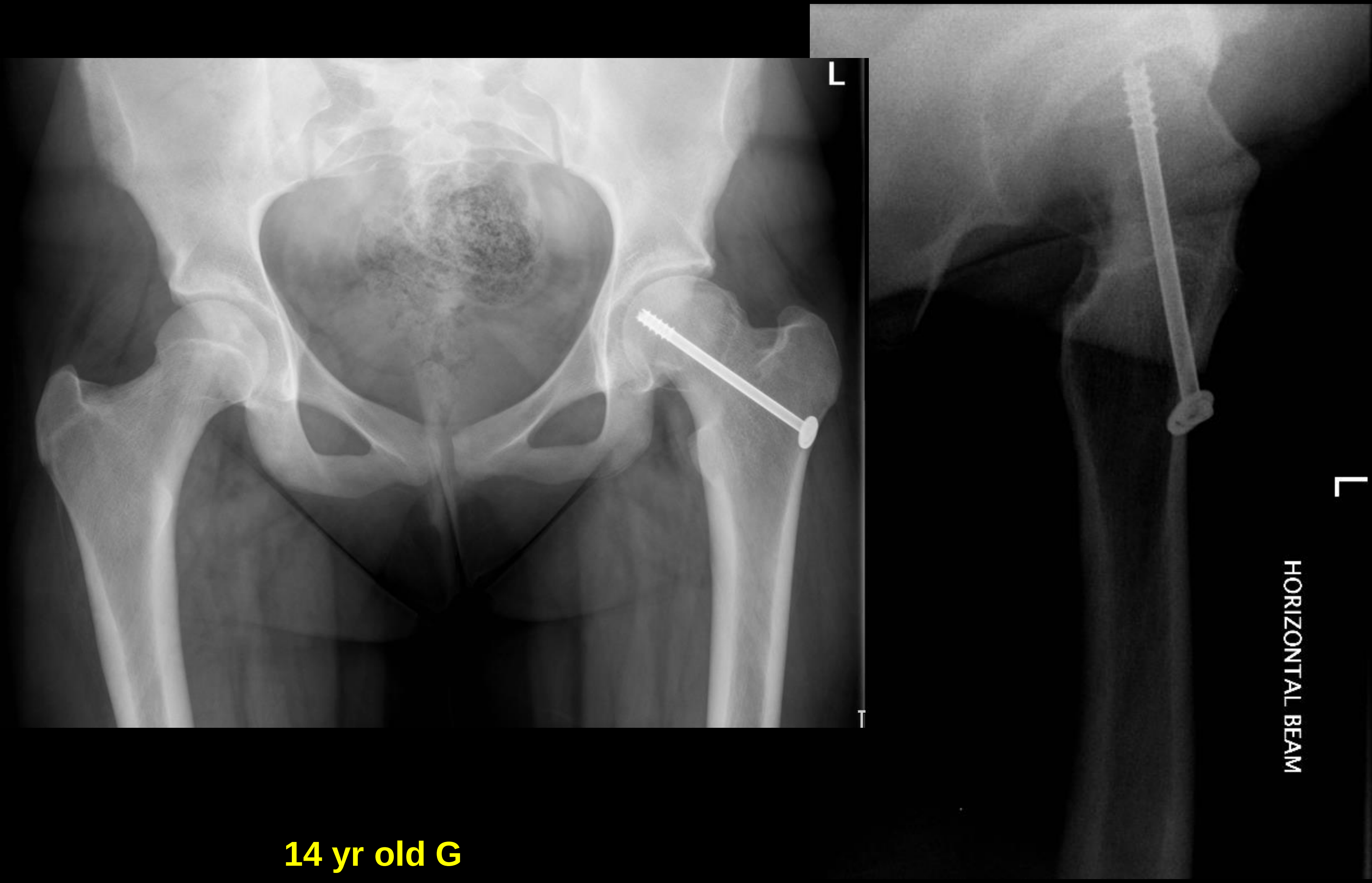
P60

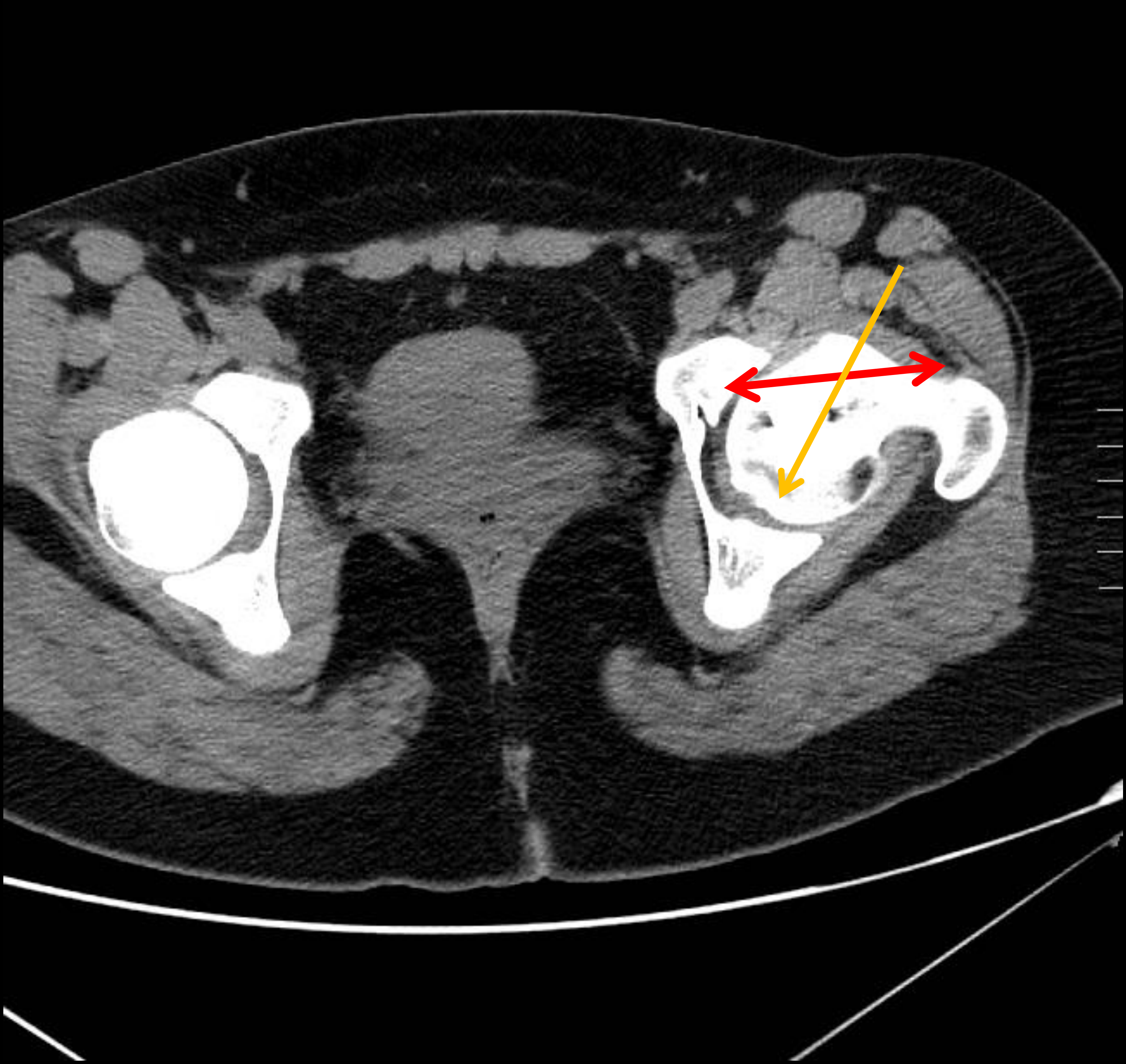


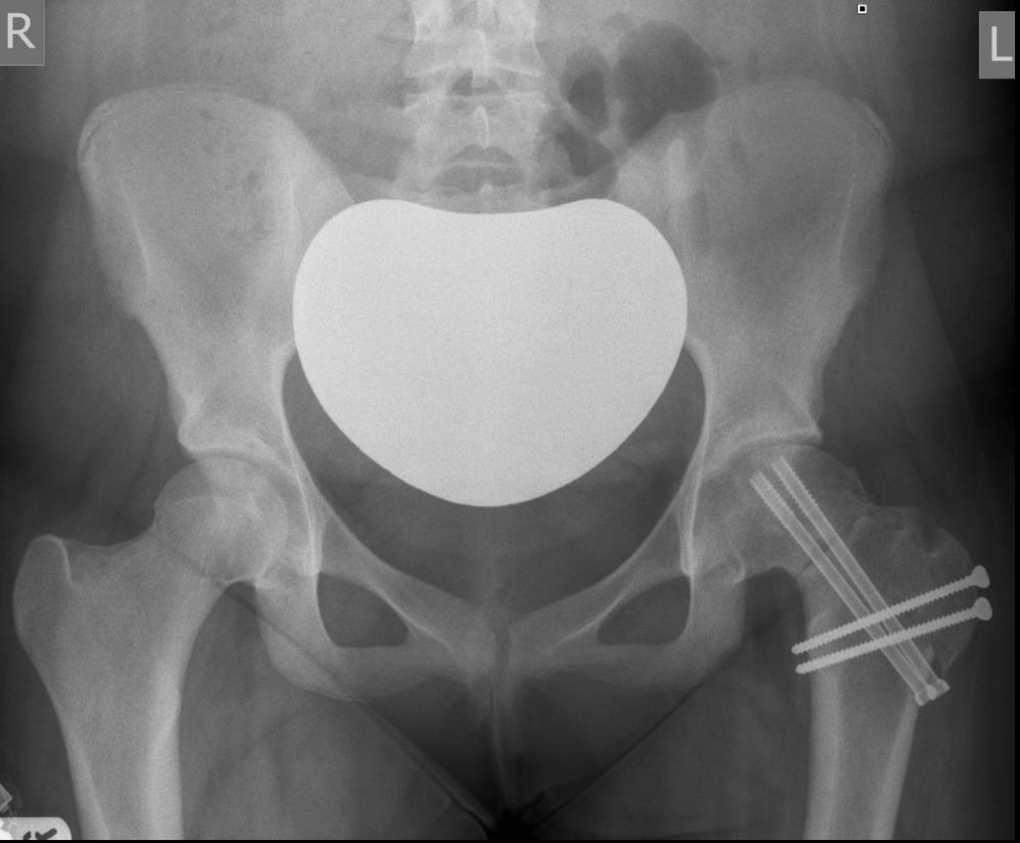


4 yrs FU



14 yr old G

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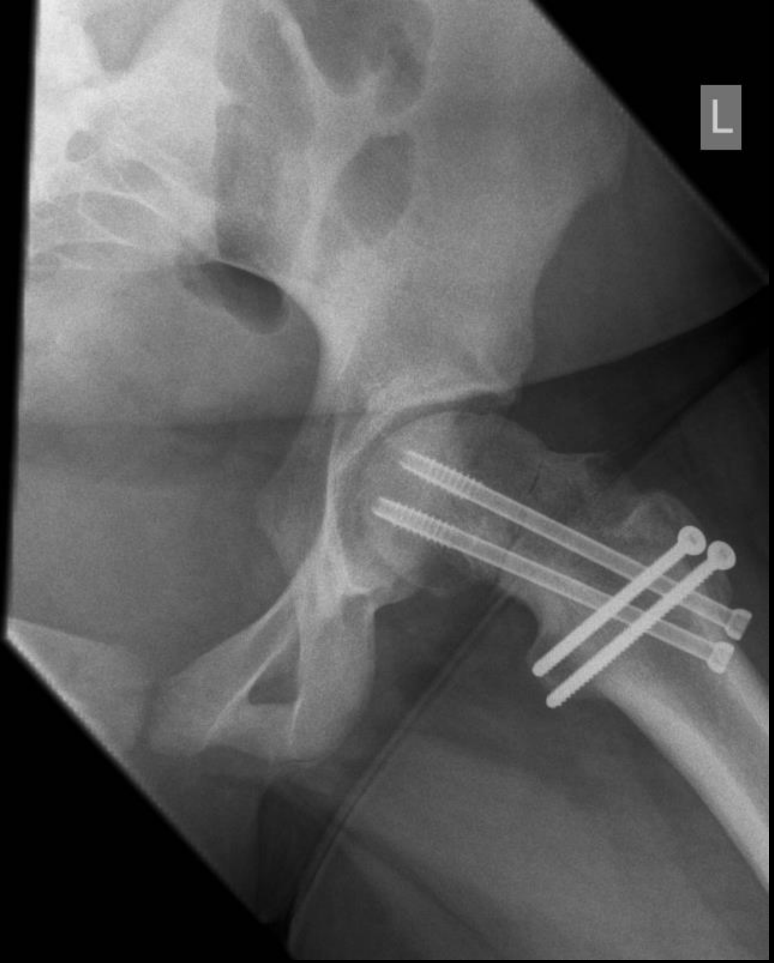
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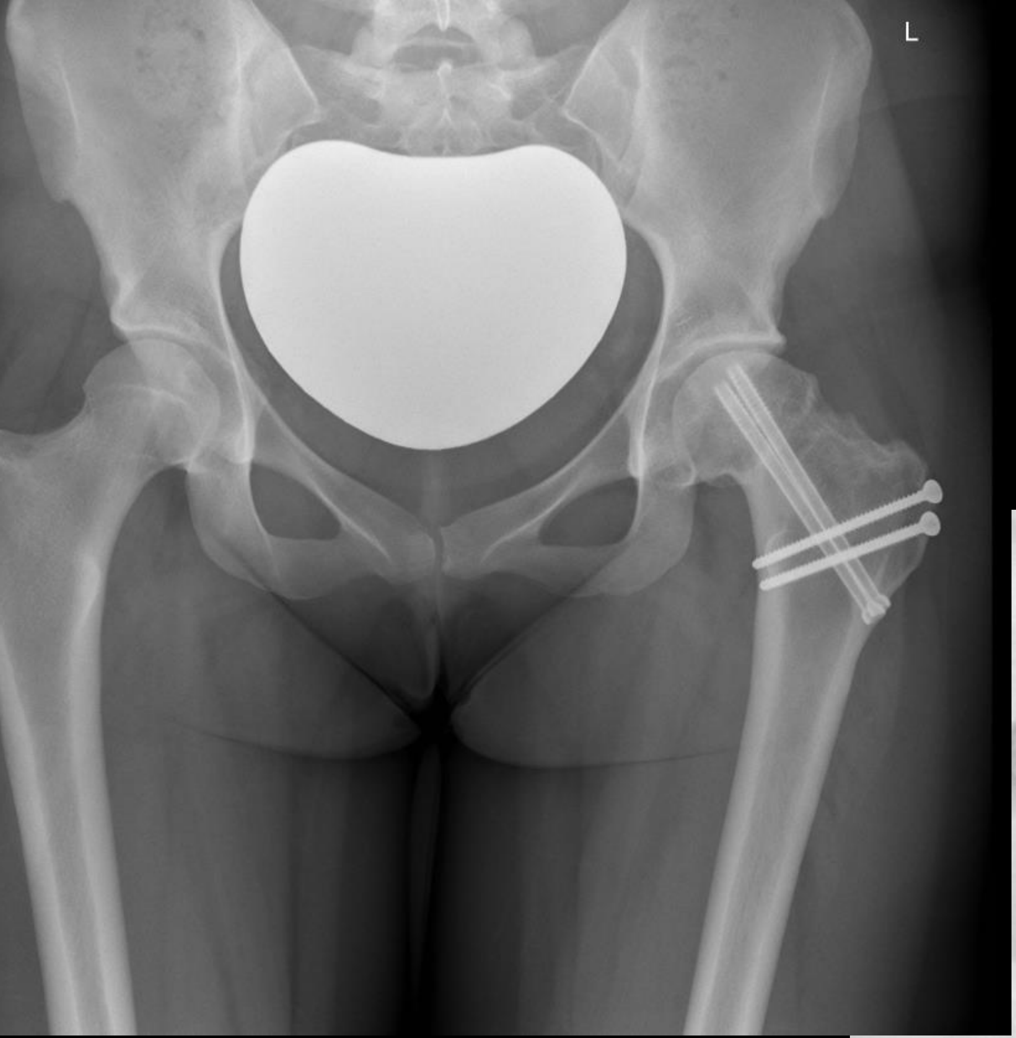
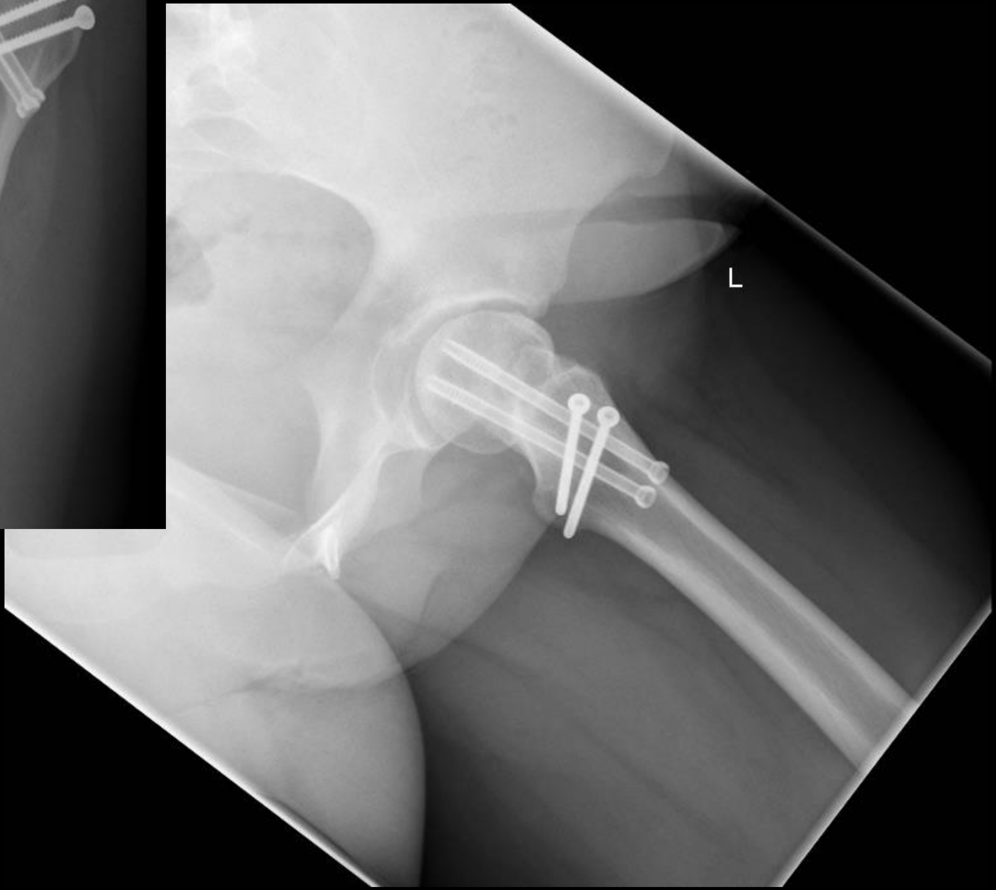




4.5 yrs FU

8 year follow

Comparable with the other 2 series

	Anderson etal. 2013	Bali et al. 2014	Current study 2015
Number of hips	12	8	12
Mean age	15 (12-19)	17.8 (13-29)	4 (11-20)
Gender (M/F)	7/4	6/2	6/6
Prior pinning insitu	9	8	8
Time from pinning to osteotomy	29 (4-73)	42 (12-144)	14.6(11-16)
Mean follow-up	61 (6-104)	41 (20-84)	48 (36-60)
AVN	2/12	0/8	0/12
Nonunion	1/12	2/8	1/12
Alpha pre	85(77.1 to 92.4)	64 (50 to 78)	81.6 (62.5 - 99)
Alpha post	46 (41.9 to 49.8)	32 (25 to 39)	34.65 (23.2 – 45.6)
HHS	77(64.1 to 89.6)	92.5 (85 to 100)	91.4(86.2-100)

Discussion

- Comparable results both groups
- Better correction of deformity
- Good restoration of form and function
- Technically demanding

Limitations

- Retrospective
- Smaller group
- Absence of matched controls
- Arbitrary time delay for definitive procedure

Thank you

INTERNATIONAL COMBINED MEETING

BRITISH HIP SOCIETY
SOCIETÀ ITALIANA DELL'ANCA

26-27 NOVEMBER 2015

MILAN, ITALY

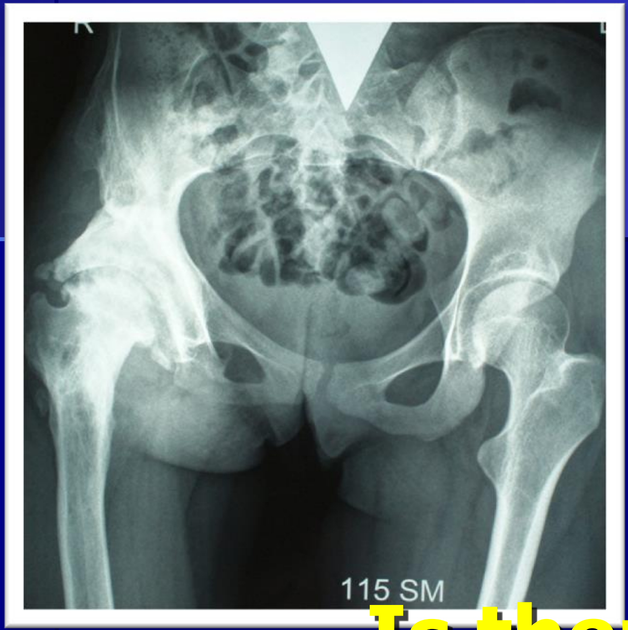
««The Turner Scientific Research Institute
for Children's Orthopedics»

HIP REPLACEMENT IN CHILDREN

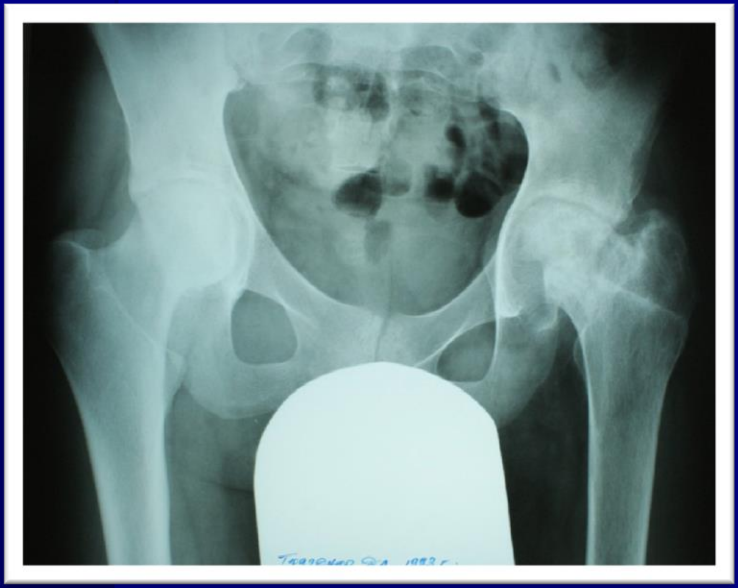
Valentin A. Neverov
Alexey G. Baindurashvili
<u>Vladimir E. Baskov</u>

Milan – 2015

Iatrogenic deformity of the hip joint



Is there a way out?



From 2009 to 2015
at the hip surgery department of the Turner Institute
we performed 214 total hip replacements
in 193 patients aged 13 -18 yo,
in 21 (10%) – bilateral damage.

All patients admitted to the clinic of the Institute with deforming coxarthrosis developed as a result of:

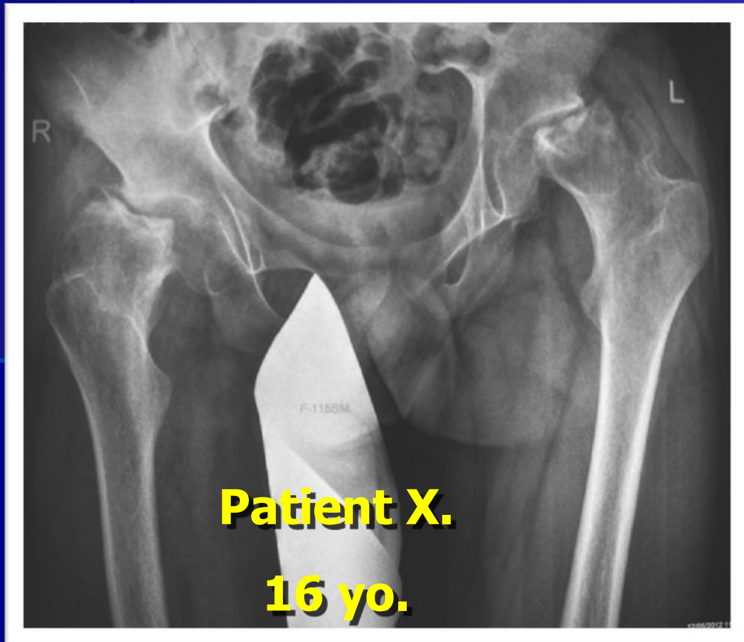
dysplastic pathology –	69 pers.	(32%)
avascular necrosis –	34 pers.	(16%)
infectious process -	28 pers.	(13%)
spondyloepiphyseal dysplasia –	21 pers.	(10%)
traumas –	22 pers.	(10%)
Perthes disease –	13 pers.	(6%)
slipped capital femoral epiphysis –	11 pers.	(5%)

infantile cerebral palsy –	2 pers.	(1%)
rhumatoid arthritis –	4 pers.	(2%)
Otto–Schrabek disease -	2 pers.	(1%)
chemotherapy -	6 pers.	(3%)
aneurysmal bone cyst –	2 pers.	(1%)

Previously operated: 143 pers. (74%),

Some of them repeatedly: 95 pers. (49%)

ДЕТСКИЙ ОРТОПЕДИЧЕСКИЙ ИНСТИТУТ им. Г.И.ТУРНЕРА



Sequelae of avascular aseptic necrosis of femoral heads

Congenital bilateral hip dislocation (condition after inappropriate surgery)

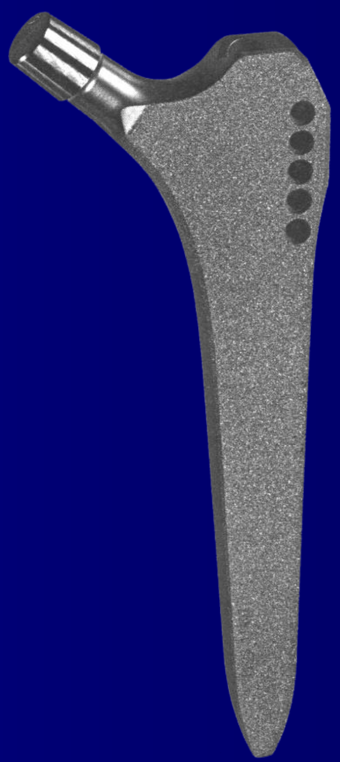
The hip replacement was performed only when growth plate was closed (Y-shaped cartilage of the acetabulum and the epiphyseal growth plate area of the femoral head)

ДЕТСКИЙ ОРТОПЕДИЧЕСКИЙ ИНСТИТУТ им. Г.И.ТУРНЕРА

Endoprosthesis, design of Zweimüller, with biological fixation of components

Standart cup

Cup for porous bone



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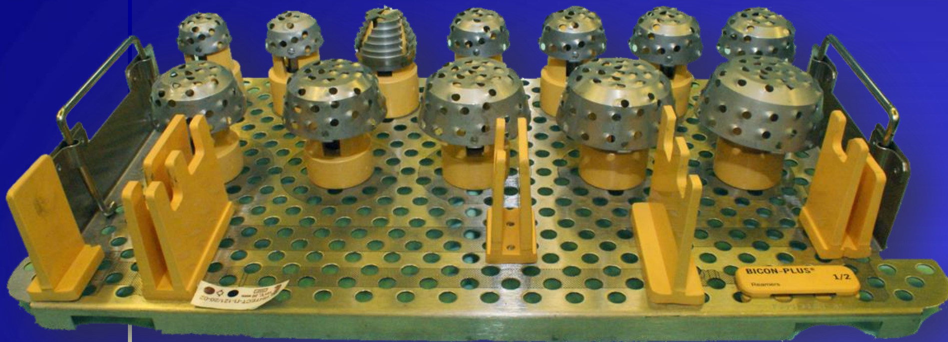

BICON-PLUS
1/2

As the bearings used:

high molecular weight polyethylene (cavity liner) +

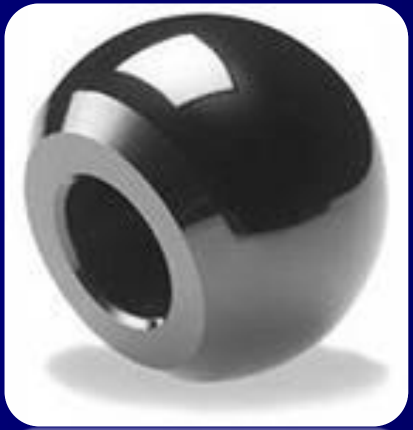
ceramics

156 (73%)

metall

25 (12%)

oxinium



33 (15%)

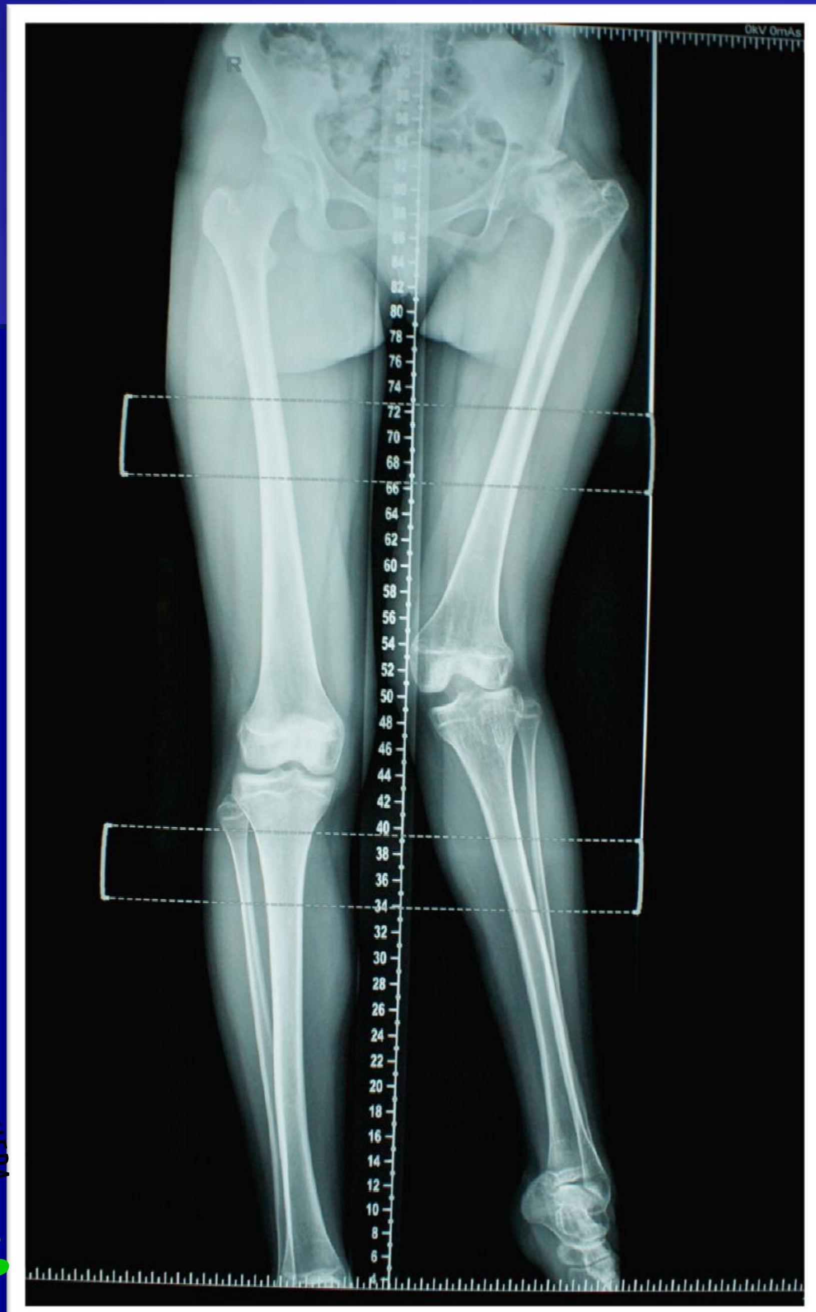
Walking with crutches, with a dosed support allowed
in 3-4 days after surgery.

Walking with the full load – in 3 months

after operation.

Tenomyotomy of femoral adductors was performed in 6 cases (3%).

Full elimination of flexion contractures during a period of 6 - 12 months in all patients.



In 185 patients (96%)
a shortening
from 2 to 8 cm was noted.

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After hip replacement:

In 75 patients (39%), the alignment of the length of the lower extremities was achieved;

112 patients (58%) had residual shortening from 1 to 3 cm;

Lengthening was performed in 6 patients (3%) with residual shortening more than 3 cm

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We carry out a monitoring of all patients with the mandatory examination and X-ray control
in 3 months after surgery,
and then at least 1 time per year.

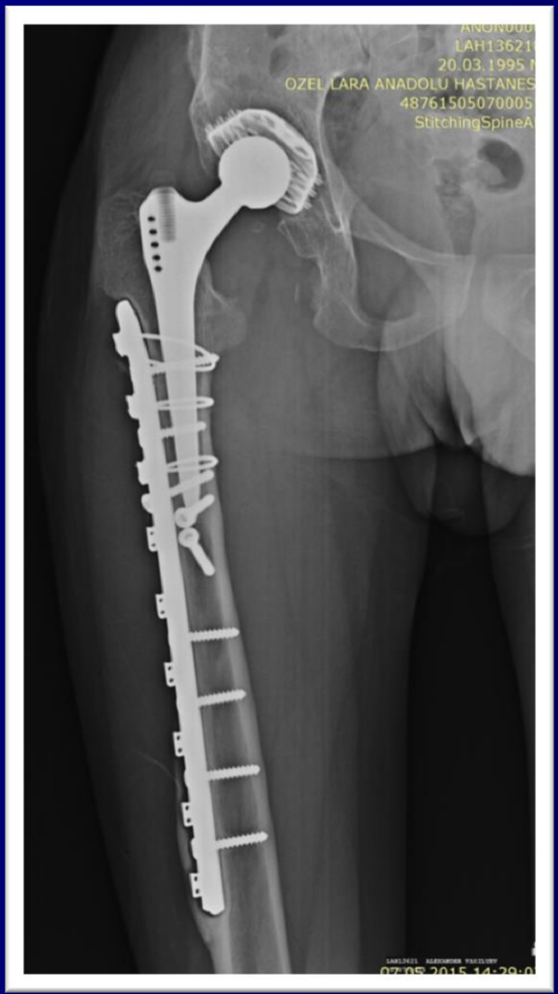
Early postoperative complications

In 7 patients (3%) - neurological complications

In 4 patients (3%) - dislocation of the replaced femoral head (due to violation of patient's regimen)

Late postoperative complications

1 case (0.5%) - periprosthetic fracture of the femur



Maximum follow-up period was 7 years.

In 207 cases (97%) good results of treatment were obtained.

ДЕТСКИЙ ОРТОПЕДИЧЕСКИЙ ИНСТИТУТ им. Г.И.ТУРНЕРА

A clinical case

**Patient A., 17 yo.,
spondyloepiphyseal dysplasia**

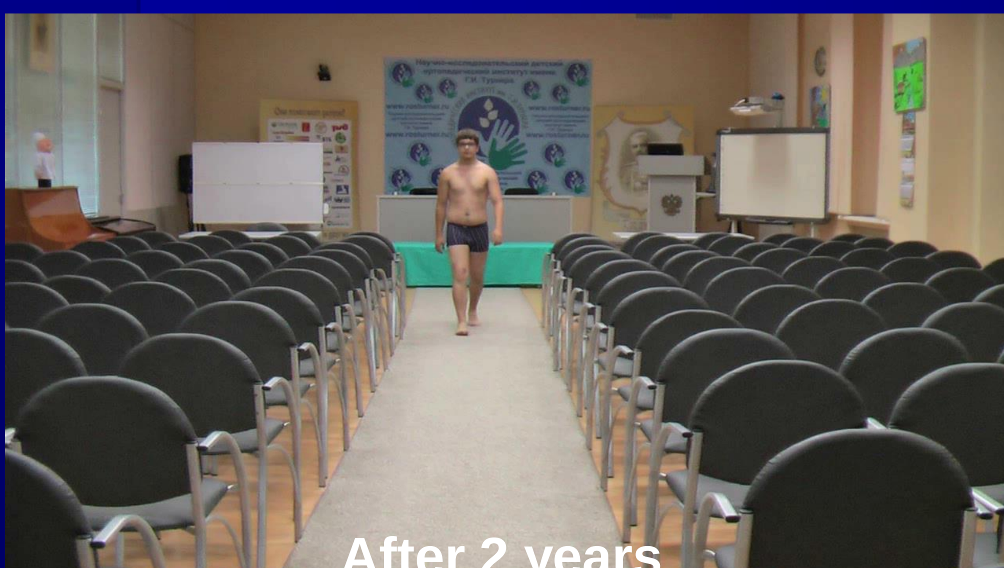
6 months after operation on the right and 8 days after operation on the left

Rehabilitation by robotic system "Lokomat“

ДЕТСКИЙ ОРТОПЕДИЧЕСКИЙ ИНСТИТУТ им. Г.И. ТУРНЕРА

In 1.5 years after hip replacement on both sides

Patient K., 16 yo.,
congenital dislocation of the left hip,
condition after multiple surgery



After 2 years

In adolescents
with irreversible deformities of the hip,
the total hip joint replacement
combined with early rehabilitation
is an appropriate and modern
treatment method,
allowing in 4-6 months
to relieve the patient from pain,
physical and social limitations.

ДЕТСКИЙ ОРТОПЕДИЧЕСКИЙ ИНСТИТУТ им. Г.И.ТУРНЕРА

www.rosturner.ru

Thank you for your very kind attention!

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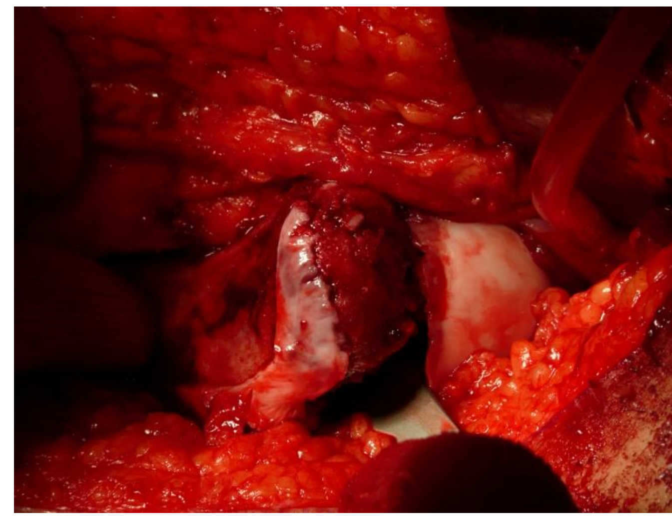
SOCIETÀ ITALIANA DELL'ANCA

26-27 NOVEMBER 2015

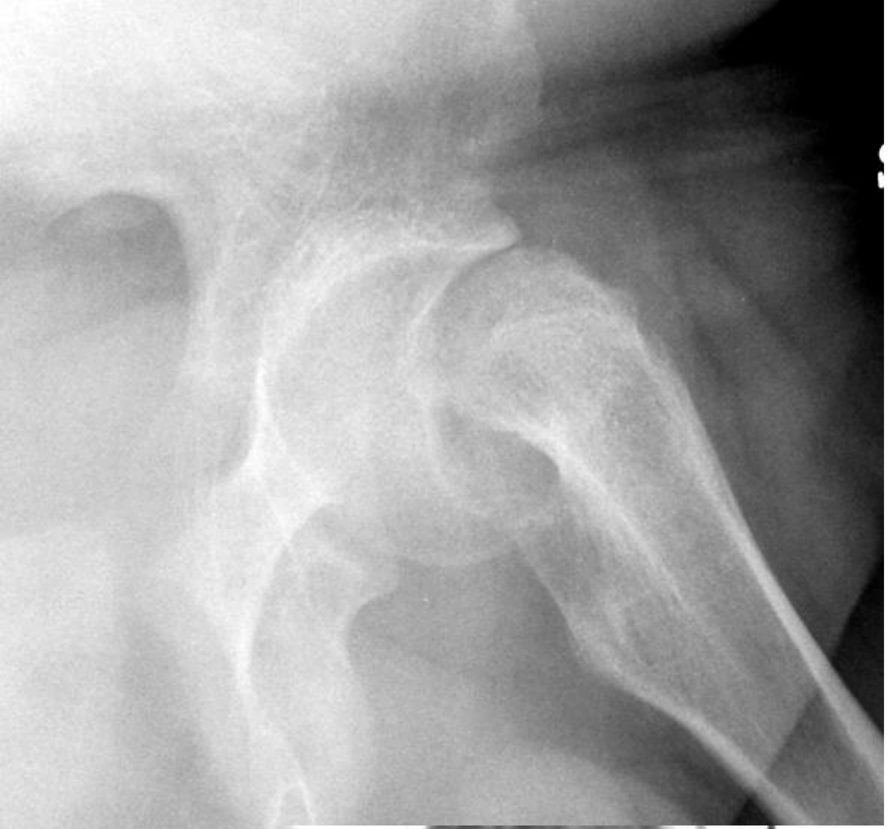
MILAN, ITALY

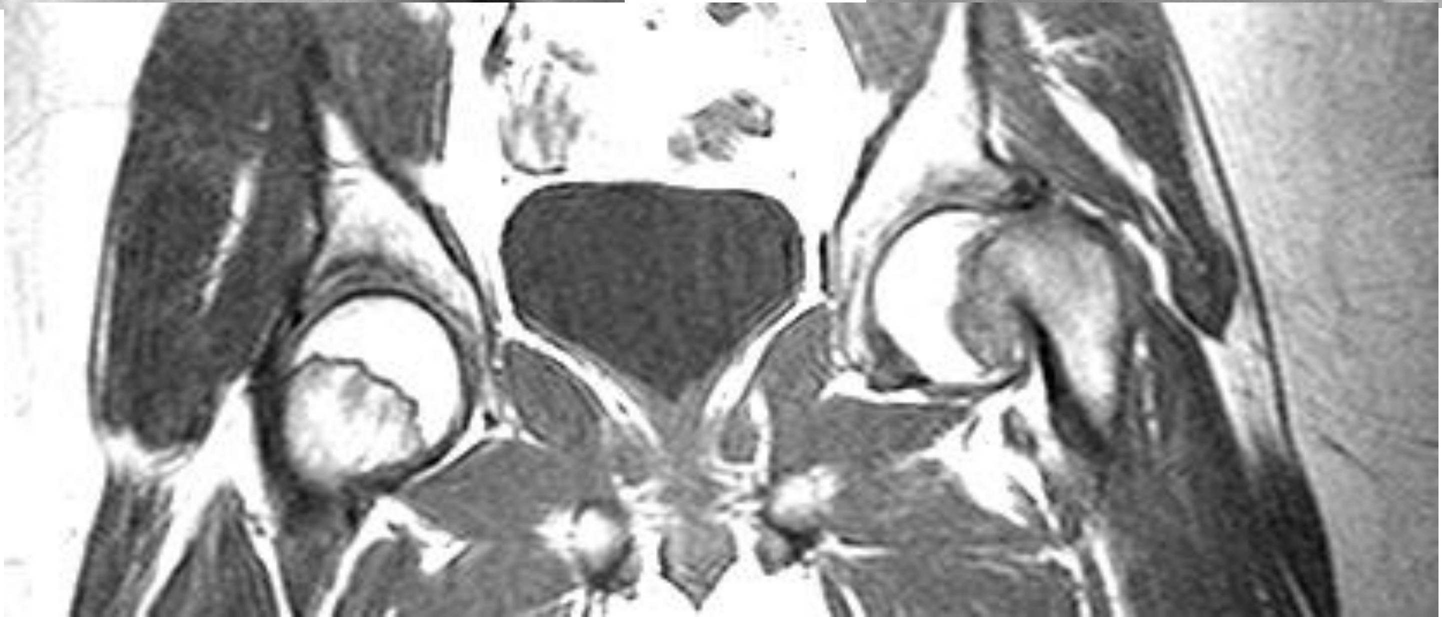
SCFE



Università degli Studi di Torino
Centro Traumatologico Ortopedico
Clinica Ortopedica e Traumatologica I

www.chirurgia-bacino-anca.unito.it





CLASSIFICATION

- ONSET OF SYMPTOMS
  - acute (less than 3 weeks)
  - chronic (more than three weeks)

- STABILITY
  - Unstable= severe hip pain and the child's inability to ambulate
  - Stable= the child is able to walk with or without crutches

- SEVERITY
  - mild (0-30°), moderate (30-50°), severe (>50°)

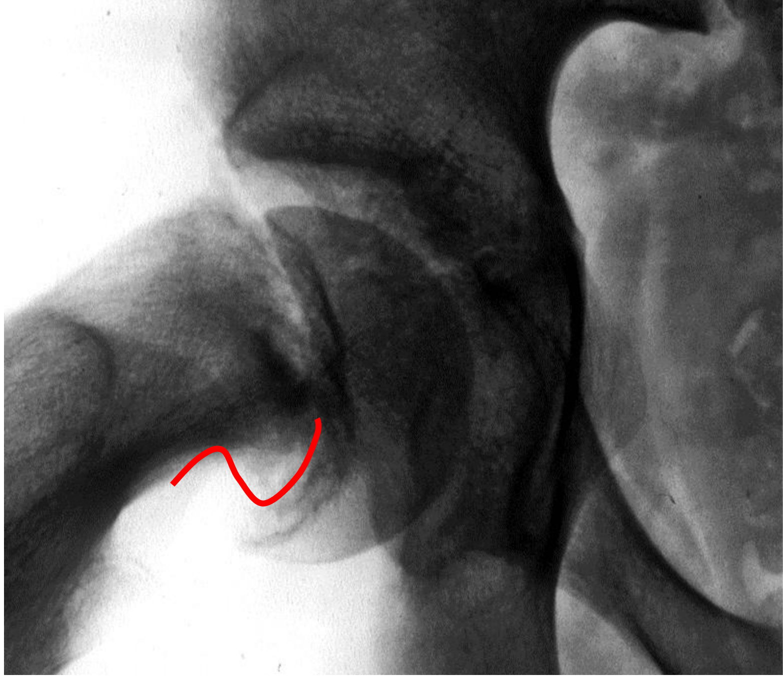
ACUTE SCFE

- 10-15% of the cases
- AVN rate up to 60%
- Mostly acute on chronic
- *Urgent reduction and fixation*

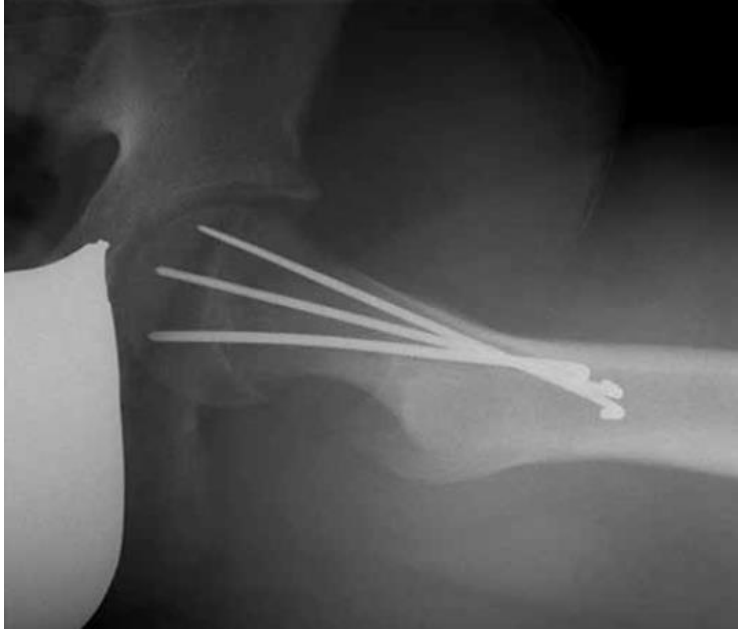
Urgent reduction and fixation

- TIMING
  - Within 24 h ? ASAP

- TECHNIQUE
  - Close /Open ?
  - Pinning/Modified Dunn ?



- “At surgery posterior callus could be demonstrated in 27/35 SCFE hips with complete disconnection
- Posterior callus leads to strectching of the retinaculum at epiphyseal realignement
- Retinacular stretching stops epiphyseal perfusion”



CLOSE REDUCTION / PINNING

- safe in true acute SCFEs
- danger of AVN due to stretching of retinacular vessels in acute on chronic SCFEs

CHRONIC SCFE

- 85-90% of the cases
- AVN rate lower (6 to 58%?)
- prototype of cam impingement:

Ganz:” 93% with visible and 70% with substantial damage of acetabular cartilage at surgery“

J Pediatr Orthop • Volume 29, Number 6, September 2009

Femoroacetabular Impingement After Slipped Capital Femoral Epiphysis: Does Slip Severity Predict Clinical Symptoms?

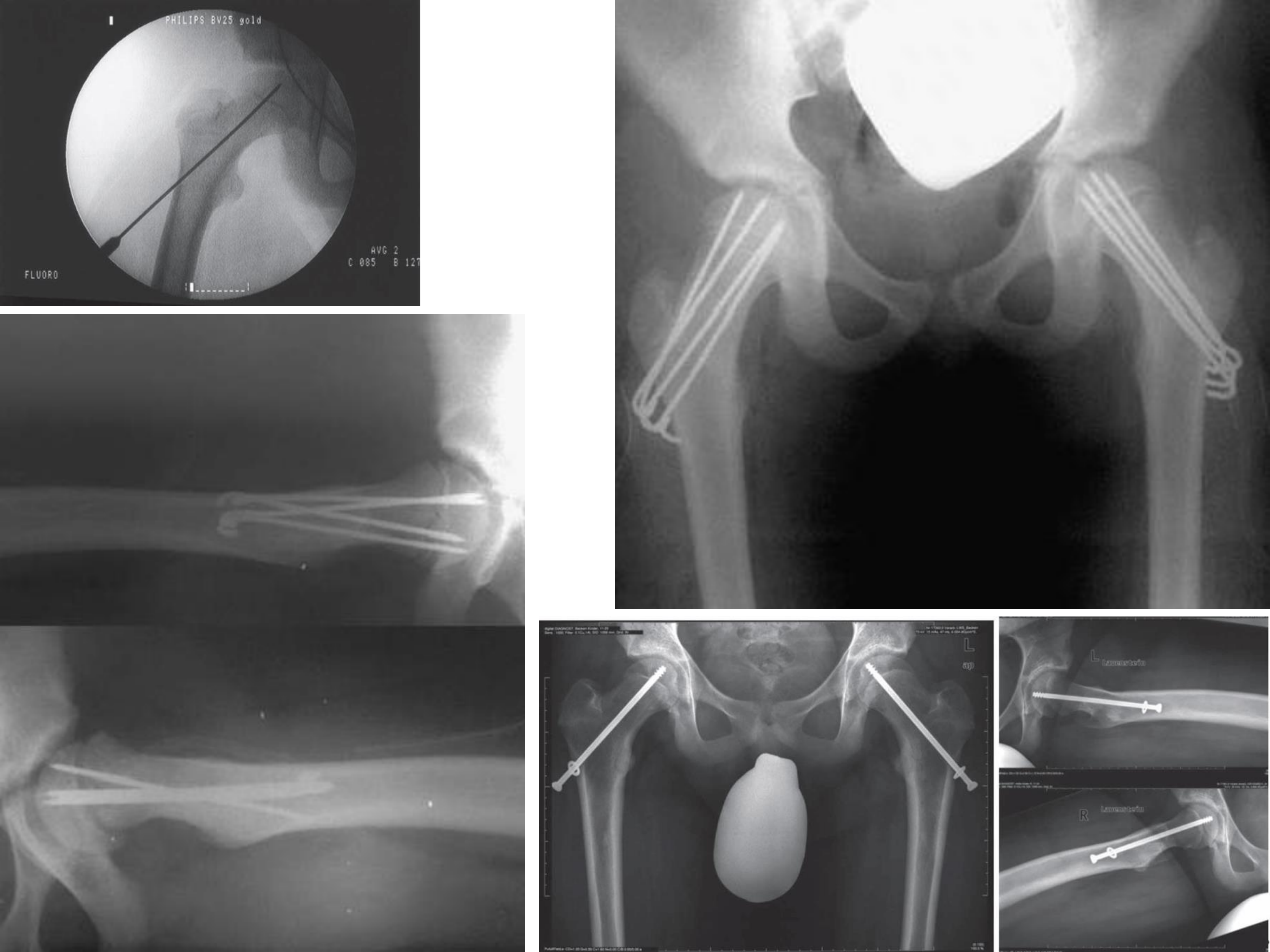
Michael K. Dodds, MCh, MRCSI, Damian McCormack, MCh, FRCSI,*† and Kevin J. Mulhall, MCh, FRCSI**

TABLE 2. Relationship of Symptoms and Signs to Southwick Slip Grade

Southwick Slip Grade	Number	Mean Harris Hip Score	Pain (%)	Pistol-grip Deformity (%)
Grade 0 pre-slip/prophylactic pinning	7	98.6	2/7 (29%)	4/7 (57%)
Grade 1 (0-30)	30	95.6	10/30 (33%)	20/30 (67%)
Grade 2 (30-60)	8	97.0	3/8 (38%)	6/8 (75%)
Grade 3 (> 60)	4	98.0	0/4 (0%)	4/4 (100%)
Total	49	96.6	15/49 (31%)	34/49 (69%)

GOALS

1. Treat the articular damage
2. Restore the anatomy
   - ✓ Reorientation of the epyphisis
   - ✓ Treatment of pelvitrochanteric impingement
   - ✓ Restoration of abductors lever arm


PHILIPS BV25 gold
AVG 2
C 085 B 127
FLUORO
L
ap
L Lauenstein
R Lauenstein

Functional Outcome of Stable Grade III Slipped Capital Femoral Epiphysis Treated With In Situ Pinning

Pablo Castañeda, MD, Carlos Macías, MD, Adolfo Rocha, MD, Alberto Harfush, MD, and Nelson Cassis, MD

Results: The mean Iowa Hip Score was 84.73. Fifty-two patients were considered to have an excellent result, 28 a good result, 16 a fair result, and 9 a bad result.

HIP
ISSN 1120-7000
Hip Int 2015; 25 (2): 104-114
DOI: 10.5301/hipint.5000189
REVIEW

Current concepts in management of slipped capital femoral epiphysis

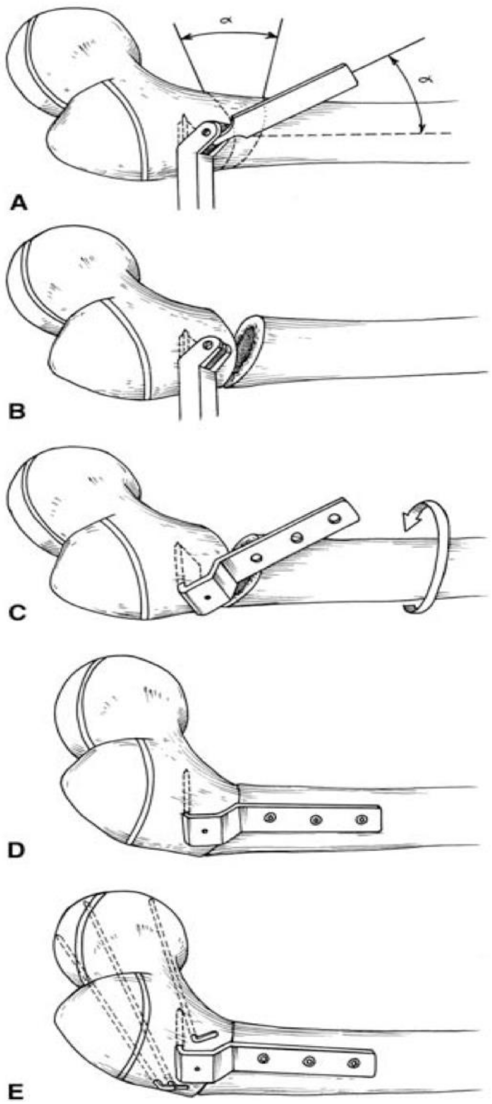
Bernd Bittersohl[1], Harish S. Hosalkar[2], Christoph Zilkens[1], Rüdiger Krauspe[1]

[1] University of Düsseldorf, Medical Faculty, Department of Orthopedic Surgery, Düsseldorf - Germany
[2] Center of Hip Preservation and Children's Orthopaedics, San Diego, California - USA

- in situ pinning with no attempt at slip-reduction is widely accepted in the treatment of mild and moderate slips
- many hips fail to remodel, resulting in various grades and forms of FAI that predisposes the hip to early OA

Extraarticular osteotomies

Schai P. A., Exner G. U. *Corrective Imhauser Intertrochanteric Osteotomy. Oper Orthop Traumatol 2007;19:368-388*



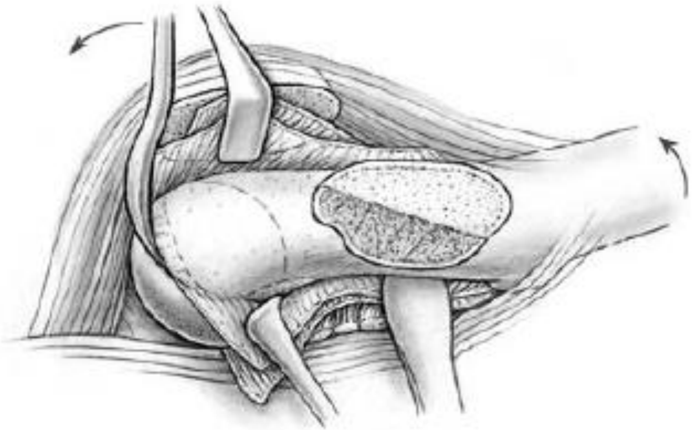
- Low complication rate
- Acceptable clinical results at long term follow-up
- Early OA
- THR more demanding

Clin Orthop Relat Res (2009) 467:704–716
DOI 10.1007/s11999-008-0687-4

SYMPOSIUM: FEMOROACETABULAR IMPINGEMENT: CURRENT STATUS OF DIAGNOSIS AND TREATMENT

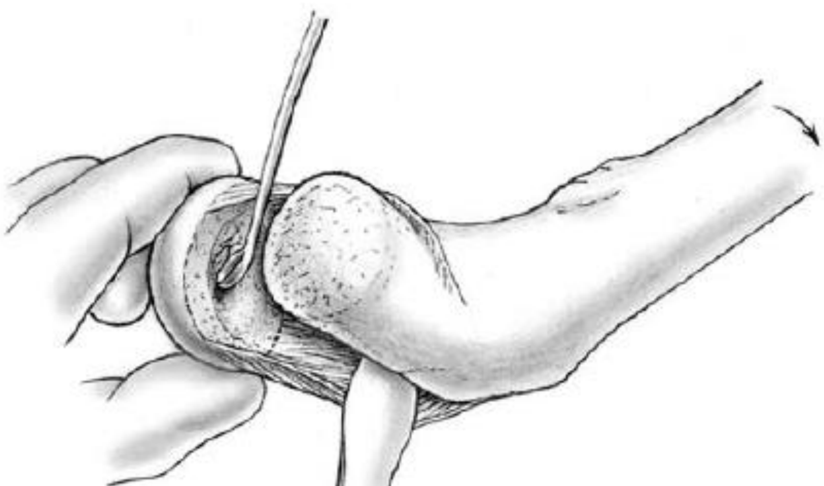
Capital Realignment for Moderate and Severe SCFE Using a Modified Dunn Procedure

Kai Ziebarth MD, Christoph Zilkens MD,
Samantha Spencer MD, Michael Leunig MD,
Reinhold Ganz MD, Young-Jo Kim MD, PhD

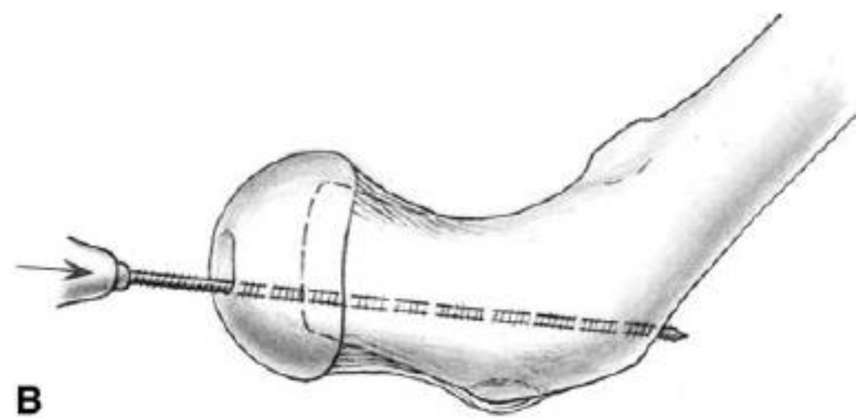


A

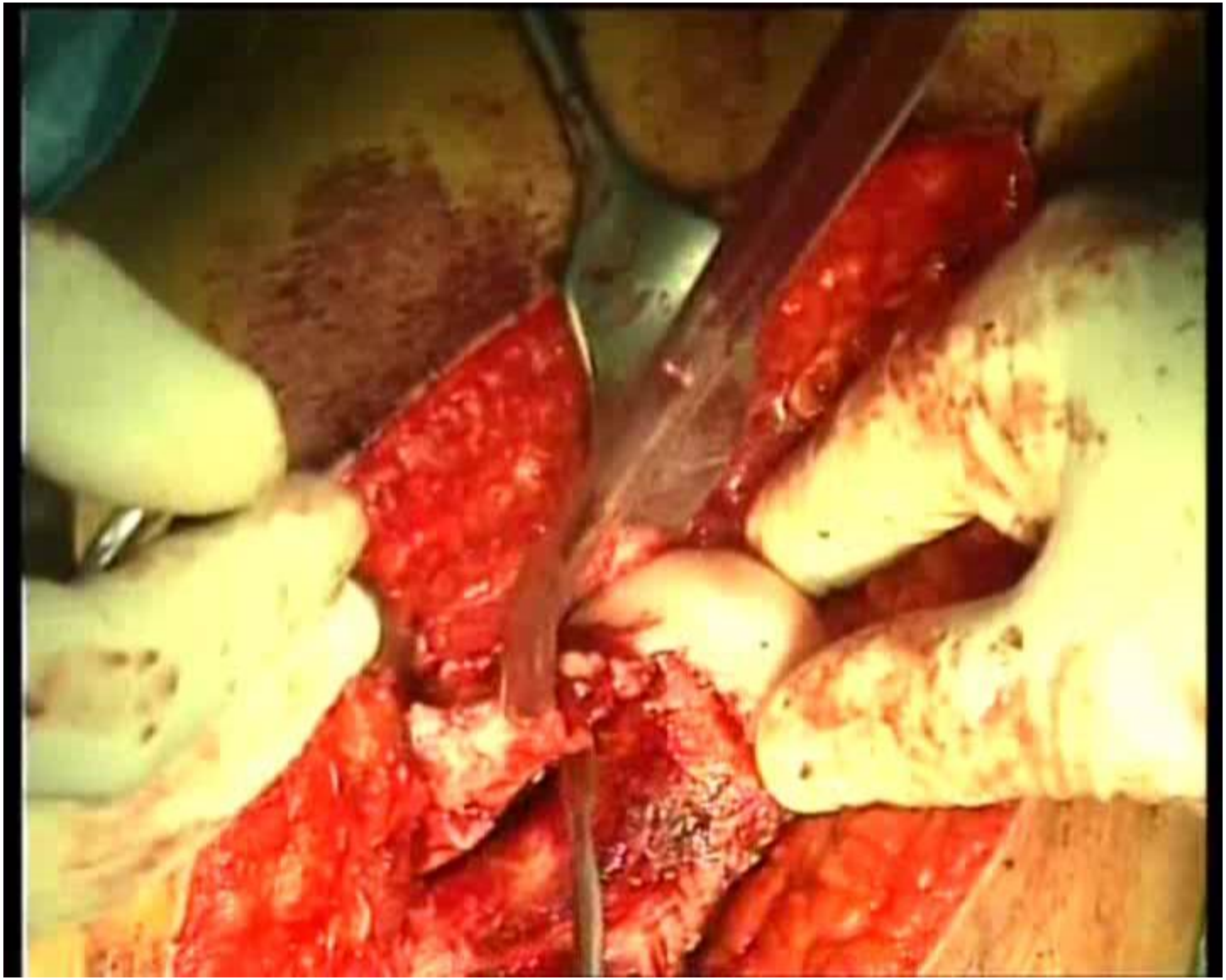
B



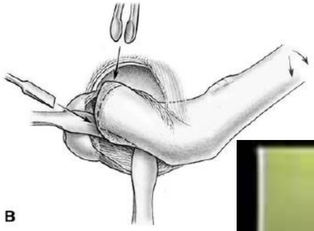
A



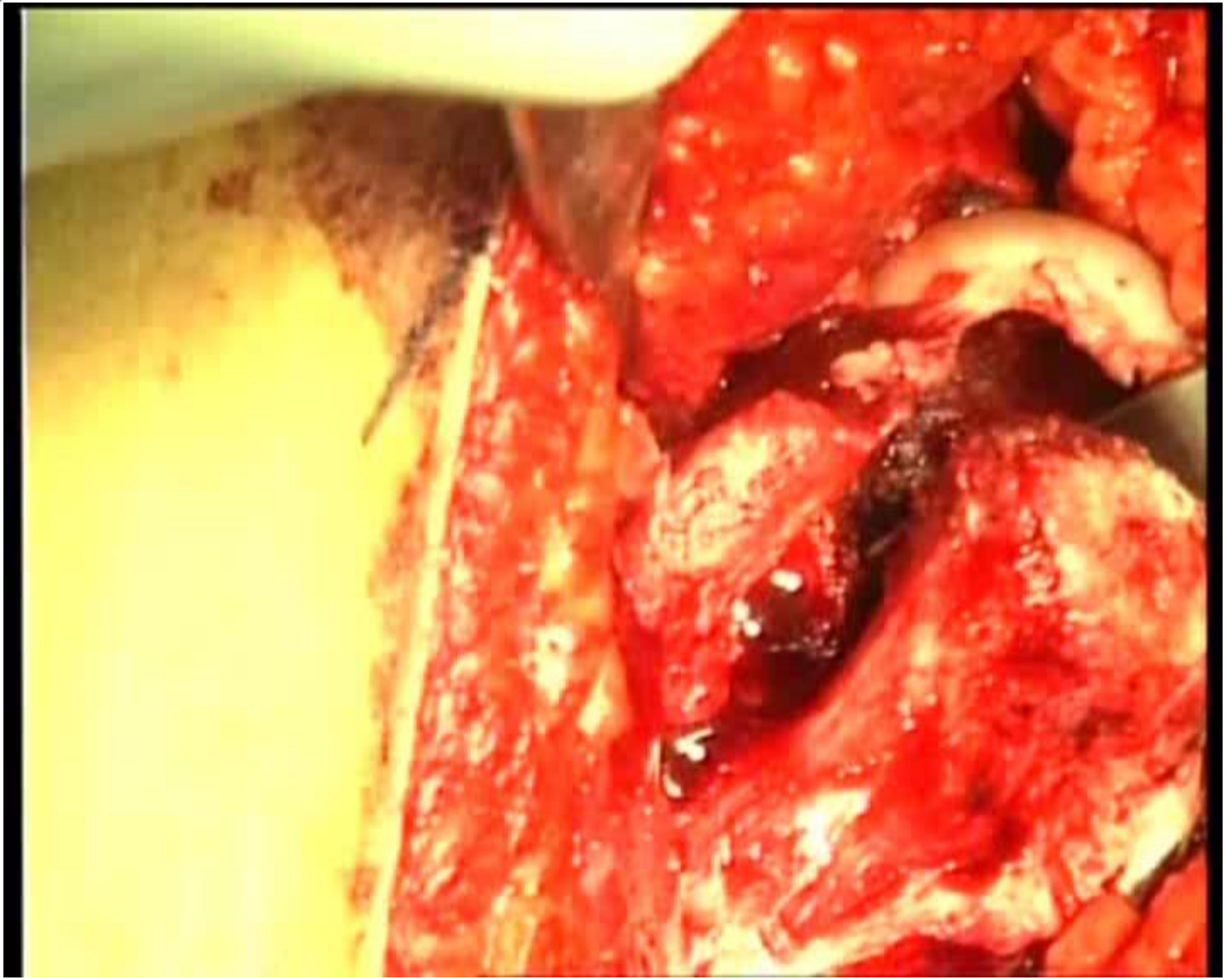
B



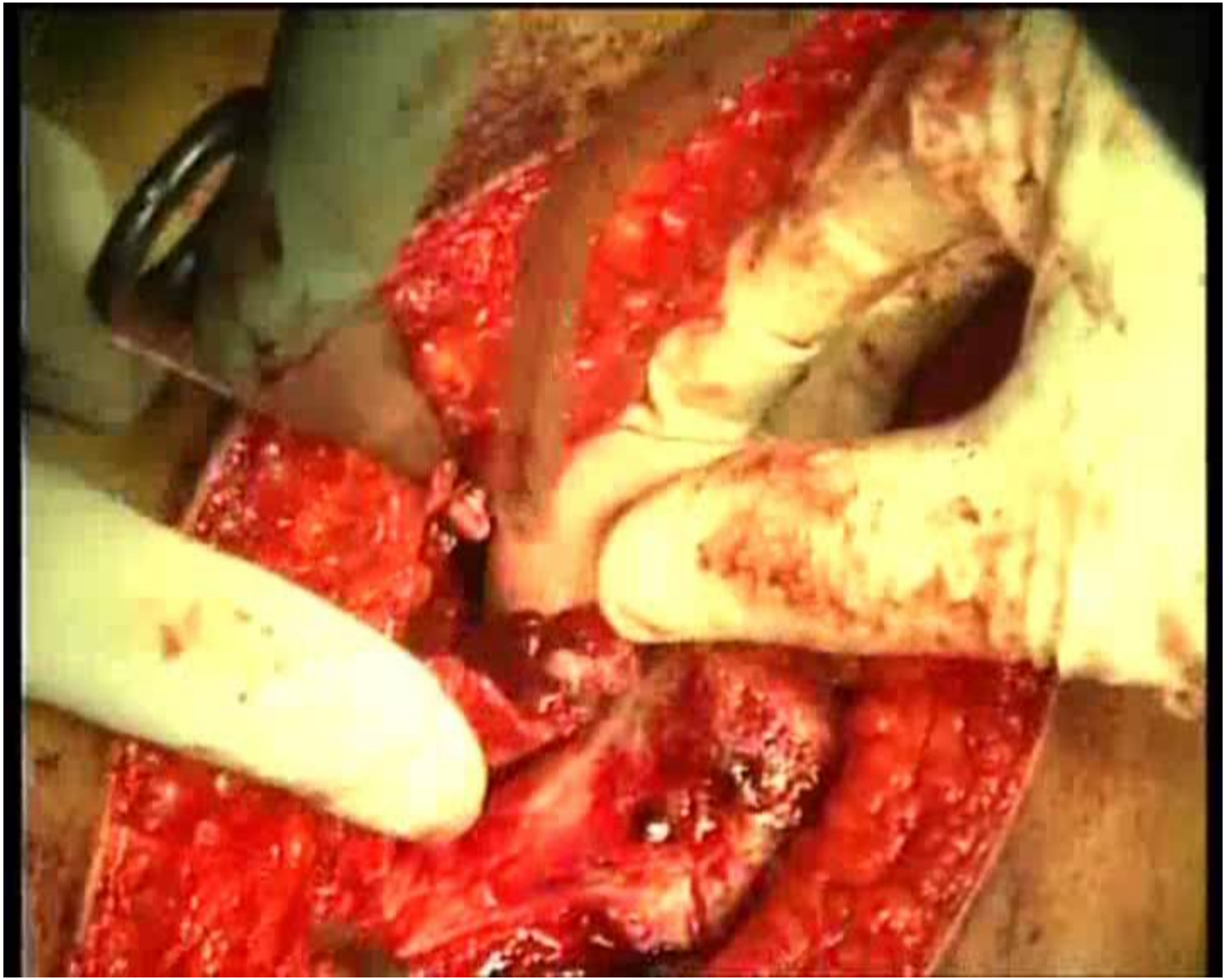
5. Epiphyseal dislocation



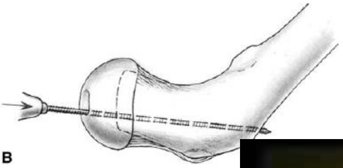
B

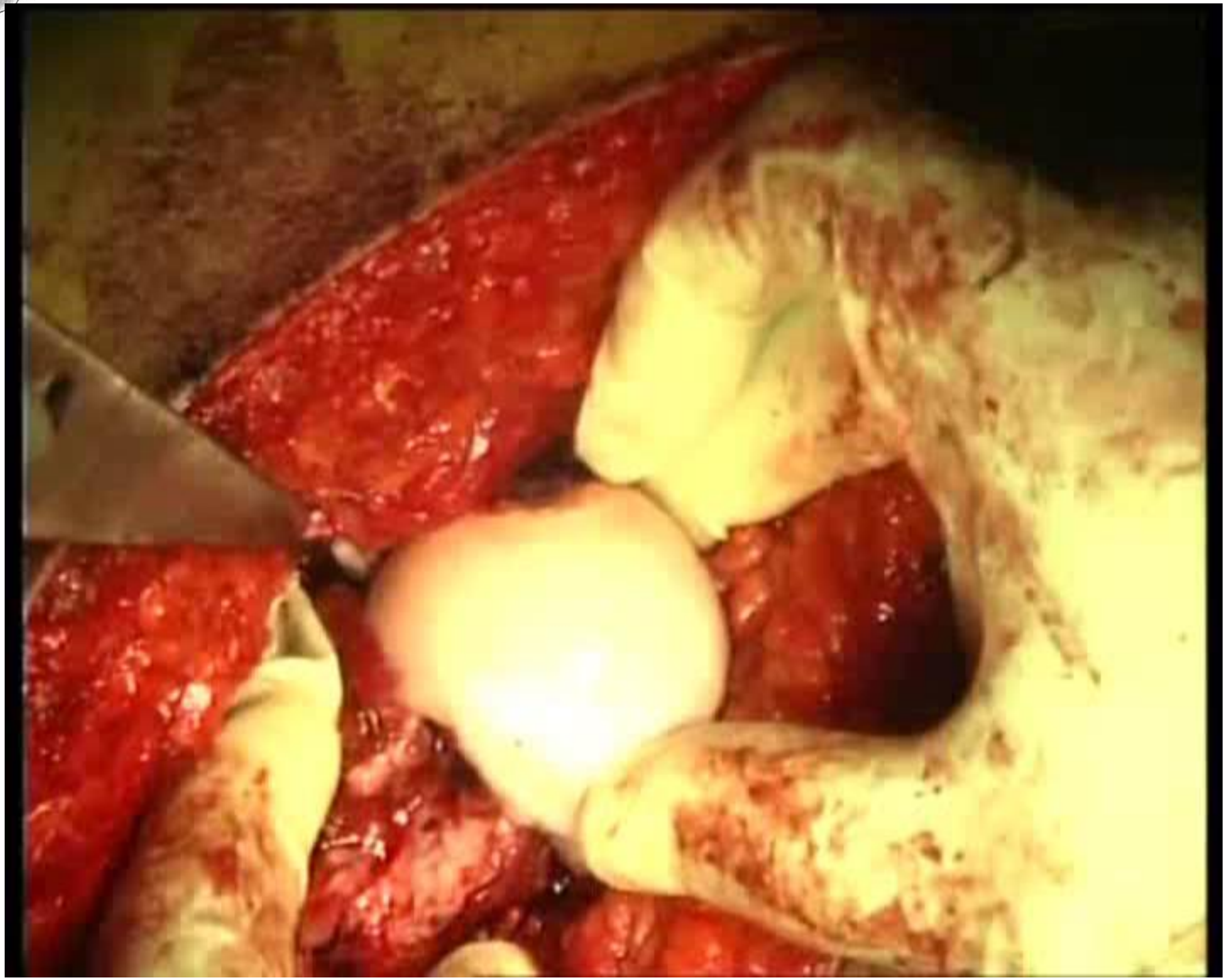


6. Inferior cheiloplasty



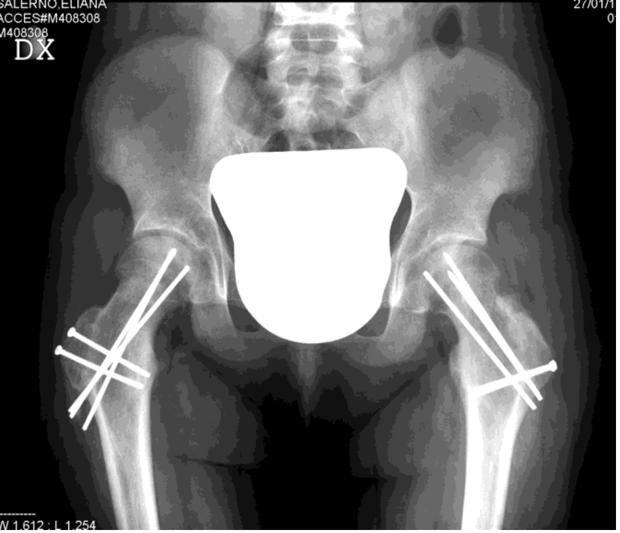
8. Head readuction





9. Fixation: 1° wire through the fovea capitis in a retrograde direction

10. Distalization of the greater trochanter



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Samantha Spencer MD, Michael Leunig MD,
Reinhold Ganz MD, Young-Jo Kim MD, PhD

- 40 cases (2 hospitals)
- f.u. 1-8 y
- AVN – chondrolysis 0%
- residual impingment : 1 case
- revision surgery: 3 cases (K wire failure)
- α angle correction: 100%

Treatment of Slipped Capital Femoral Epiphysis with a Modified Dunn Procedure

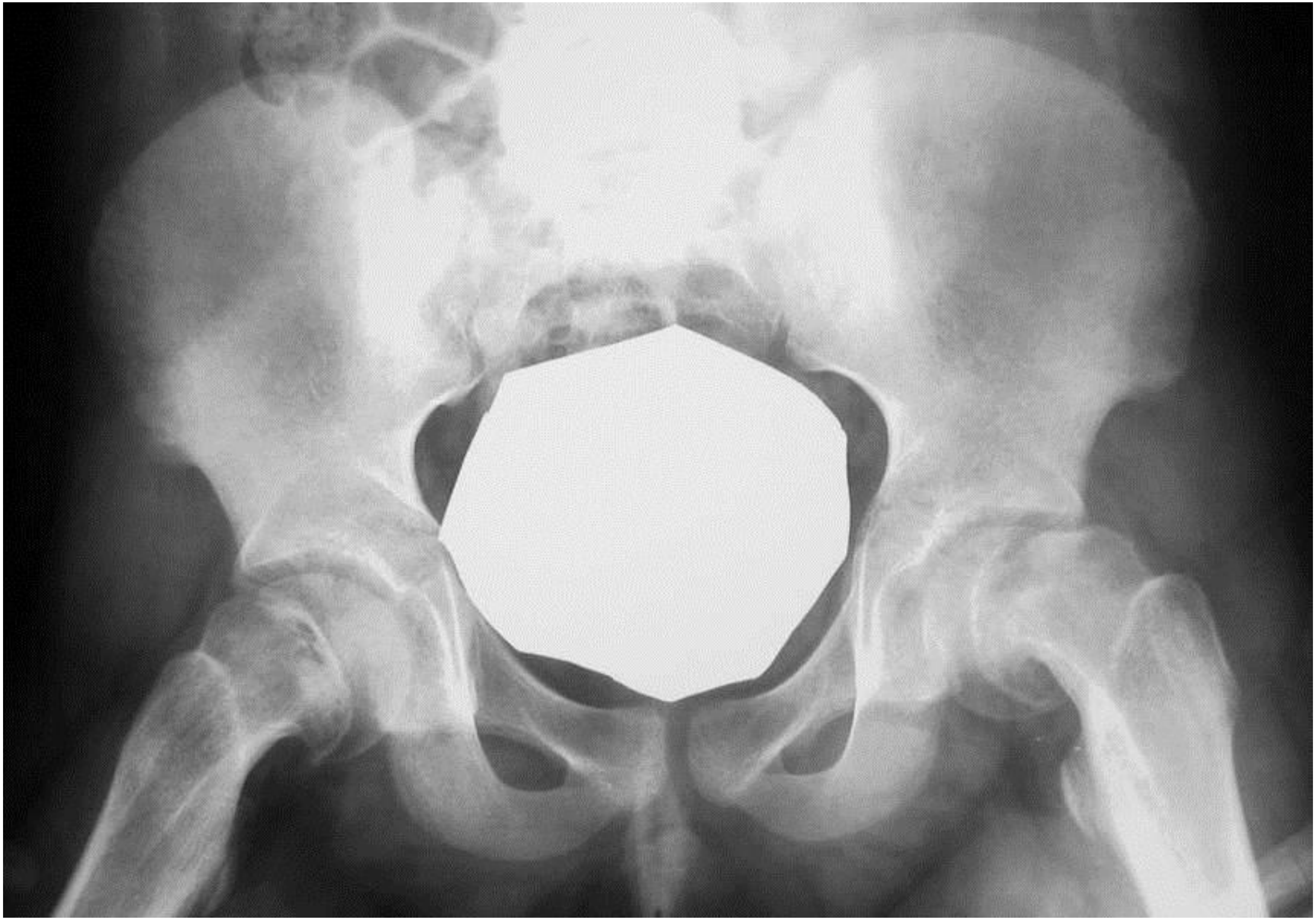
By Theddy Slongo, MD, Diganta Kakaty, MD, Fabian Krause, MD, and Kai Ziebarth, MD

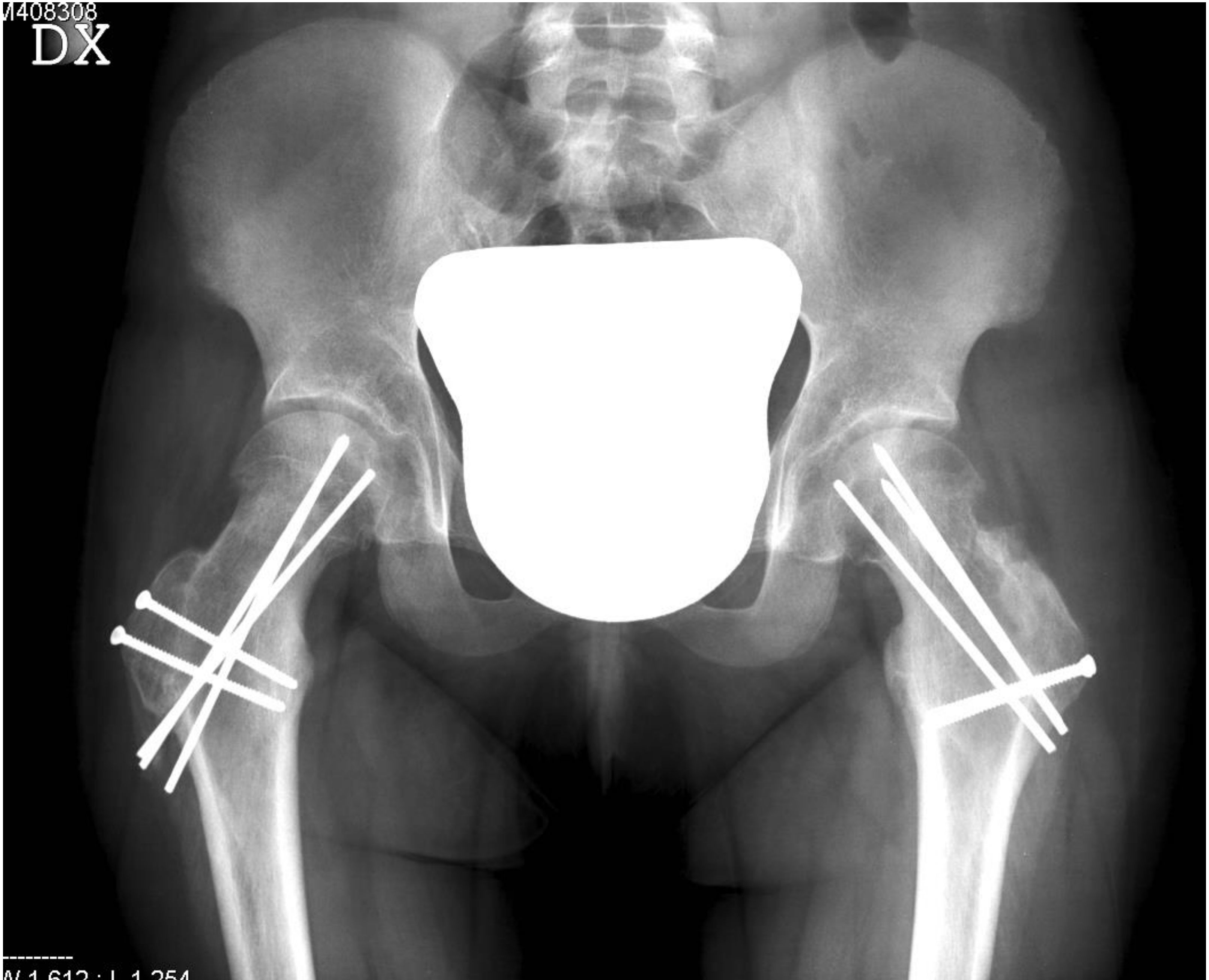
Investigation performed at the Department of Paediatric Surgery, University Children's Hospital, Bern, and the Department of Orthopedic Surgery, University Hospital Bern, Bern, Switzerland

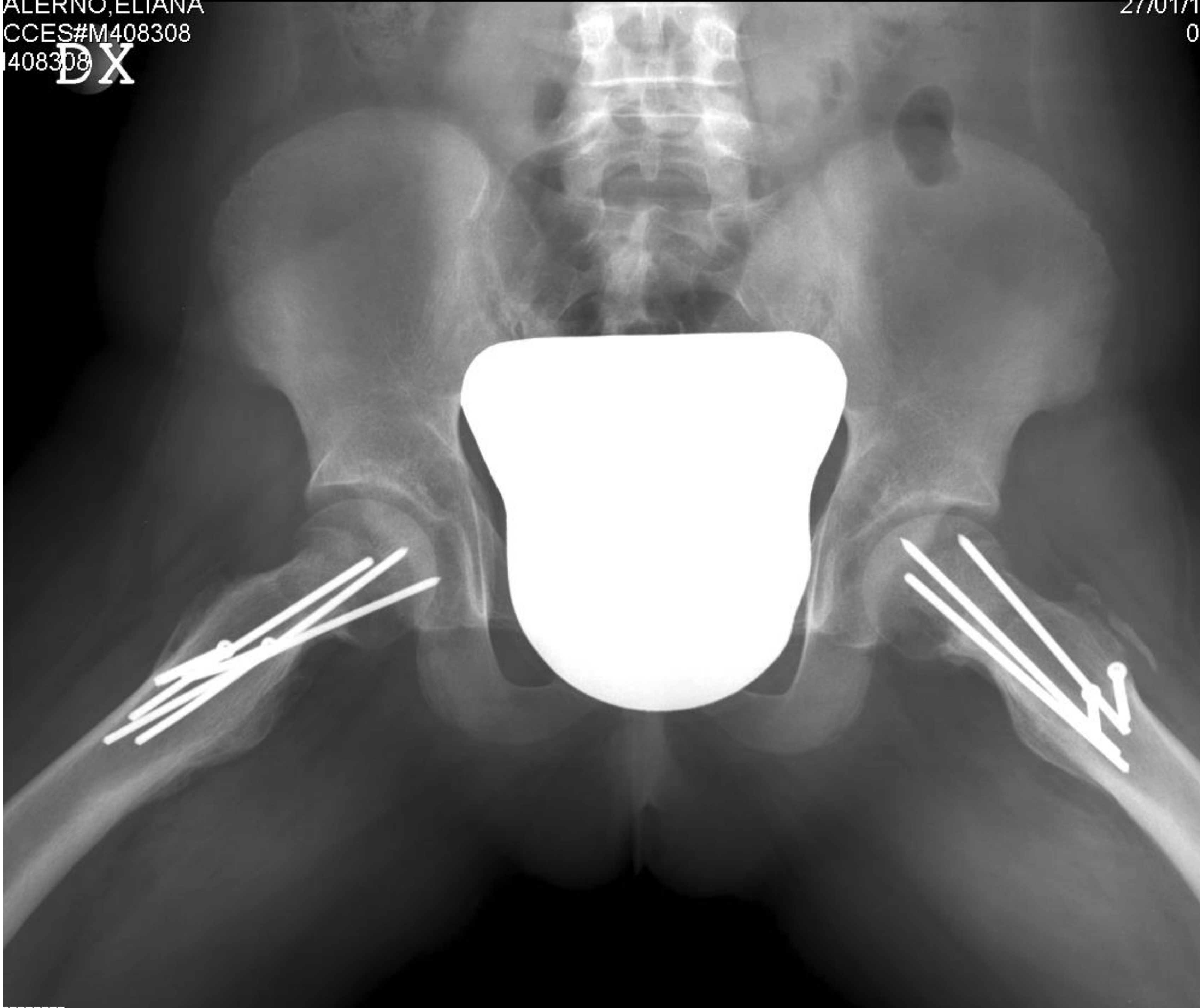
Results: Twenty-one patients had excellent clinical and radiographic outcomes with respect to hip function and radiographic parameters. Two patients who developed severe osteoarthritis and osteonecrosis had a poor outcome. The mean

- 23 cases
- f.u. 2-5
- AVN 2/23

S.E. female, 12 y.o.




M408308
DX
W 1.612 : L 1.254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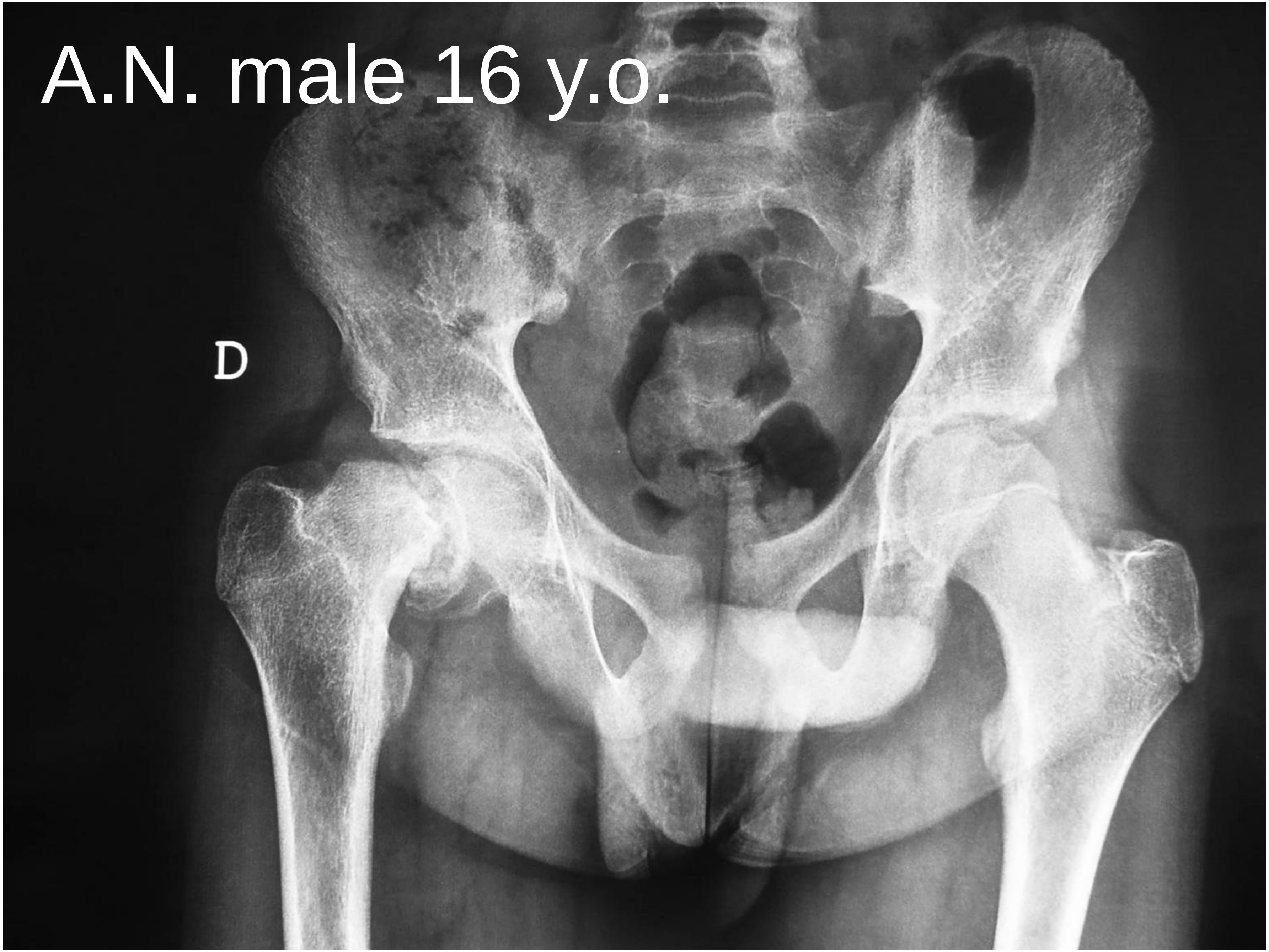
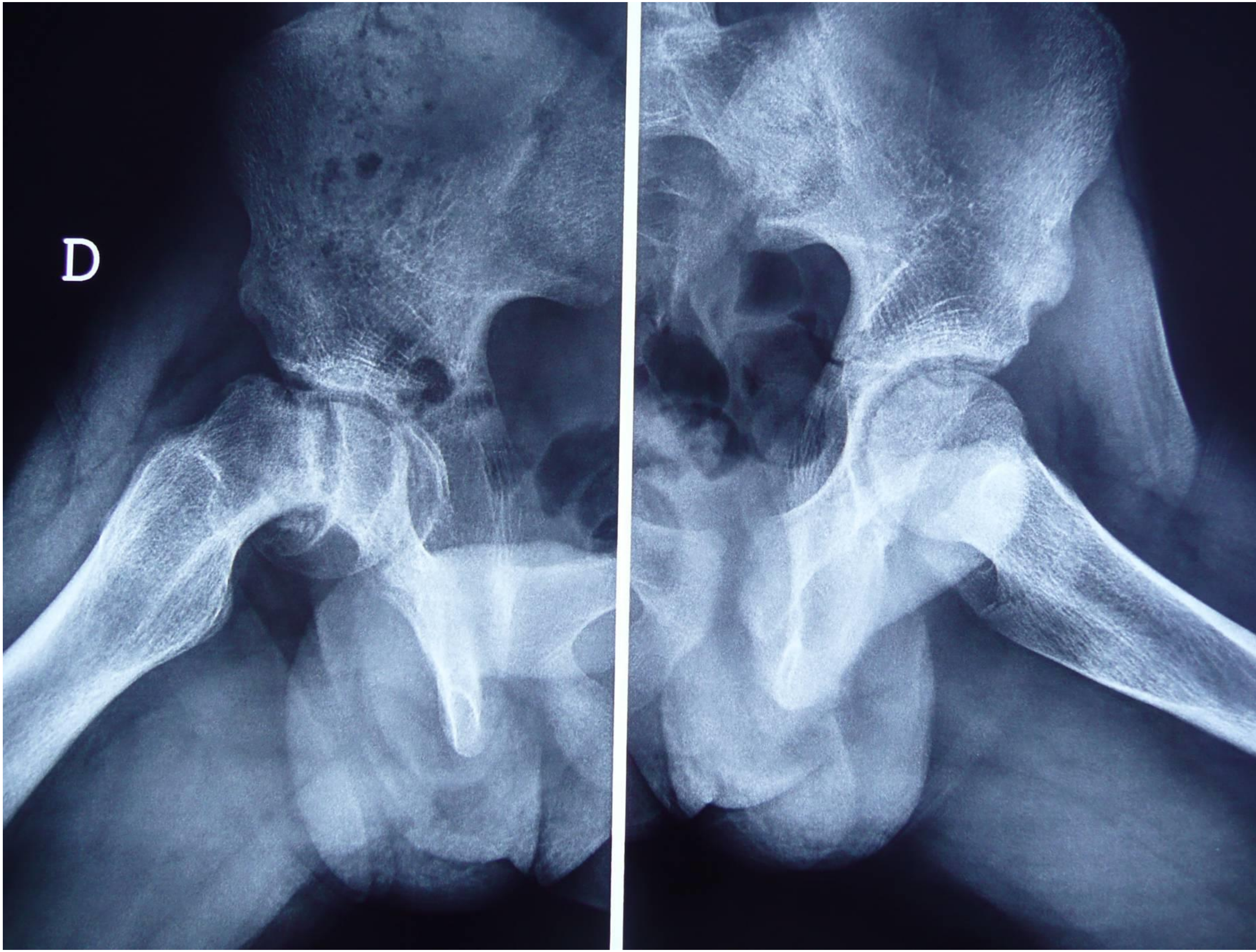

A.N. male 16 y.o.
D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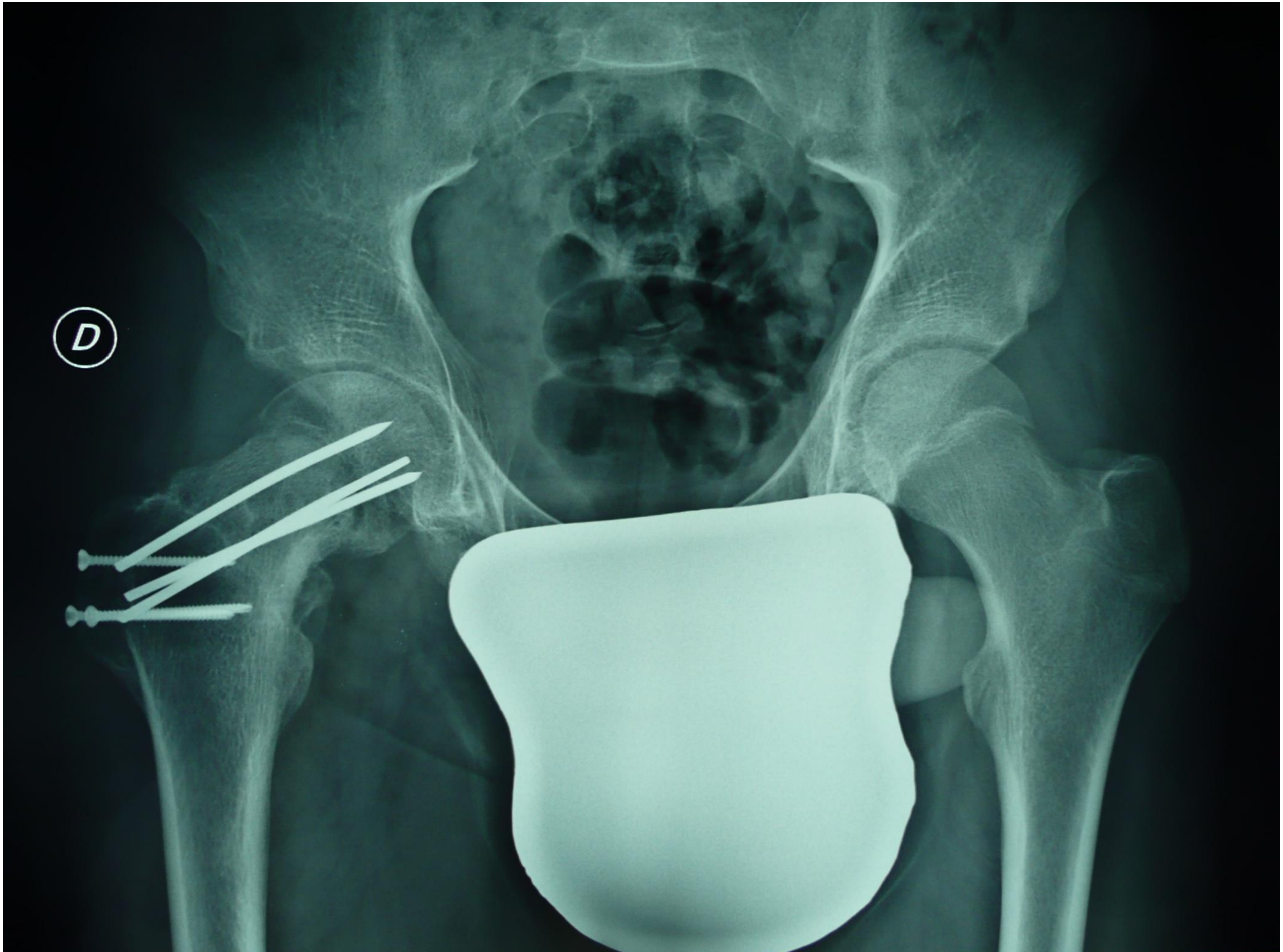
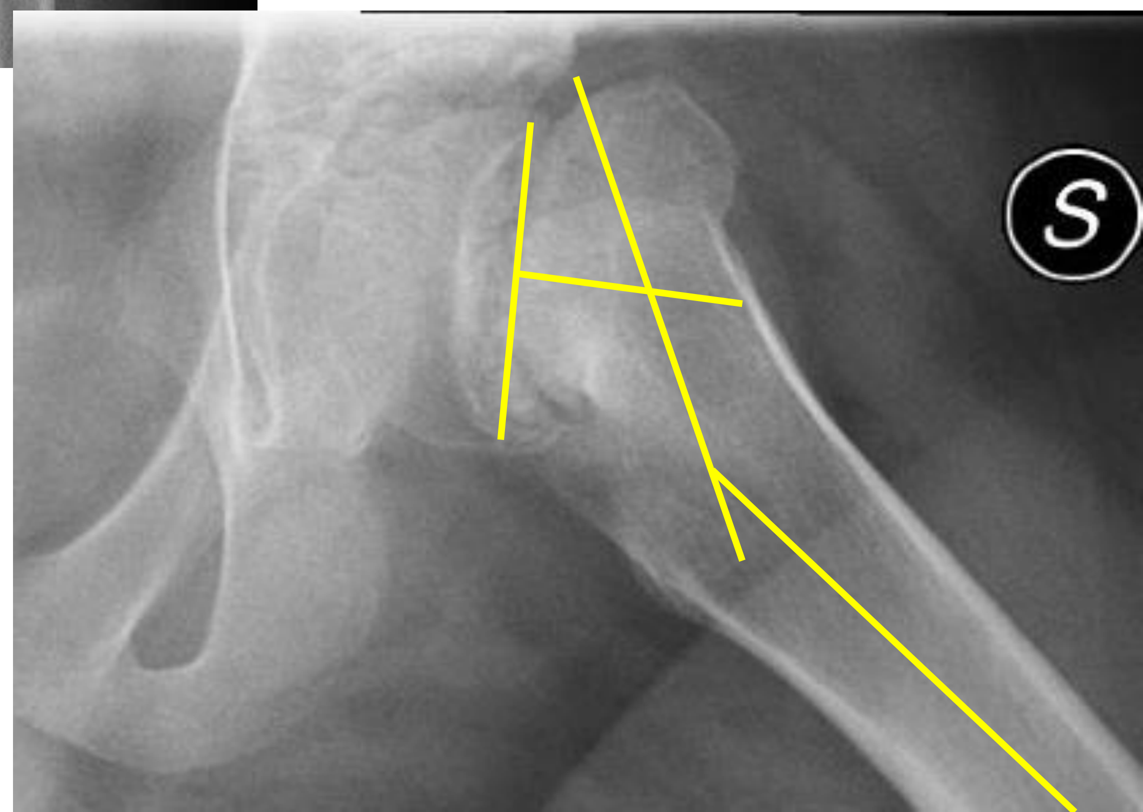

D


D


6y f.u.
S

- AVN: 6\54
- 4 acute (all but 1 referred after 48 h)
- 2 chronic (partial collapse)
- One further head collapse was not considered for neglected postoperative protocol (full weight bearing at suture removal):
  - Relevance of the compliance


lizza pos.: AP
S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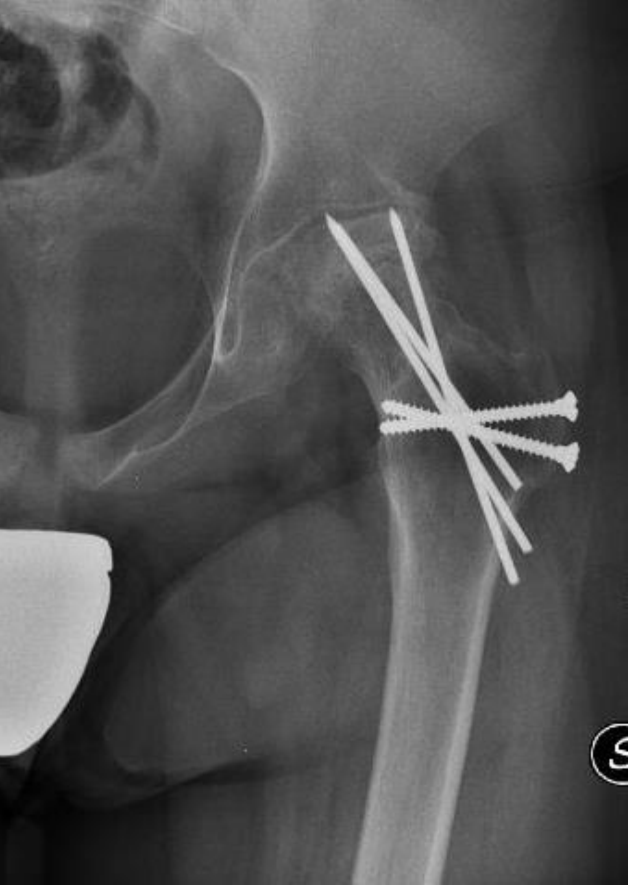
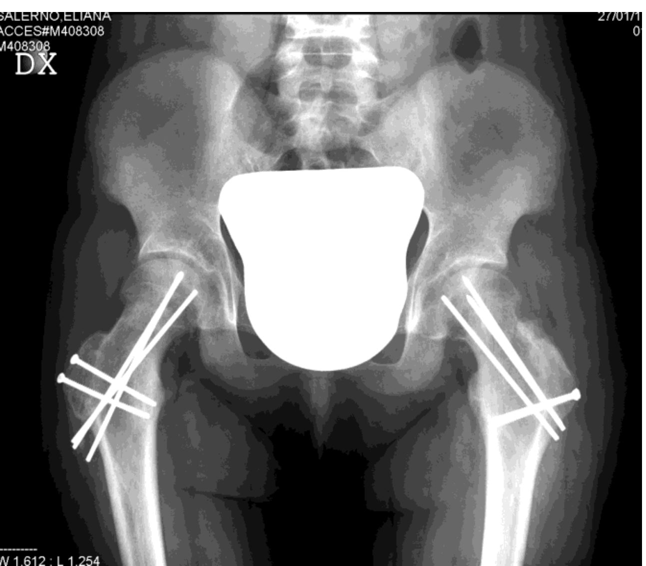


Courtesy of G. Marrè, S. Boero
Gaslini Institute, Genova

ADVANTAGES

1. Treatment of the articular damage
2. Restoration of the anatomy
3. Restoration of abductors lever arm
4. Correction of limb length



DRAWBACKS

1. Learning curve
2. Complications rare but potentially severe in a short term

CONCLUSIONS:

- pinning in situ is the treatment of choice for slips up to 30°.
- For more severe slips modified Dunn re-allignement provides high amount of excellent results with low complication rate.

•The results are reproducible by trained surgeons


Thank You!

INTERNATIONAL COMBINED MEETING

BRITISH HIP SOCIETY
SOCIETÀ ITALIANA DELL'ANCA

26-27 NOVEMBER 2015

MILAN, ITALY

Adolescent/Young Adult Sequelae of Perthes' Disease

"A comprehensive review of Perthes' leaves you more confused at the end than you were at the beginning"

J N O'Hara

Birmingham, UK

Legg-Calve-Perthes Disease Hypothesis

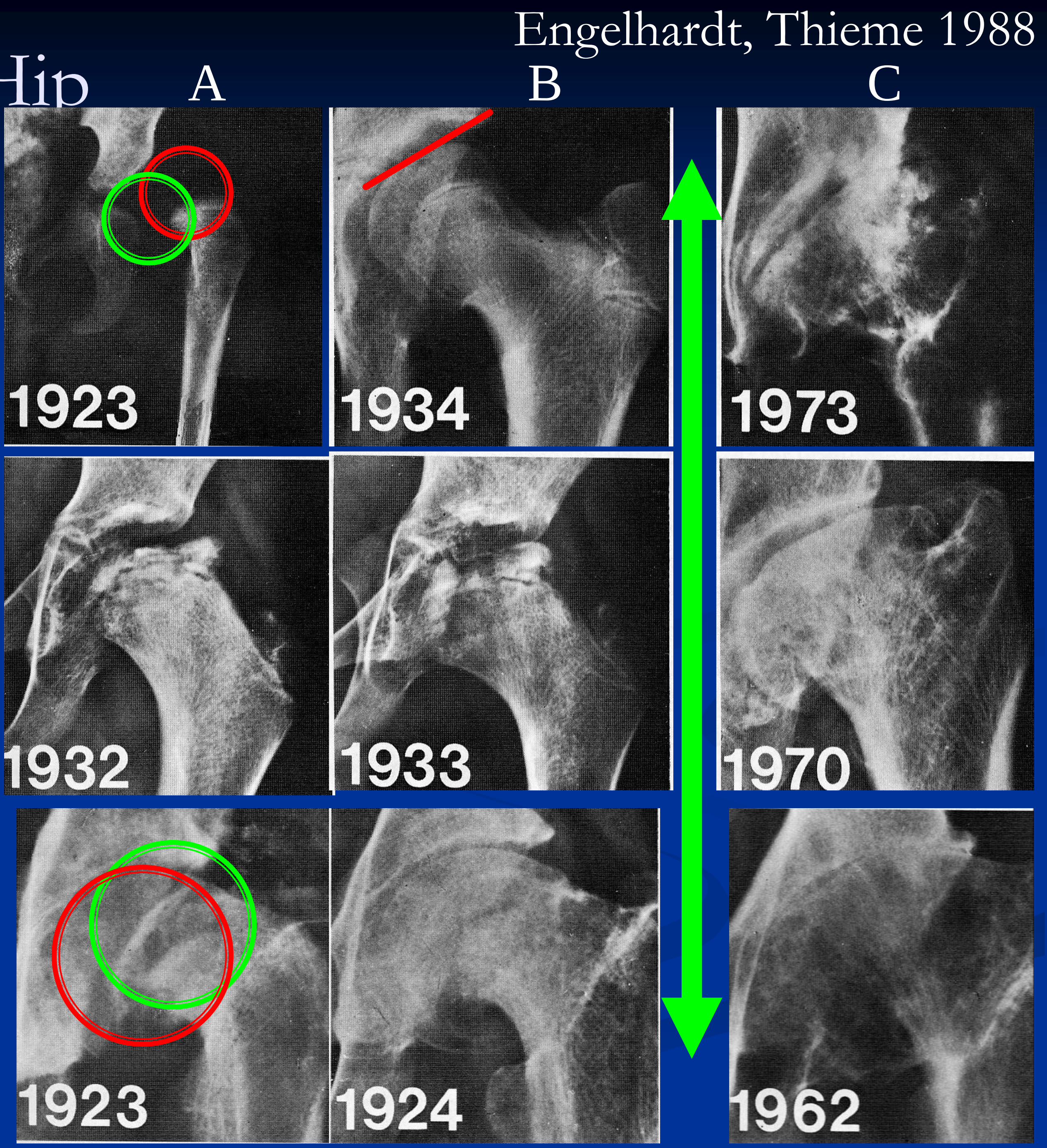
- "In the susceptible child the changes which are called Legg-Calve-Perthes disease are the consequences of ischaemia of variable duration, followed by a repair process, with a (variable) growth disturbance, which if severe (or uncontrolled) leads to femoral head deformity and subsequent (premature) arthritis" [after A Catterall, 1982]

Why does OA Hip occur?

Dislocation
Dysplasia

Perthes'

SUFE



Hip Pathology

Socket instability

F (7%)

symptomatic

ERECT/W-B

Socket

Dysplasia

Athletes

sports

Overweight

….Normal

…Overuse

McD,

BK, SKY

TV

Perthes, SUFE,

M(7%)

↓↓↓ Flexion, IR

Head

Impingement

(flexion impairment)

Treatment Options for Perthes Disease

- Many different treatments
- Many different indications/contra-indications
- Plenty of Controversy
- Corollary – few negligence cases

Classificationssss of LCPD (all based on a snapshot in time!)

- Salter – 2
- Catteral - 4
- Herring – was 3 ....now 3-4(!)

- Benefit to patients.............questionable
- Benefits to Surgeons........... A certain degree of (un) certainty. (of this we can be sure)
- Benefits to originators......
  - Many free trips and dinners

Certainties about Life

- Death
- Taxation
- Rust in your car
- The weather forecast will be wrong

Certainties About Perthes' Disease

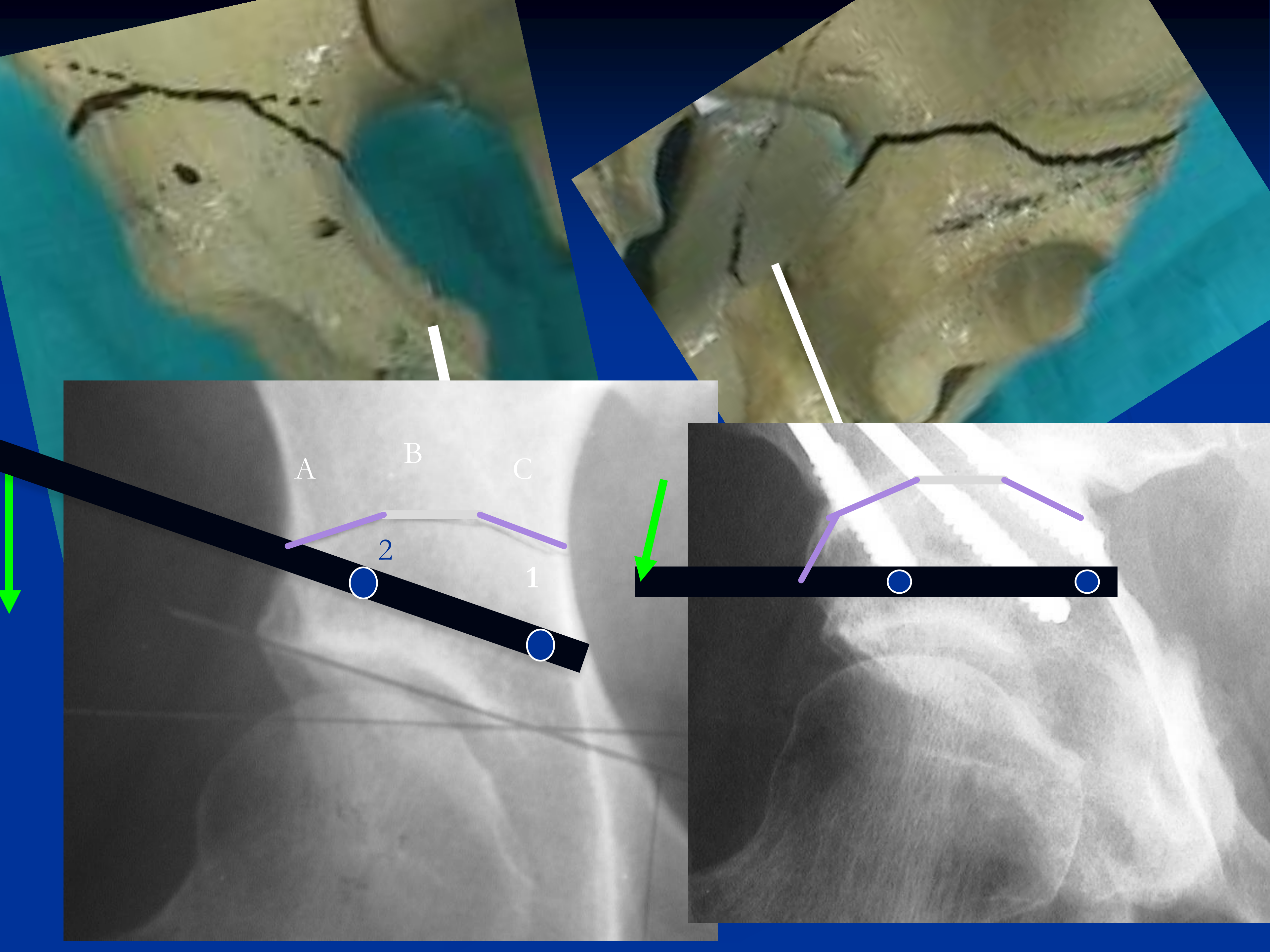
- Round Head = Good, Durable Result
- Younger patients – better results

- Certainties of Treatment

- …………………………………………
- Perthes' disease remains **a riddle wrapped in a mystery inside an enigma**
- **13 Journeys to the moon.$$$$$$$$$$$……..**

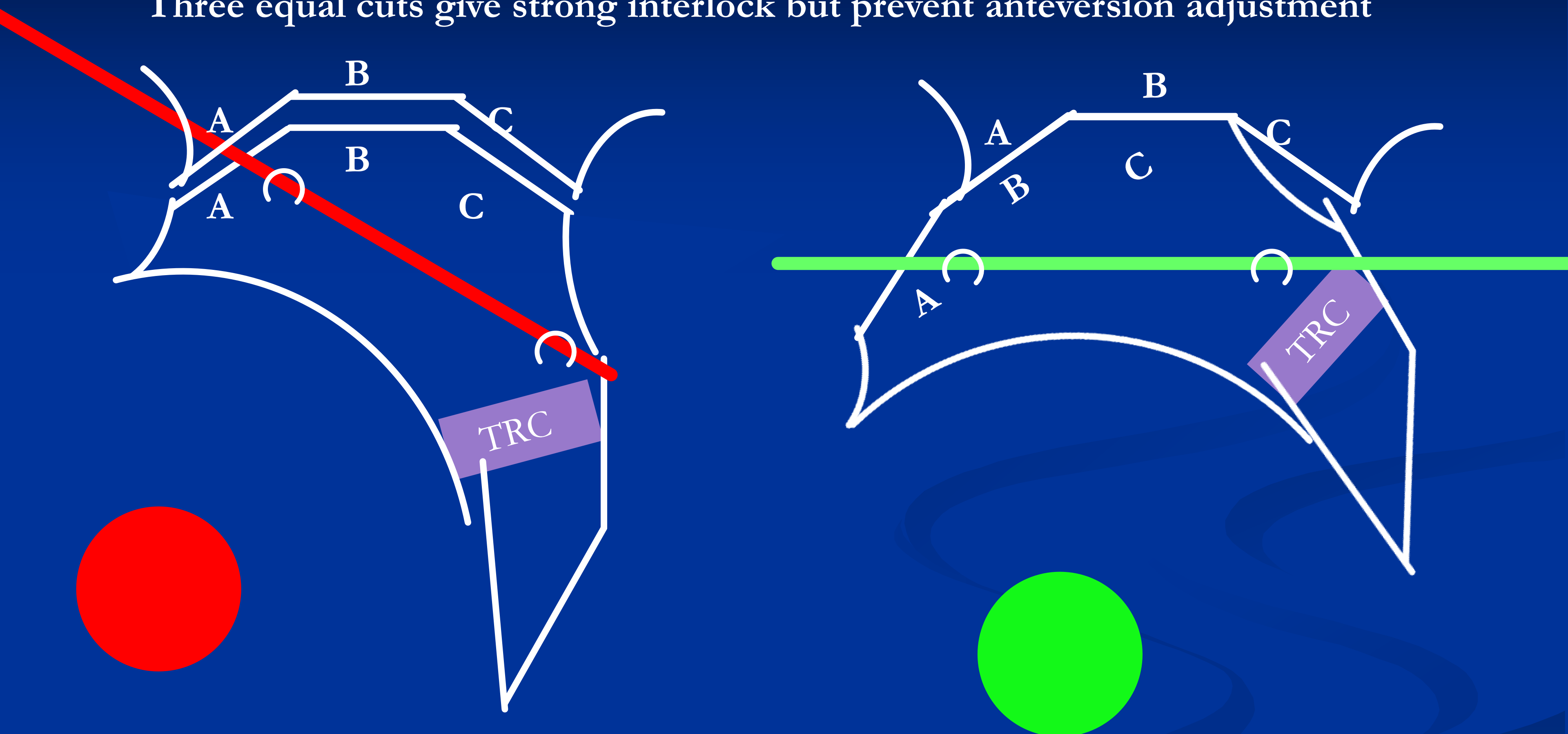
Decision Making in active Perthes' disease.

- Include, head predicted to be out of round O/E
  - Females > 7
  - Males > 8
  - Herring 2&3
  - Salter "B"
- PFO varus if only 20 degrees required
- BIPO if >20 degrees required, age 8/9 or over.


A
B
C
2
1

Achieves automatic and proportional medialisation/distalisation

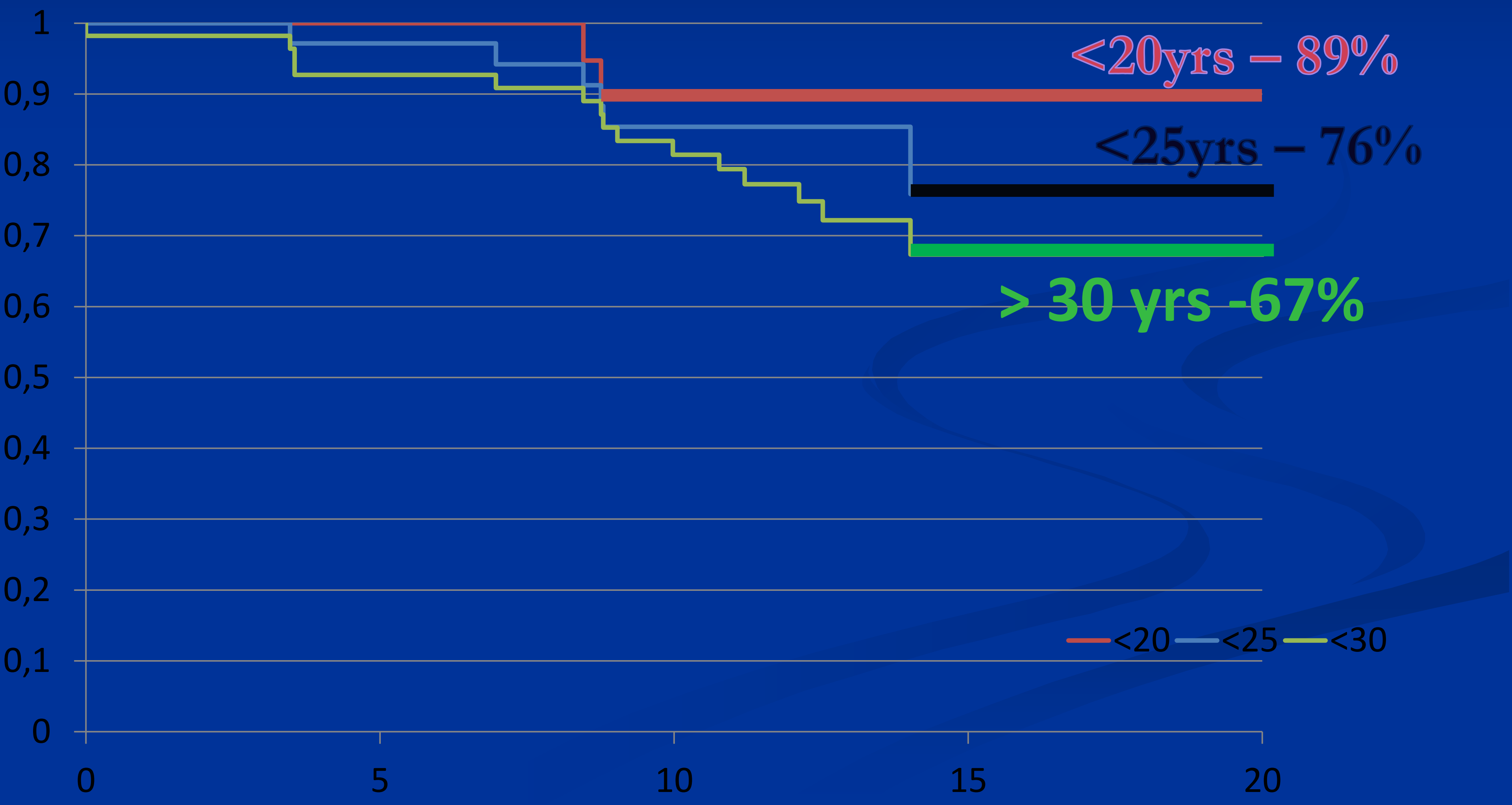
Three equal cuts give strong interlock but prevent anteversion adjustment



The essential principle of the operation is to make three linked bone cuts on the ilium, the angle between them (here 30 °) reflecting the intended lateral rotation of the central acetabular fragment (CAF). An external fixator is attached to the CAF in the plane of the presenting acetabular mal-alignment to provide a powerful lever to mobilise the CAF and manoeuvre it into a position of predictable and reproducible correction.

BIPO KM curve for dysplasia

(low threshold for arthroplasty)
[similar to Millis but only 70% F/U]
No arthroplasties x 6years[PAO cont decline]



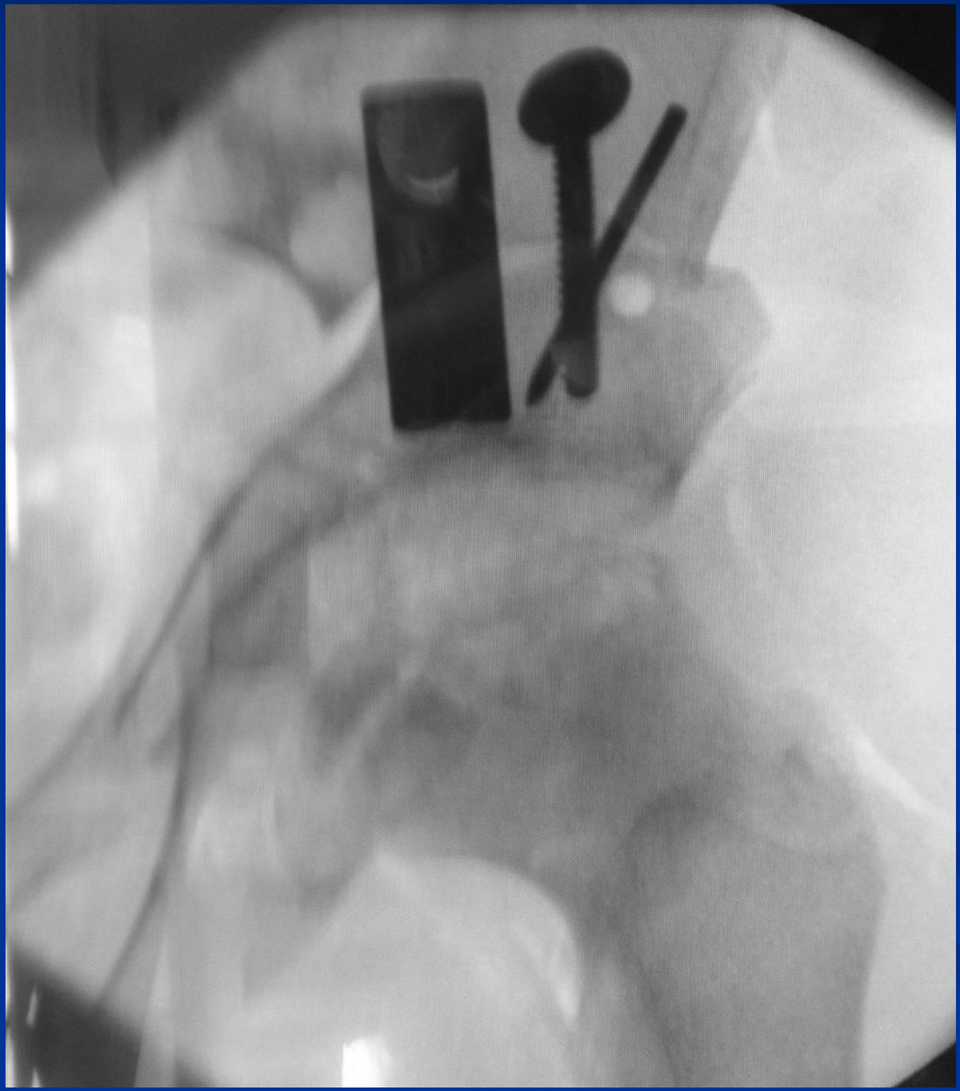
Our indications

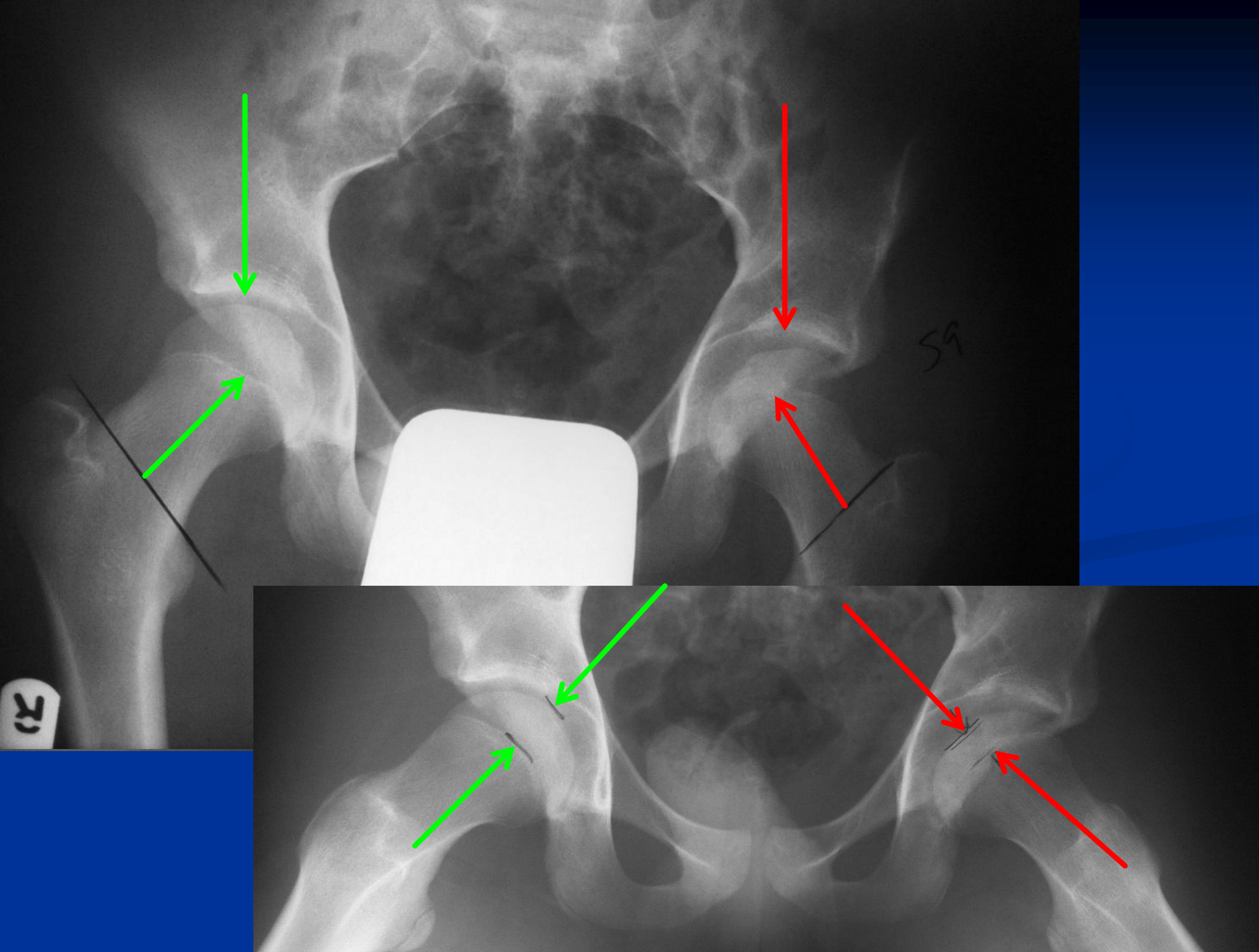
- Catterall group 3 and 4
- Herring group B and C
- Waldenstrom's stage 2 and early 3
- Containable at examination under anaesthesia (EUA) or arthrogram

- A pre-operative EUA and / or an arthrogram was performed in every case

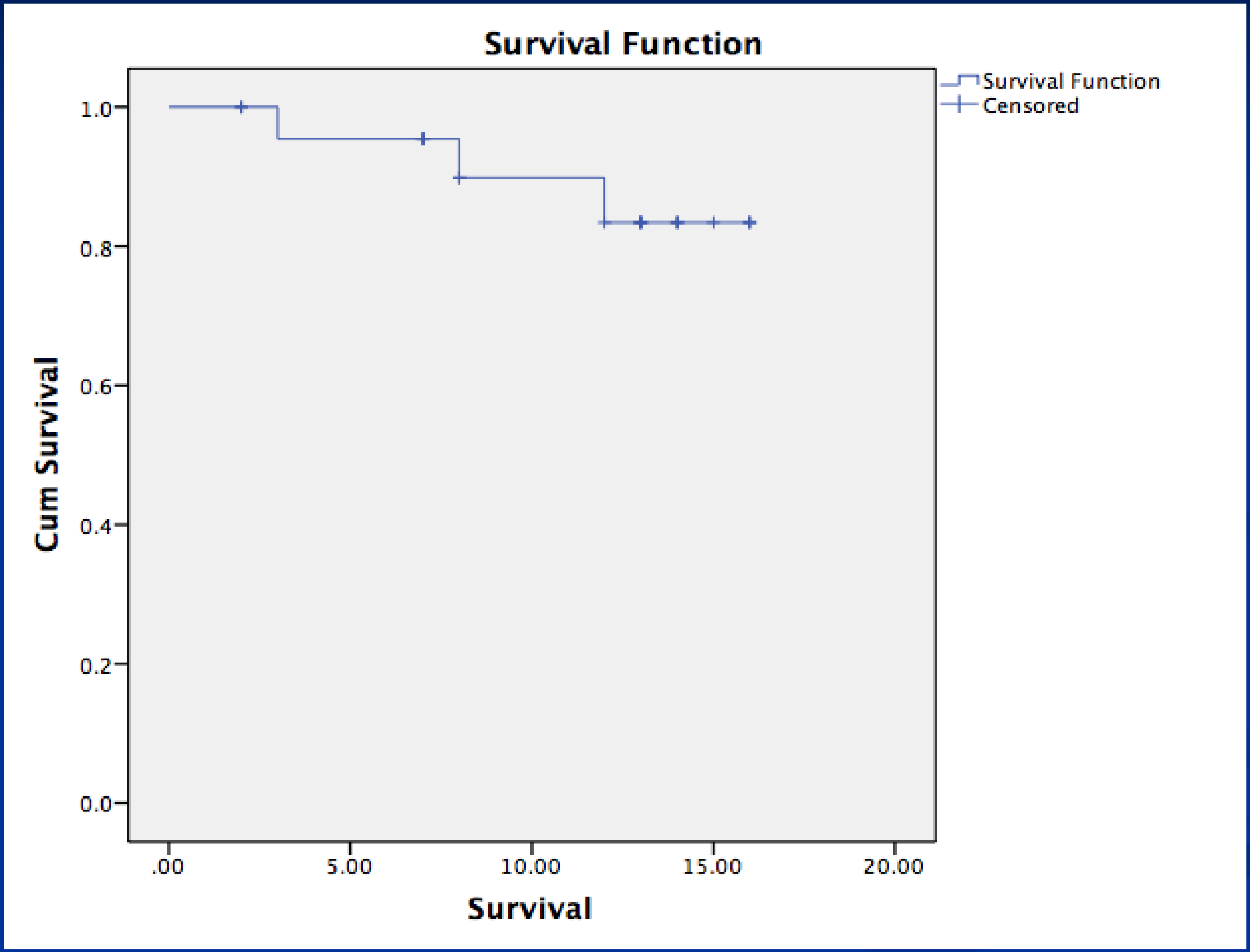
LCPD Patient Characteristics

- 22 hips of 21 patients with severe LCPD with an average age of onset of 7 years and 7 months (range 5-11 years)
- 13 hips were in Waldenstrom's stage II and 9 were in stage III
- 17 hips were Herring group C and 5 were group B
- 6 hips had 4 radiological at risk signs, 9 had 3, 4 had 2 and 3 had 1




59

K-M survival


Survival Function
Survival Function
Censored
Cum Survival
1.0
0.8
0.6
0.4
0.2
0.0
.00
5.00
10.00
15.00
20.00
Survival

Causes of Symptoms (Adolescent/Young Adult)

- **Extra-articular (overloading/impingement)**
- Abnormal femoral version
- Abnormal femoral offset/neck length

Operations on Symptomatic Healed Perthes' Disease (Adolescent/Young Adult)

- Do nothing (!)
- Correct acetabular dysplasia
- Correct femoral version
- Correct femoral offset/neck length
- Surgical dislocation/debridement for impingement
- Abandon hope and wait for arthroplasty.

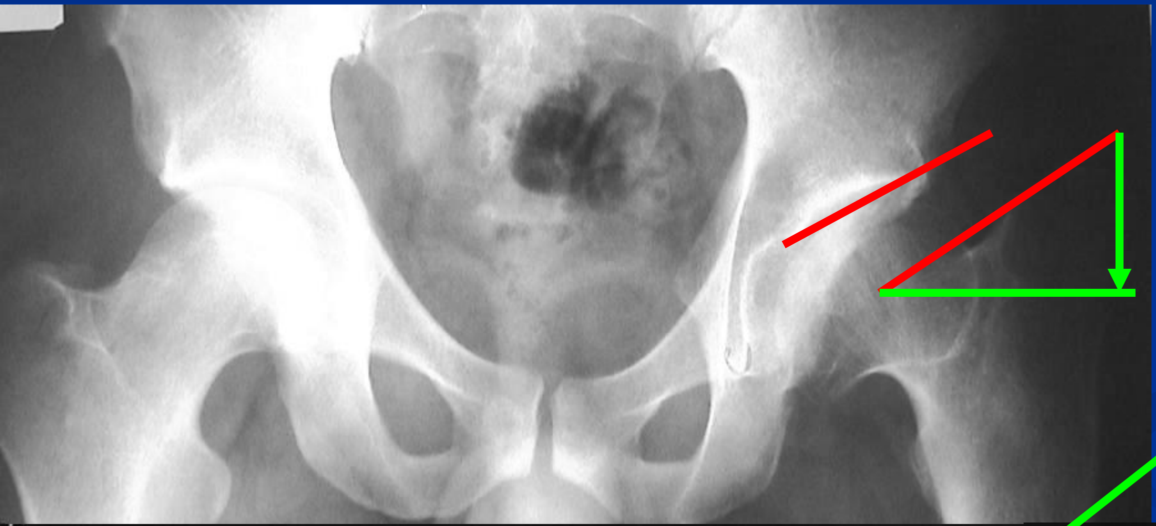
Operations For Extra-articular Impingement

- Combinations of
- Pelvic Osteotomy (sometimes retroverted)
- Femoral Osteotomy

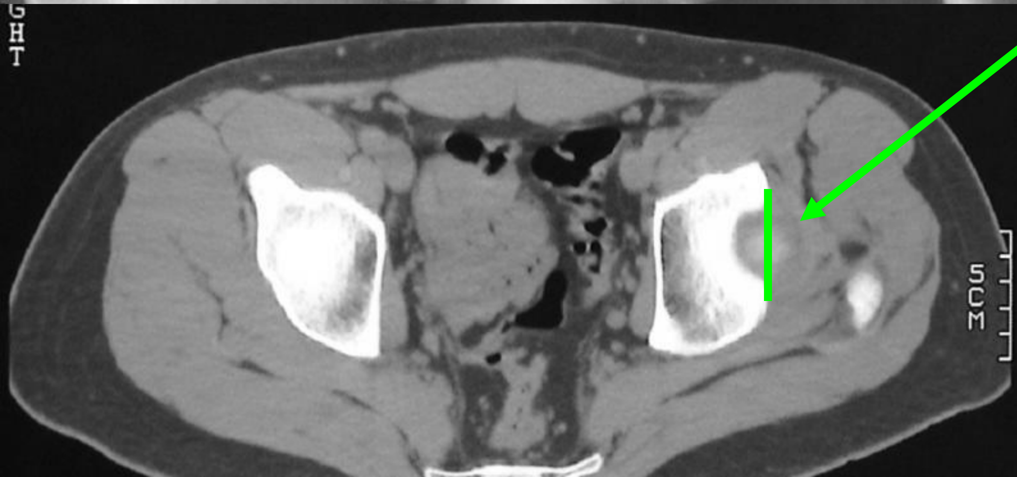
- Most commonly BIPO &Valgus
- Also DFO (+/- BIPO or debridement)

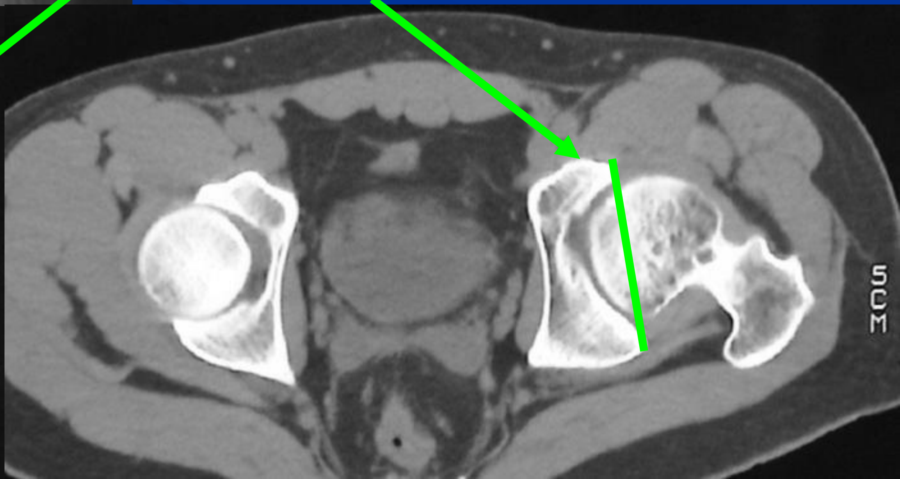
Adult Perthes

- Short neck, high GT, dysplastic acetabulum
- S.W.,28yrs



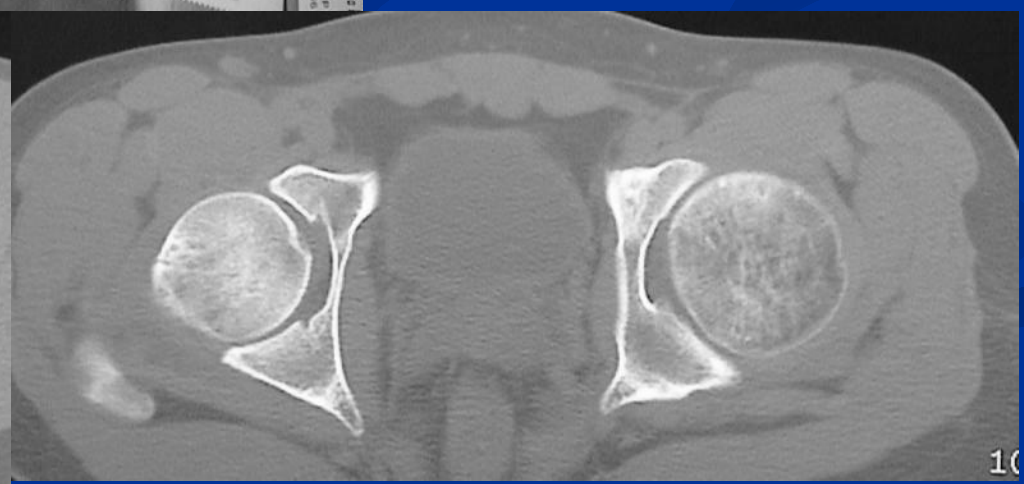
Physiological acetabular anteversion



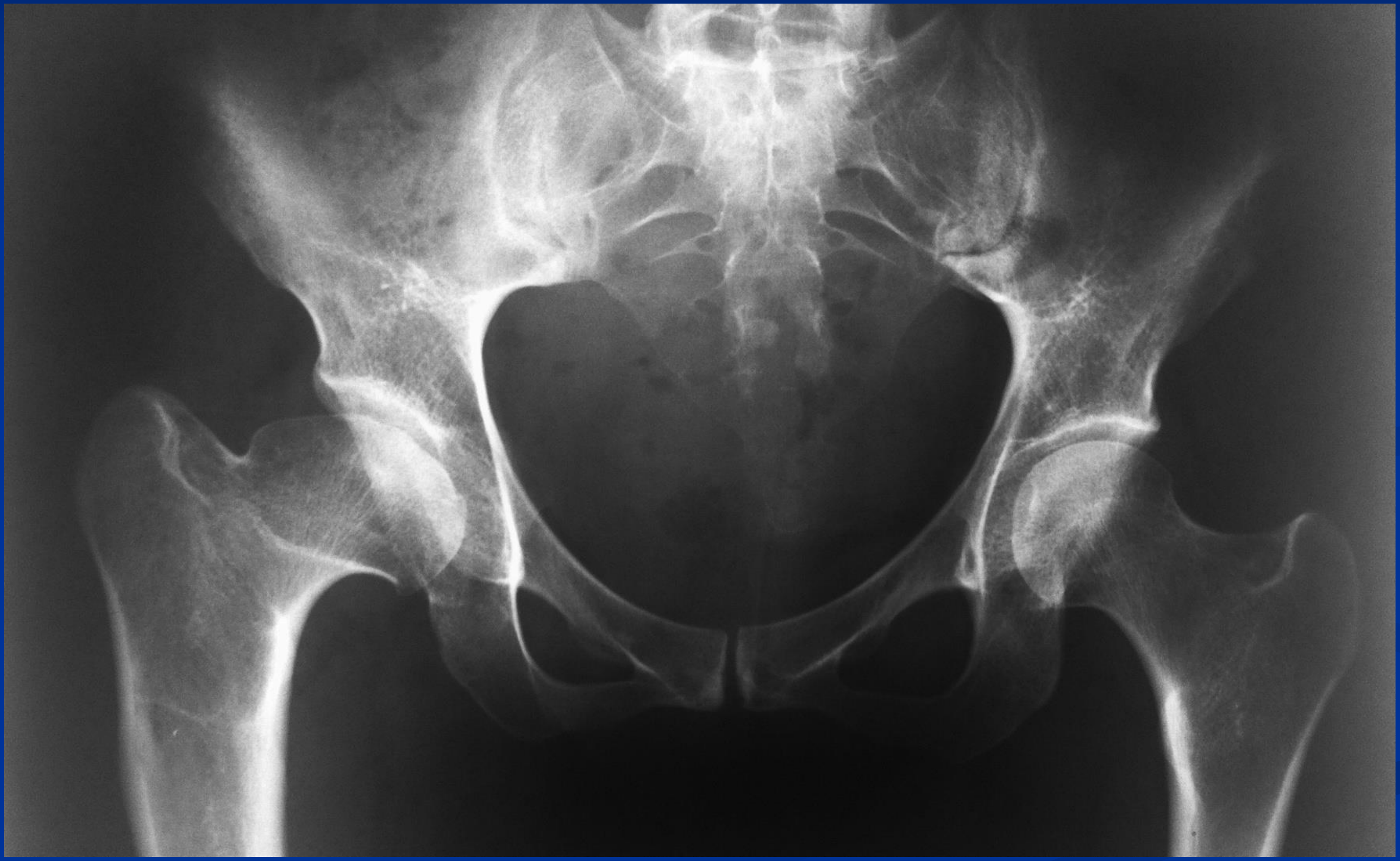


Adult Perthes,28yrs.

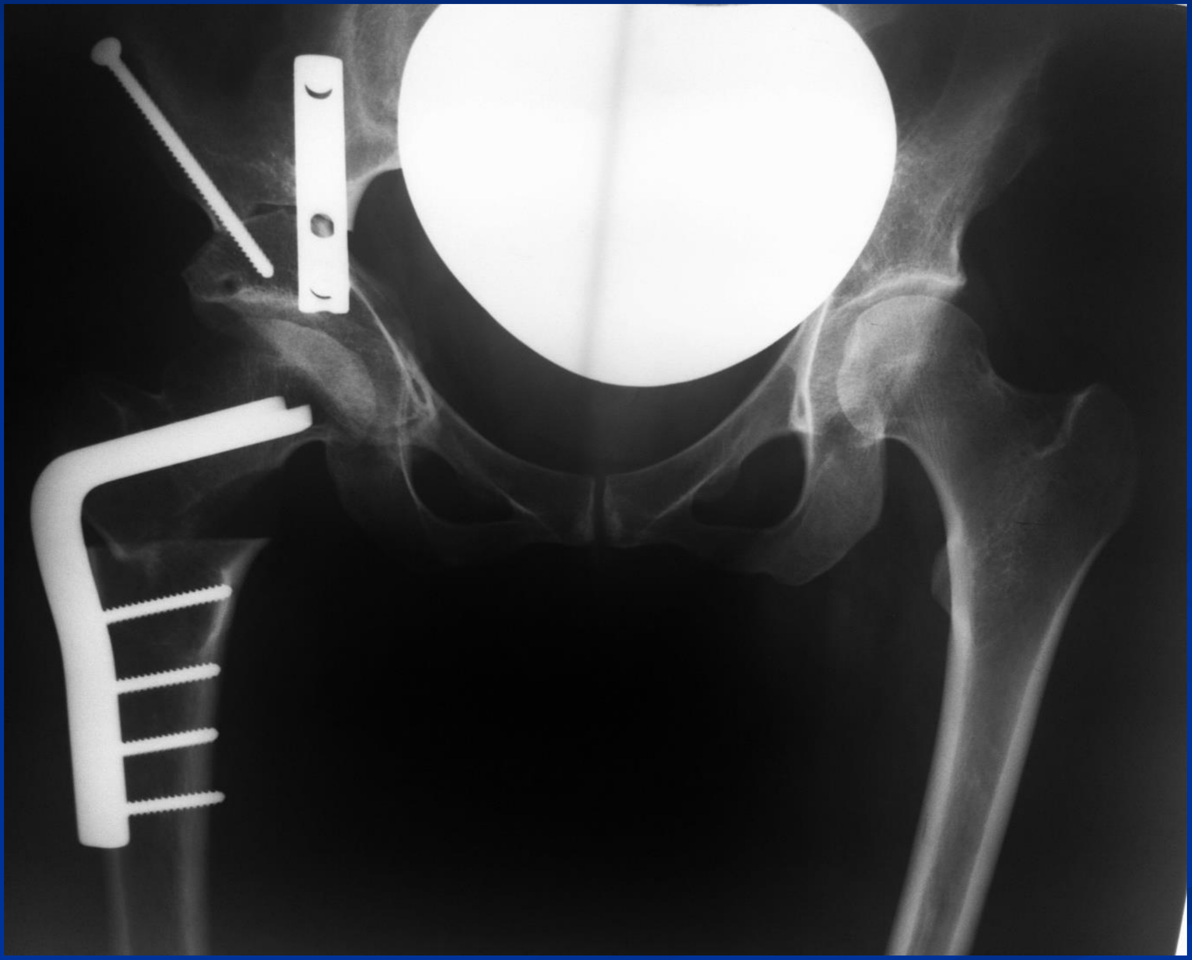
- Normalised radiological parameters
- HHS = 100



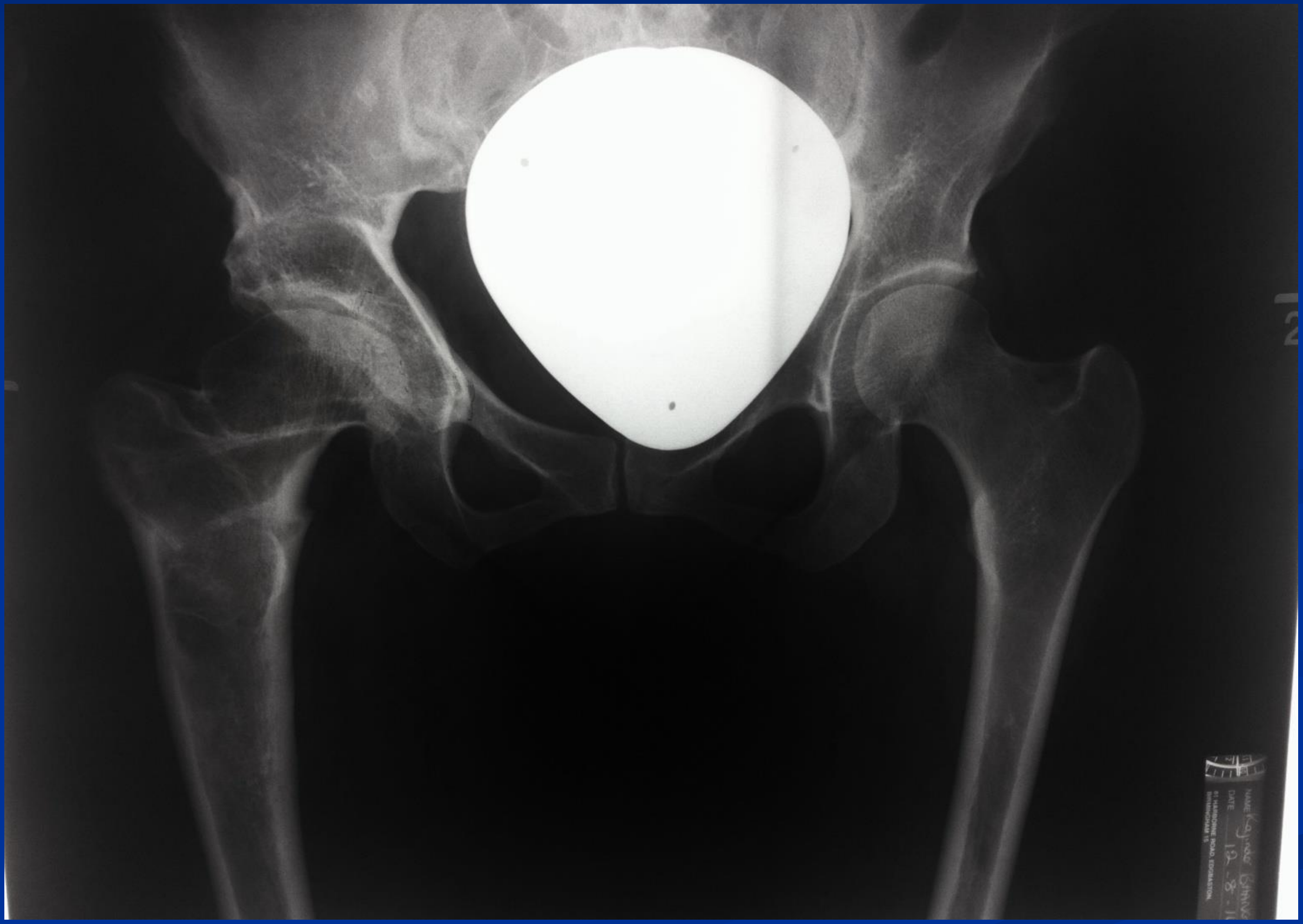
Lawyer, aet 29, old LCPD



Post-op



14 yrs later



PINNACLE
CORAIL

BIPO & Valgus; Patients

- We identified 65 patients (66 hips)
- mean age of 29.2 years (range 13.3-51)
- mean follow-up of 13.6 years (range 8.1-22.5).

BIPO & Valgus; Radiological Parameters

- Presenting Sourcil Inclination 24^{O} (range 14.5-33)
- Postoperatively 4.9^{O} (range 1-12)

typical correction for socket 20^{O},
femur valgus 30^{O}

- Tonnis grade preop **1.8** (range 1-2)

At mean 13.6yrs F/U was **2.2** (1-3)

BIPO & Valgus; Short-Term Complications

- 1 permanent sciatic nerve injury
  - 2nd patient, had a major bleed medially – did we damage the sciatic nerve with a ligaclip??
- 1 deep infection (washout / antibiotics)
- 5 non-unions (8%) of the femur that required refixation/bone-grafting

BIPO & Valgus; Metalwork removal

- Advised strongly to every patient
- All femoral plates removed
- 2 Patients still have pelvic metal in situ (apologies to successor arthroplasty surgeons)

BIPO & Valgus; Clinical Features at 13.6yrs F/U

- the mean OHS was 56 (range 60-47)
- NAHS 71/80 (range 59-80)
- UCLA activity score 8 (range 5-10)
  - Better than our series of BIPOs for dysplasia.

BIPO & Valgus; Failure = Arthroplasty

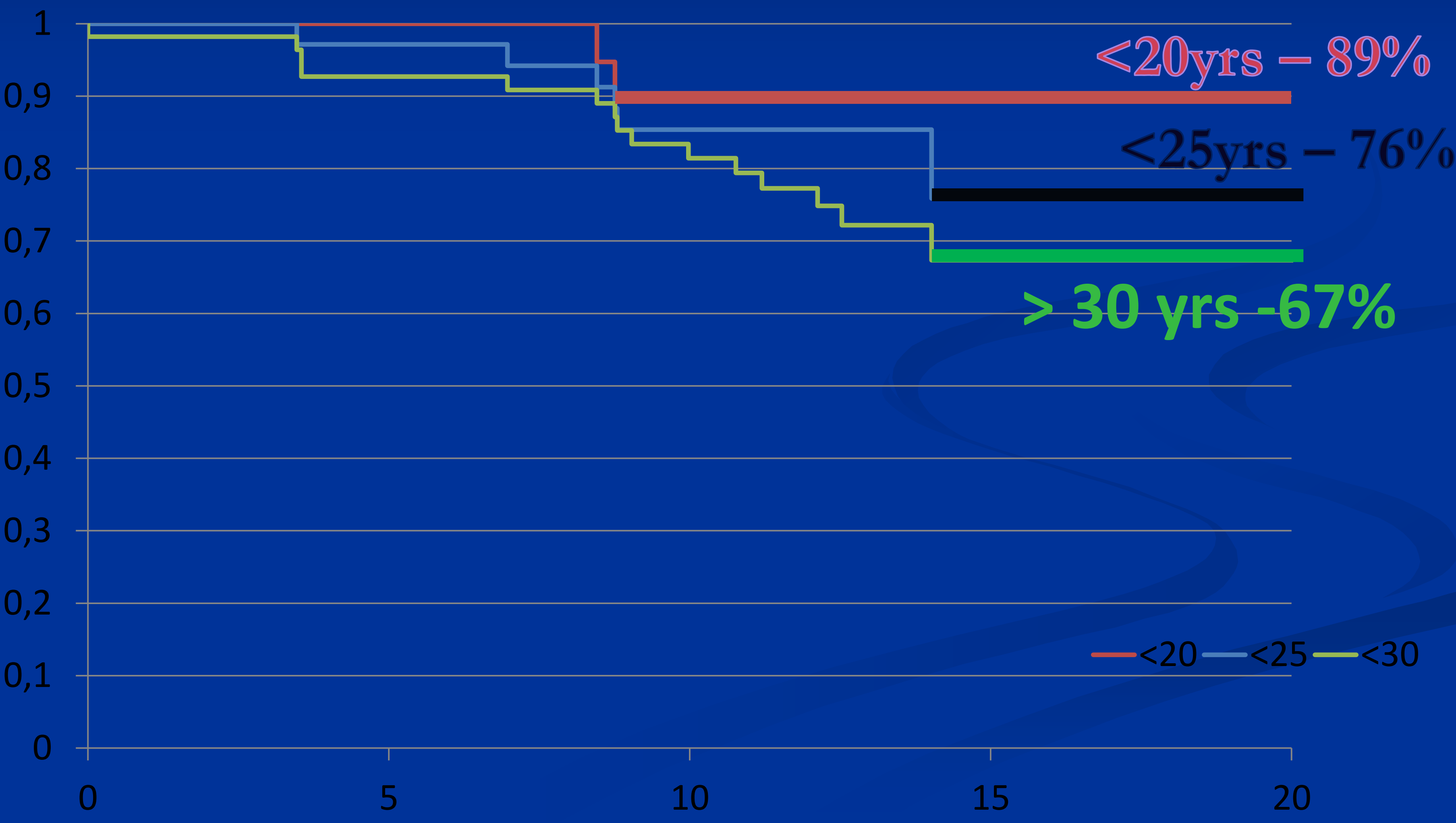
- There were 12/66 (18%) conversions to arthroplasty (10 resurfacings, 2 THRs)
- at a mean of 7.9 years

(range 2.2-12.2) after surgery

  - 10 of these (84%) were >35 at operation.
- Odds ratio higher with age and OA grade

BIPO

(low threshold for arthroplasty)



BIPO + DFO
(Double Osteotomy)
After Wagner

BIPO+DFO

BIPO+DFO

BIPO+DFO
Patients Details and Follow-up

- Twenty four patients (25 hips)

  M : F 15:9

  Age 18.7

  (9.3– 38.8)

- mean follow-up of **7 years**

  (range: 3-14.8).

BIPO+DFO
Underlying Disease & Complexity

- Legg-Calve-Perthes-Disease : 17
- Congenital hip dysplasia : 5
- Septic Arthritis : 1
- Epiphyseal Dysplasia ; 1

BIPO+DFO
Staging of operations

- 1 (first) had Tonnis acetabuloplasty
- 6 patients had contemporaneous Birmingham Interlocking Pelvic Osteotomy (BIPO) (4 for acetabular retroversion with dysplasia)
- 2 had later surgical dislocations with debridement (at metalwork removal)

BIPO+DFO Failure;

- Arthroplasty 2/25 **8%**
- at 2 and 13.8 years

BIPO+DFO
Medium Term Clinical Outcome

- Mean Oxford Hip Score 41.6
  (range:58-27),
- Non-Arthritic Hip Score 53.4
  (range:25-77)
- UCLA activity score 4.2
  (range:2-6)

BIPO+DFO
Tonnis OA Grade

- The mean Tonnis grade
  - Pre-operatively 1.3
    (range:1-2)
  - at review 1.5
    (range:1-3)

BIPO+DFOComplications
(thanks to Heinz Wagner)

- Problems (1)
  - Soluble and do not change outcome
- Obstacles (3)
  - Require a change of treatment and do not affect outcome
- Complications (0)
  - Compromise outcome

Changes in Bone Shape

- preop

Ave. shortening pre-op	2.2 cms
Avg. proximal migration of GT	2.4 cms

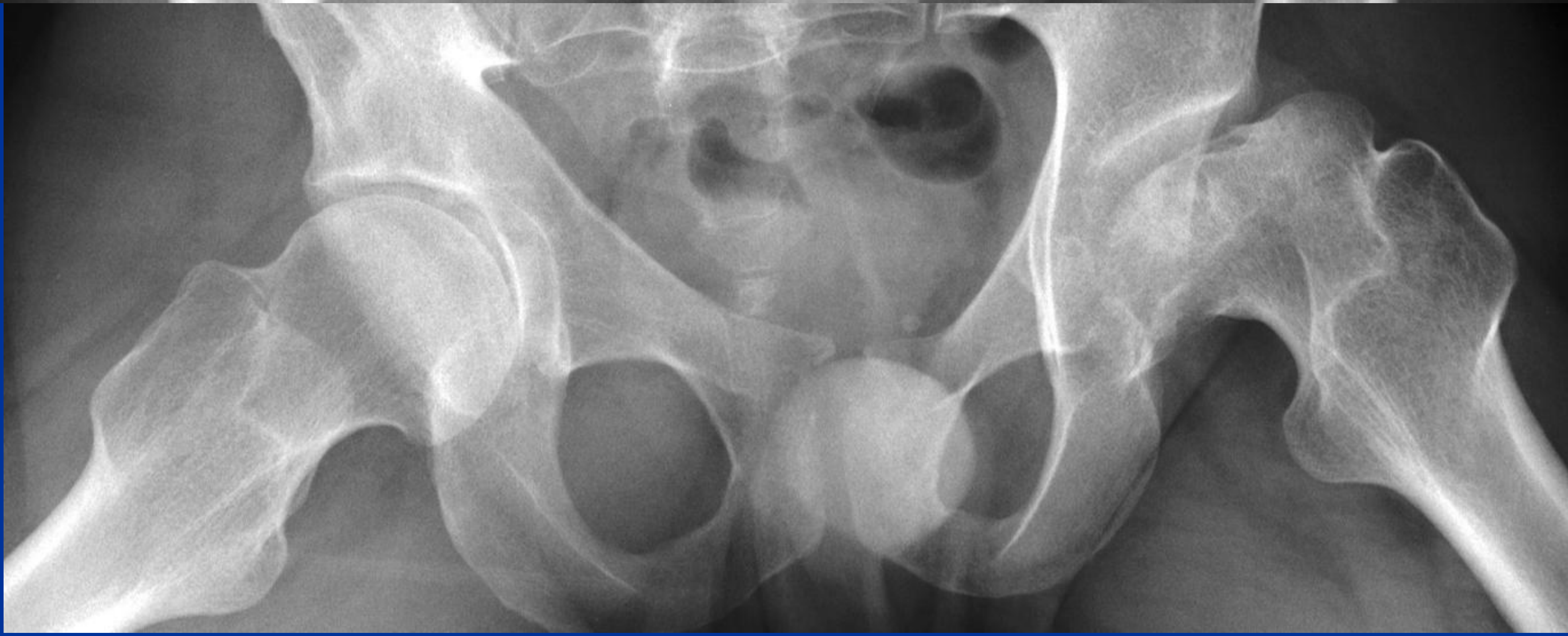
- postop

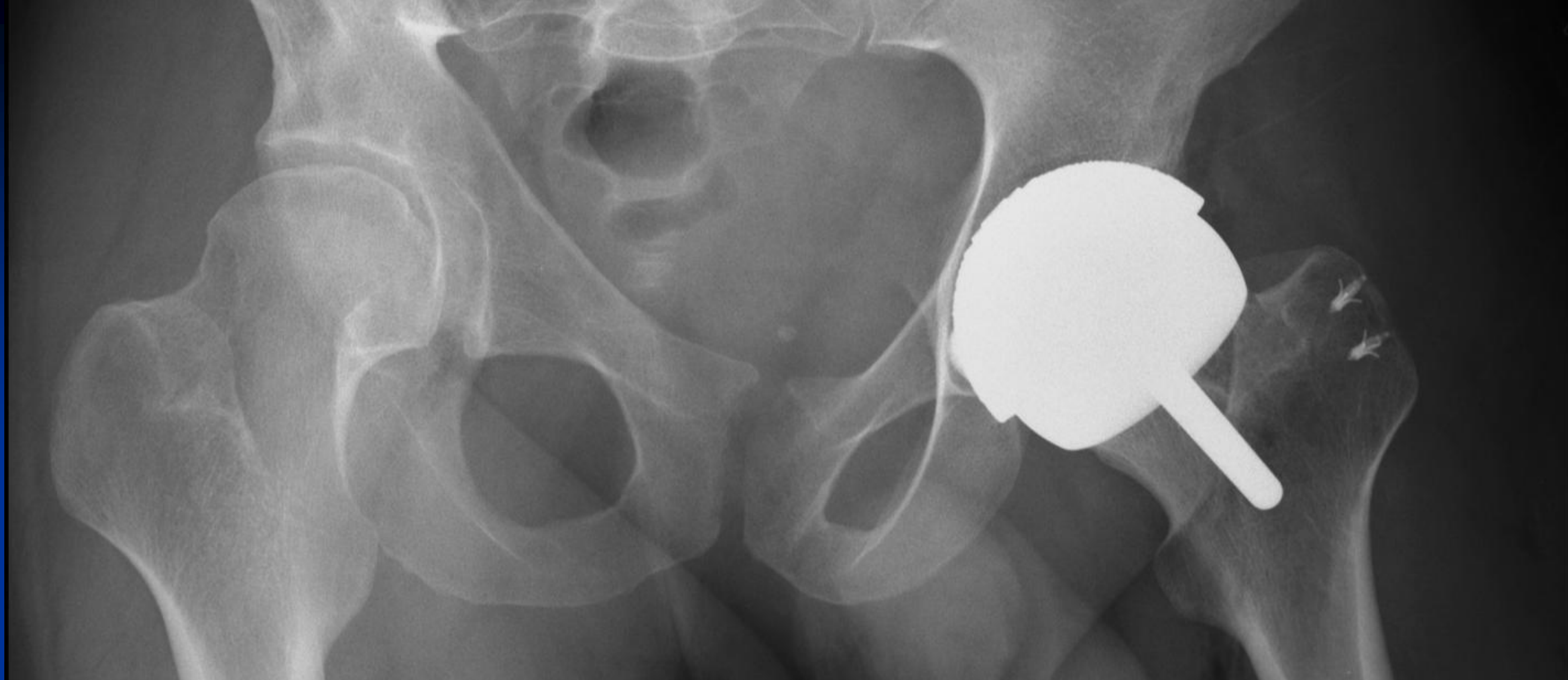
Avg. Distalisation of GT	2 cms
Avg. Gain in Length	2.5 cms
Avg. Offset gain	1.5 cms

  - Patients were most pleased with discarding shoe modifications and inserts (incongruity)

BIPO+DFO
Operation Achieves

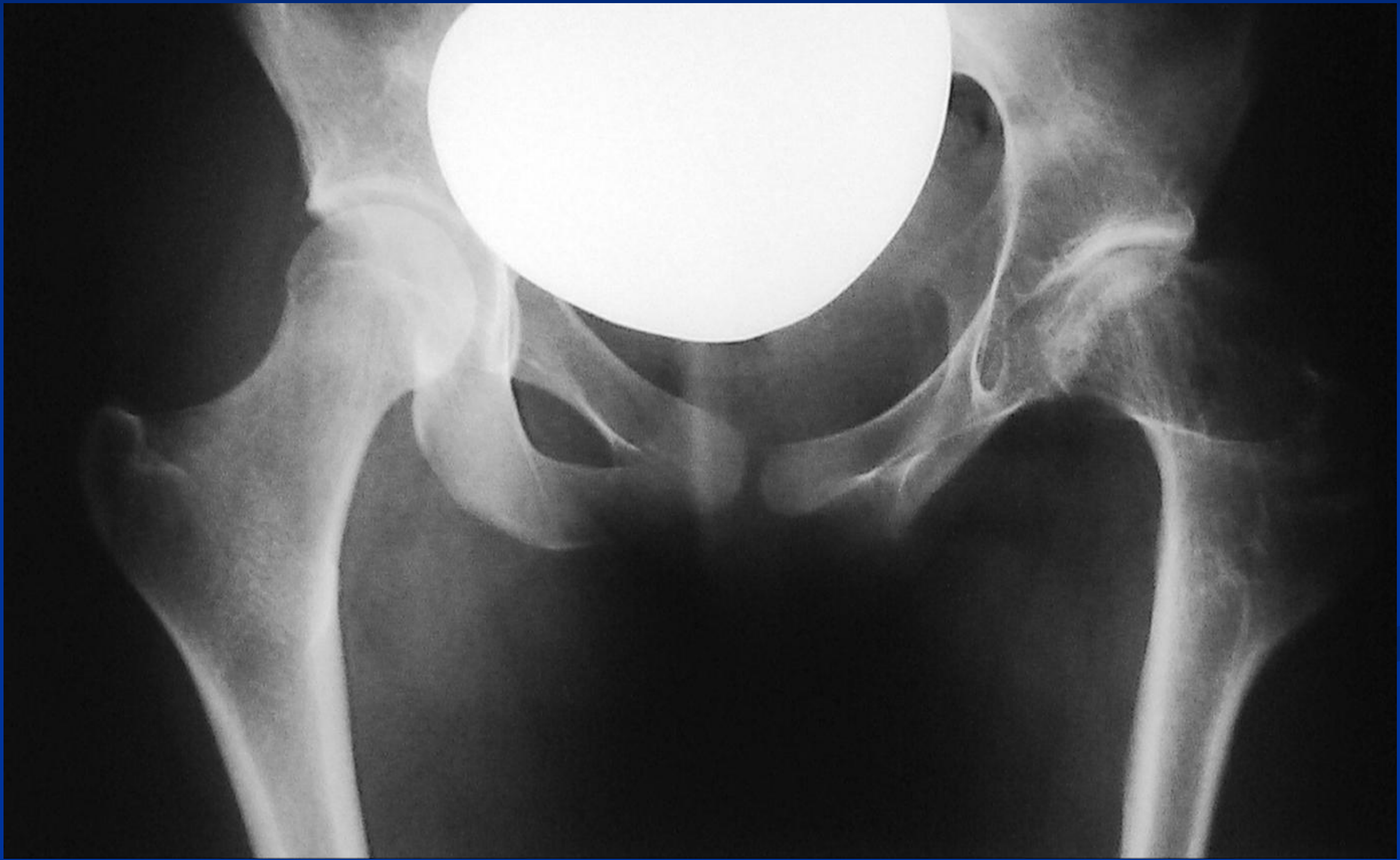
- More difficult with blade-plate,
  - easy with LCS-DF
- Independant correction of
  - leg-length
  - Offset
  - Articulotrochanteric distance

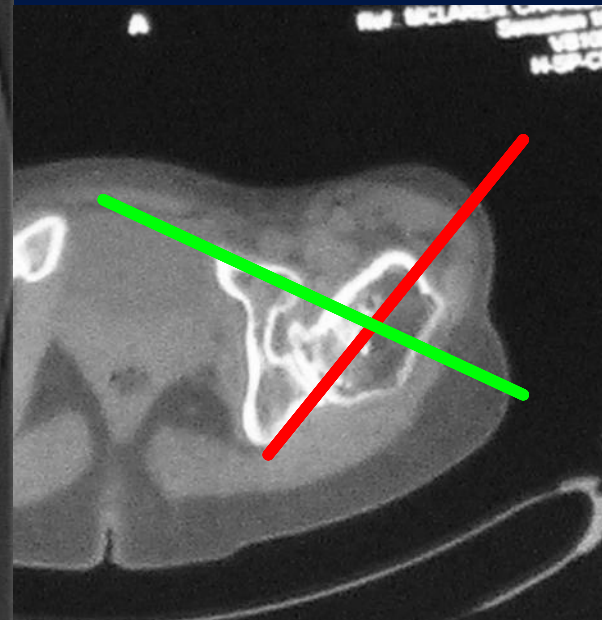



LT
C

2 or 3 earlier Valgus osteotomies [!]




12.30 cm
3 Distance: 13.08
4
3
ce: 45.91 cm
2 Distance: 43.62 cm
1
2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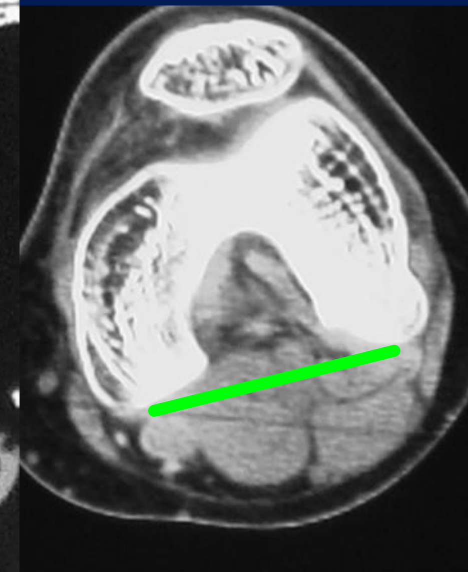
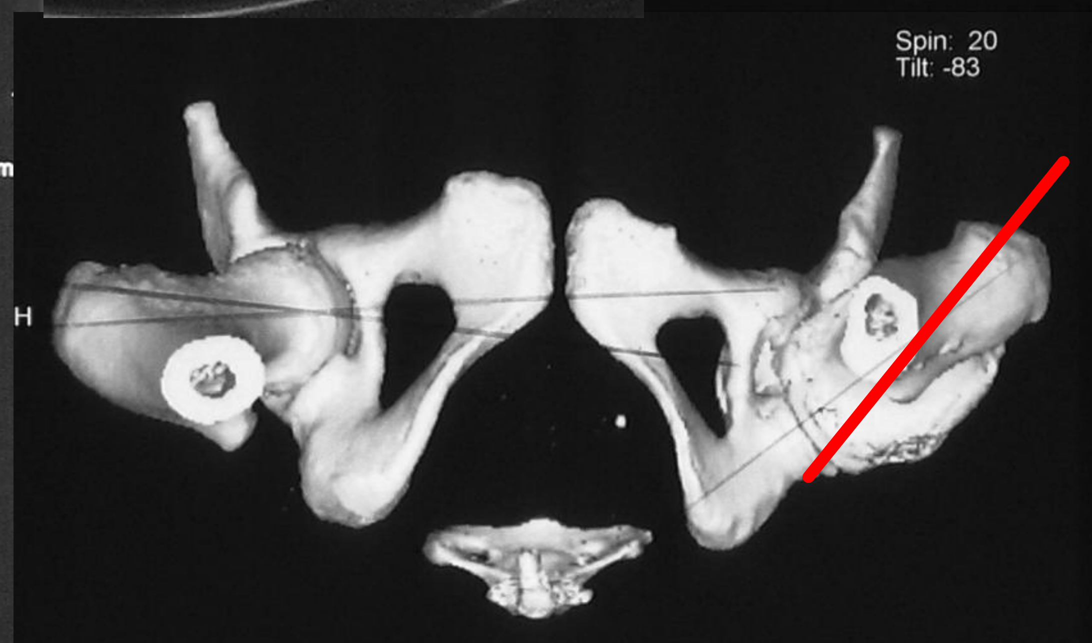
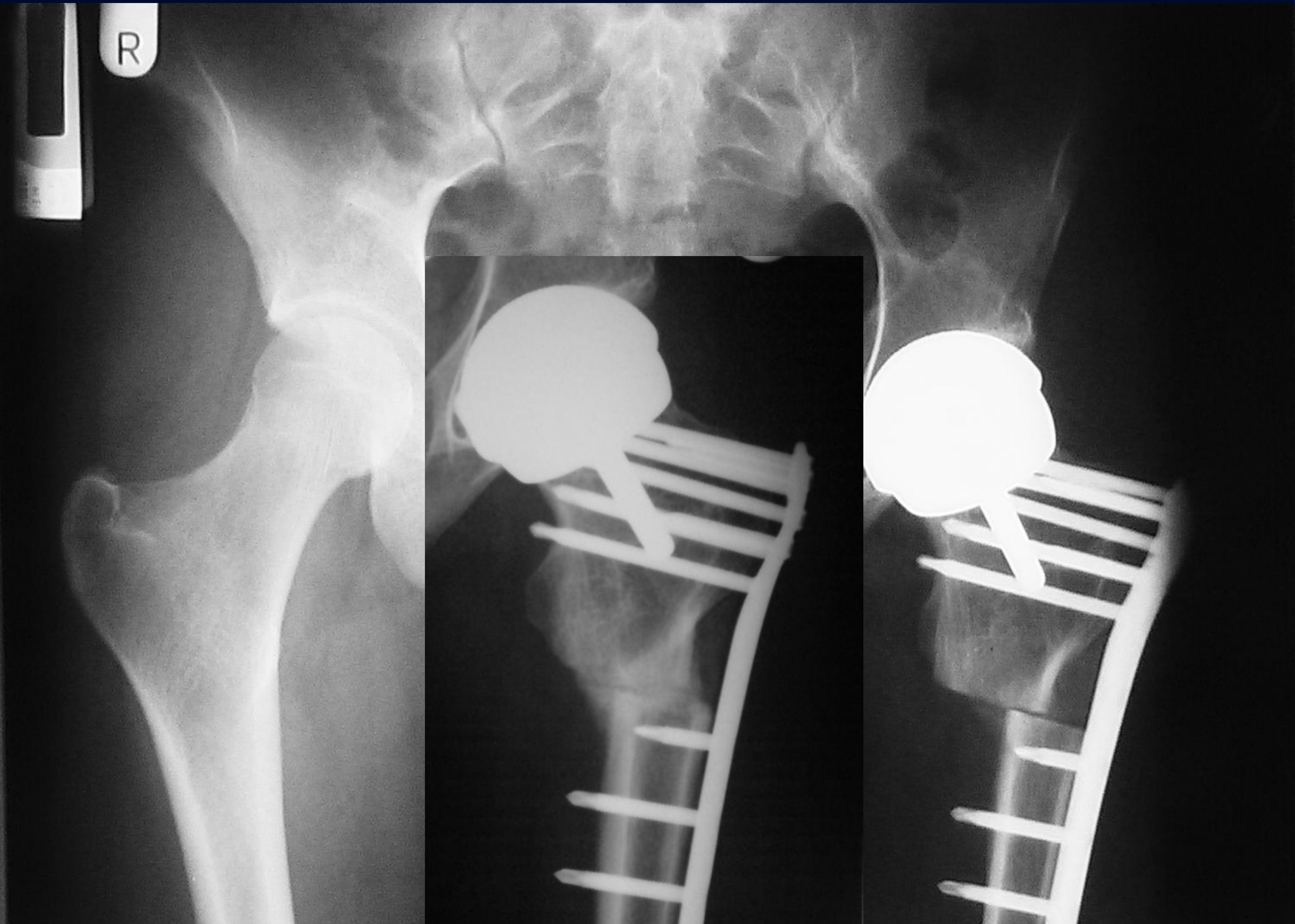



Spin: 20
Tilt: -83
H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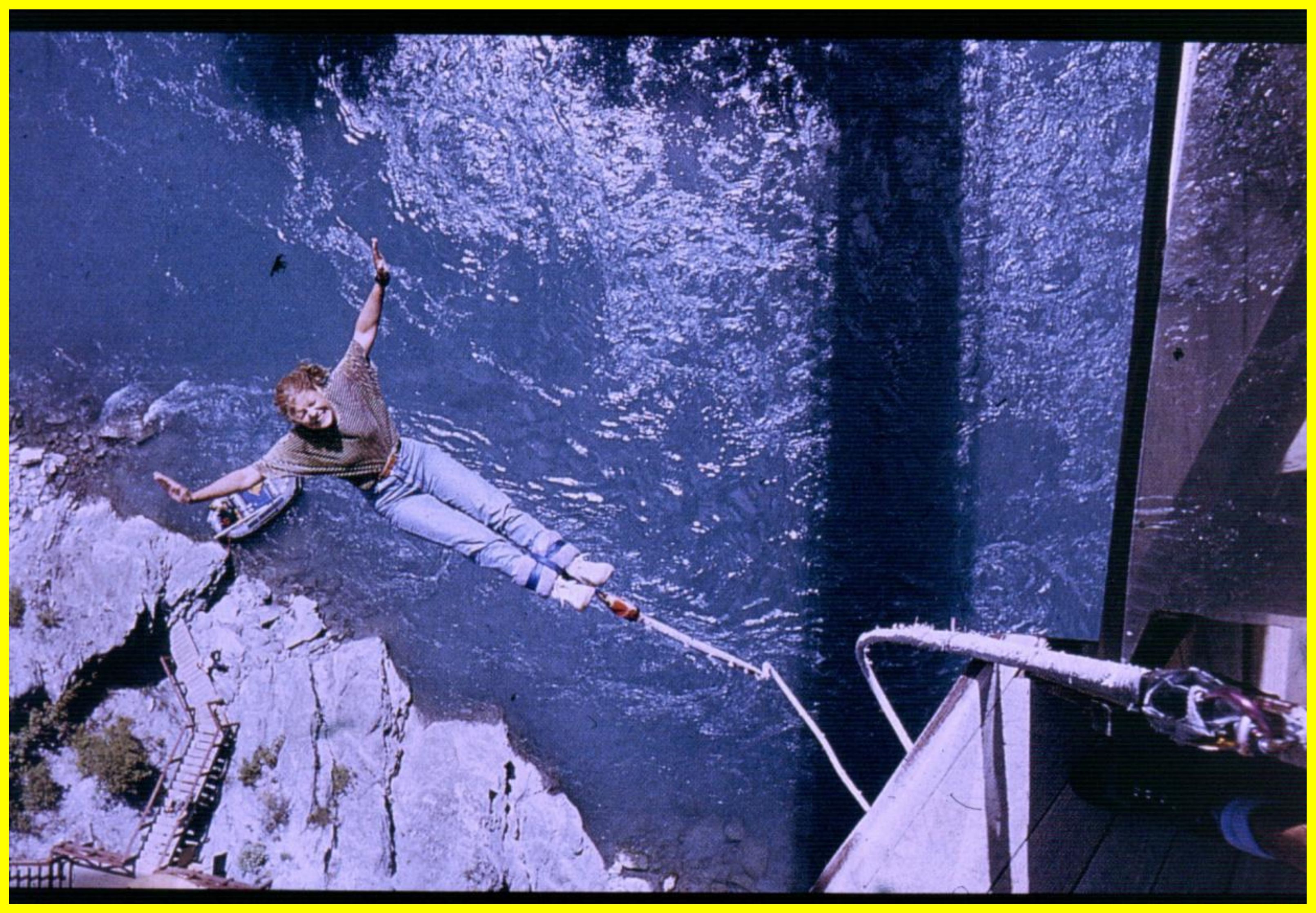
Legg Calve Perthes' Disease

- No matter how successful we can be with producing a spherical head, we cannot usefully restore proximal femoral growth.
- Good, reliable options are now available for dealing with dysplasia and extra- and intra-articular impingement
- For some patients the prognosis is irreversibly poor.

Thank You



INTERNATIONAL COMBINED MEETING

BRITISH HIP SOCIETY
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International Combined Meeting

BRITISH HIP SOCIETY
SOCIETA' ITALIANA DELL'ANCA

Milano Italia – 26-27 novembre 2015

Algorithm for surgical treatment of dislocated hip in Cerebral Palsy (CP)

Prof. Nicola Portinaro
Direttore Clinica Ortopedica
Università degli Studi di Milano
Responsabile U.O. Ortopedia Pediatrica e Neuro-Ortopedia
Humanitas Research Hospital
nicola.portinaro@humanitas.it

Causes of hip dislocation in CP

Generally normal at birth

- Abnormal forces and altered vectors acting on the acetabular roof → deformity
- Spasticity: unclear, overestimated ???? (dislocated also in hypotonic)

Guidelines surveillance

DEVELOPMENTAL MEDICINE & CHILD NEUROLOGY SYSTEMATIC REVIEW

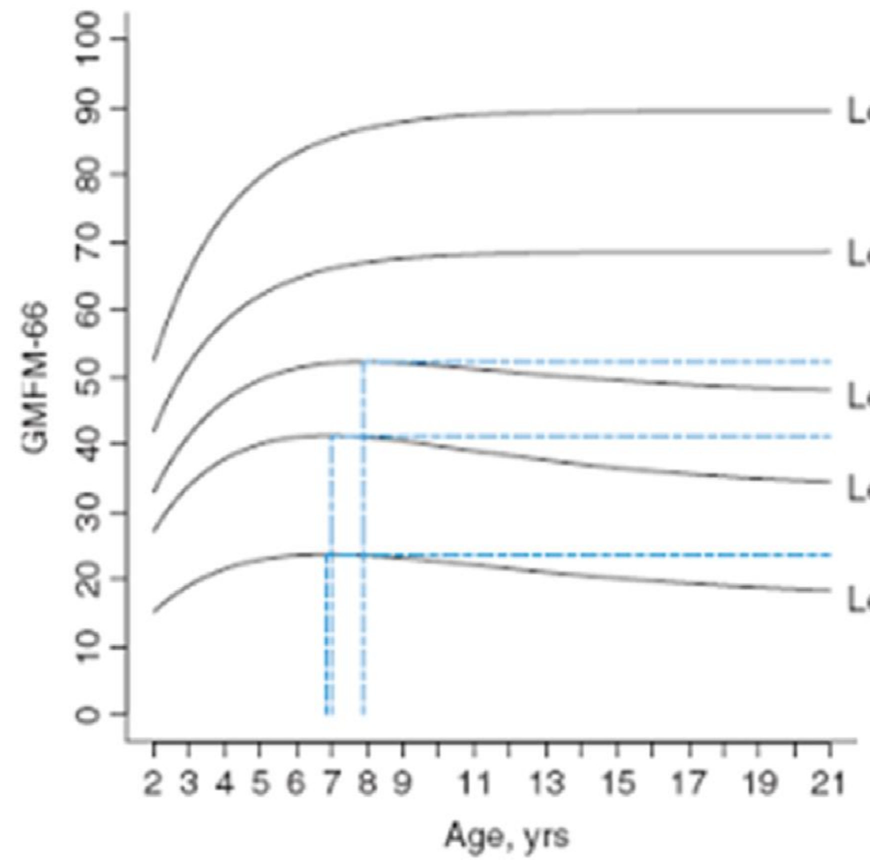
Australian hip surveillance guidelines for children with cerebral palsy: 5-year review

MEREDITH WYNTER[1] | NOULA GIBSON[2] | KATE L WILLOUGHBY[3] | SARAH LOVE[2] | MEGAN KENTISH[1] | PAM THOMASON[4] | H KERR GRAHAM[3,4] | ON BEHALF OF THE NATIONAL HIP SURVEILLANCE WORKING GROUP*

1 Queensland Paediatric Rehabilitation Service, Lady Cilento Children's Hospital, Brisbane, Qld; 2 Princess Margaret Hospital for Children, Perth, WA; 3 Department of Orthopaedics, The Royal Children's Hospital, Melbourne, Vic.; 4 Hugh Williamson Gait Analysis Laboratory, The Royal Children's Hospital, Melbourne, Vic., Australia.

Correspondence to Meredith Wynter, Queensland Paediatric Rehabilitation Service, [illegible] Lady Cilento Children's Hospital, PO Box [illegible], South Brisbane, Vic. [illegible], Australia.
E-mail: meredith.wynter@health.qld.gov.au

*Members of the National Hip Surveillance Working Group are listed in Appendix.



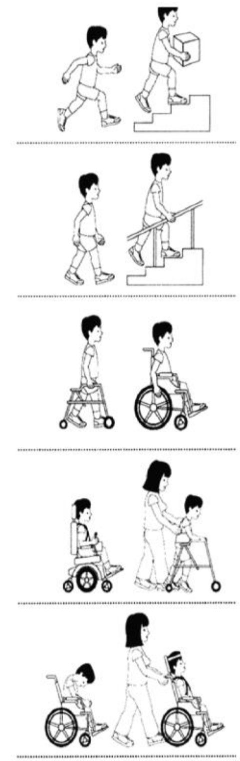


Figure 1: Predicted Gross Motor Function Measure (GMFM-66) motor scores as a function of age by Gross Motor Function Classification level. *GMFCS levels with significant average peak and decline. Dashed lines illustrate age and score at peak GMFM-66.

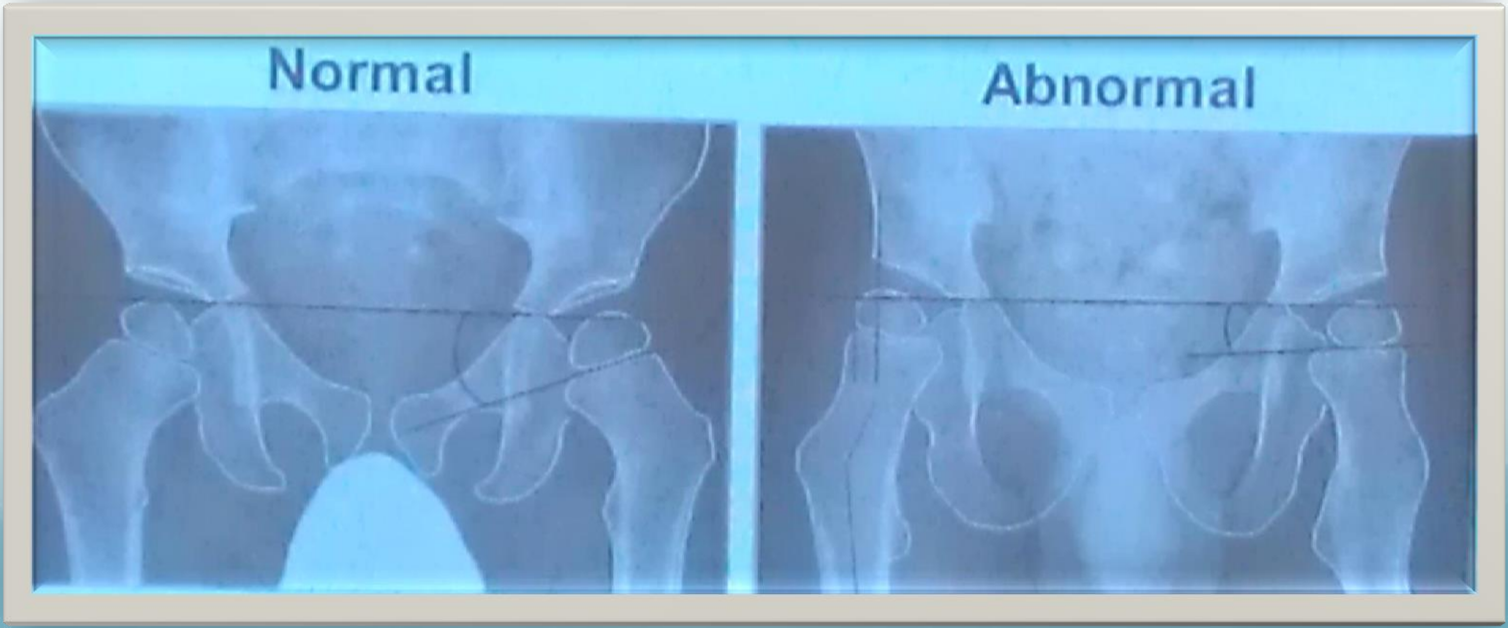
Radiological measurements used for diagnosis and classification of hip dislocation

A.I. (Acetabular Index): **>25˚**

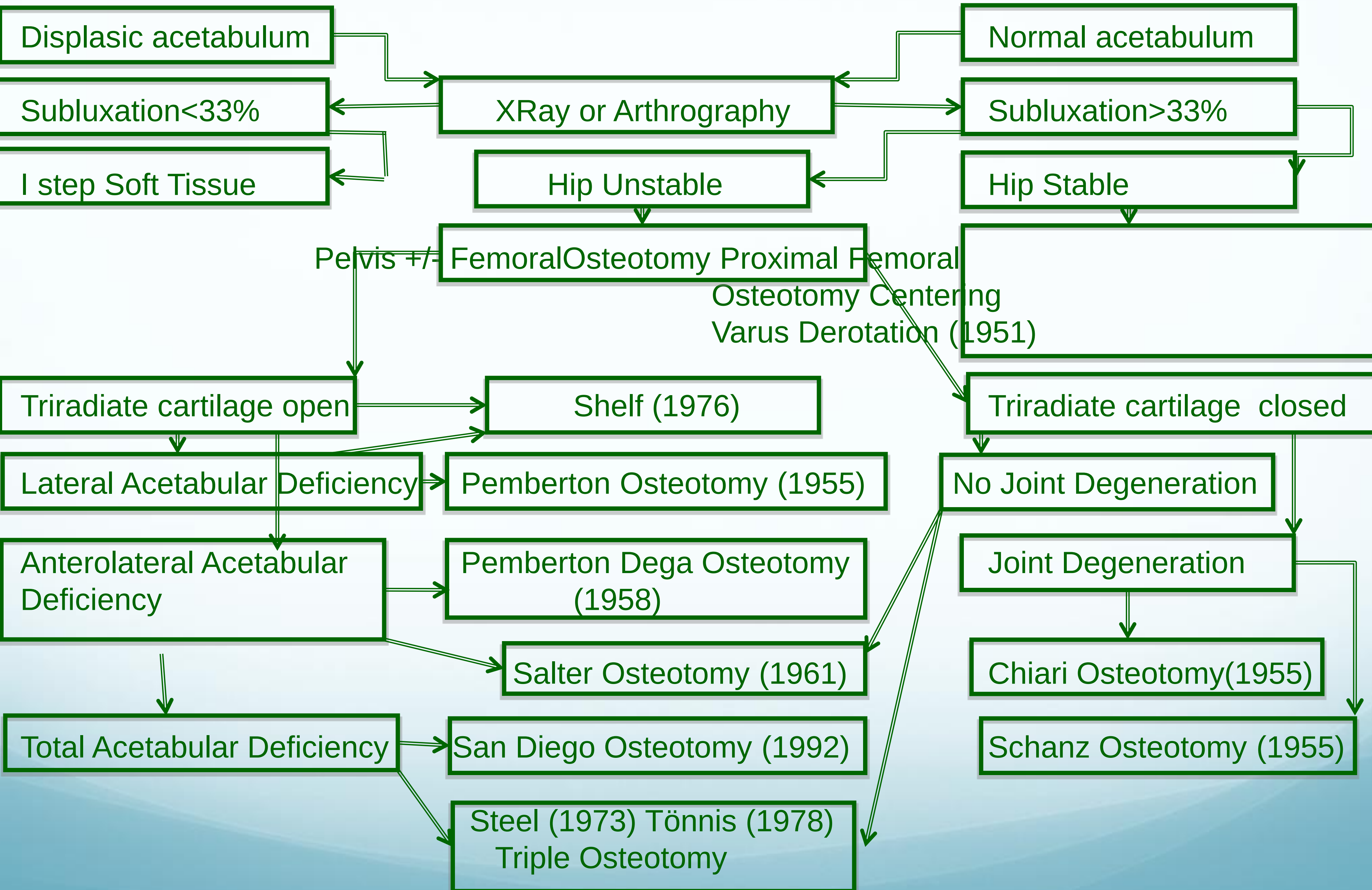
M.P.(migration percentage): **>33%**

N.S.A. (Neck shaft Angle): **>155˚**

H.E.A. (Hilgereineir epiphyseal angle): **< 12˚**



Algorithm for the surgical treatment of dislocated hip in CP



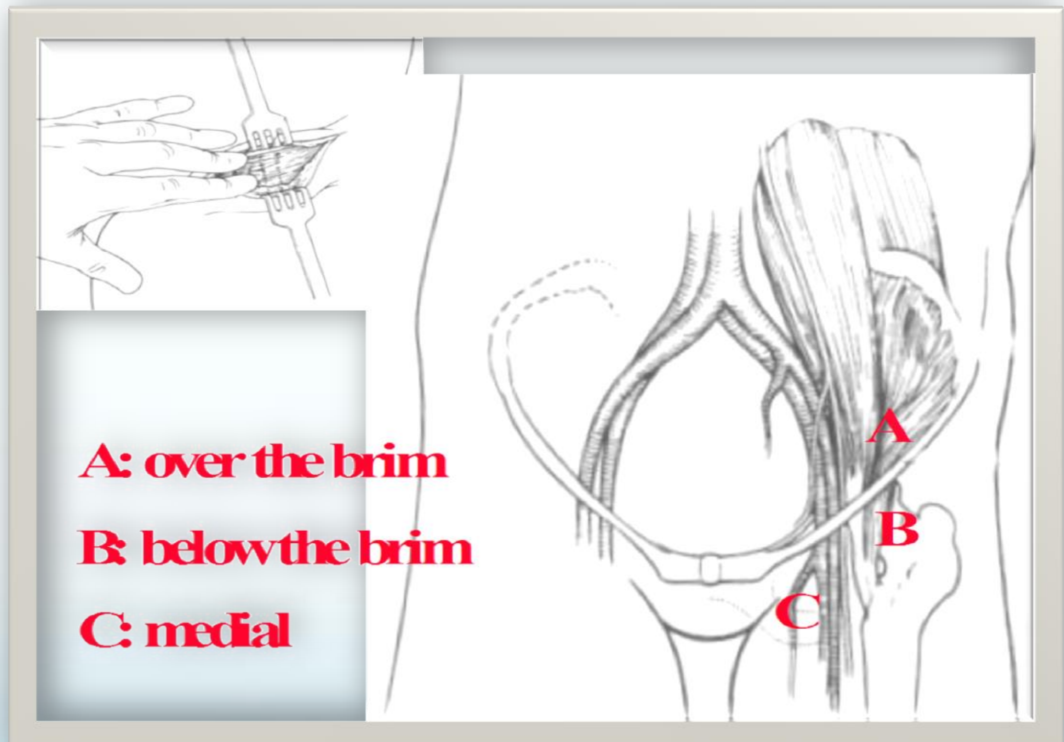
Non-invasive treatment

Journal of Medicine and Life Volume 7, ***Special Issue 3****, 2014*

Extracorporeal Shockwave Therapy (ESWT) benefits in spastic children with Cerebral Palsy (CP)

Combined soft tissue release

adductors, psoas, rectus femoris e medial hamstring



FONDAZIONE ARIEL
CENTRO DISABILITÀ NEUROMOTORIE INFANTILI

Early preventive surgery

Late correction surgery

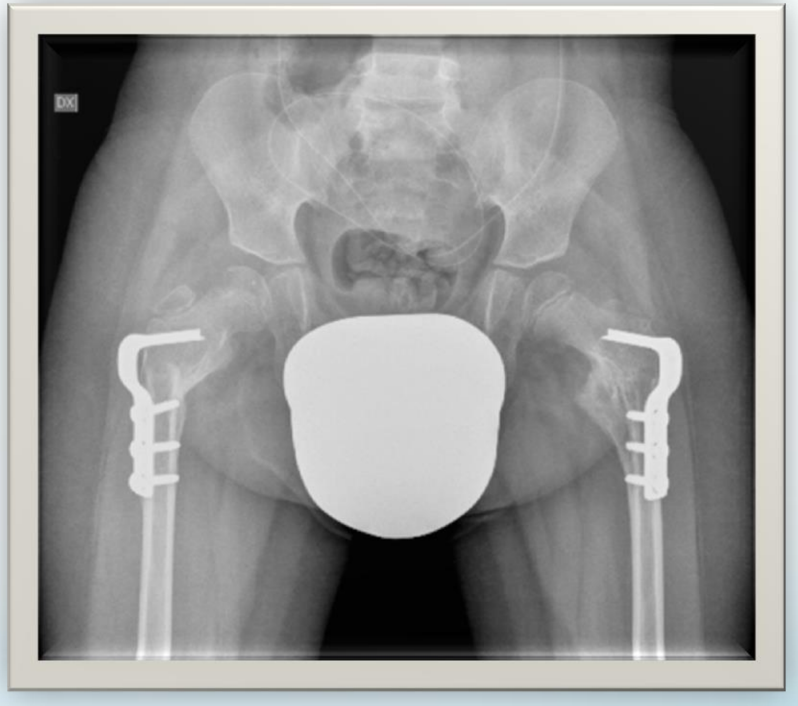
Salvage procedures

Early: Proximal Femoral Temporary Epiphysiorisis

Portinaro et Al 2005

ARiel
FONDAZIONE ARIEL
CENTRO DISABILITÀ NEUROMOTORIE INFANTILI

Late: Varus Osteotomy of Proximal Femur



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Late: Varus Derotation Femoral Osteotomy
Pelvic Osteotomy

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Salvage: Valgus Osteotomy of Proximal Femur

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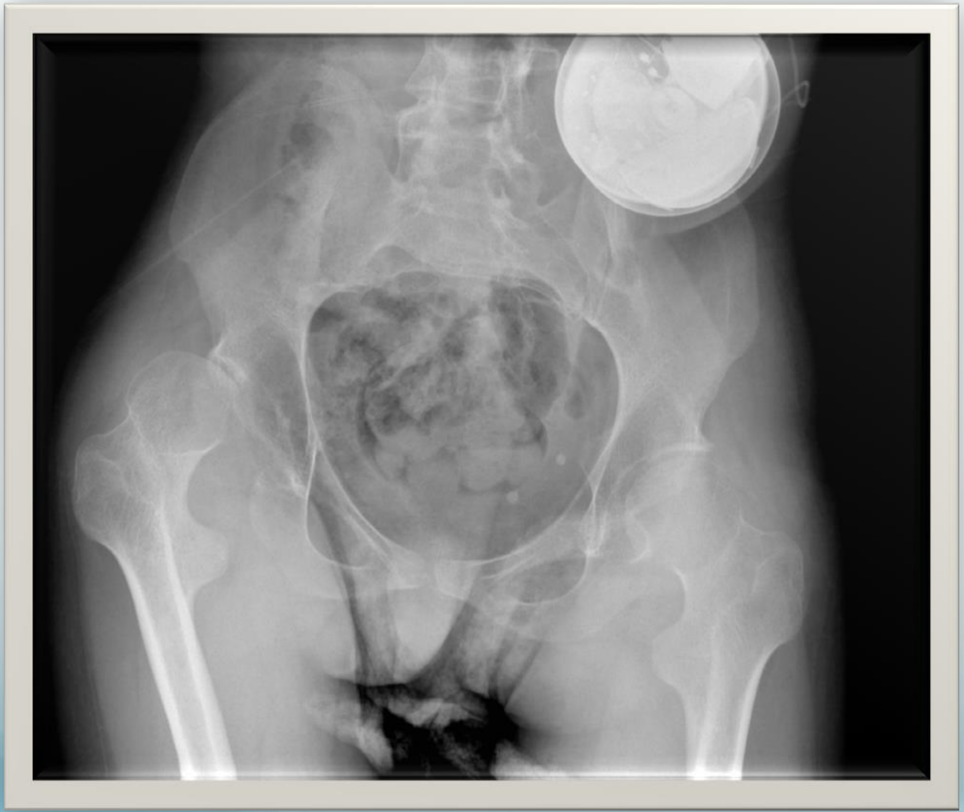
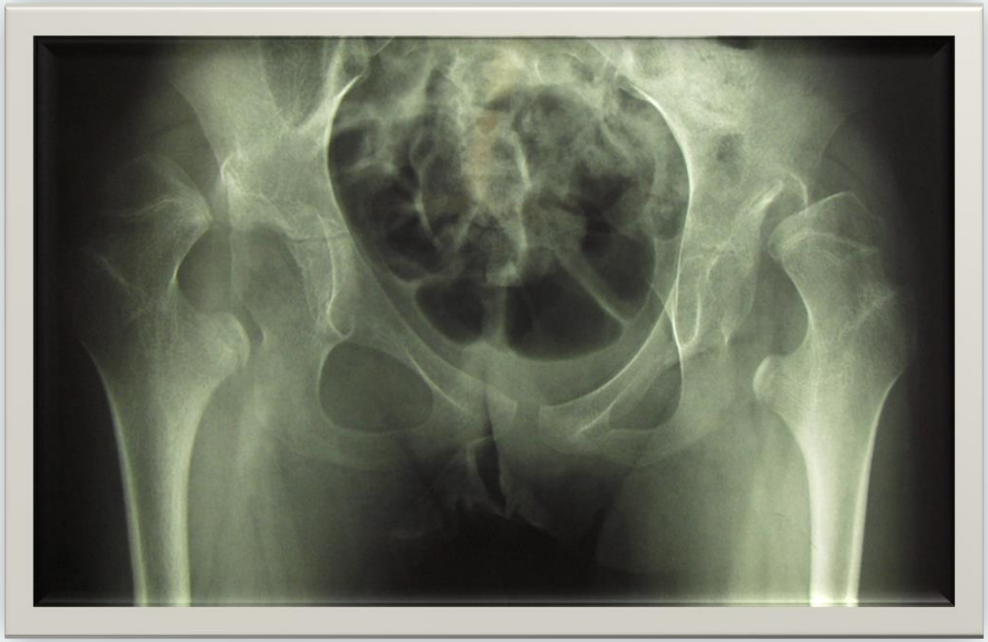
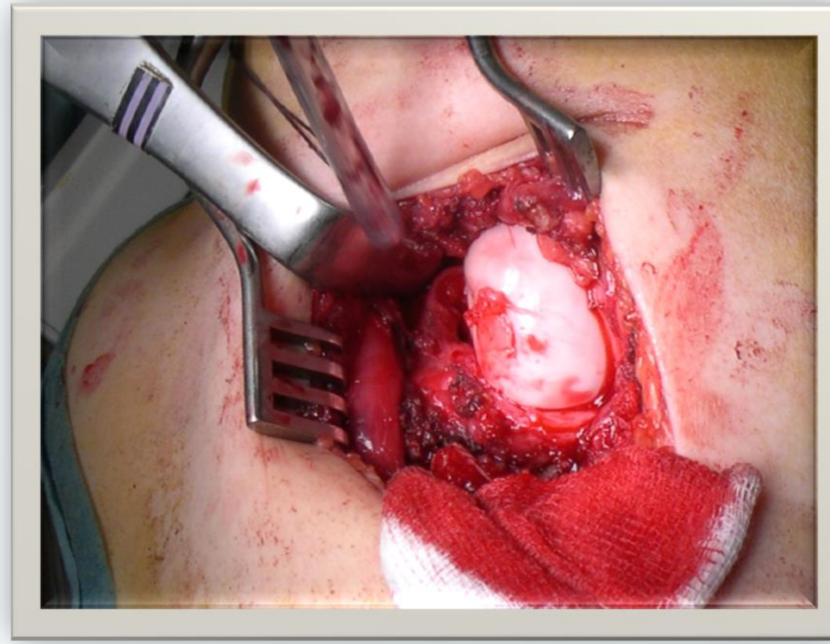
Salvage: Resection of the Femoral Head Valgus Derotation Femoral Osteotomy







Resection of the Femoral Head and Neck

ARieL
FONDAZIONE ARIEL
CENTRO DISABILITÀ NEUROMOTORIE INFANTILI

Our Experience

Early: proximal femoral epiphysiorisis

- Patients: 28
- Mean Age at the time of surgery: 7.6 years
- Avarage follow-up: 3.4 years (1.4-5.6 years)

- GMFCS:
  - 0 patients Grade I
  - 0 patients Grade II
  - 0 patients Grade III
  - 16 patients Grade IV (57.15%)
  - 12 patients Grade V (42.85%)

Results

- Reimers' migration percentage (MP):
  Left side: Δ 11.66%
  Right side: Δ 6.96%

- Acetabular Index (AI):

  Left side: Δ 6.37˚
  Right side: Δ 5.59˚

- Neck-shaft Angle (NSA):
  Left side: Δ 12.81˚
  Right side: Δ 12,92˚

Complications

- 2 patients (7.14%): replacement of the screw
- 3 patients (10.71%): needed bilateral botox
- 8 patients DVO’s
- 0 AVN!!!!!!! Big concern

Pre–op

Post-op

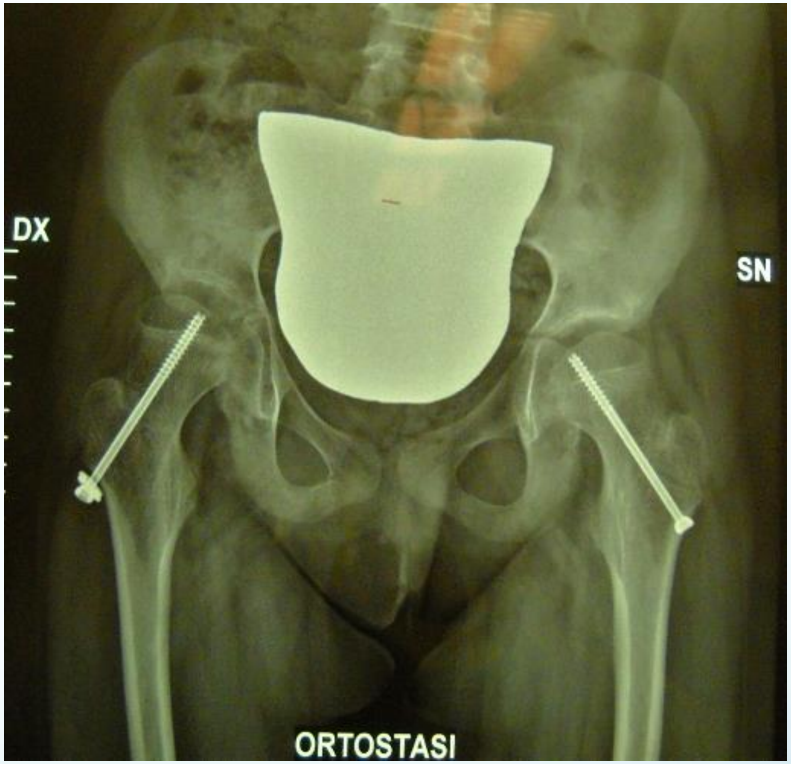
Pre–op

Post-op

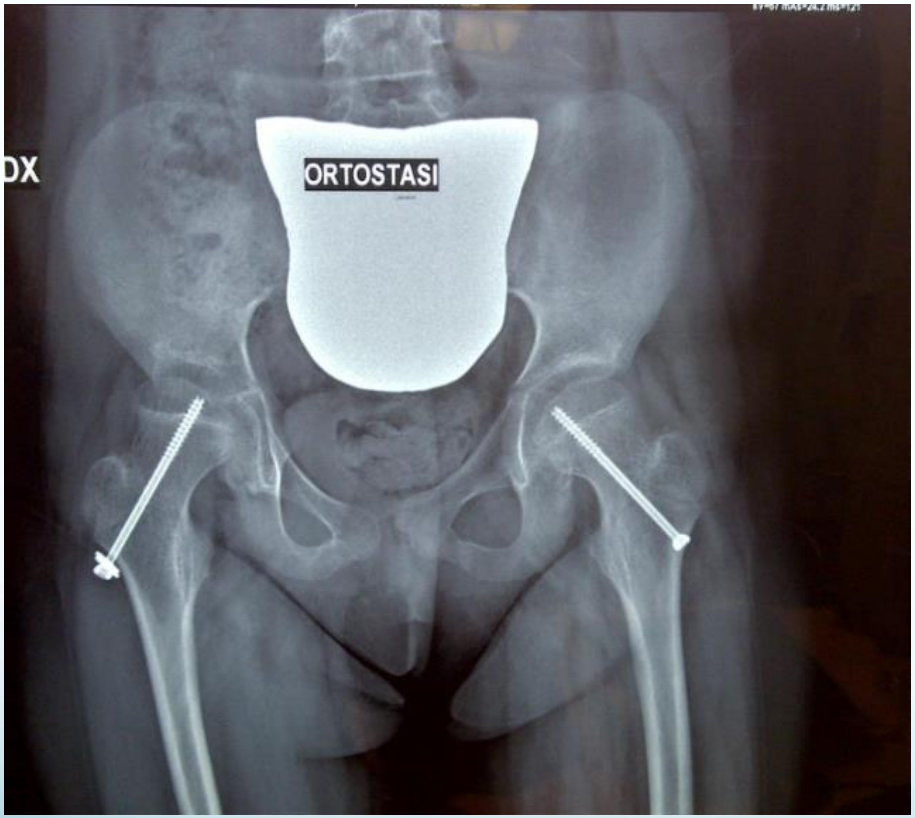
At two years

1 YR Pre–op

Post-op



At two years



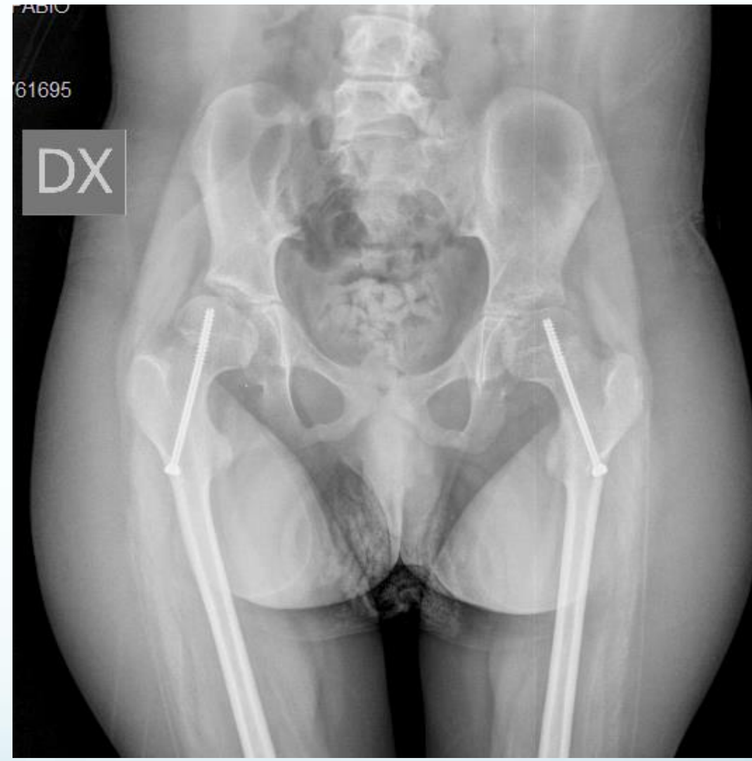
At four years

Pre–op

Post-op

At two years

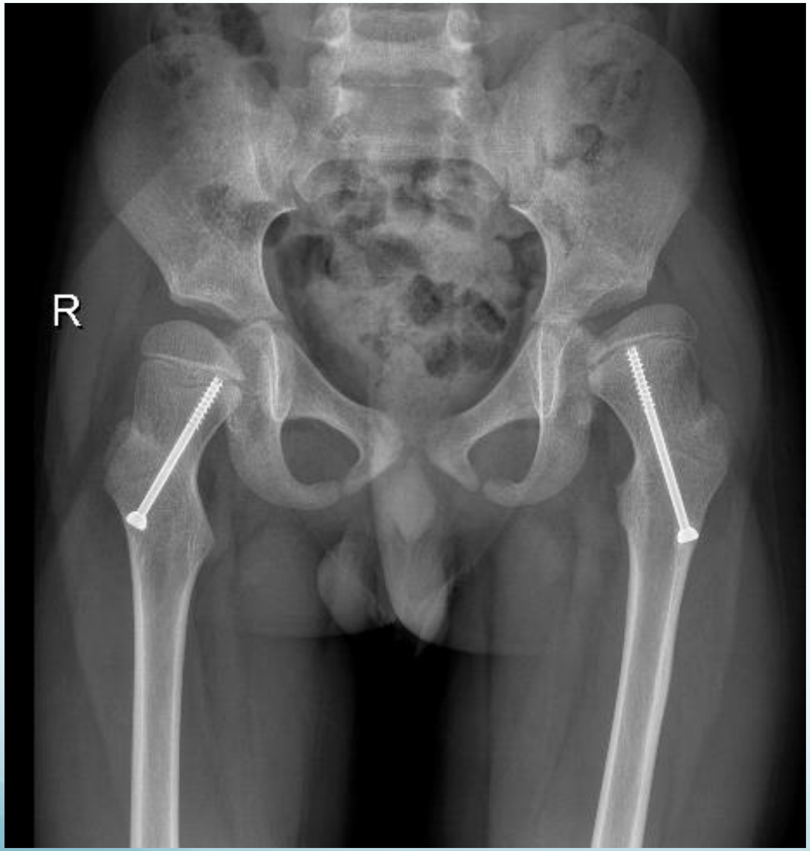
At four years



Pre–op

Post-op

At three years



Removal of screws at 3.5 years

Late: Combined soft tissue and pelvic recon

- Patients: 66 (74 hips)
- Age: 10.97 ± 2.82
- Follow up: 3.08 ± 1.81 years

- Robin's Score:
  - 2 hips Grade II (2.7%)
  - 2 hips Grade III (2.7%)
  - 62 hips Grade IV (83.78%)
  - 8 hips Grade V (10.81%)

- GMFCS:
  - 0 Pt Grade I
  - 5 Pt Grade II (7.6%)
  - 13 Pt Grade III (19.7%)
  - 19 Pt Grade IV (28.8%)
  - 29 Pt Grade V (43.9%)

Results

- **<u>Reimers' migration percentage (MP):</u>**

  Pre-Op: **66,11% (**Range 11%-100%)
  Final follow-up: **3.95%** (Range 0%-18%)

- **<u>Acetabular Index (AI):</u>**

  Pre-Op: **45.31°** (Range 30° -58°)
  final follow-up: **27.15°** (Range 18° -34°)

- **<u>Neck-shaft Angle (NSA):</u>**

  Pre-Op: **162.57°** (range: 144° -176°)
  final follow-up: **122.55°** (range:106-138°)

Complications

•Early: -30 days:

8 hips (10.80%) → 4 Post-operative blood transfusions (5.40%)
→ 3 Wound dehiscence (4.05%)
→ 1 Non significant increase of RI no further surgery was required during the follow-up

•Late: +30 days:

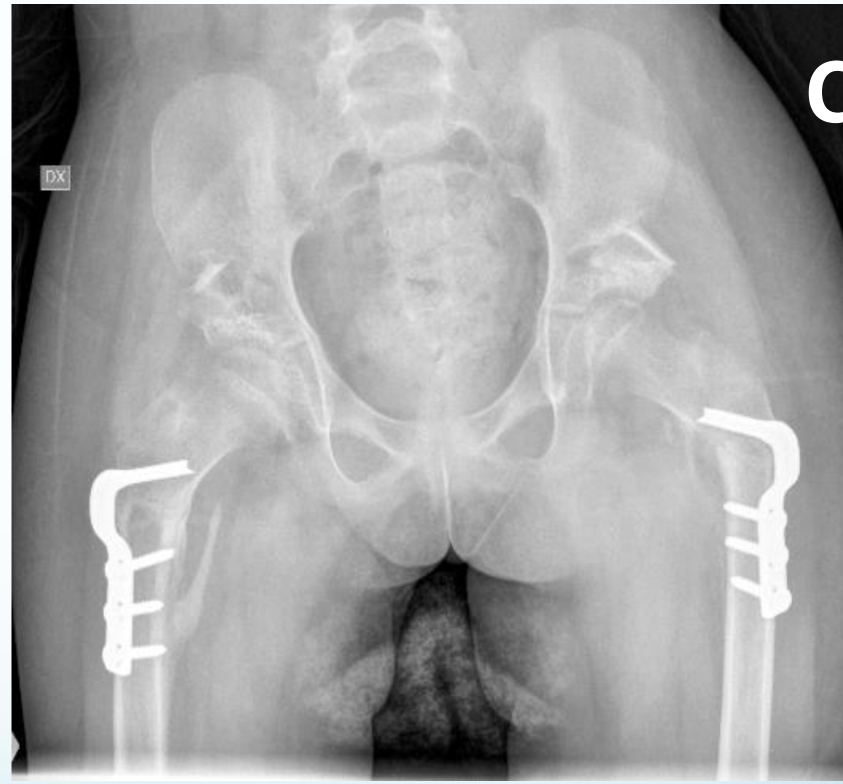
16 hips (17.57%) → 11 graft resorption not associated with significant deterioration of AI
→ 5 painful for more than 6 months with complete resolution within one yr of follow-up (6.76%)

No: → AVN of the femoral head
→ Premature closure of triradiate cartilage
→ Stress fractures after metal removal

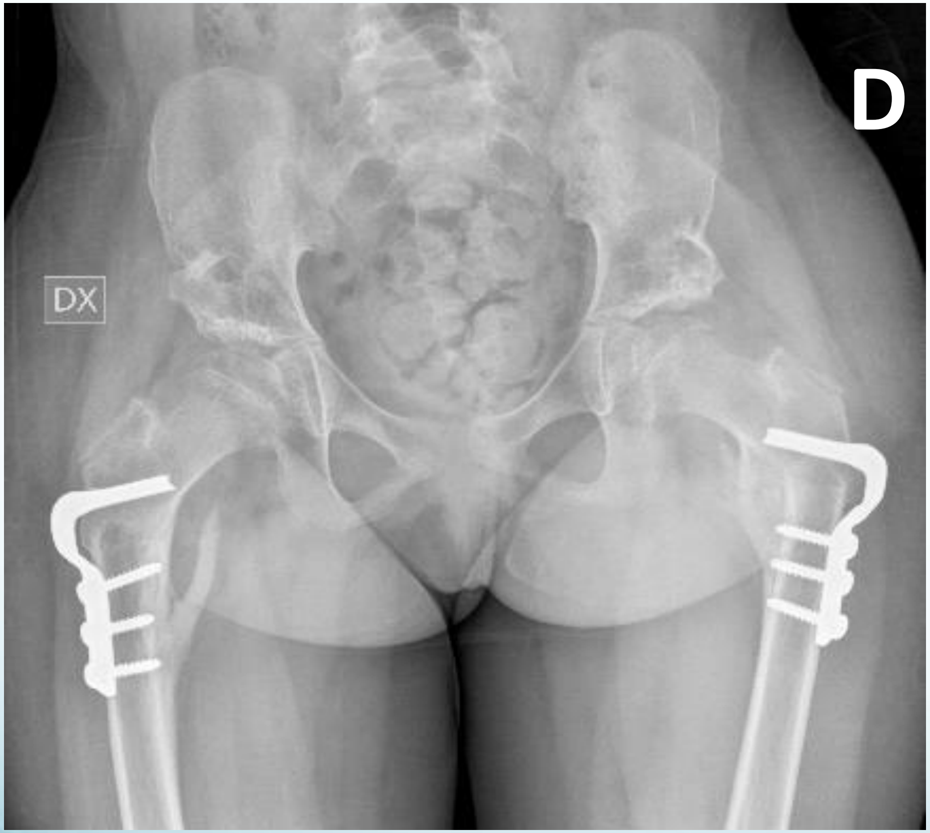
Pre-operative AP radiograph of pelvis

Post-operative

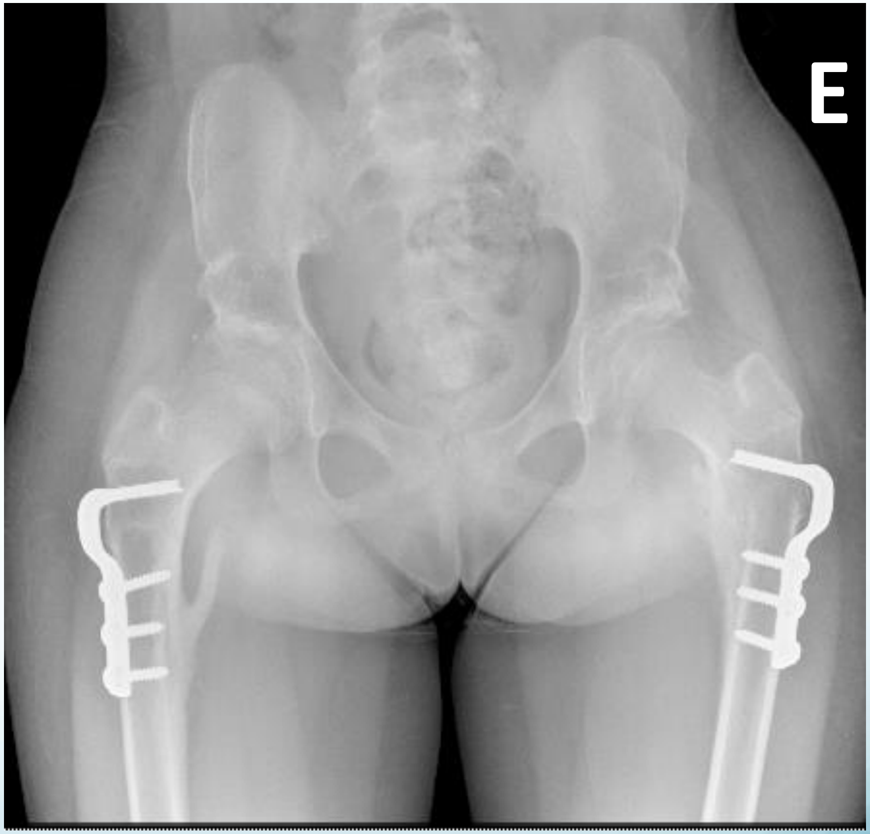
Post-operative opposite side at 6 months



At one year

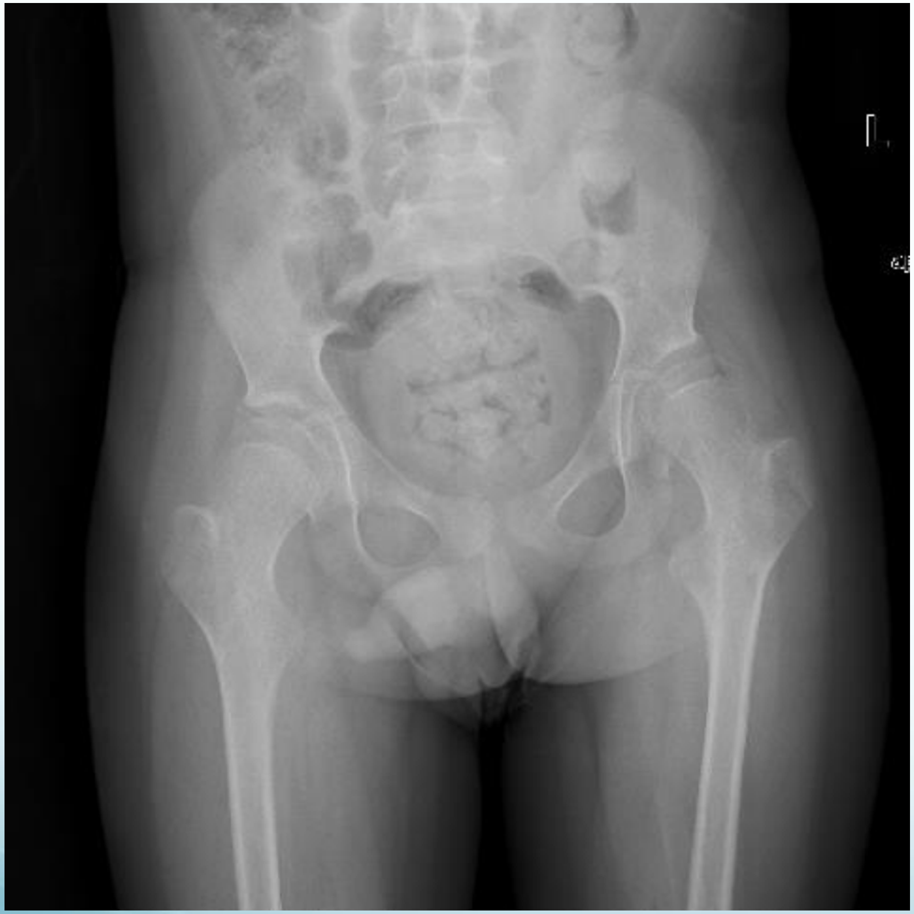


At two years



Removal of plates (2.5 years)

Pre-op



Post-op

Grazie

HUMANITAS
RESEARCH HOSPITAL

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MILAN, ITALY

INTERNATIONAL COMBINED MEETING
BRITISH HIP SOCIETY
SOCIETÀ ITALIANA DELL'ANCA

Hip Arthroscopy in the Immature Skeleton

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Professor of Orthopaedic Surgery, St George's University of London
Director of Research, South West London Elective Orthopaedic Centre
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theeoc south west london elective orthopaedic centre
INTERNATIONAL SOCIETY FOR HIP ARTHROSCOPY
BRITISH HIP SOCIETY
St George's University of London

Gross RH. Arthroscopy in hip disorders in children. Orthop Rev 1977;6:43-9

First English language paper published in 1977 by Richard Gross, describing 32 diagnostic arthroscopic procedures in 27 children for CDH, Perthes, SUFE and neuropathic subluxation.

Anatomical Considerations

- Femoral anteversion decreases with age from 31.1° at one year to 15.4 ° at 16 years[1]
- The neck-shaft angle also has been reported to decrease from 136.2 ° at one year to 127.3 ° at 18 years[2,3]
- Fusion of the acetabulum and proximal femoralepiphyses occurs at between 17-19 years

1. Fabry, Guy, G. Dean MAacEWwen, and A. R. Shands Jr. "Torsion of the femur." *The Journal of Bone & Joint Surgery* 55.8 (1973): 1726-1738.
2. Lee, Mark C., and Craig P. Eberson. "Growth and development of the child's hip." *Orthopedic Clinics of North America* 37.2 (2006): 119-132.
3. Zippel, H. "Untersuchungen zur Normalentwicklung der Formelemente am Hüftgelenk im Wachstumsalter." *Beitr Orthop* 18 (1971): 225-269.

Indications

• Infants & toddlers	DDH & Septic Arthritis
• Child	Legg Calve Perthes
• Adolescent	SUFE & Osteochondritis dissecans
• Teens	Dysplasia Sports and Trauma

Equipment & Instruments

2.9mm arthroscopes

Infants

Hip Arthroscopy for the Treatment of Children With Hip Dysplasia: A Preliminary Report

James J. McCarthy, MD; G. Dean MacEwen, MD

Orthopedics

April 2007 - Volume 30 · Issue 4

Posted April 1, 2007

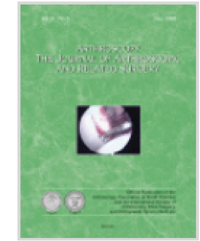
DOI: 10.3928/01477447-20070401-08

2 girls
1 boy
Mean age 14 months

ELSEVIER

Arthroscopy: The Journal of Arthroscopic & Related Surgery

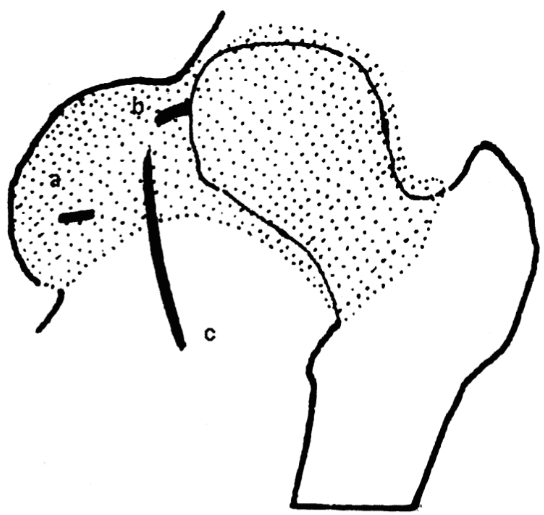
Volume 21, Issue 5, May 2005, Pages 574–579

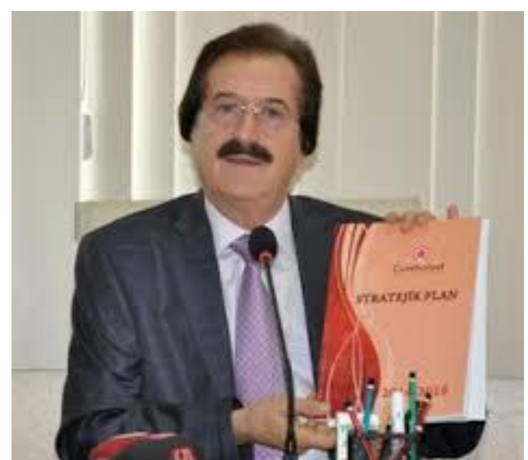


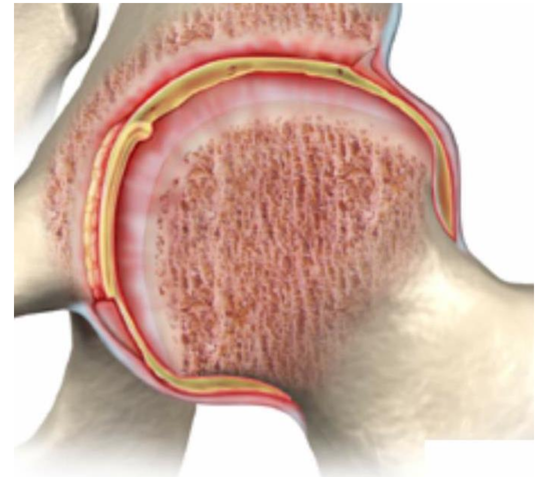
Original article

Arthroscopic-Assisted Surgical Treatment for Developmental Dislocation of the Hip

Okay Bulut, M.D.[a], Hayati Öztürk, M.D.[a], Gündüz Tezeren, M.D.[a], Sema Bulut, M.D.[b]







Septic Arthritis

- Arthroscopic lavage has been successfully used to treat septic arthritis of the paediatric hip[1]

1. Chung, Wui K., Gordon L. Slater, and Edward H. Bates. "Treatment of septic arthritis of the hip by arthroscopic lavage." *Journal of Pediatric Orthopaedics*13.4 (1993): 444-446.

Children

Legg Calve Perthes

- Indications for arthroscopy in this condition are limited
- It has been used to characterise intra-articular pathology in children with the condition and may aid further operative planning[1,2]

1. Roy, Dennis R. "Arthroscopy of the hip in children and adolescents." *Journal of children's orthopaedics* 3.2 (2009): 89-100
2. Suzuki, Shigeo, et al. "Arthroscopy in 19 children with Perthes' disease: Pathologic changes of the synovium and the joint surface." *Acta Orthopaedica*65.6 (1994): 581-584.

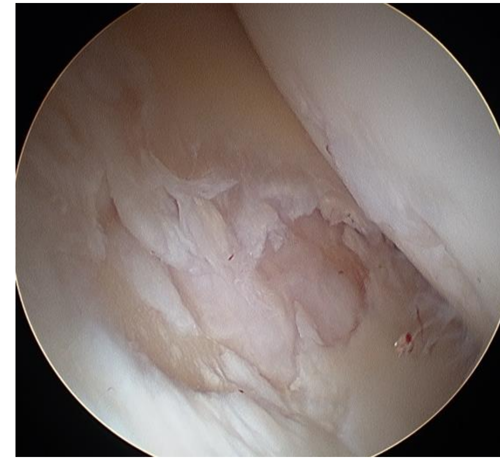
Legg Calve Perthes

- The condition has been associated with loose bodies, and in this context arthroscopy and removal of these have improved hip scores post-operatively[1]

1. Kocher, Mininder S., et al. "Hip arthroscopy in children and adolescents."*Journal of Pediatric Orthopaedics* 25.5 (2005): 680-686.

Adolescents

Post DDH



- Arthroscopy in adolescents with previously treated DDH has revealed high rates of cartilage lesions and labral tears[1]

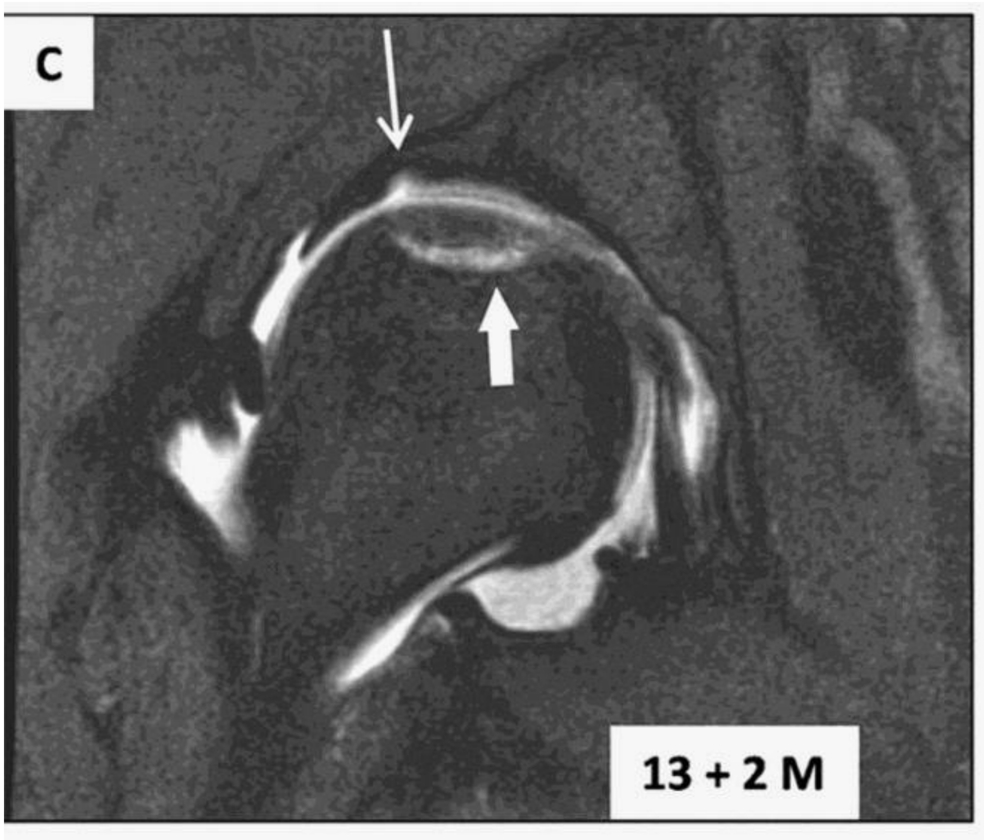
1. Fujii, Masanori, et al. "Intraarticular findings in symptomatic developmental dysplasia of the hip." *Journal of Pediatric Orthopaedics* 29.1 (2009): 9-13.

Slipped capital femoral epiphysis, SCFE /SUFE

- Two studies have used arthroscopy to describe intra-articular changes after SCFE[1,2].
- Arthroscopic head-neck osteoplasty following in situ pinning gave excellent short term outcomes in a series of three patients[2]
- A more recent Brazilian case series suggests that severe SCFE can be successfully corrected arthroscopically, although one of five cases went on to develop avascular necrosis[3]

1. Futami, Tohru, et al. "Arthroscopy for slipped capital femoral epiphysis." *Journal of Pediatric Orthopaedics* 12.5 (1992): 592-hyhen.
2. Leunig, Michael, et al. "In situ pinning with arthroscopic osteoplasty for mild SCFE: a preliminary technical report." *Clinical Orthopaedics and Related Research®* 468.12 (2010): 3160-3167.
3. Akkari, Miguel, et al. "Trapezoidal bony correction of the femoral neck in the treatment of severe acute-on-chronic slipped capital femoral epiphysis."*Arthroscopy: The Journal of Arthroscopic & Related Surgery* 26.11 (2010): 1489-1495.

Osteochondritis Dissecans



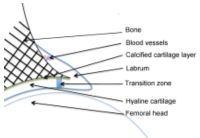
Teenagers

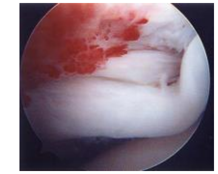
Post PAO

- Arthroscopy has been utilised to investigate and treat ongoing hip pain following periacetabular osteotomy, PAO. Follow up Harris Hip scores were significantly improved[1].

1. Kocher, Mininder S., et al. "Hip arthroscopy in children and adolescents."*Journal of Pediatric Orthopaedics* 25.5 (2005): 680-686.

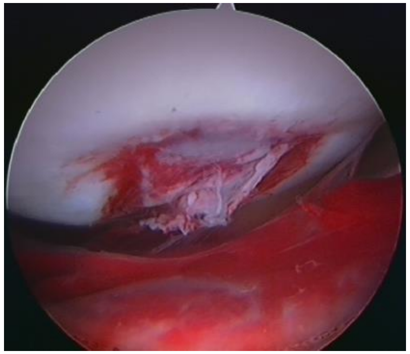
FAI





- This condition is increasingly recognised in the adolescent athlete
- As with the adult population the presence of both cam and pincer lesions is often present.
- Arthroscopic intervention in adolescents has been associated with significant improvements over a range of outcome measures and high post-operative satisfaction[1,2]

1. Tran, Phong, Michael Pritchard, and John O'Donnell. "Outcome of arthroscopic treatment for cam type femoroacetabular impingement in adolescents." *ANZ journal of surgery* 83.5 (2013): 382-386.
2. Philippon, Marc J., et al. "Early outcomes after hip arthroscopy for femoroacetabular impingement in the athletic adolescent patient: a preliminary report." *Journal of Pediatric Orthopaedics* 28.7 (2008): 705-710.



Trauma

- Ligamentum Teres sprains and tears
- Traumatic hip dislocation

Kashiwagi, Naoya, Shigeo Suzuki, and Yoichi Seto. "Arthroscopic treatment for traumatic hip dislocation with avulsion fracture of the ligamentum teres."*Arthroscopy: The Journal of Arthroscopic & Related Surgery* 17.1 (2001): 67-69.

JCA

- An early paper describes the use of hip arthroscopy in juvenile chronic arthritis, JCA, to evaluate its severity and perform synovectomy or tentotomy if indicated[1]

- A later study of three patients undergoing arthroscopic synovectomy for JCA found a significant improvement in function[2]

1. Holgersson, Svante, et al. "Arthroscopy of the hip in juvenile chronic arthritis."*Journal of Pediatric Orthopaedics* 1.3 (1981): 273-278

2. Kocher, Mininder S., et al. "Hip arthroscopy in children and adolescents."*Journal of Pediatric Orthopaedics* 25.5 (2005): 680-686.

Osteoid Osteoma

- Both acetabular and proximal femoral osteoid osteomas have been successfully excised arthroscopically[1, 2]

1. Aşık, Mehmet, et al. "Arthroscopic excision of acetabular osteoid osteoma in a 7-year-old patient." *Knee Surgery, Sports Traumatology, Arthroscopy* (2014): 1-4.
2. Lee, Dae-Hee, Woong-Kyo Jeong, and Soon-Hyuck Lee. "Arthroscopic excision of osteoid osteomas of the hip in children." *Journal of pediatric orthopaedics*29.6 (2009): 547-551.

Loose bodies

- Dahners found loose bodies in 33 out of 36 patients (92%) arthroscoped post traumatic hip dislocation (1).

- Coleman described seven cases of loose bodies in adolescent hips without any apparent underlying pathology (2).

1. Mullis BH, Dahners LE. J Orthop Trauma. 2006 Jan;20(1):22-6. Hip arthroscopy to remove loose bodies after traumatic dislocation.
2. Santora SD, Stevens PM, Coleman SS. Intra-articular loose bodies in the adolescent hips. *Journal of Paediatric Orthopaedics* 1990; **10:** 261-4.

Complications

- Paediatric hip arthroscopy carries all the risks of adult hip arthroscopy as well as the potential for growth plate disturbance, physeal separation and osteonecrosis.
- Nwachukwu et al. reviewed 218 arthroscopies in 175 patients under 18 years and found the following complications[1]:
    - Transient pudendal nerve palsy (2)
    - Instrument breakage (1)
    - Suture abscess (1)

1. Nwachukwu, Benedict U., et al. "Complications of hip arthroscopy in children and adolescents." *Journal of Pediatric Orthopaedics* 31.3 (2011): 227-231.

Complications (cont)

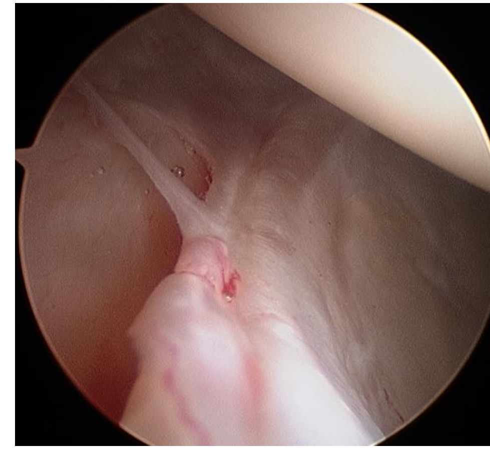
- Recurrent labral tear following initial debridement[1]
- Avascular necrosis after: soft tissue debridement in the context of DDH and arthroscopic resection of the femoral neck with pinning in a child with SCFE[2, 3]

Kocher, Mininder S., et al. "Hip arthroscopy in children and adolescents."*Journal of Pediatric Orthopaedics* 25.5 (2005): 680-686.

McCarthy, James J., and G. Dean MacEwen. "Hip arthroscopy for the treatment of children with hip dysplasia: a preliminary report." *ORTHOPEDICS-NEW JERSEY-* 30.4 (2007): 262.

Philippon, Marc J., et al. "Early outcomes after hip arthroscopy for femoroacetabular impingement in the athletic adolescent patient: a preliminary report." *Journal of Pediatric Orthopaedics* 28.7 (2008): 705-710.

Complications (cont)



- Capsulolabral adhesions requiring a revision arthroscopy developed in 13% of patient following treatment for FAI[1]

1. Philippon, Marc J., et al. "Outcomes 2 to 5 years following hip arthroscopy for femoroacetabular impingement in the patient aged 11 to 16 years." *Arthroscopy: The Journal of Arthroscopic & Related Surgery* 28.9 (2012): 1255-1261.

Summary

- Hip arthroscopy can be used in the paediatric and adolescent population to treat a range of pathologies

- Outcomes are generally favourable although modified HHS did not improve in patients undergoing arthroscopy with full thickness chondral defects and AVN

- Complication rates have been reported to be as low as 1.8% however there is a high rate of capsulolabral adhesions following treatment for FAI

Thank you

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