

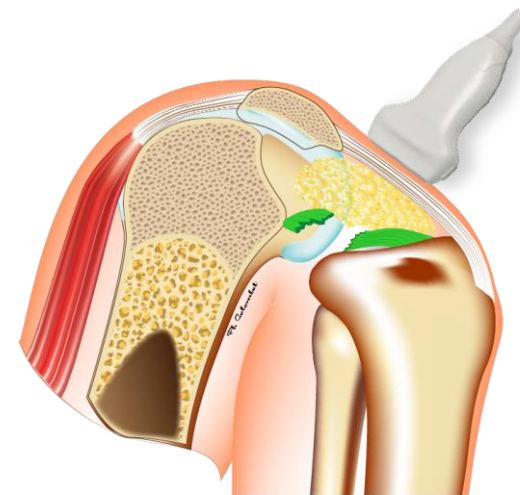


Dynamic ultrasound imaging in ACL lesions and preoperative decision making

Burt Klos

Stephan Konijnenberg

The Netherlands

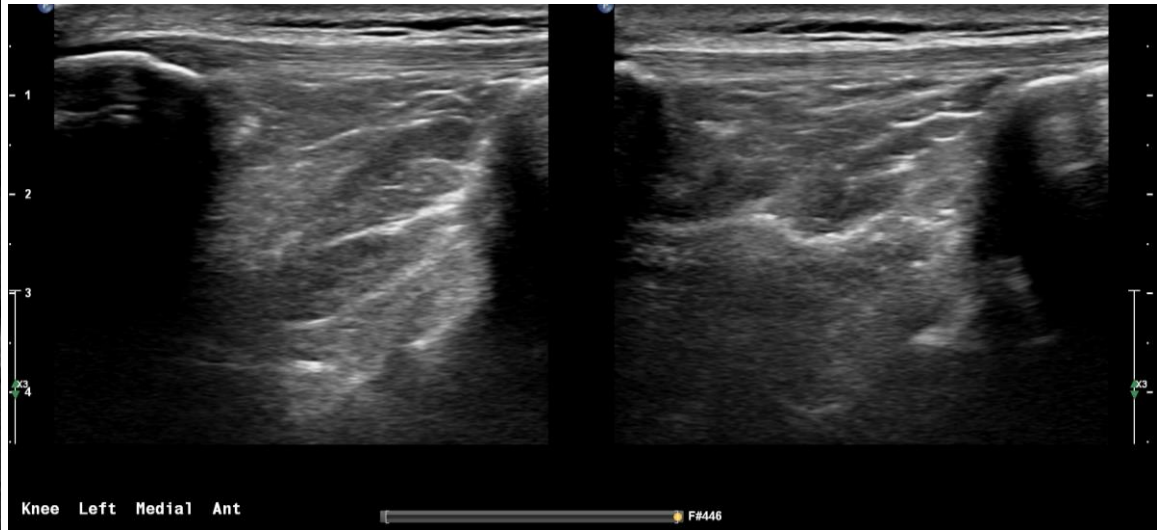
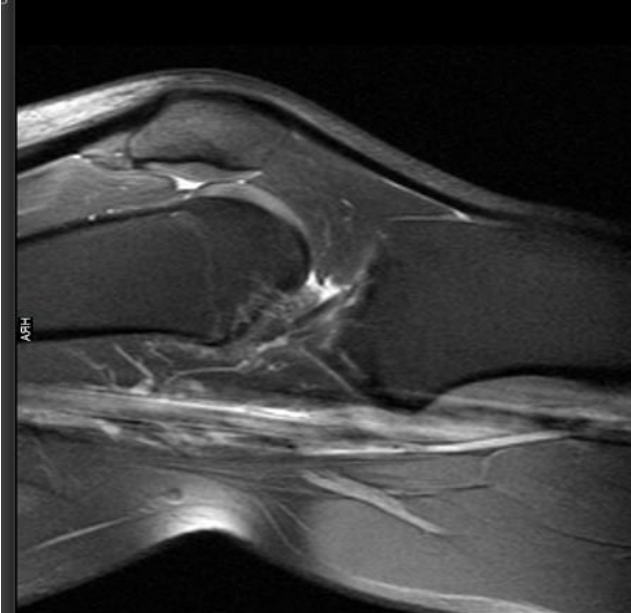
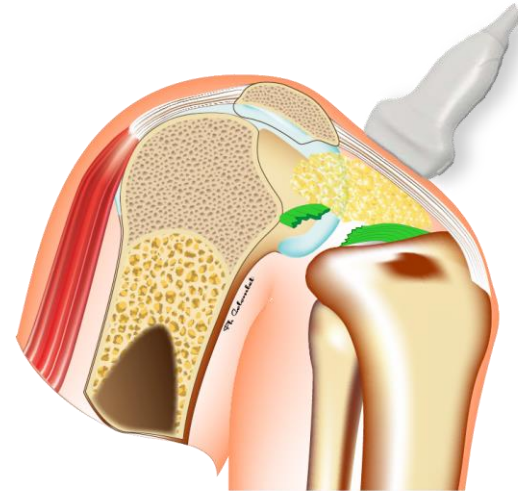
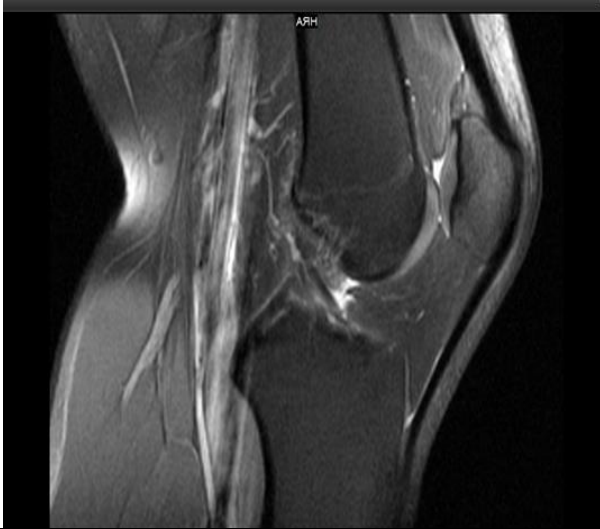


Misunderstanding Knee Imaging

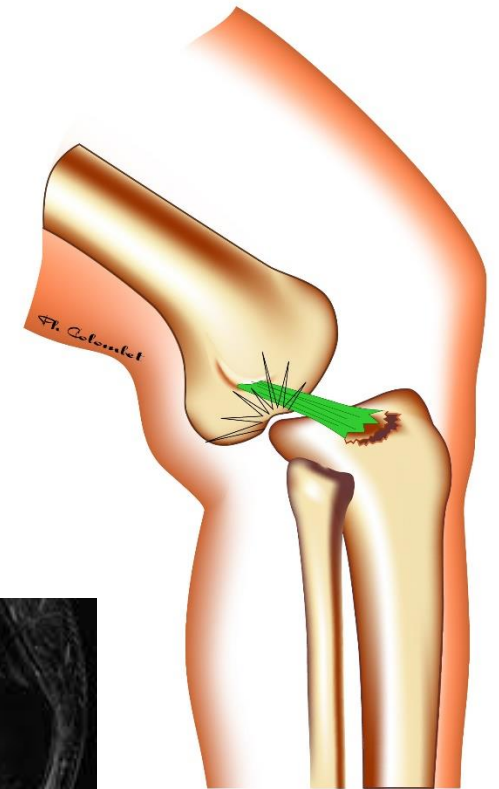
- Knee X ray is of little value in acute knee injury
- Ultrasound can not detect meniscus / ACL lesions
- Most intra articular lesions can be detected with MRI



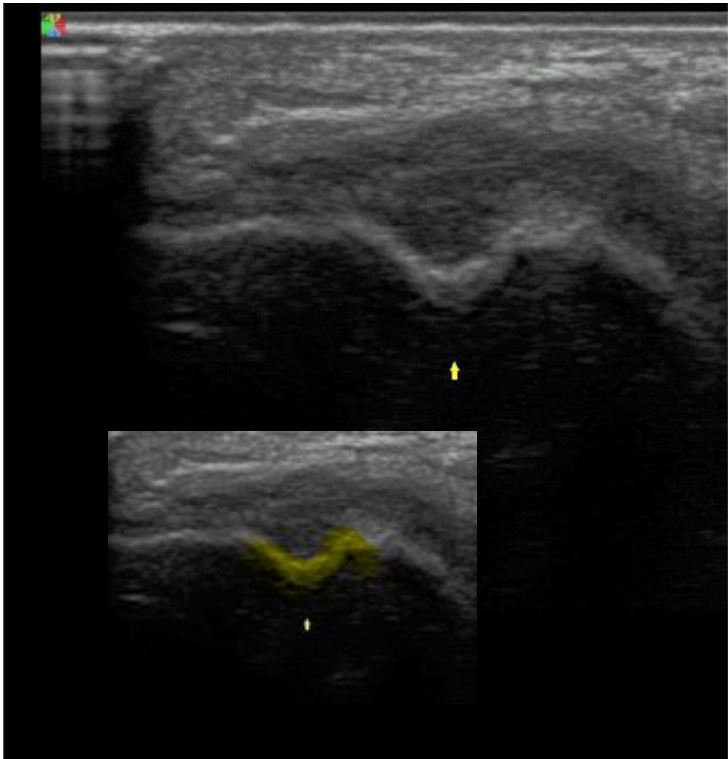
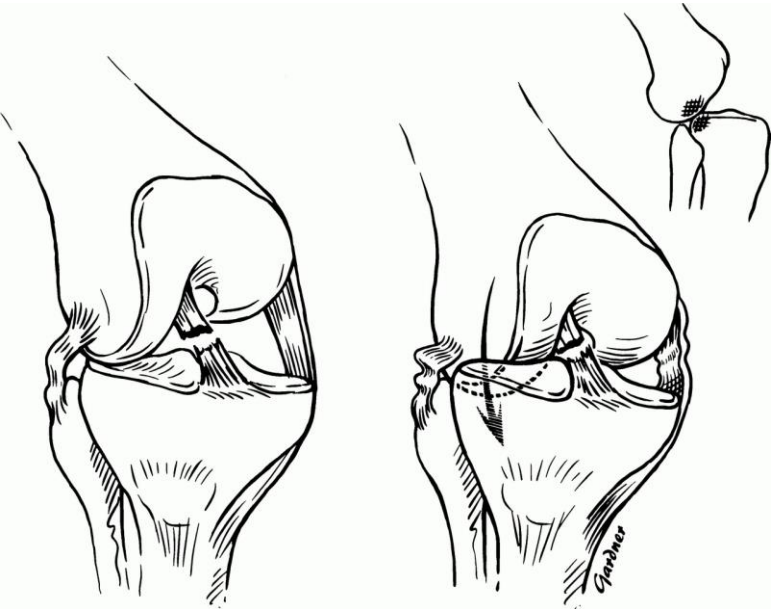
MRI intact ACL ?



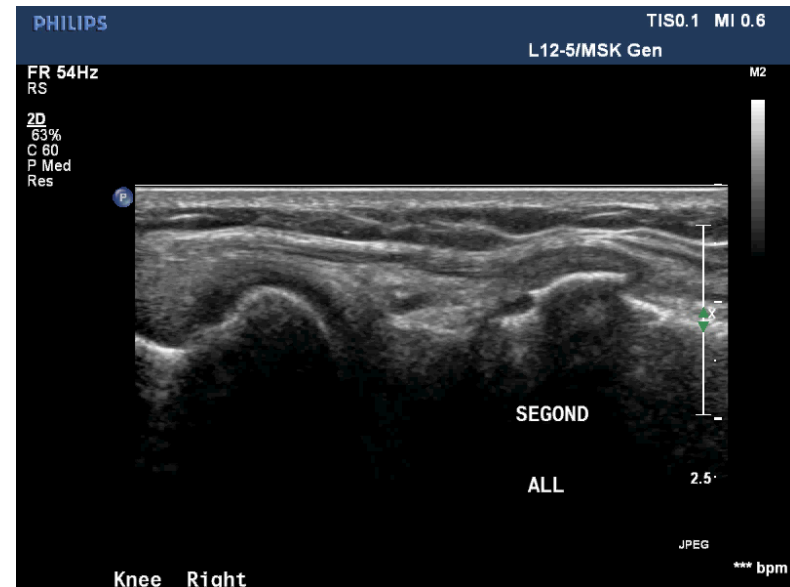
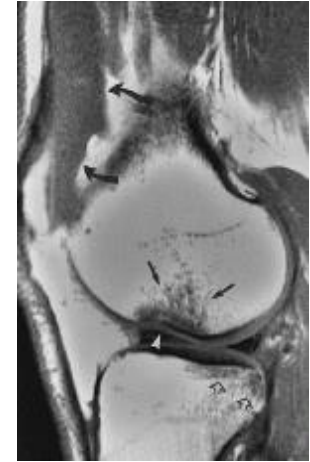
Primary injury / plain X ray information



Impaction lateral FC



Segond and Impression fractures



MRI	Echografie
Expensive	Cheap
Extensive information	Focused information
Static	Dynamic
No intervention	Intervention possible (injection)
Availability / waiting time	Depending local situation / less waiting
Patient no interaction Claustrobic (5 %)	Patient friendly Interactive .
Patient passive role	Interactive role patient

In flexion

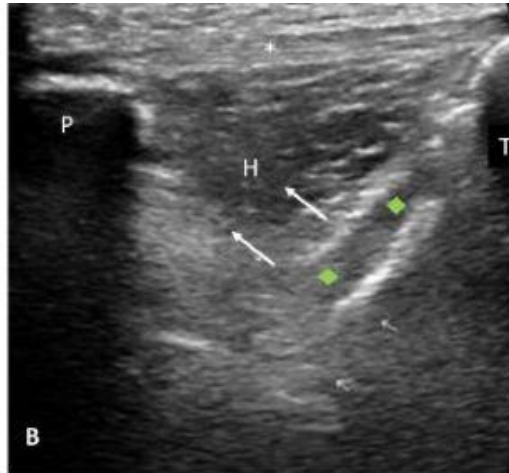
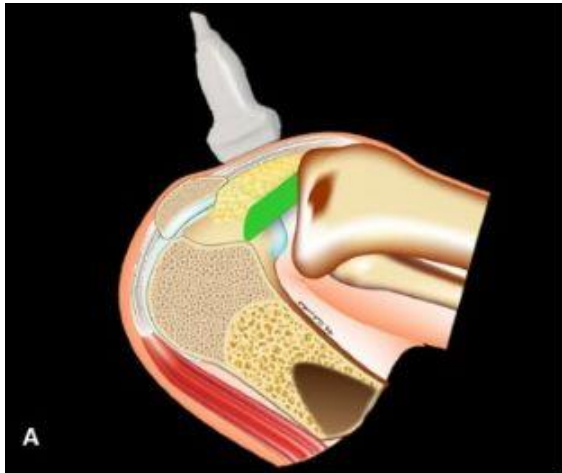
- Anterior meniscus
- ACL
- Bone lesions

Prone

- Posterior meniscus
- PCL







Normal ACL: anatomic drawing and corresponding ultrasound image

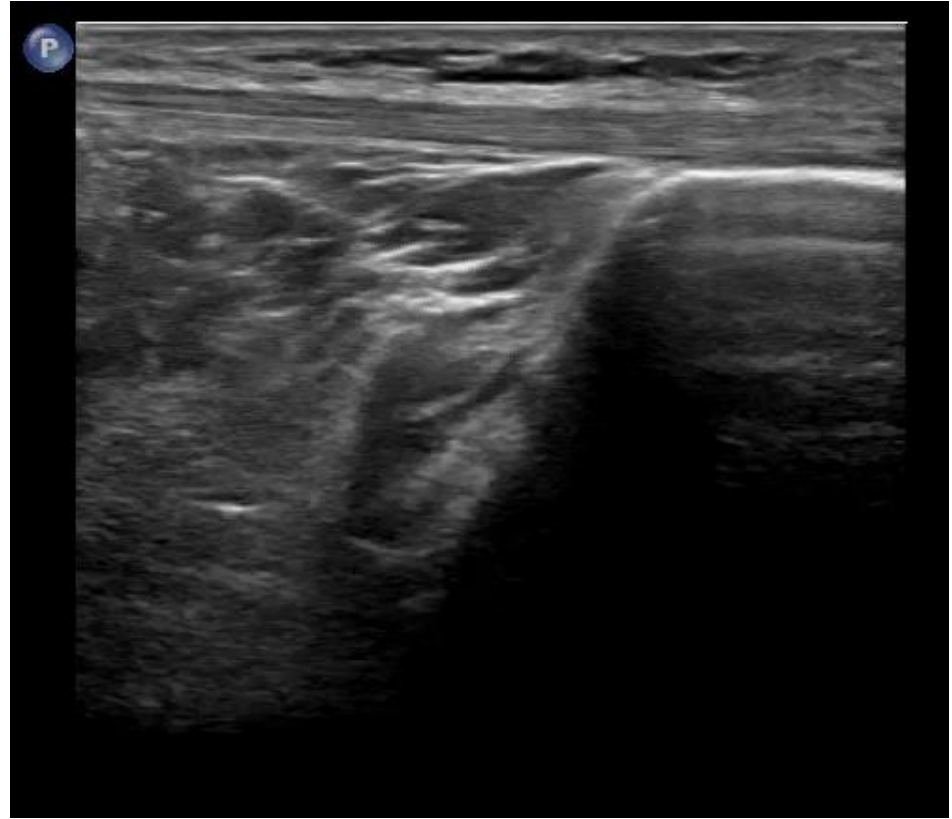
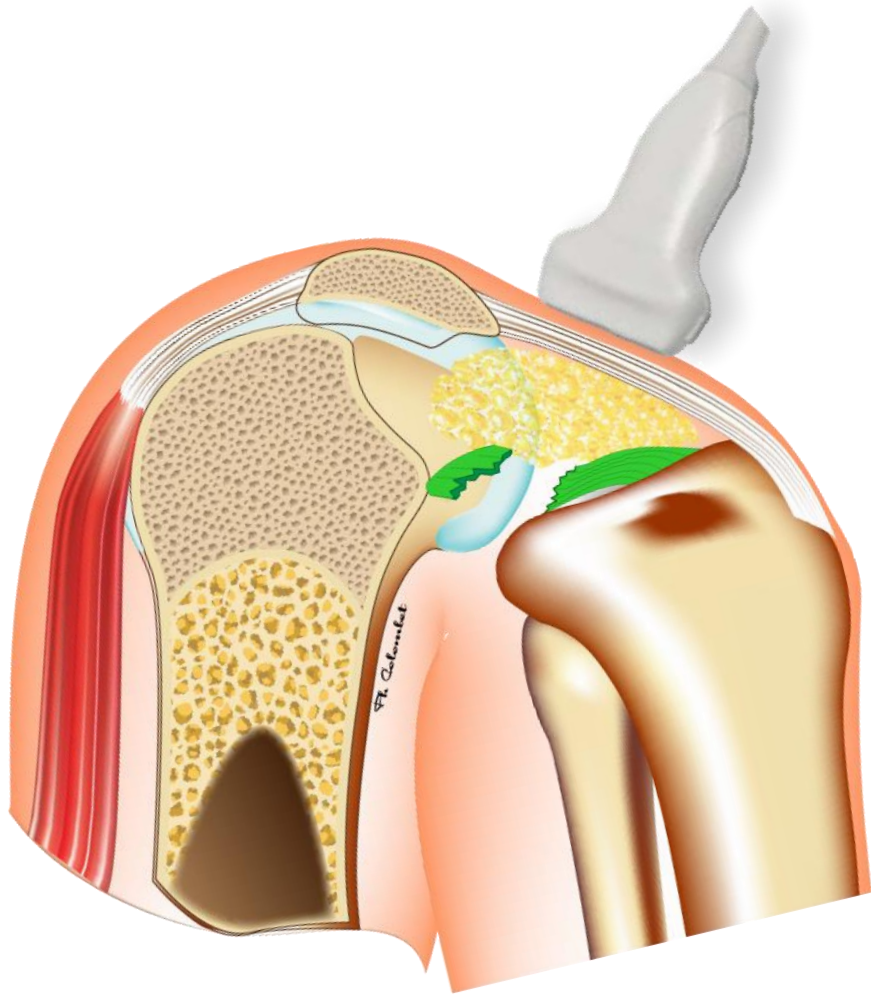
**Diagnostic *accuracy of dynamic*
ultrasound imaging in partial and
complete anterior cruciate ligament
tears: a retrospective study in
247 patients**

Manon Breukers,^{1,2} Dorieke Haase,^{1,2} Stephan Konijnenberg,² Tiburtius V S Klos,²
Geert-Jan
Dinant,¹ Ramon P G Ottenheijm

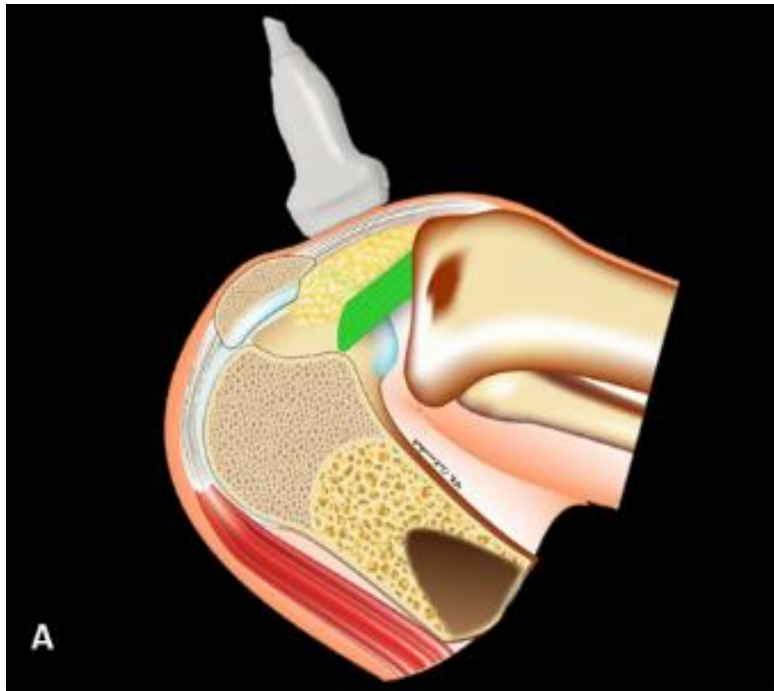


ICONE

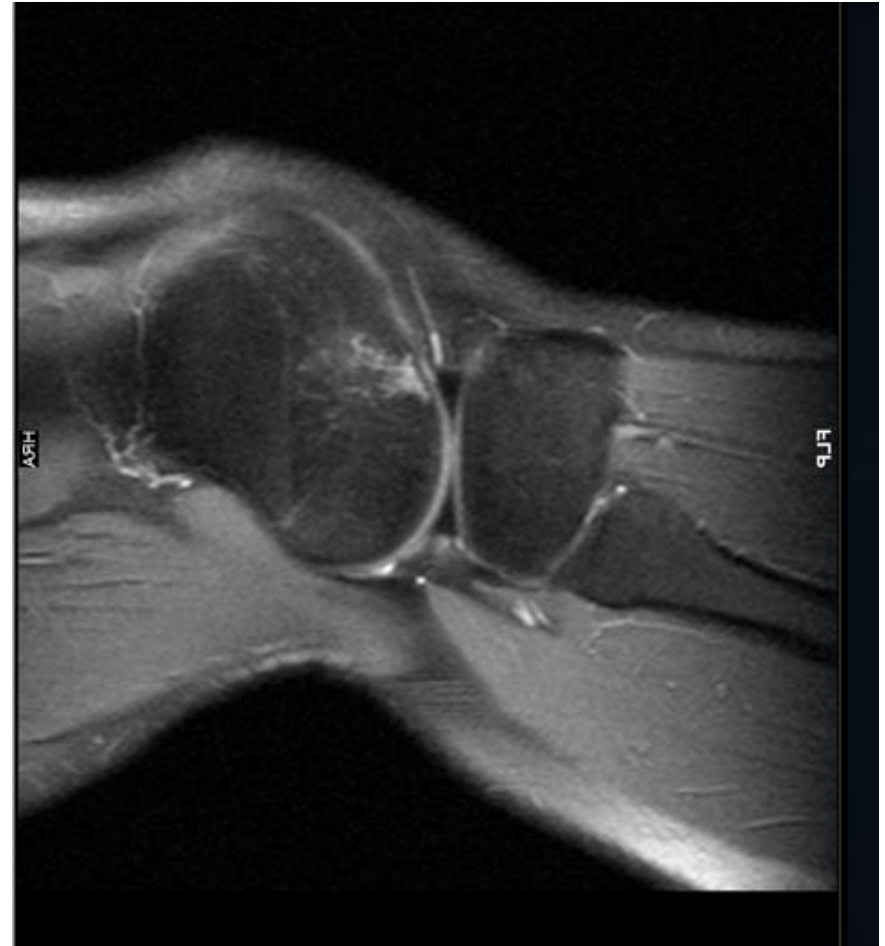
December 2019



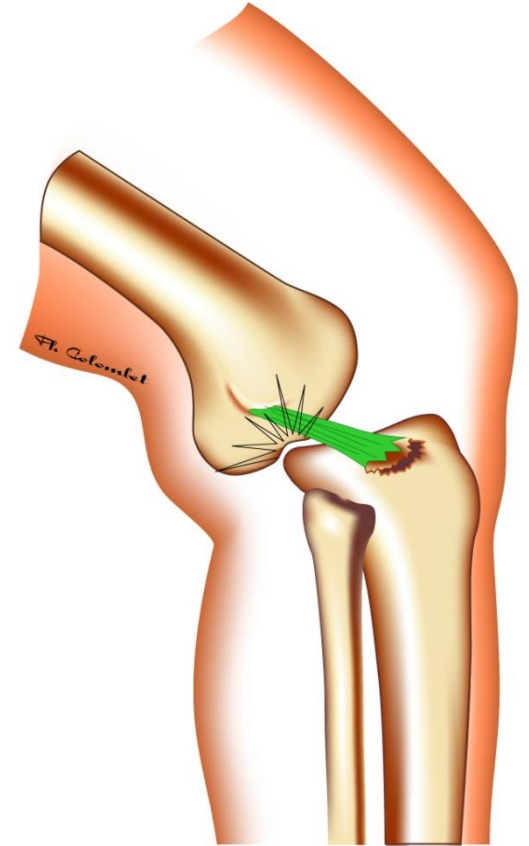
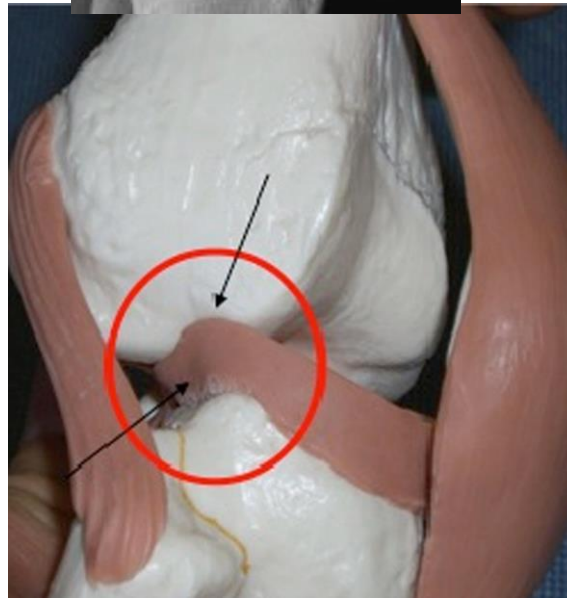
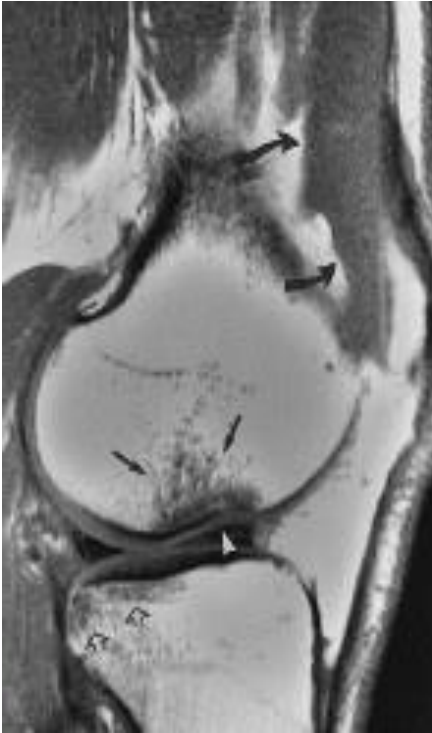
Intact ACL



Bone bruise MSU vs MRI



Combined lesions.

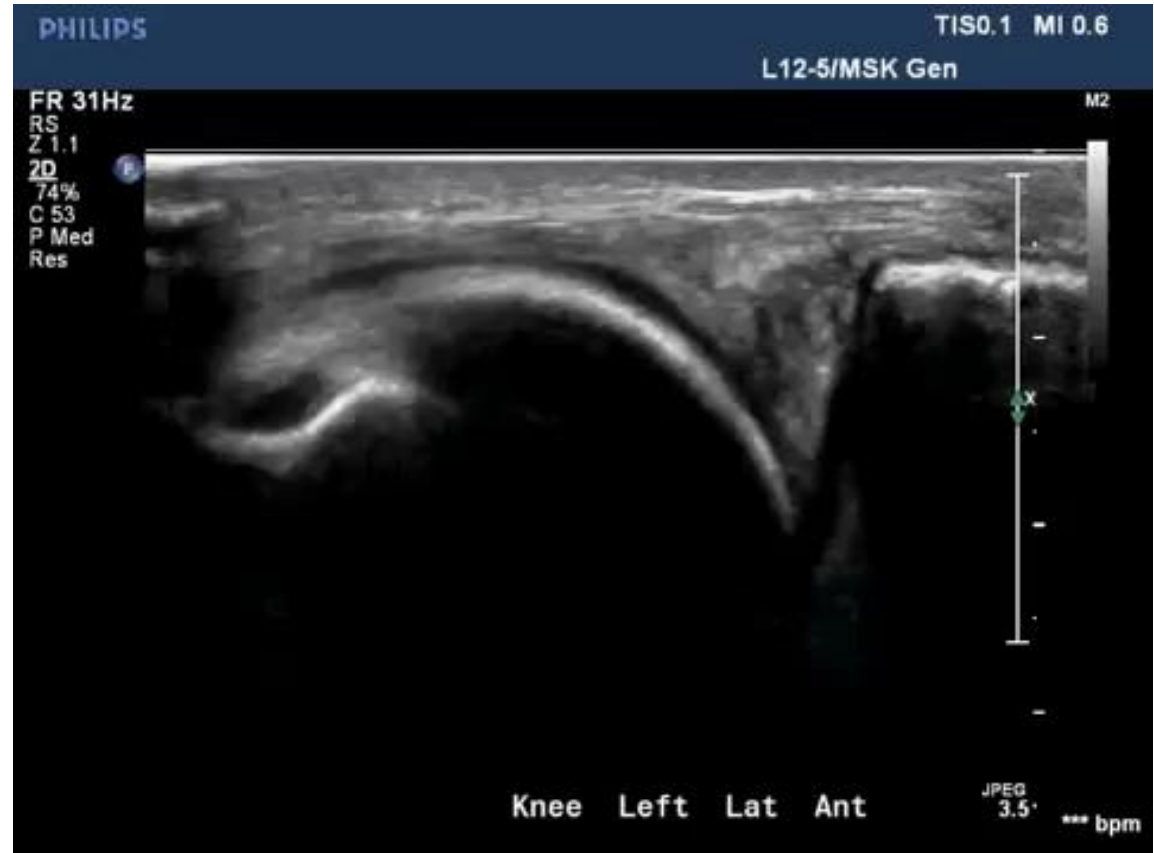


Combined ACL / MM



HR Dynamic Ultrasound

- Meniscus video

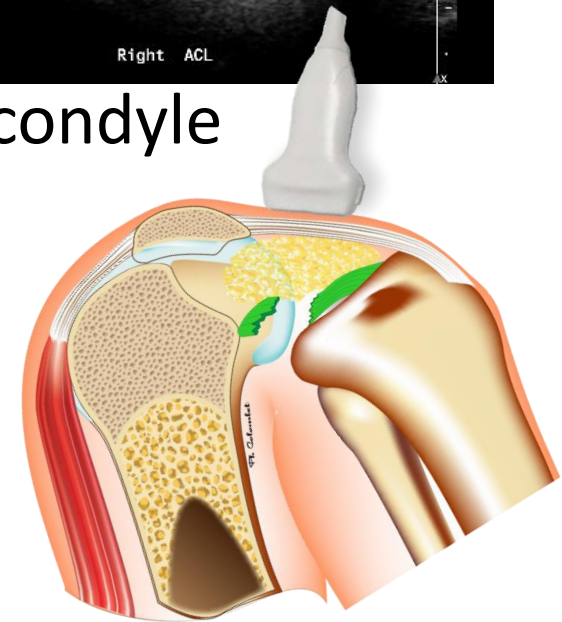
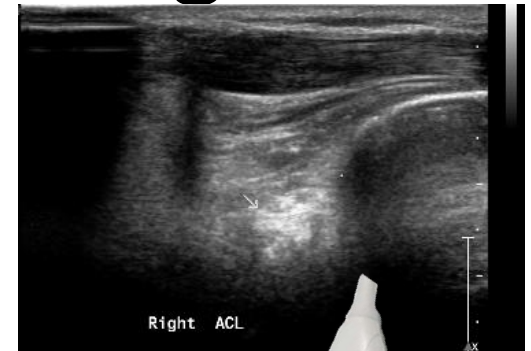


Knee instability

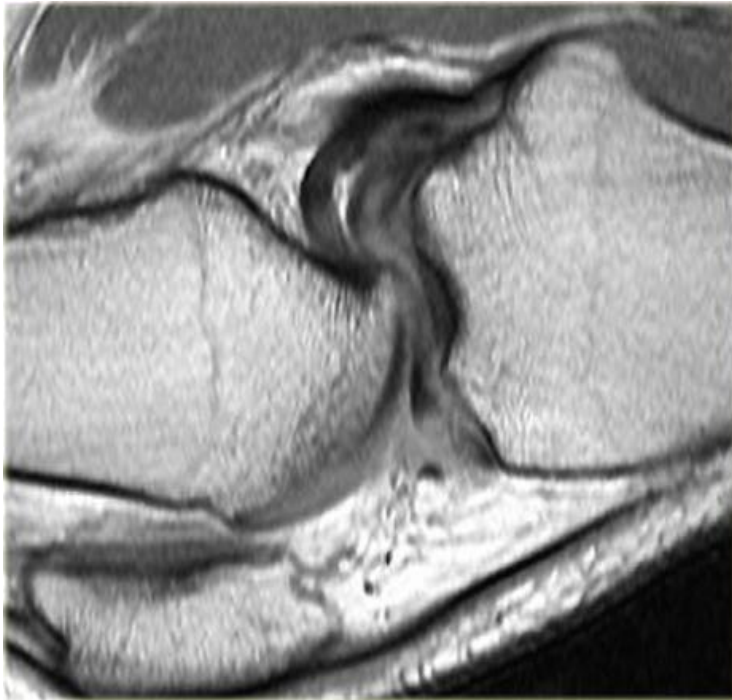


ACL # ultrasound findings

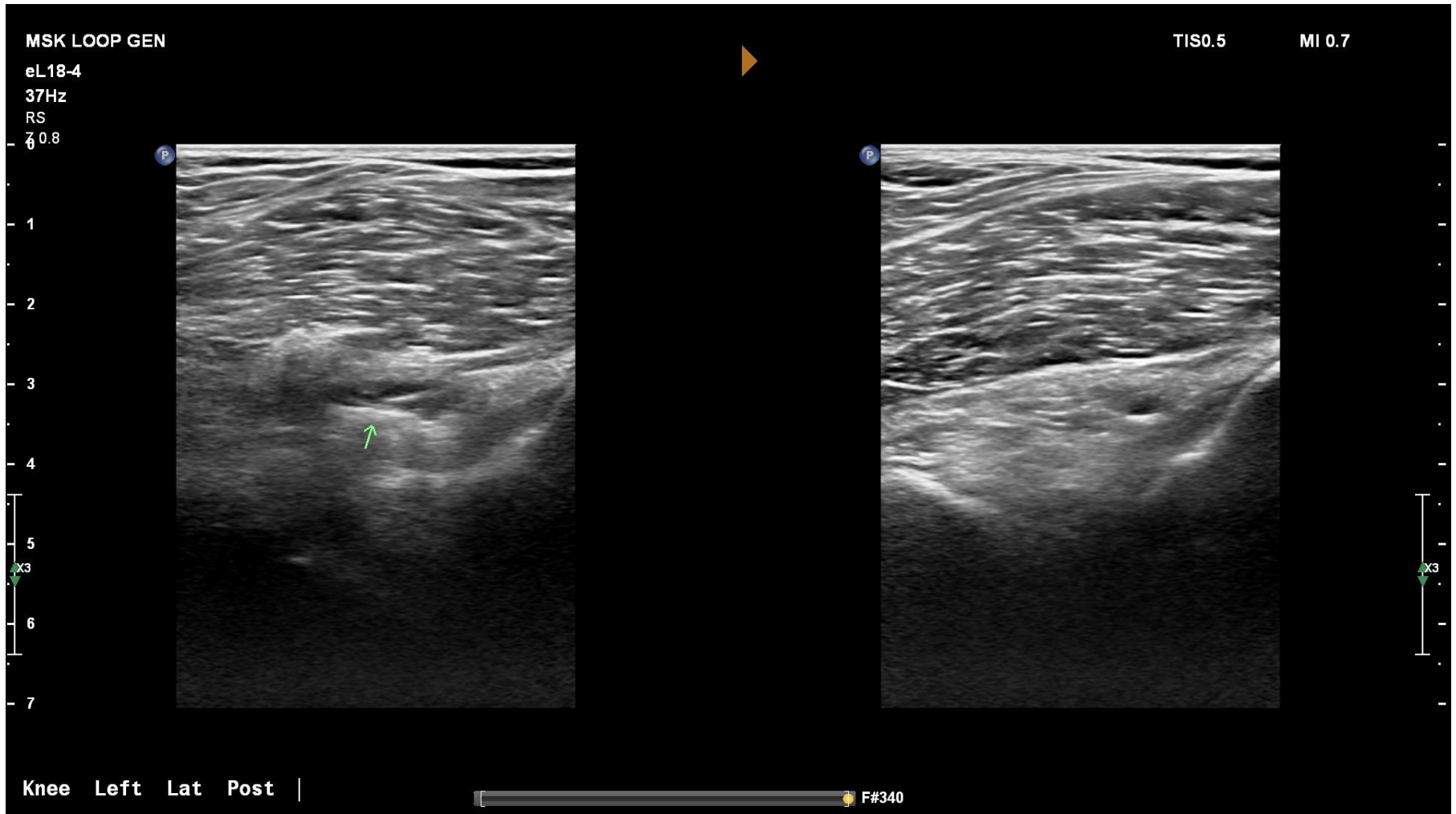
- Anterior findings
 - Cyclops / scar tissue
 - Impaction fracture lateral femoral condyle
- Hyperflexion stress
 - Dynamic resistance / elongation
- Posterior findings
 - Scar tissue PCL
 - Rotation / translation posterior med plateau



MRI bugling PCL



PCL scar tissue



Laxity check



TEST 90° - DRAWER
REFERENCE POSITION

ACL Surgeries X

P T F
1 2 C

PRE-OP. LAXITIES

- DRAWER
- ROTATION 90°
- LACHMAN
- ROTATION 30°
- VAR.-VALG. STABILITY
- PIVOT-SHIFT
- PRE-OP. SUMMARY

FLEXION: 89° ROTATION: 15° INT

Place the leg in the reference position for the drawer test (90°), without any drawer.

PRAXIM

A 3D computer-generated model of a knee joint, showing the femur (thigh bone) and tibia (shin bone) in a reference position for a drawer test. The model is rendered in a light blue color. Two yellow dots are visible on the tibia, likely representing tracking markers.

Rotation



TEST 90° - ROTATION ACQUISITION

Lateral (mm)

Ant 0 4

Post 4

Ext 13

13

Ant 2

Post 0 2

Medial (mm)

5 POSITIONS (MIN 10 - MAX 500)
FLEXION: 82° ROTATION: 10° EXT

Perform the rotation test at 90°.
BLUE pedal to stop the acquisition.

ACL Surgeries

P T F
1 2 C

PRE-OP. LAXITIES

DRAWER

ROTATION 90°

LACHMAN

ROTATION 30°

VAR-VALG. STABILITY

PIVOT-SHIFT

PRE-OP. SUMMARY

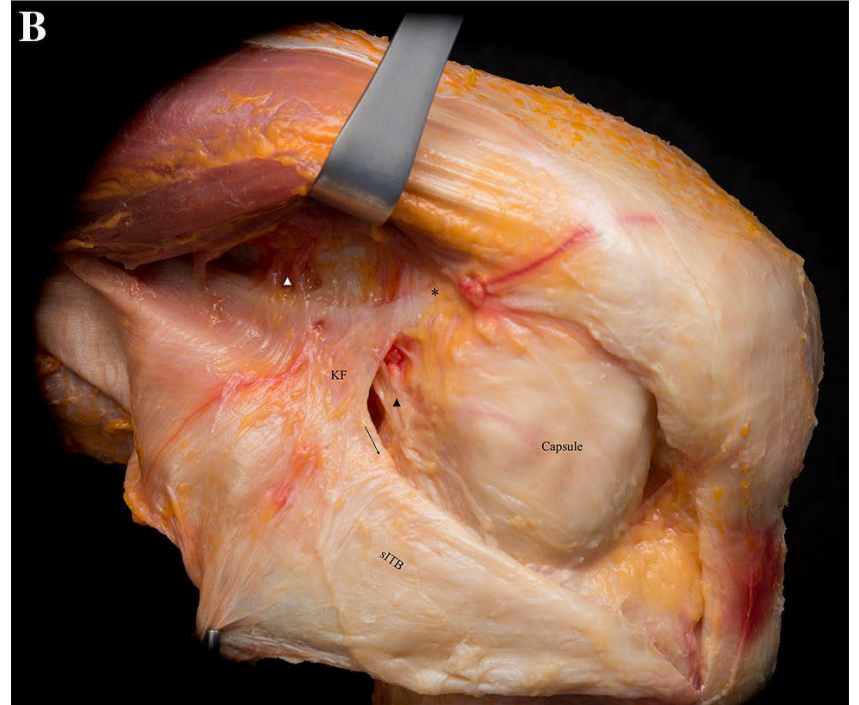
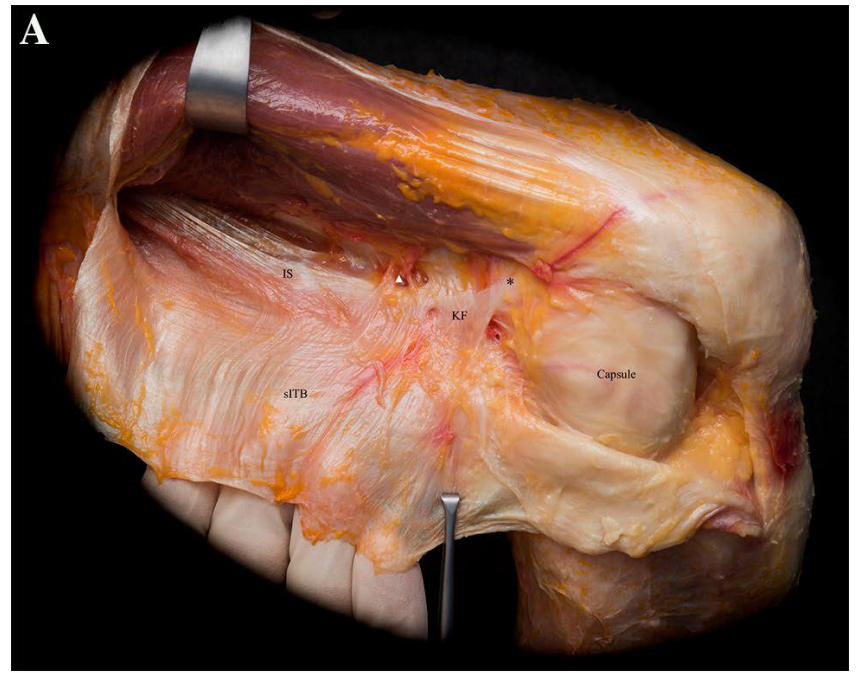
PRAXIM



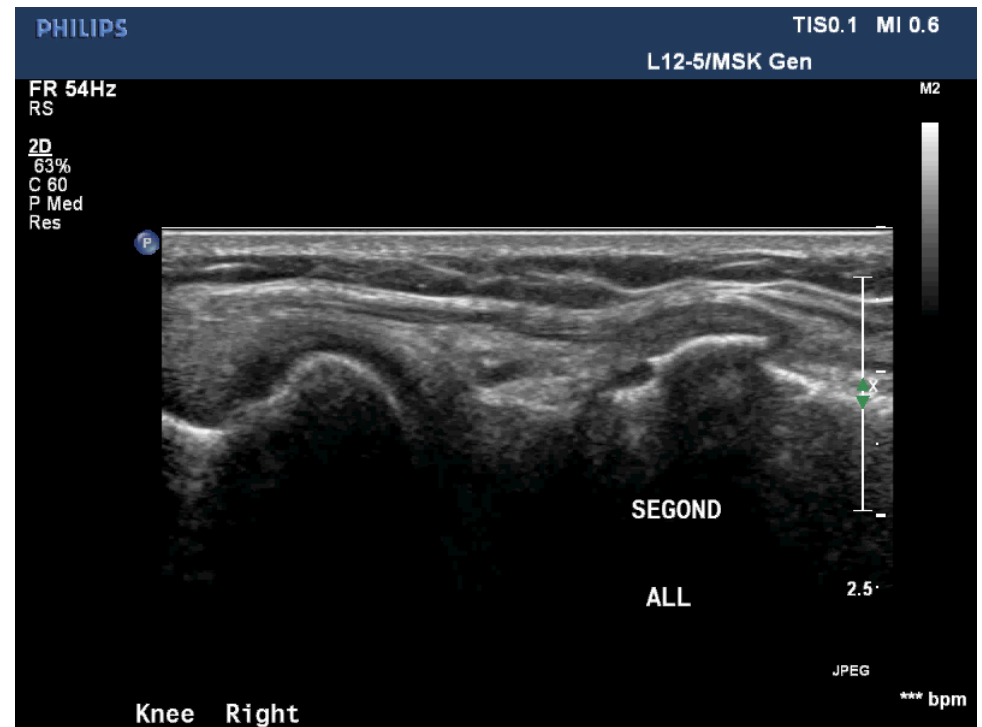
ICONE

Misunderstanding Segond lesion:

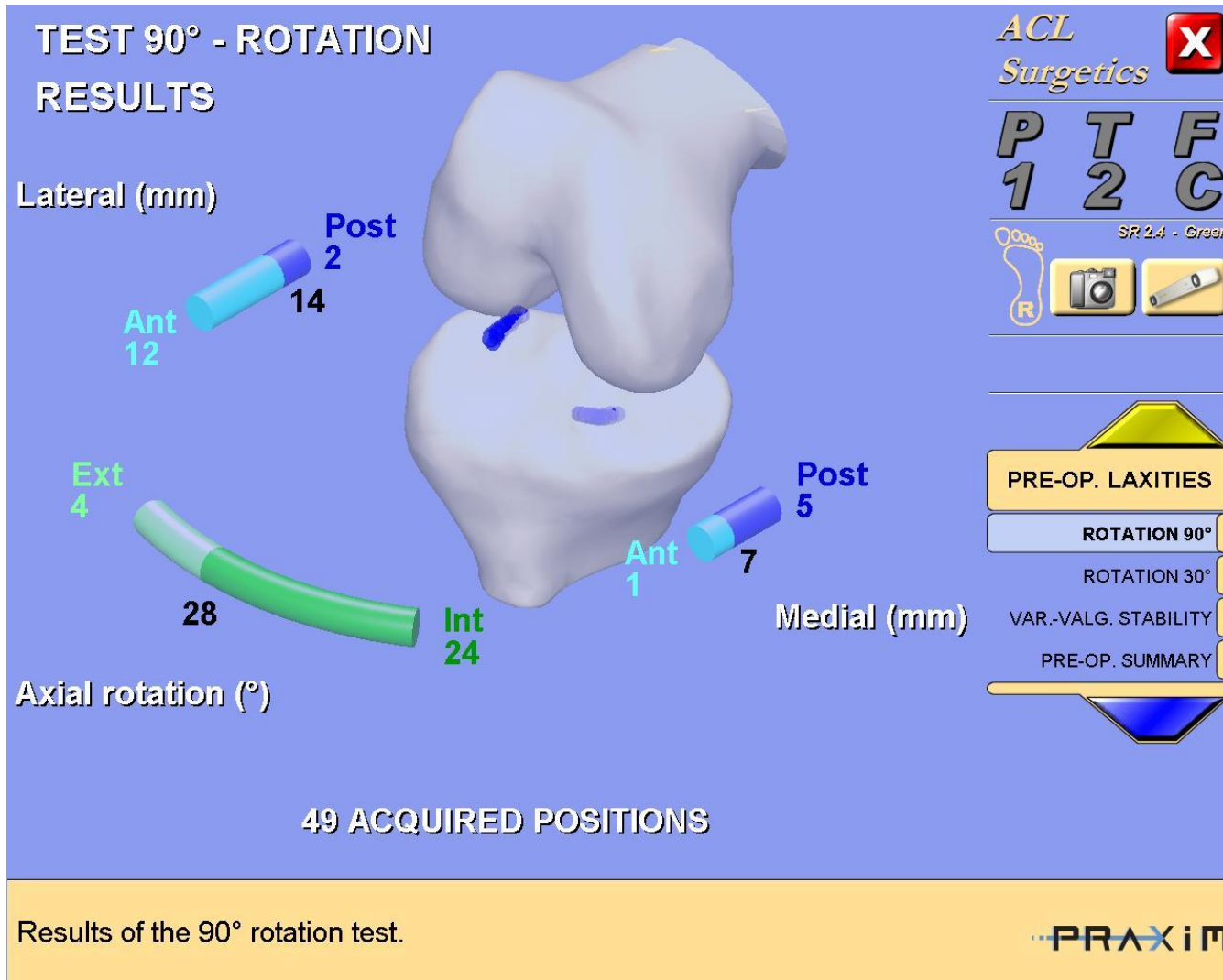
- Segond avulsion is only a minor small fragment (on X ray)
- Segond fracture is not attached to strong ligament complex (not just small ALL)
- Segond fracture is rare (hard to find)
- Segond fracture itself needs no treatment .
- Segond fracture cannot be fixed (with a implant)

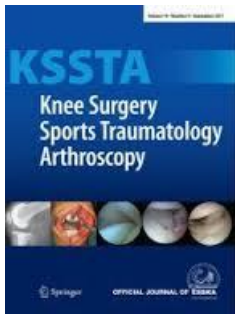


Segond fracture



ALL instability





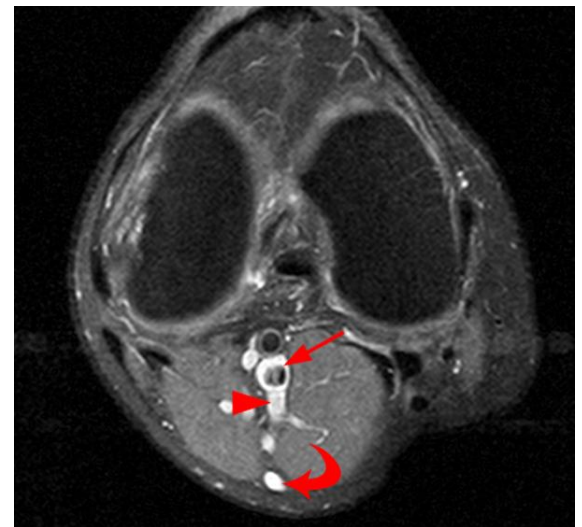
KSSTA April 2017

- High prevalence of ALL complex Segond avulsion using ultrasound imaging .
- Klos / Scholtes / Konijnenberg
- Ultrasound should be considered in case of impaction fracture to check for Segond avulsion.



Thrombosis in acute knee trauma

- Dong JT, Wang X, Men XQ (2015) Incidence of deep venous thrombosis in Chinese patients undergoing arthroscopic knee surgery for cruciate ligament reconstruction.
- Incidence : 34 of 282 patients (12.1 %)
- Knee Surg Sports Traumatol Arthrosc 23(12):3540–3544



Conclusion

- Preoperative MSU vs MRI dynamic possibilities
- Small lesions (avulsion , peripheric meniscus)
- ACL elongation
- Less problems with hematoma (acute knee trauma)
- Posttrauma venous thrombosis !?

