

Postoperative FAI Imaging

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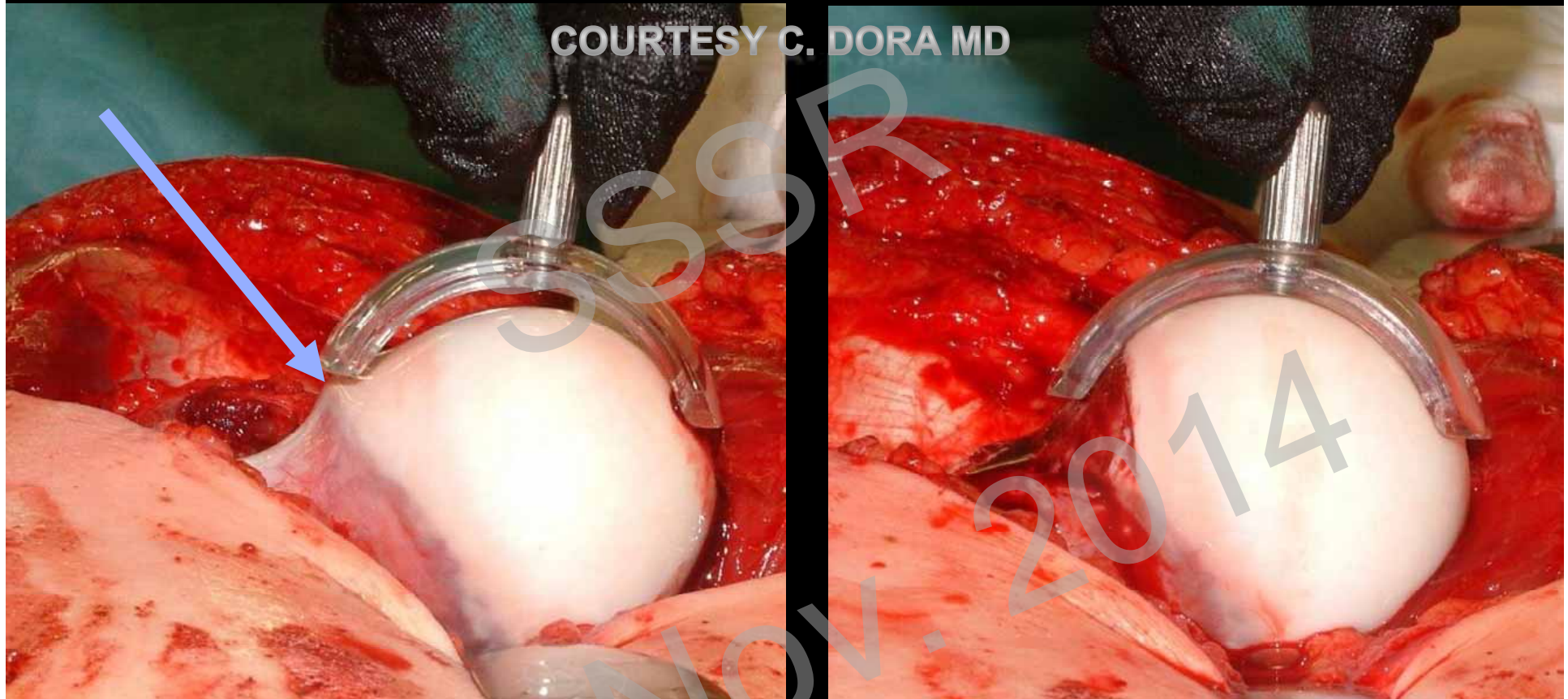
1. Nov. 2014

Postoperative FAI Imaging

- Surgical Correction
- Soft Tissues and Capsule
- Labrum and Cartilage

1. Nov. 2014

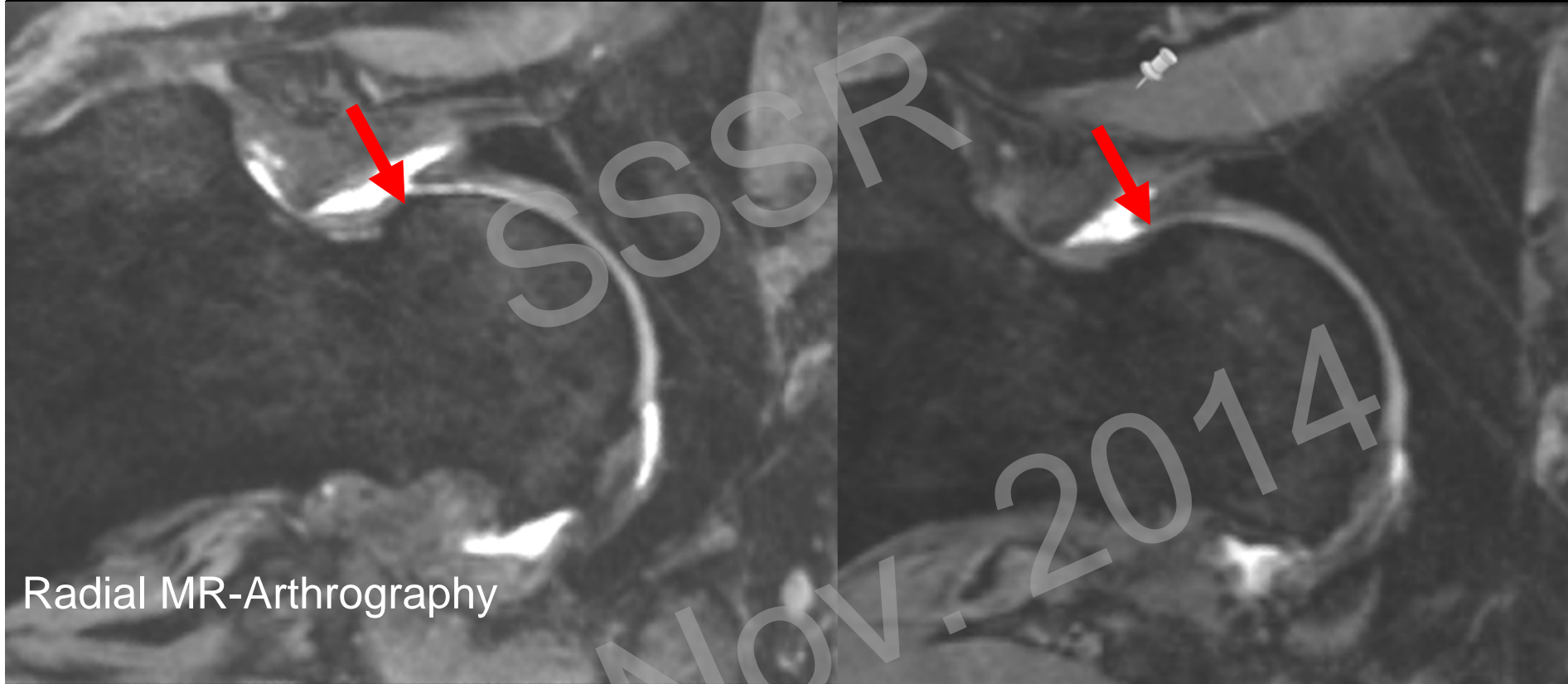
Correction: Osteochondroplasty



Surgical dislocation of the femoral head

Resection of cam deformity

FAI Surgery: Insufficient Correction



Radial MR-Arthrography

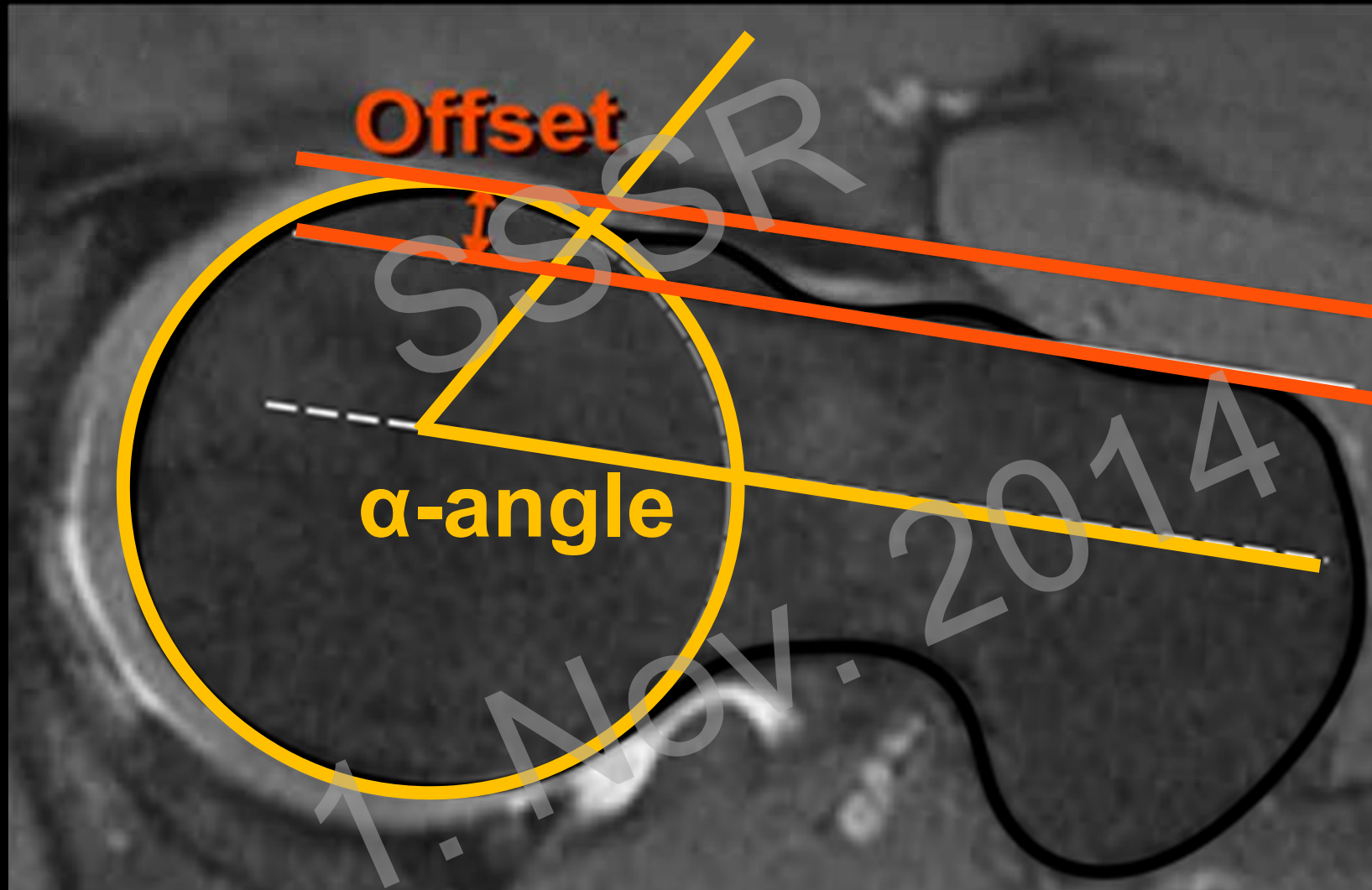
Persistent pain after arthroscopic FAI surgery

FAI Surgery: Inadequate Correction



Persistent pain after arthroscopic FAI surgery

Assessment of Correction



FAI Surgery: Sufficient Correction?

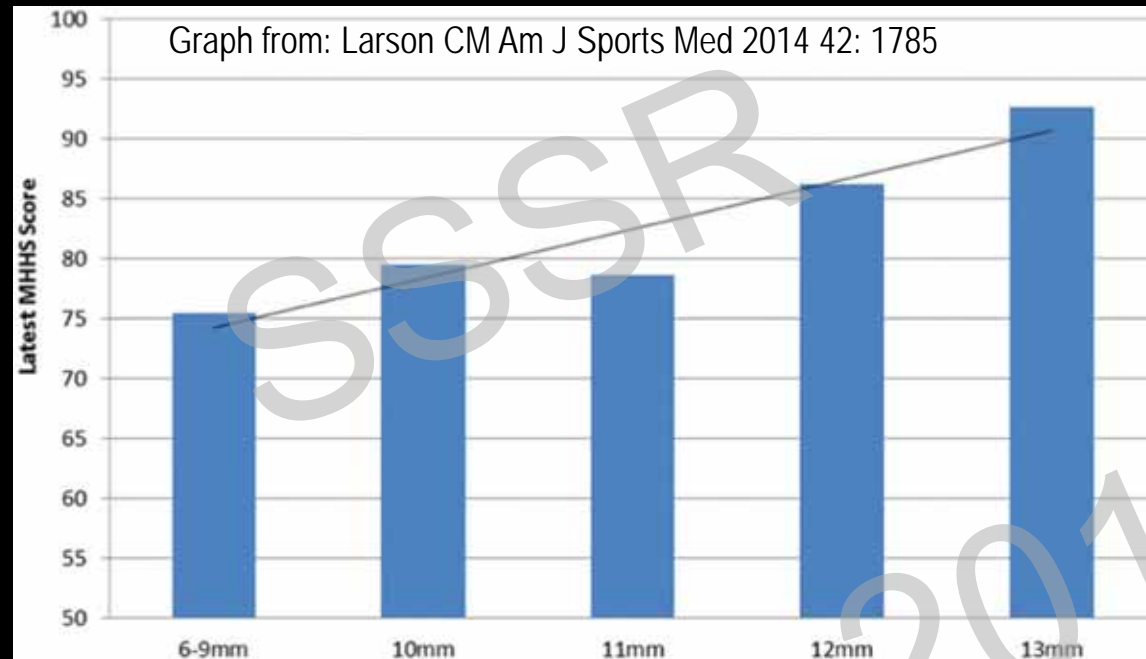
Clinical definition of a sufficient correction:

“In 90 degree hip flexion the internal rotation should reach 20 to 25 degree.”

Imaging definition of a sufficient correction:

“After FAI surgery an alpha angle of 43 degree is considered sufficient.”

FAI Surgery: Sufficient Correction?

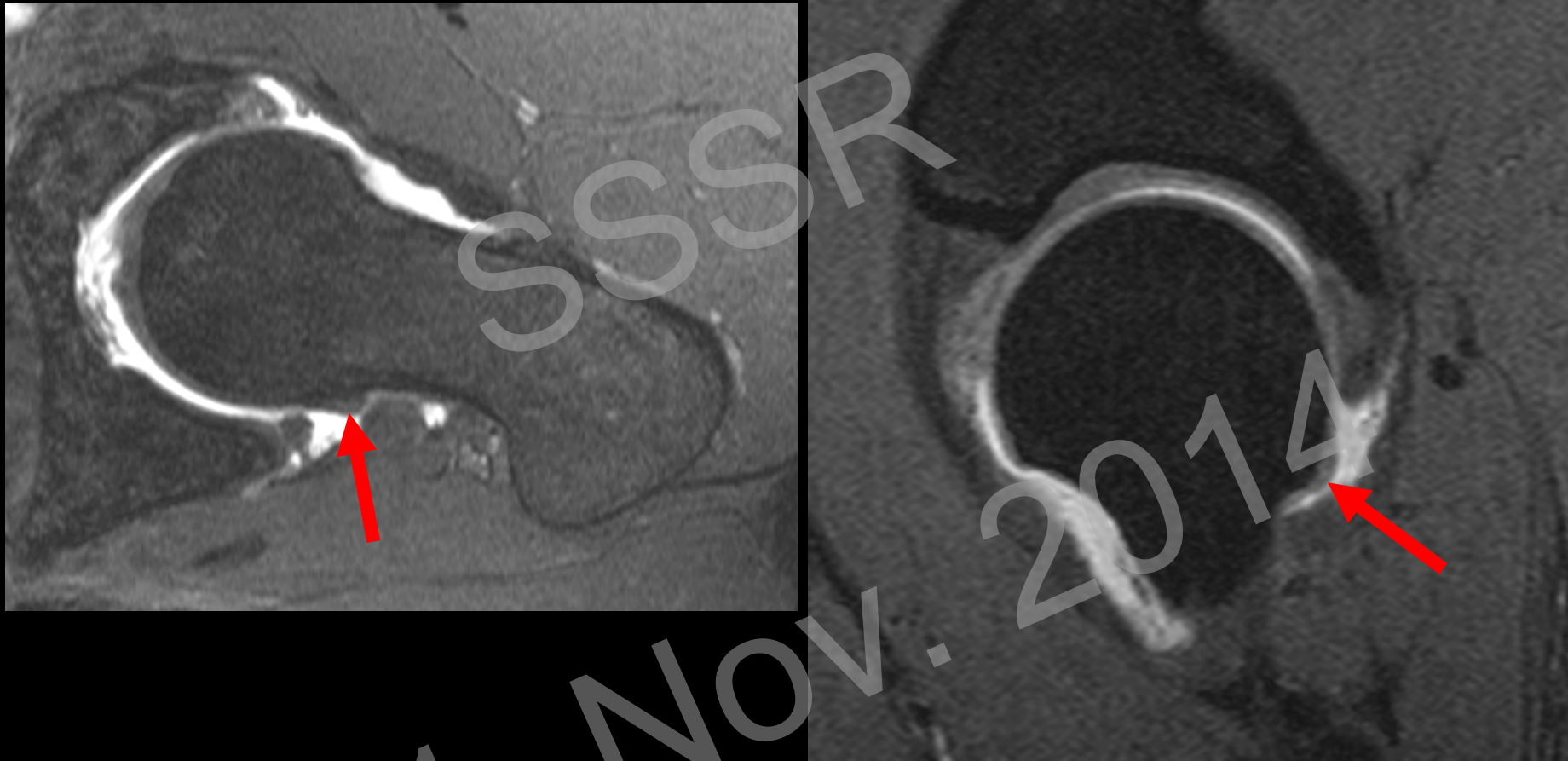


Head-neck offset

Predictor of outcome values after revision surgery:

head-neck offset	6 - 9 mm:	75.3 HHS
	13 mm :	92.6 HHS (P < .01)

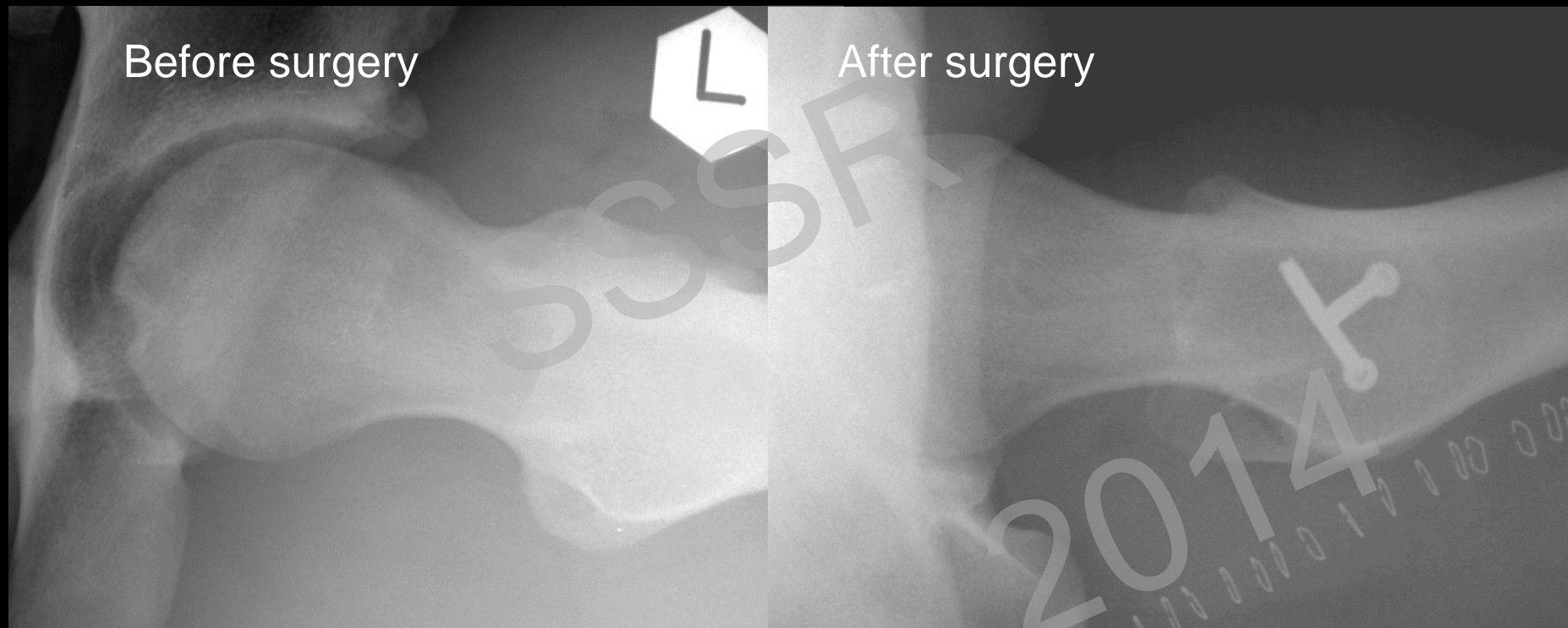
Dorsal Cam Deformity



Postop after arthroscopic FAI Surgery: Osteochondroplasty

Dorsal cam deformity: difficult to address

Osseous Remodeling after Osteochondroplasty



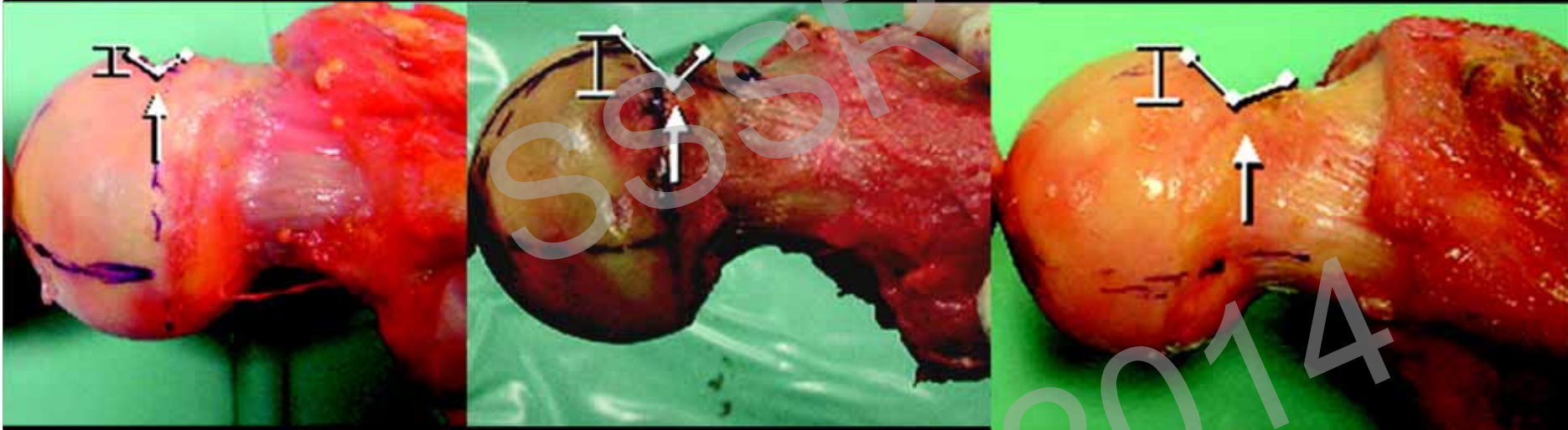
Osseous remodeling after osteochondroplasty:
Recorticalization occurs in during the first 2 years.

Depth of Osteochondroplasty

10%

30%

50%



Resection of $< 30\%$ of the anterolateral quadrant of the head-neck junction did not significantly alter the load-bearing capacity of the proximal part of the femur.

Femoral Neck Fracture after FAI Surgery



Fracture of the femoral neck after arthroscopic FAI surgery

Femoral Neck Fracture after FAI Surgery

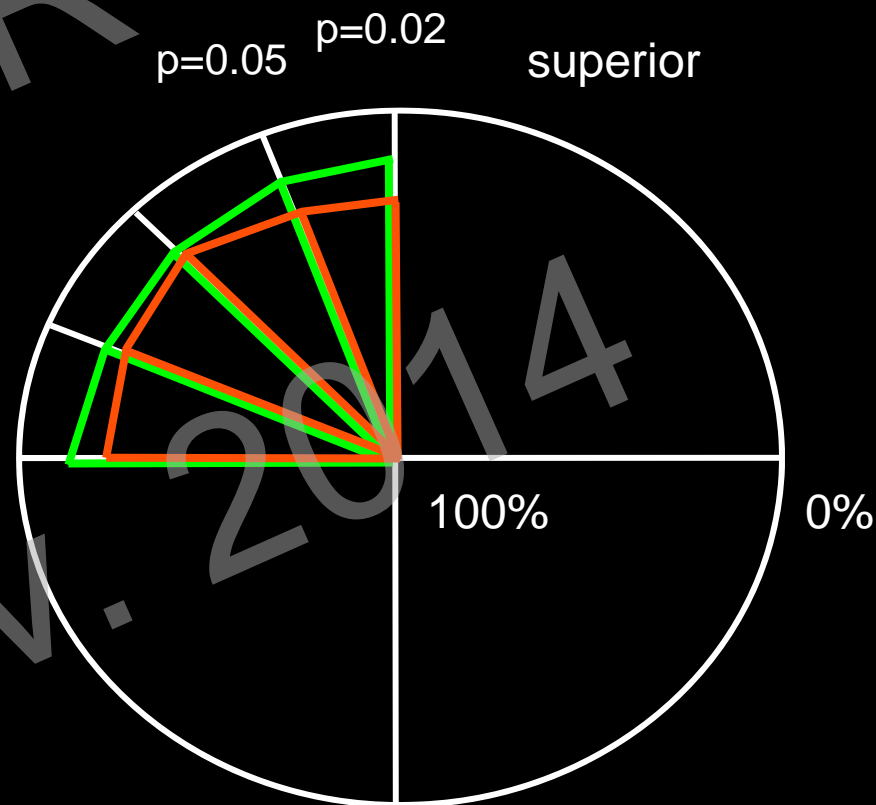
Risk Factors

		Fracture (n=7)	No Fracture (n=376)	
male	(%)	100	43	p=0.001
age		44.1	34.3	p=0.01
height	(cm)	180	169	n.s.
weight	(kg)	82.6	71.9	n.s.
BMI	(kg/m ²)	25.6	24.0	n.s.

Femoral Neck Fracture after FAI Surgery



Depth of Resection



fracture

(n=7)

22.4%

control

(n=15)

15.5%

p=0.01
anterior

p=0.01

Femoral Neck Fracture after FAI Surgery

Incidence	1.8%
Inadequate trauma	4.4 weeks (2 – 12 weeks)
Risk factor	male age > 44 years depth of resection
Treatment	conservative (5) screw fixation (2)
Outcome	impaired after fracture healing

Overcorrection: Acetabulum



Overcorrection of the acetabulum after arthroscopic FAI surgery results in dysplastic hip

Overcorrection Acetabulum



Acetabular retroversion

Overcorrection Acetabulum



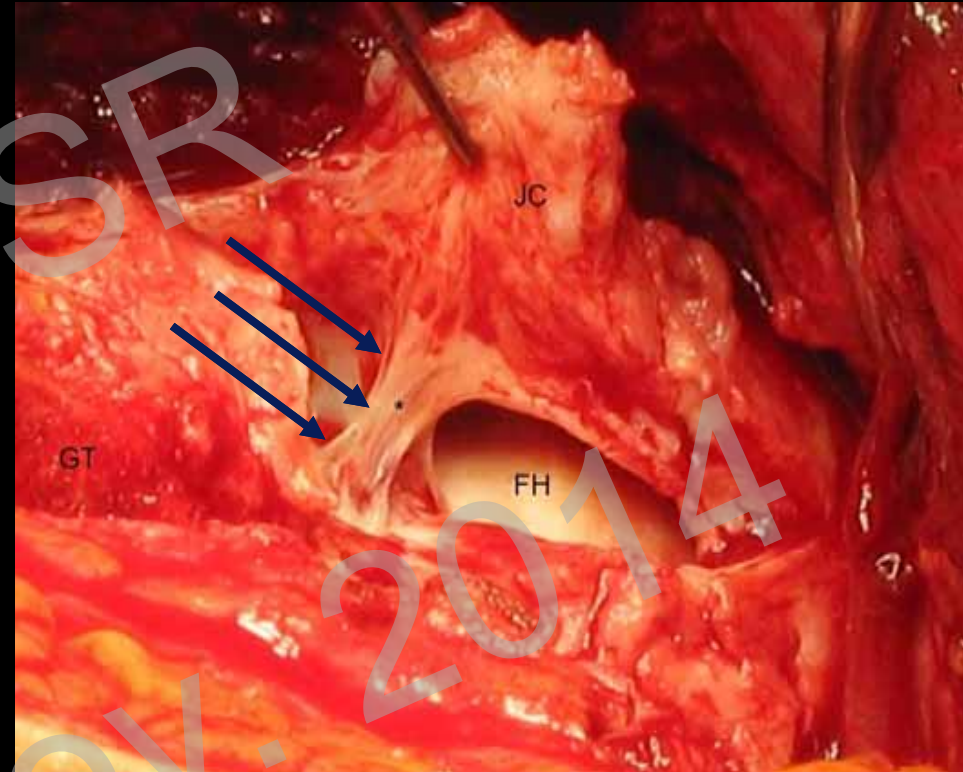
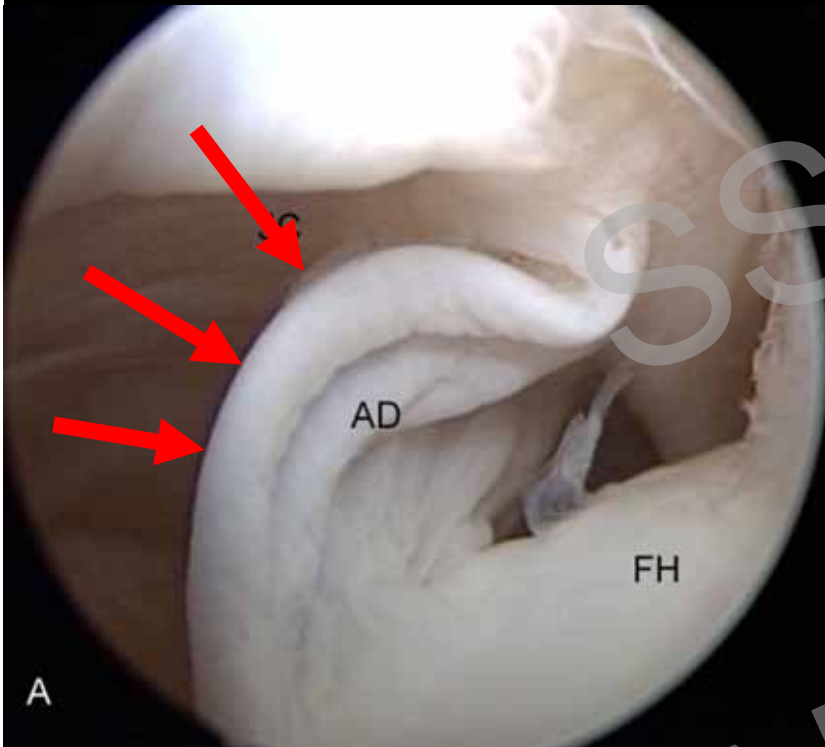
Overcorrection of the acetabulum – Dysplastic hip

Overcorrection Acetabulum



Overcorrection of the acetabulum – Dysplastic hip Periacetabular Osteotomy

FAI Surgery: Adhesions

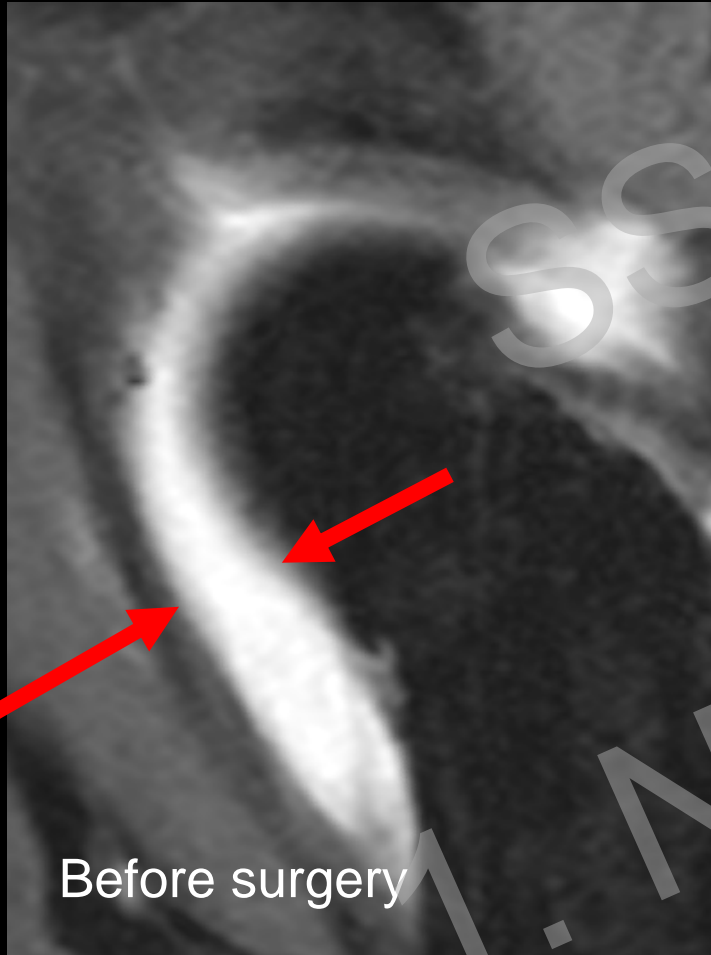


Images From Martin Beck MD, Clin Orthop Relat Res. 2009

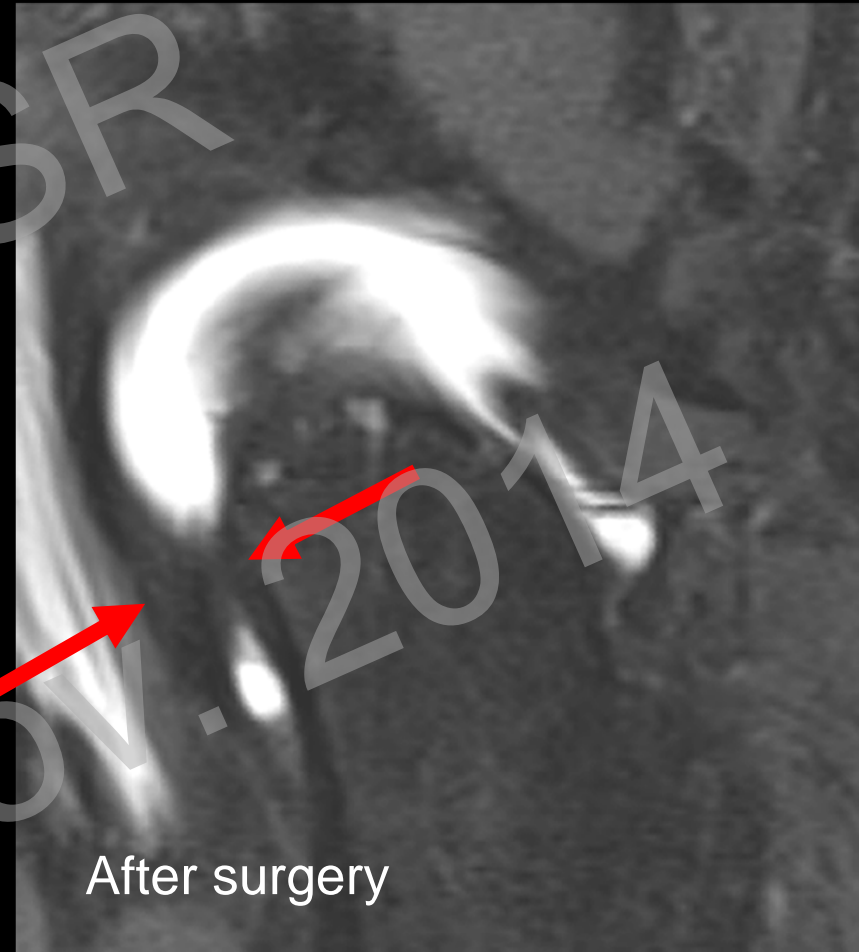
Adhesions joint capsule and the resected area on the femoral neck

Soft tissue impingement , restriction of motion

Adhesions: Arthrography necessary



Before surgery

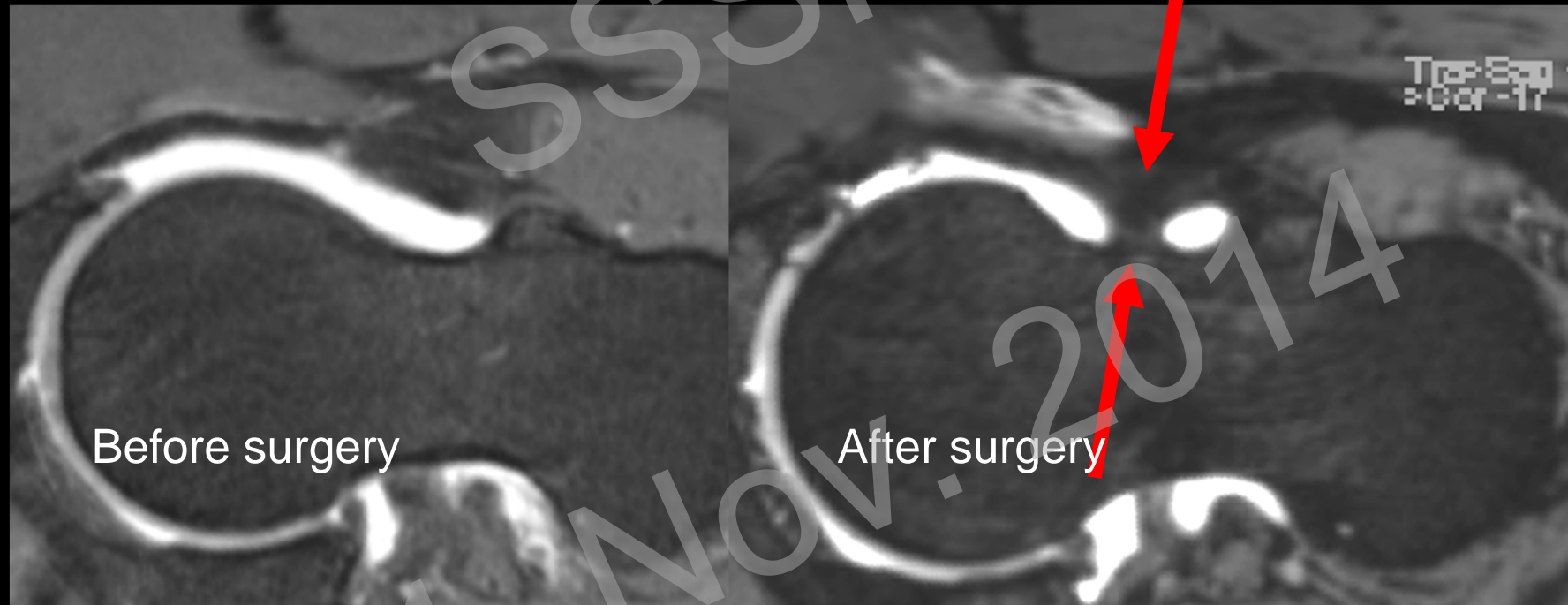


After surgery

MR Arthrography is needed to diagnose adhesions

Adhesions are frequent

63% (54/85) of patients undergoing arthroscopic hip revision surgery for residual (FAI) had adhesions:



Capsular defects



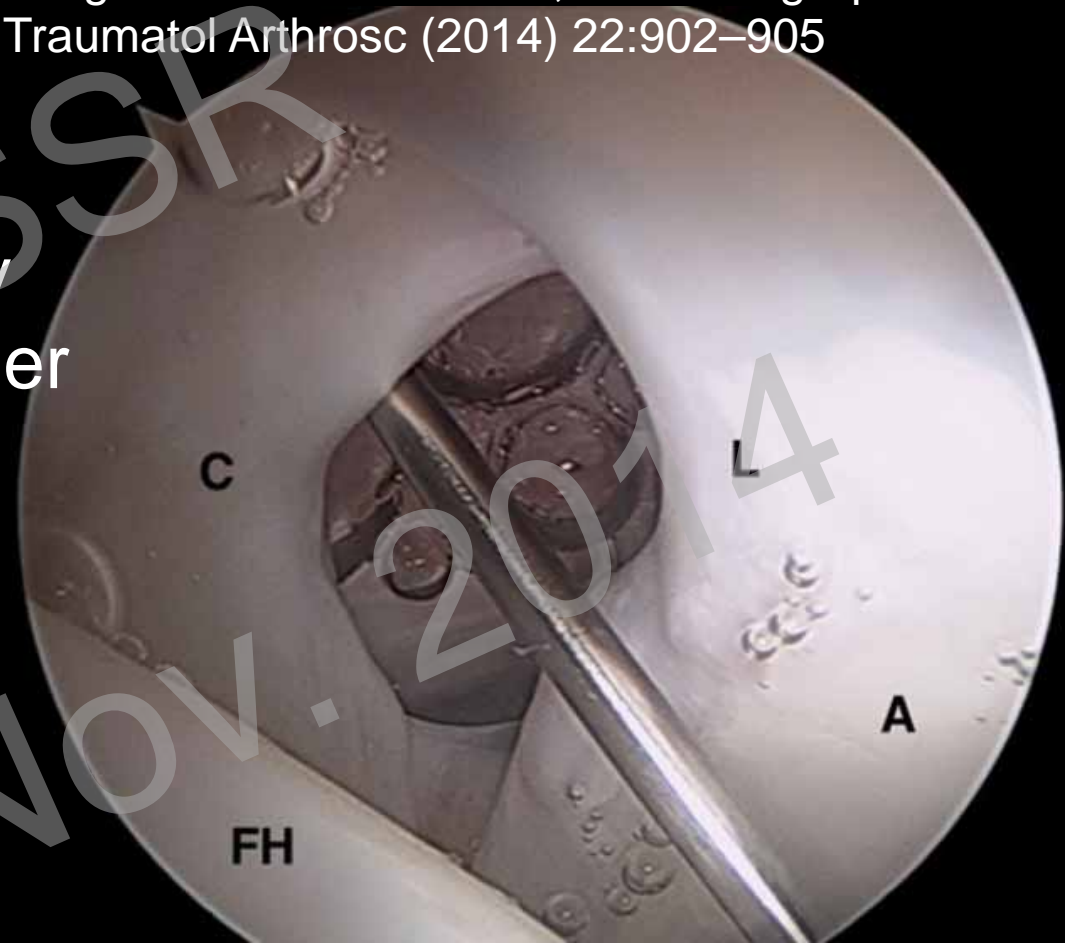
Before surgery

After surgery

Capsular defects

Image From McCormick F, Knee Surg Sports Traumatol Arthrosc (2014) 22:902–905

DDx for patients with hip pain after surgery in the absence of other diagnoses.



Capsular defects



Capsular plication positive effect at revision surgery

Improvement of HHS

With plication: 26.4 [pre = 51.9 vs post = 78.3]

Without plication: 14.8 [pre = 65.6 vs post = 80.4]

Labral Surgery

- Labral resection
- Labral debridement
- Labral refixation
- Labral reconstruction
(Lig teres, iliotibial tract,
tibialis anterior allograft)



Labral Surgery: Adhesions



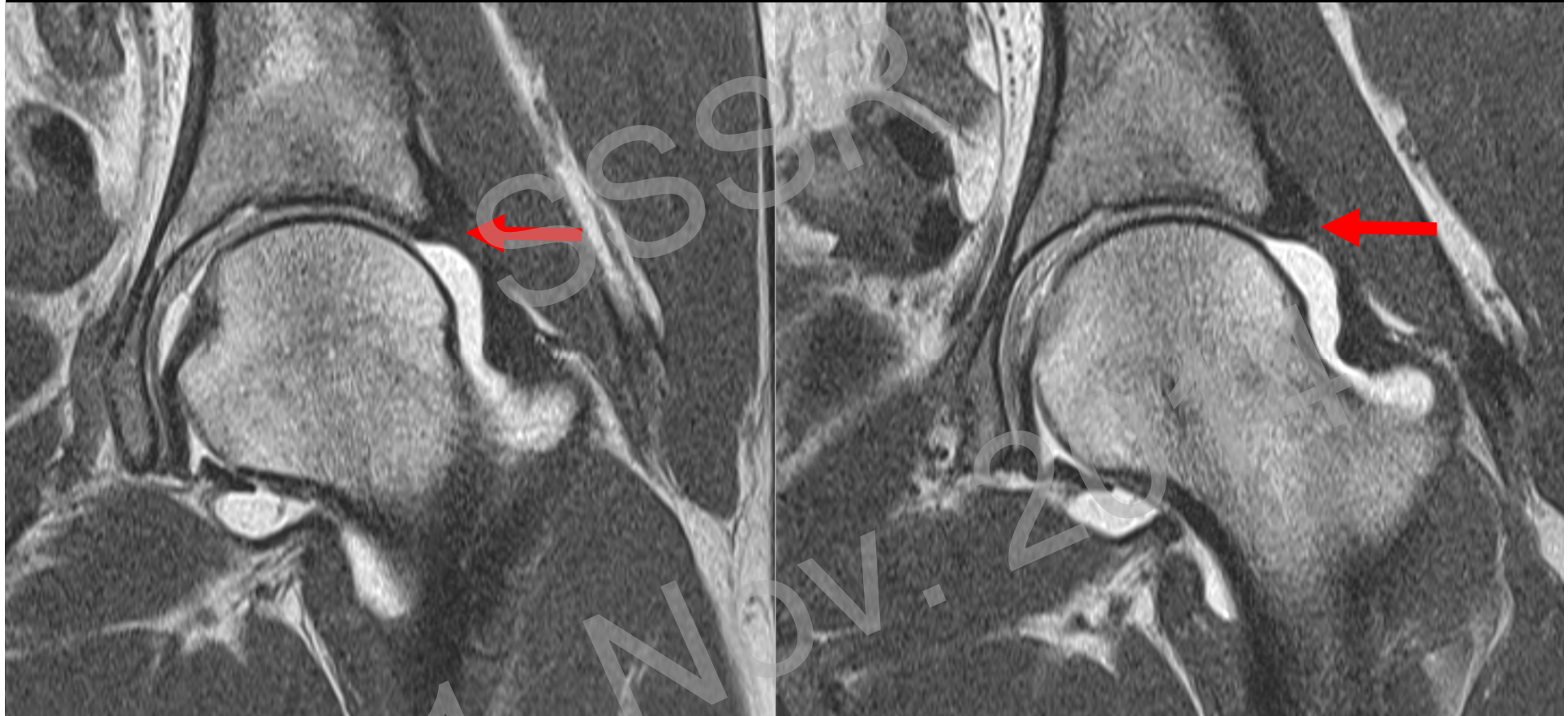
Occur after labral surgery (labral fixation or debridement)
May interfere with sealing function of the labrum

Labral Resection – Regeneration?



Sheep model: In 16 of 18 hips, the labrum regenerated to the extent that dense fibrous scar extending from the surgically denuded origin filled the defect.

Labral Resection – Regeneration?



Postoperative MR arthrography after
Labral Resection between 11:00-15:00

Labral Debridment



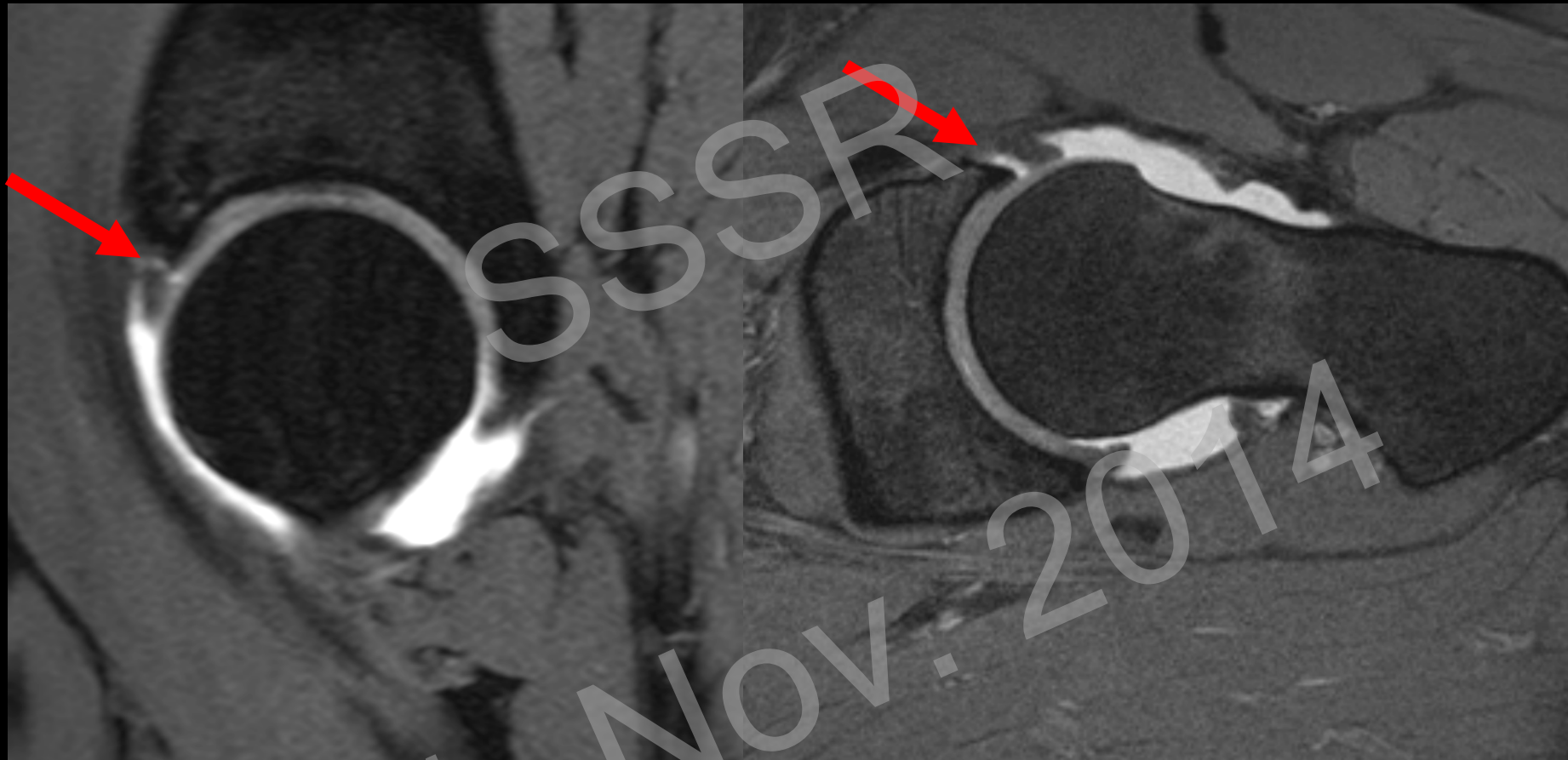
Insufficient debridement

Labral Reattachment



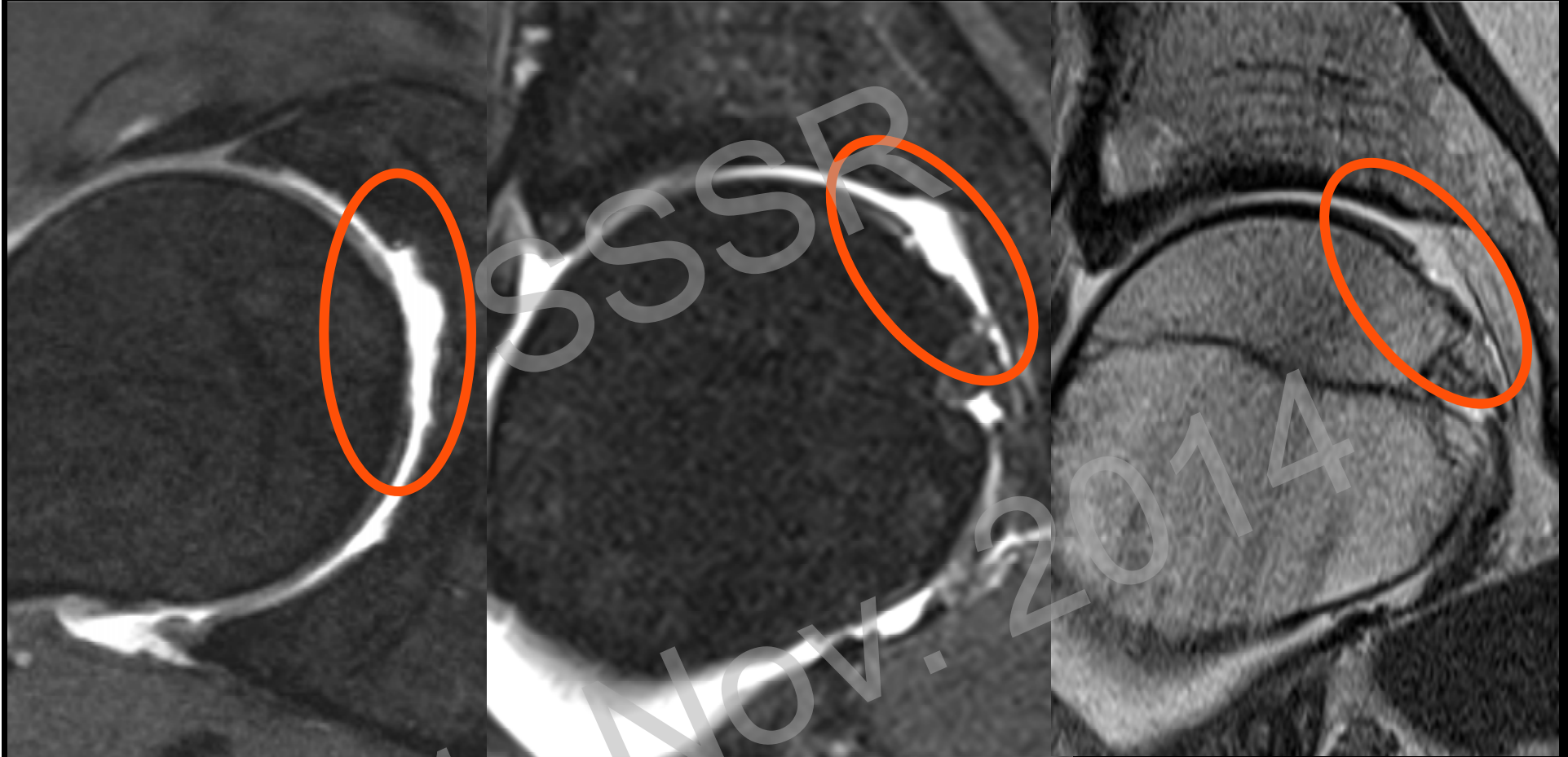
Two different patients with an intact labral reattachment
Anchors often difficult to see

Retear of the Labrum after Refixation



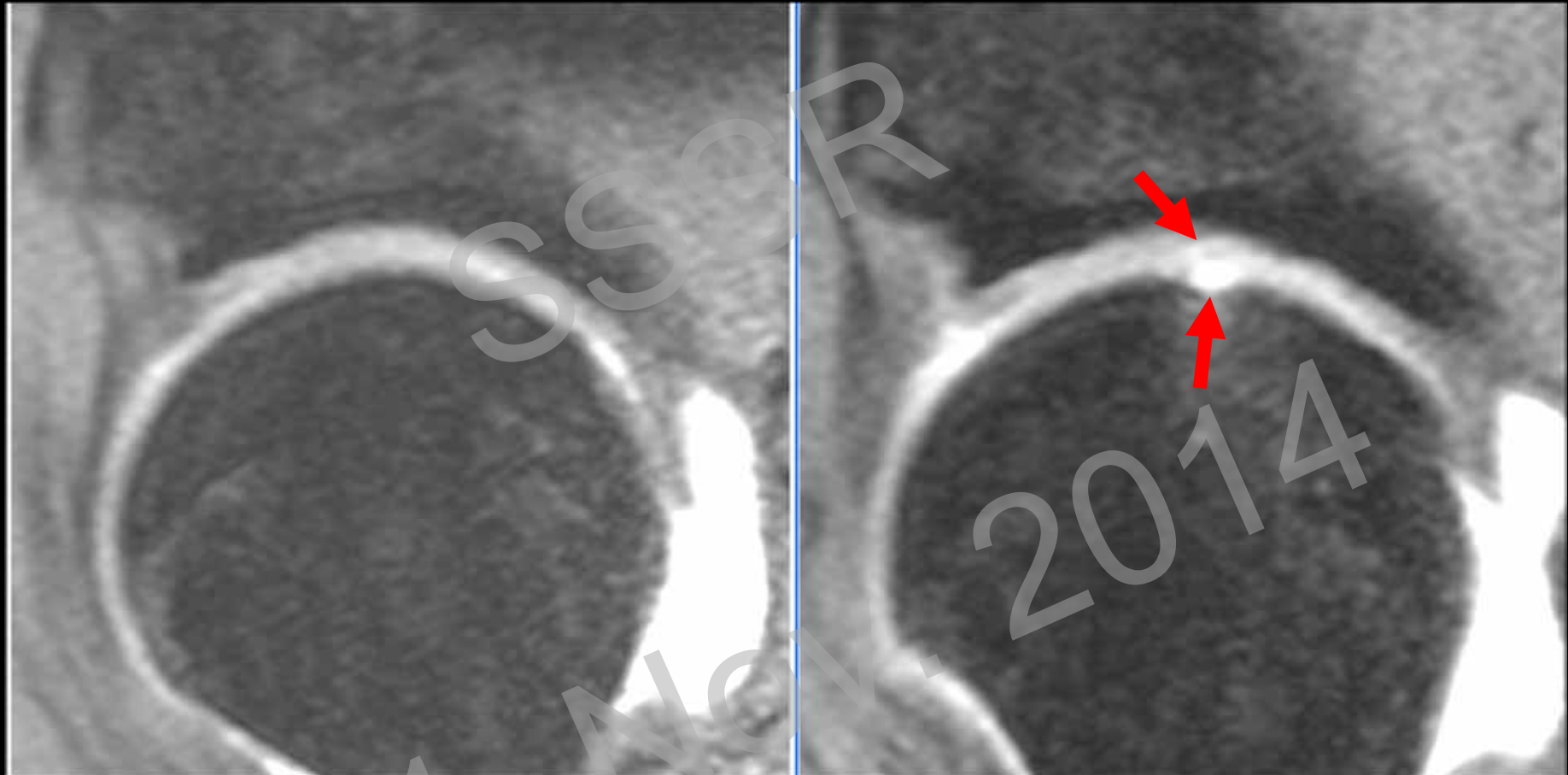
Patient with a retear of the labrum after fixation

Preoperative Cartilage Damage: Underrating



Femoral cartilage defect - Parafoveal chondral defects

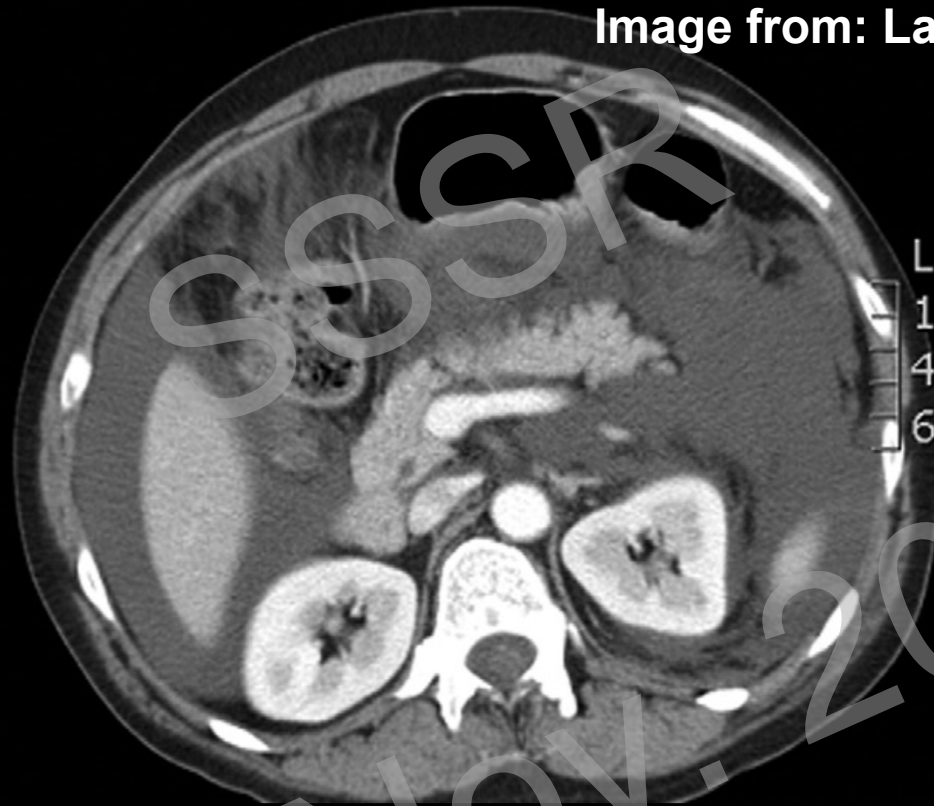
Postoperative Cartilage Damage: „Merci Docteur“



Cartilage damage caused by arthroscopy

Acute Complications

Image from: Ladner B., Arthroscopy.
2010 Jan;26(1):131



Intra- and retroperitoneal irrigation liquid after arthroscopy of the hip joint.
Intrathoracic fluid extravasation after hip arthroscopy.
Abdominal compartment syndrome after hip arthroscopy
Abdominal fluid extravasation during hip arthroscopy

Case: 30y male, FAI

Preop



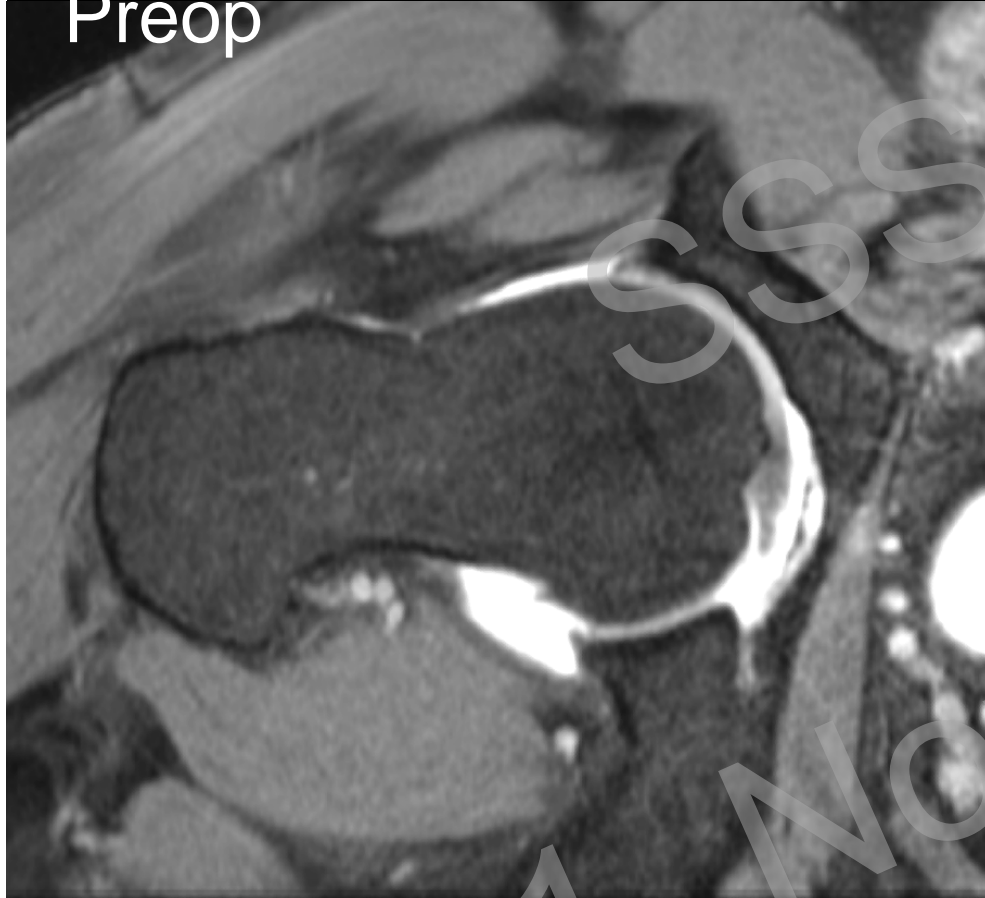
Case: 30y male, FAI

Preop

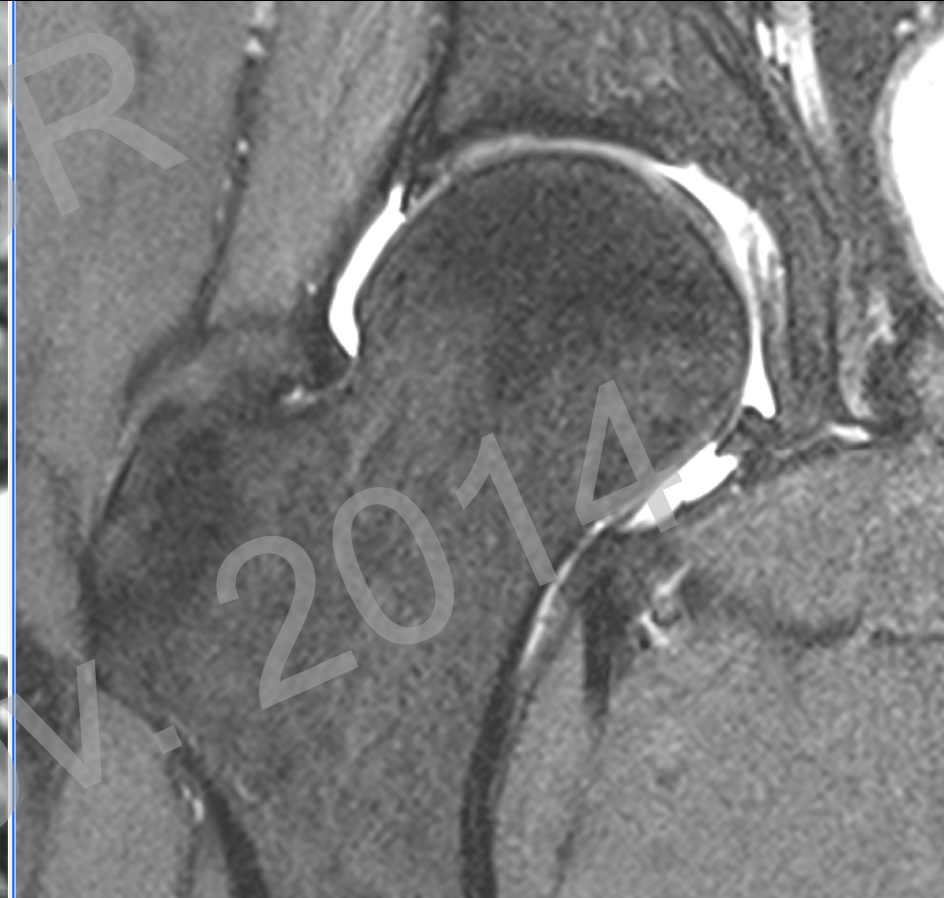


Case: 30y male, FAI

Preop



Radial - MR arthrography



Coronal – MR arthrography

Postoperative Radiograph

Postop



Persistent symptoms after open FAI surgery

Postoperative Radiograph

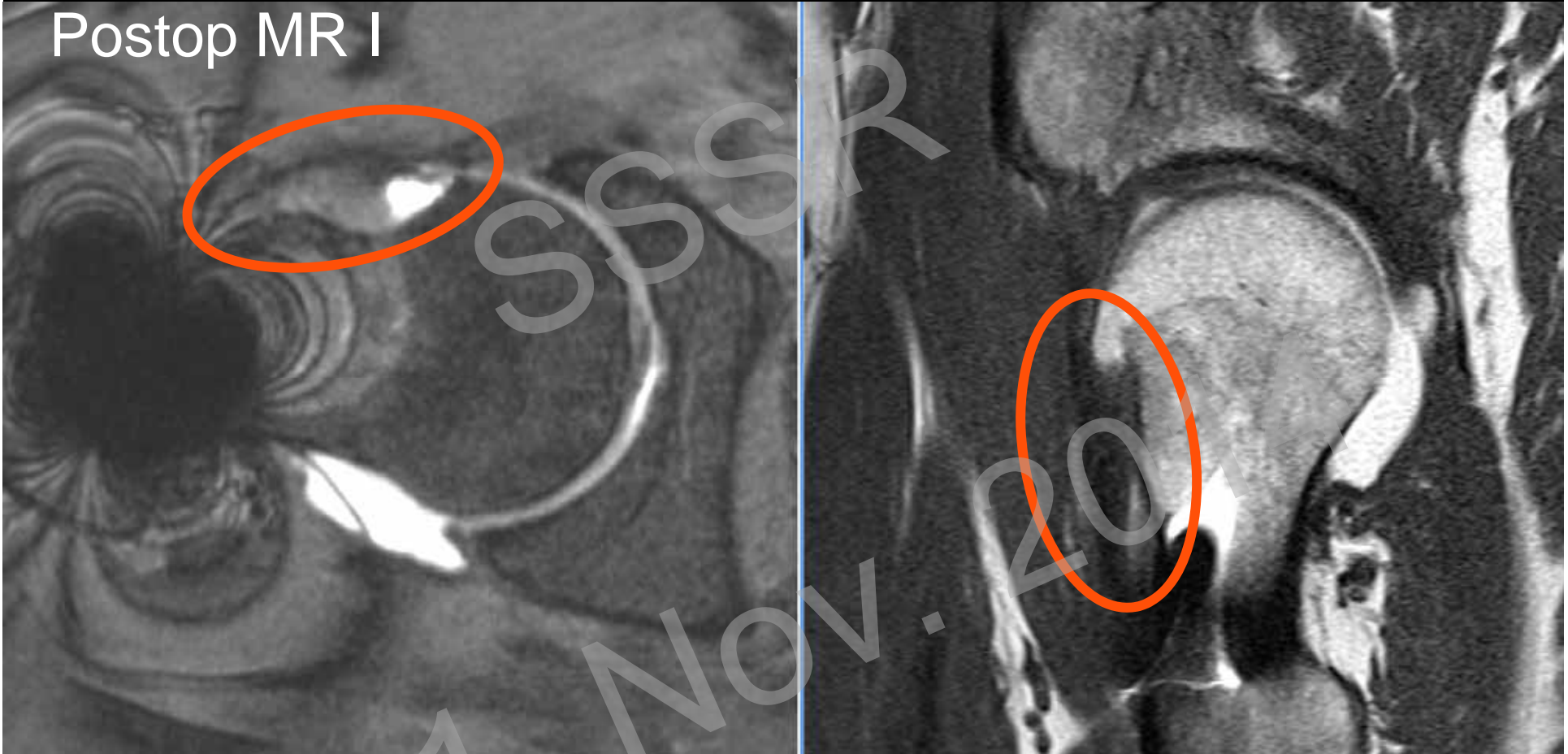
Postop



Persistent symptoms after open FAI surgery

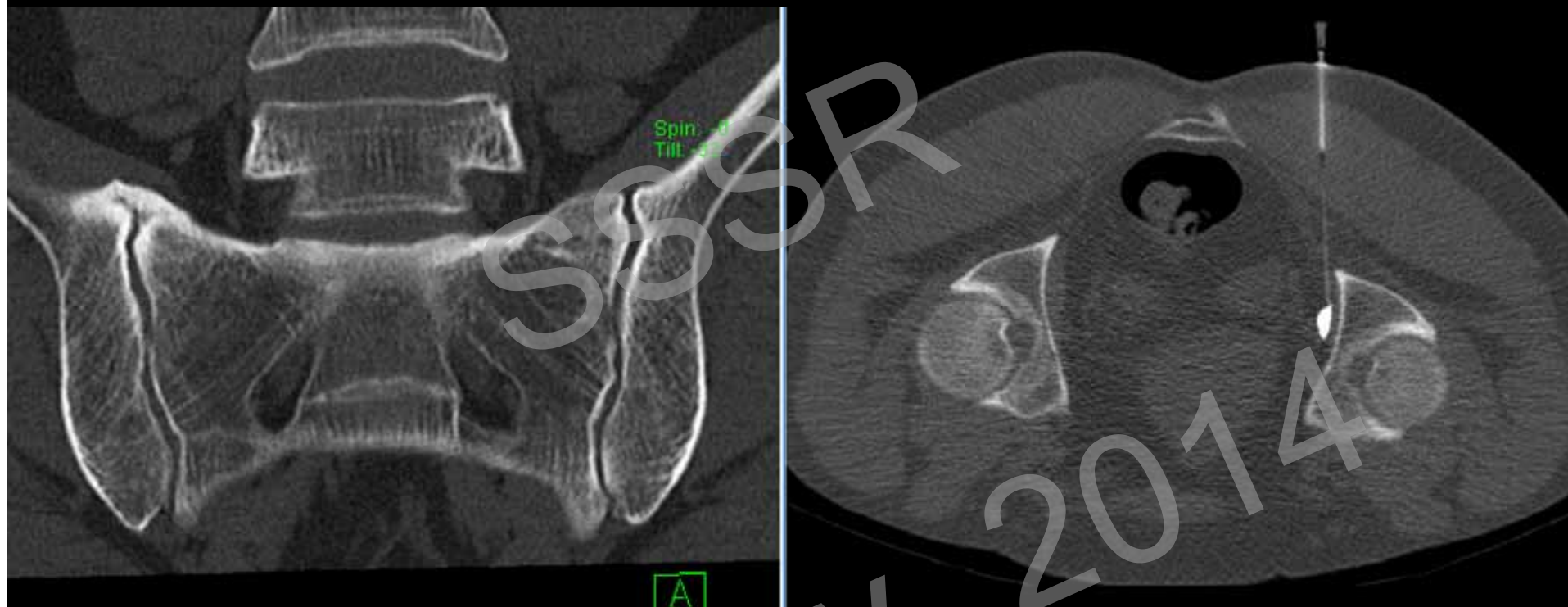
Adhesions

Postop MR I



Anterior Adhesions.

Various treatments



Adductors, inguinal hernia

Lumbar spine

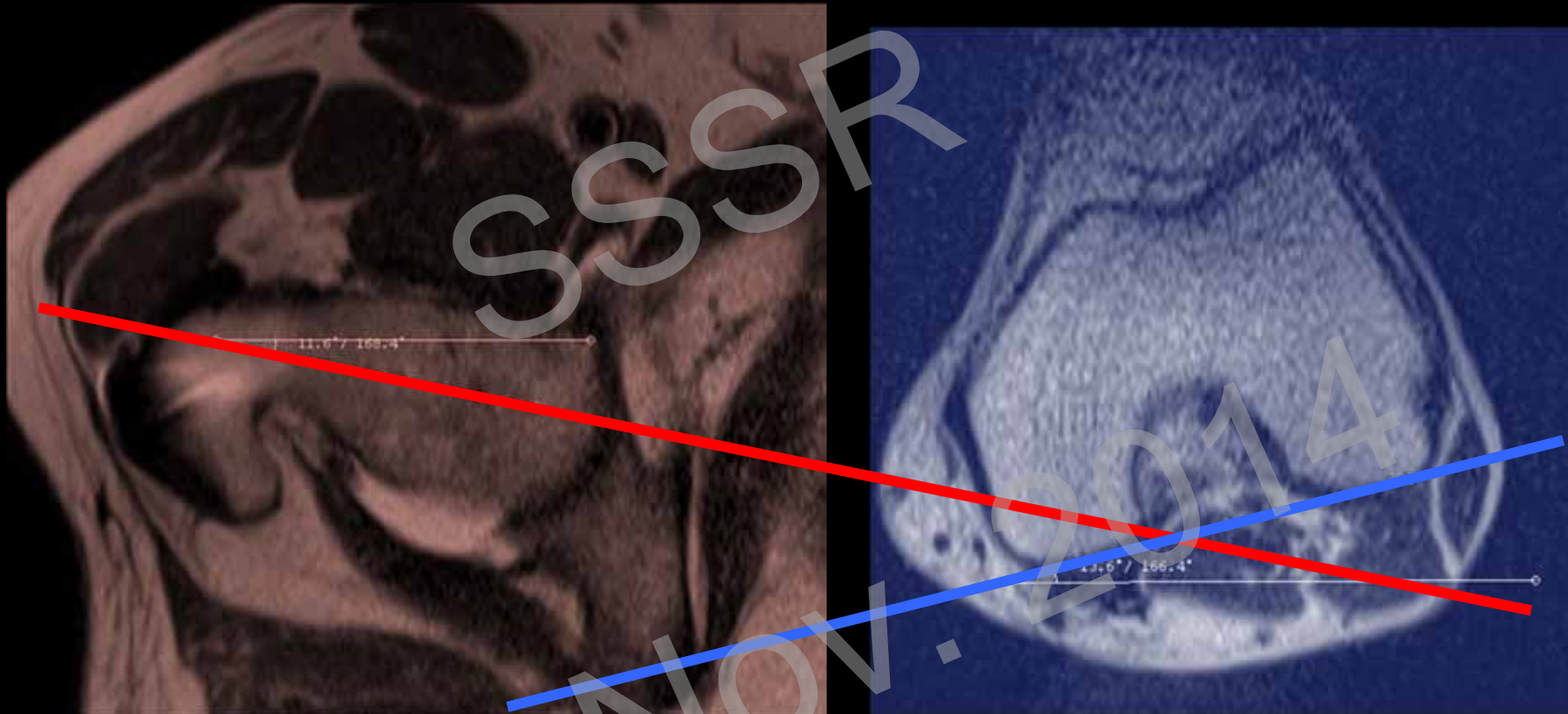
SI joint injections

Pudendal nerve injection

Recurrent deformity, adhesions?



Femoral Torsional Malalignment



40 ° femoral retrotorsion

Thank you for your attention



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Swiss Society of
Musculoskeletal Radiology

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1. Nov. 2014