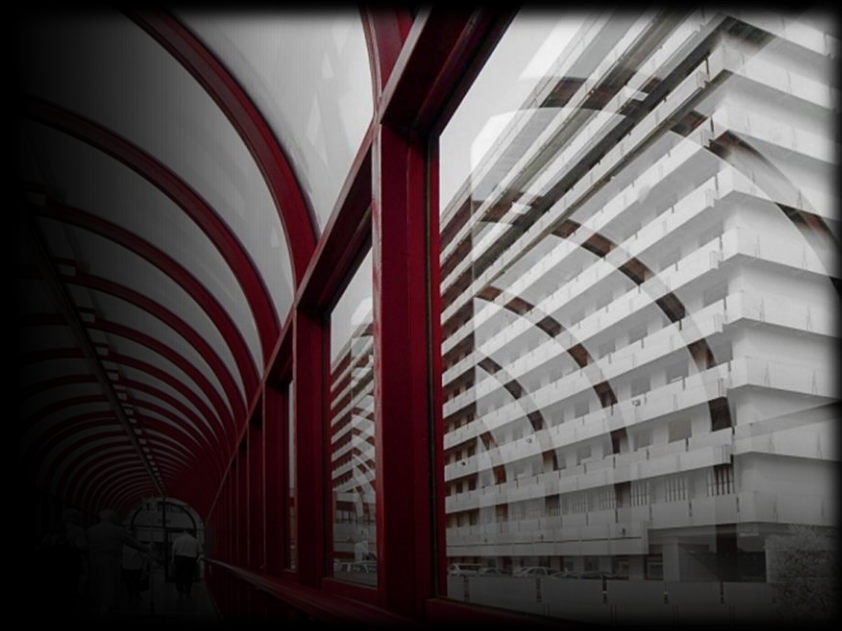




Lésions méniscales du genou à l'IRM

Souad Acid

V Perlepe, T Kirchgesner, J Malghem, F Lecouvet,
B Vande Berg,

Lésions méniscales

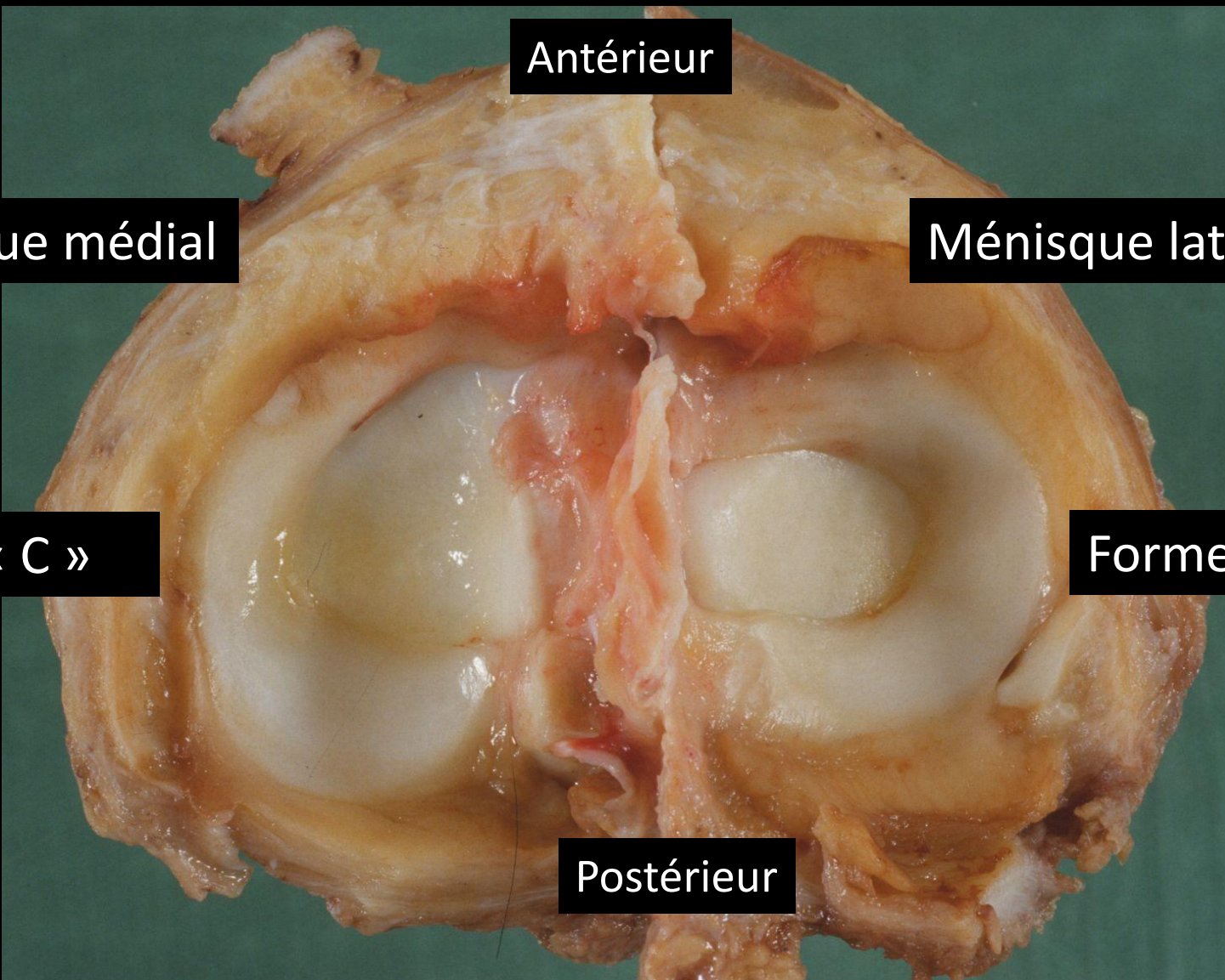
- Sensibilité limitée de l'examen clinique
- Intérêt du traitement arthroscopique
- IRM: meilleure imagerie non invasive

Objectifs

- Anatomie normale
- Lésions méniscales élémentaires
- Pièges: variantes anatomiques/post opératoire
- Lésions associées

Objectifs

- Anatomie normale
- Lésions méniscales élémentaires
- Pièges: variantes anatomiques/post opératoire
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Antérieur

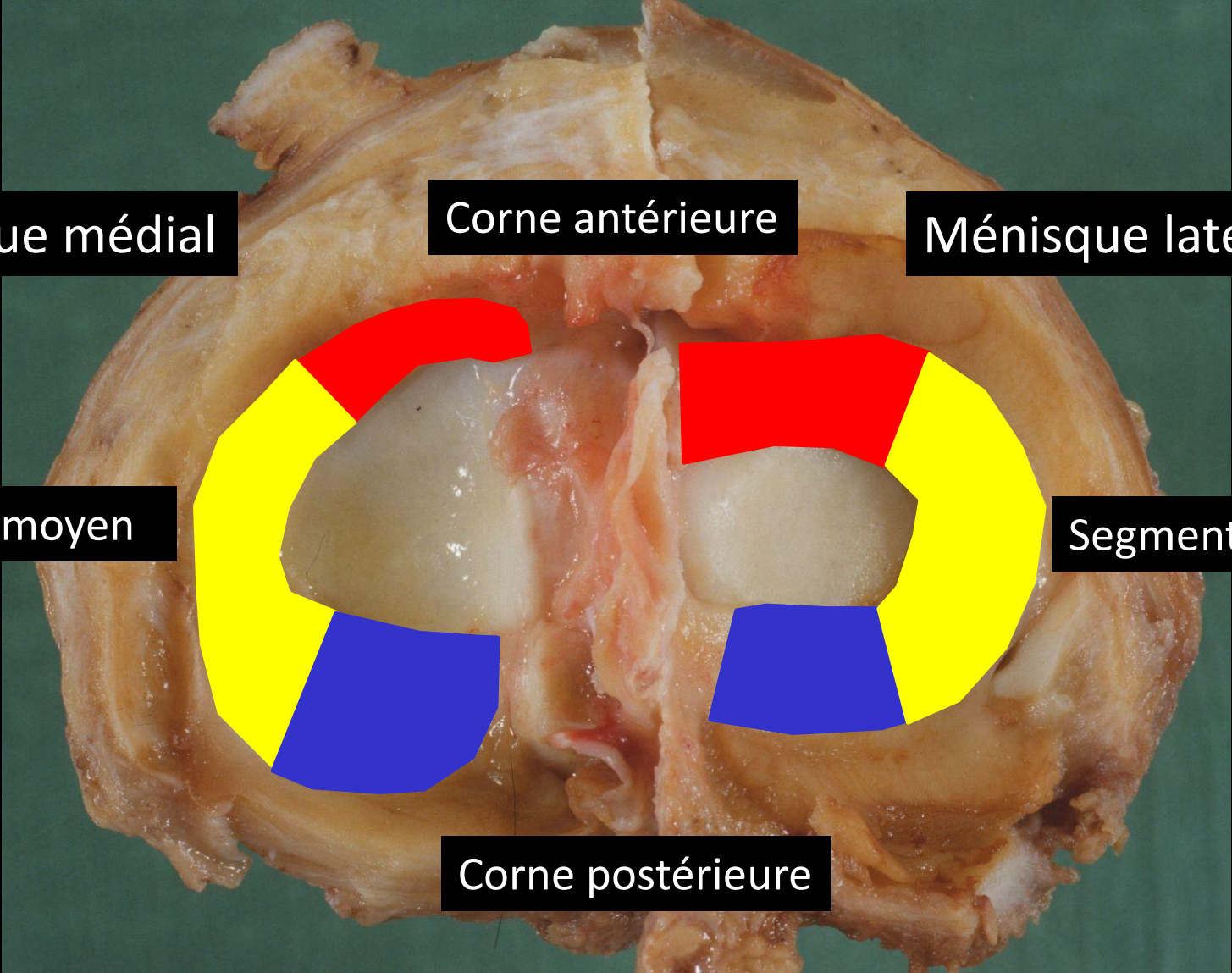
Ménisque médial

Ménisque latéral

Forme « C »

Forme « O »

Postérieur



Ménisque médial

Corne antérieure

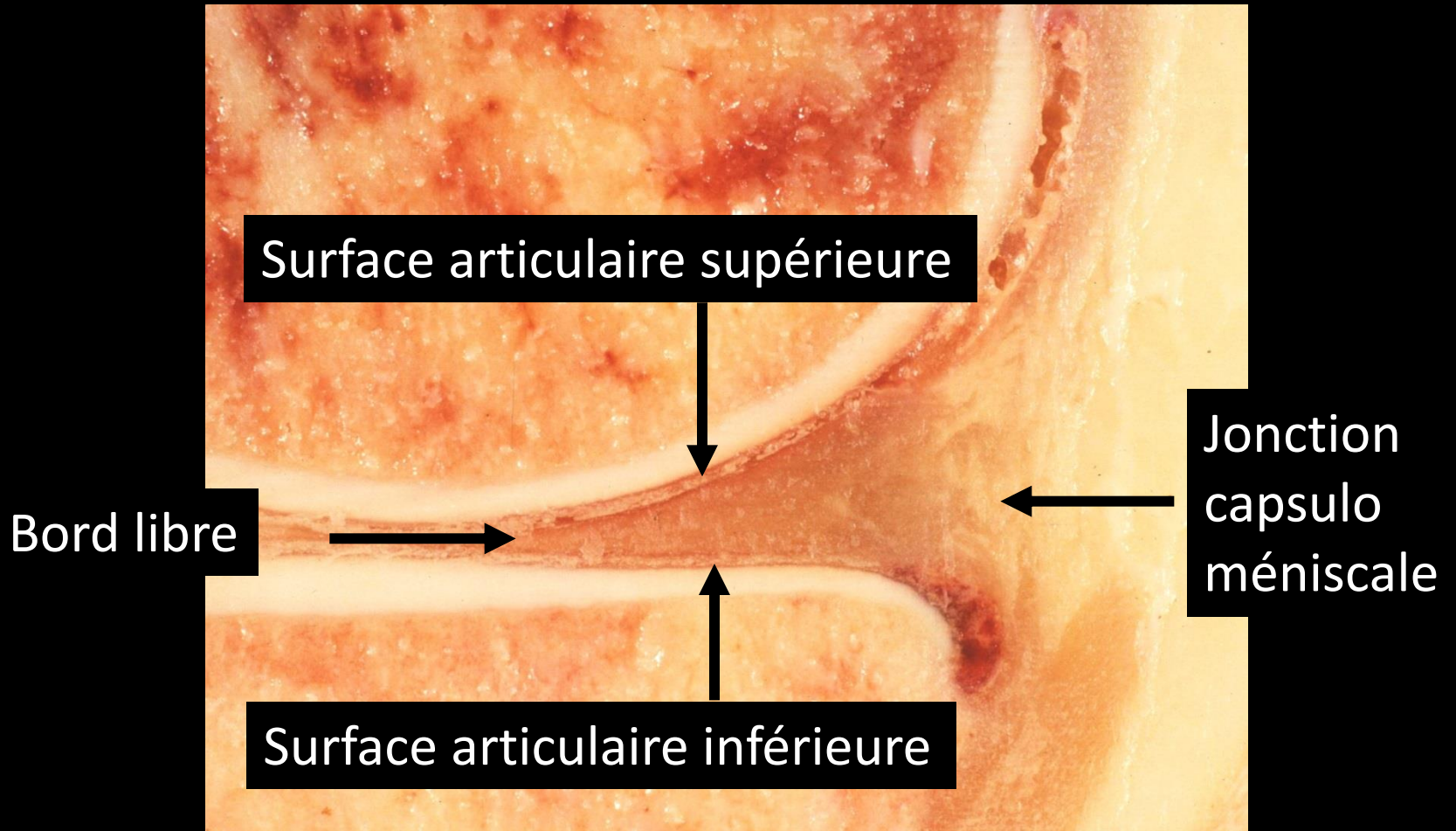
Ménisque latéral

Segment moyen

Segment moyen

Corne postérieure

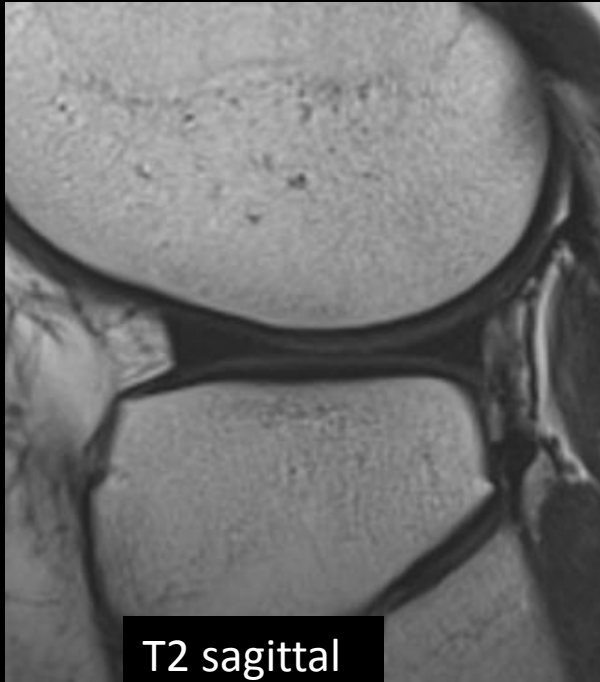
Coupe anatomique sagittale



Comment imager le ménisque?

- 3 plans/ 3D
- Coupes fines 3/4 mm
- Séquence « T2 » avec saturation de graisse: DPFS
- Séquence non saturée (T1/T2)
- Pas de gadolinium

Aspect du ménisque en IRM



T2 sagittal

Hyposignal

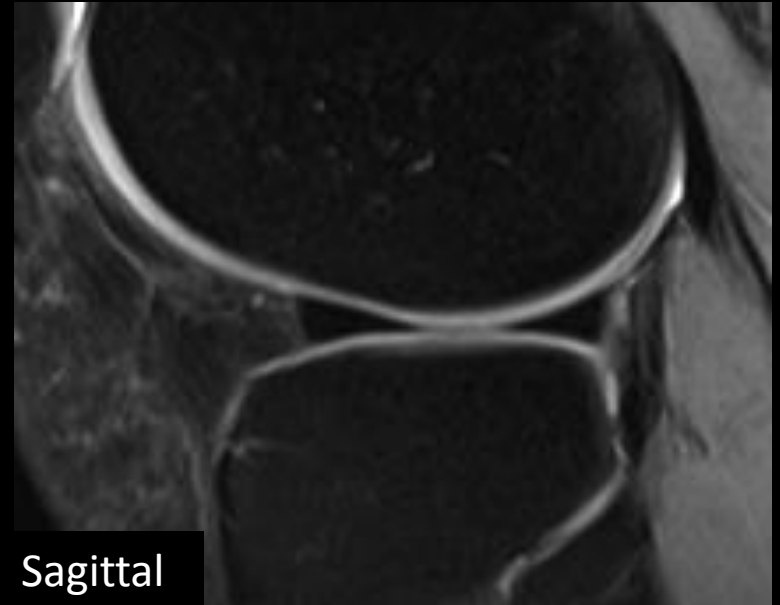
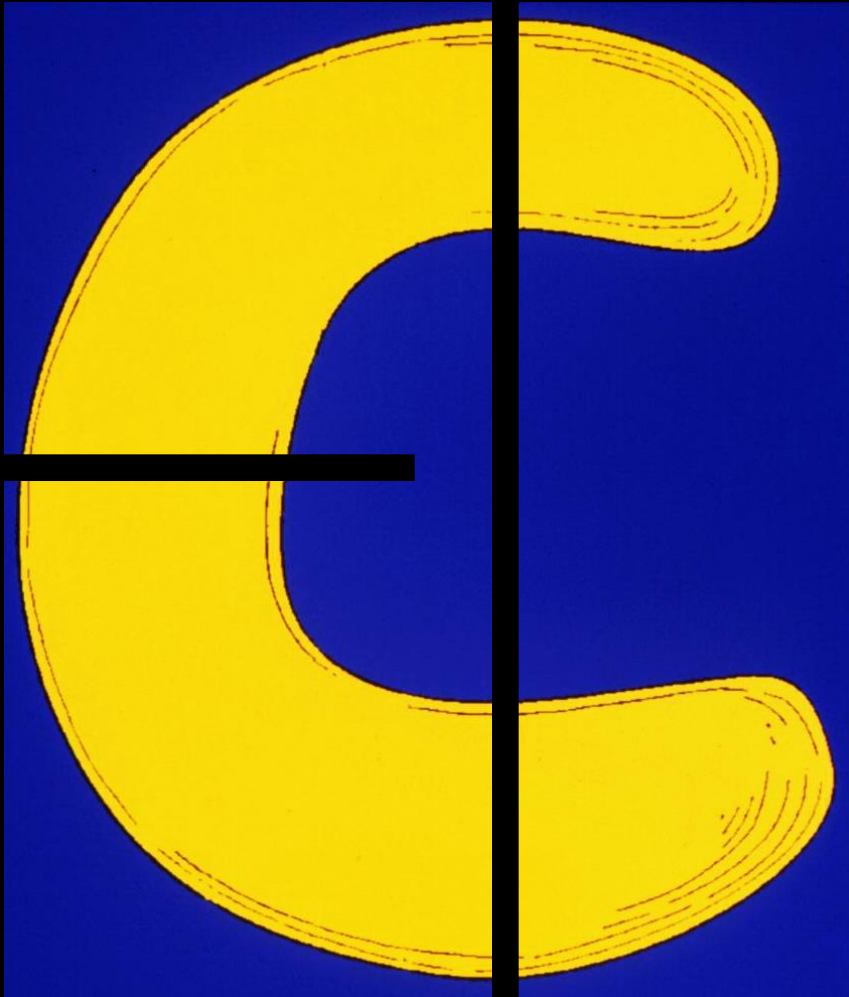


T1 coronal



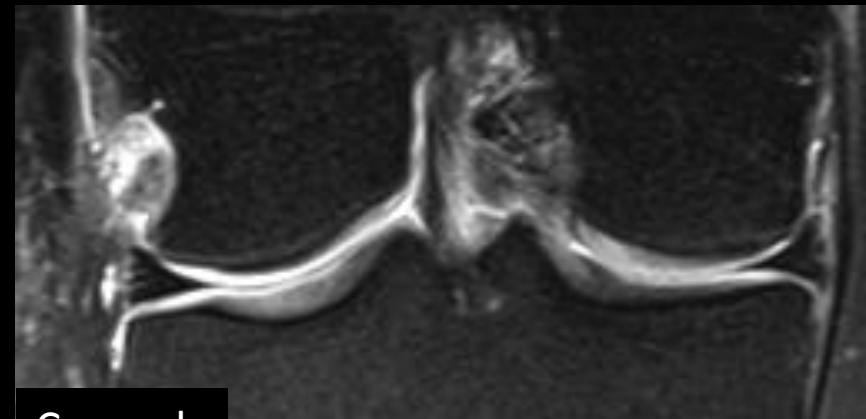
DP FS coronal

Aspect du ménisque en IRM



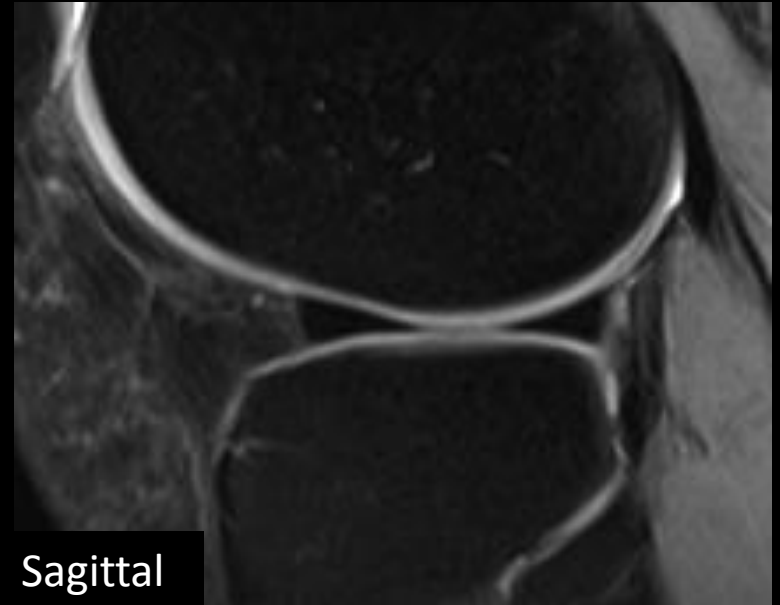
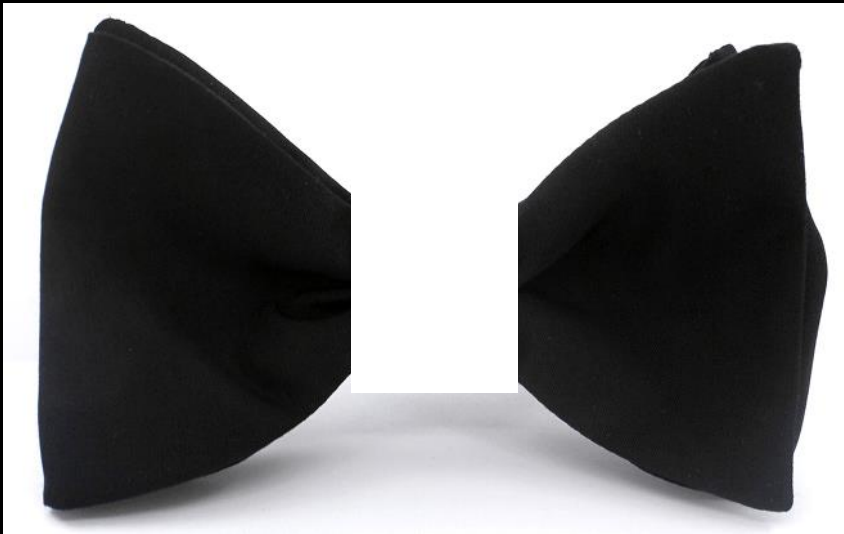
Sagittal

DP FS



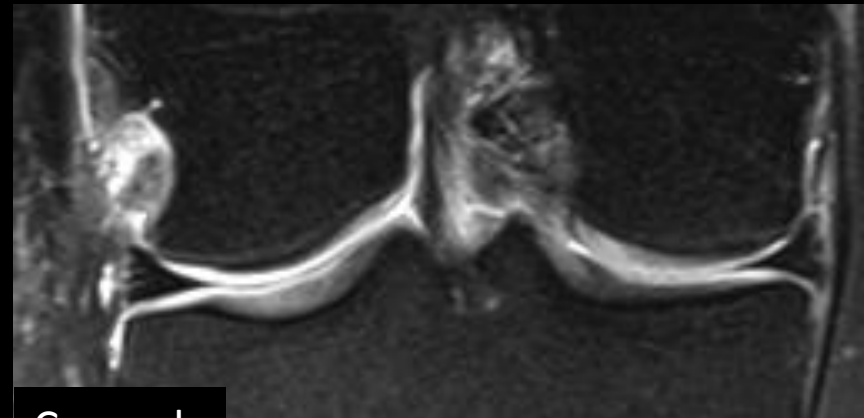
Coronal

Aspect du ménisque en IRM



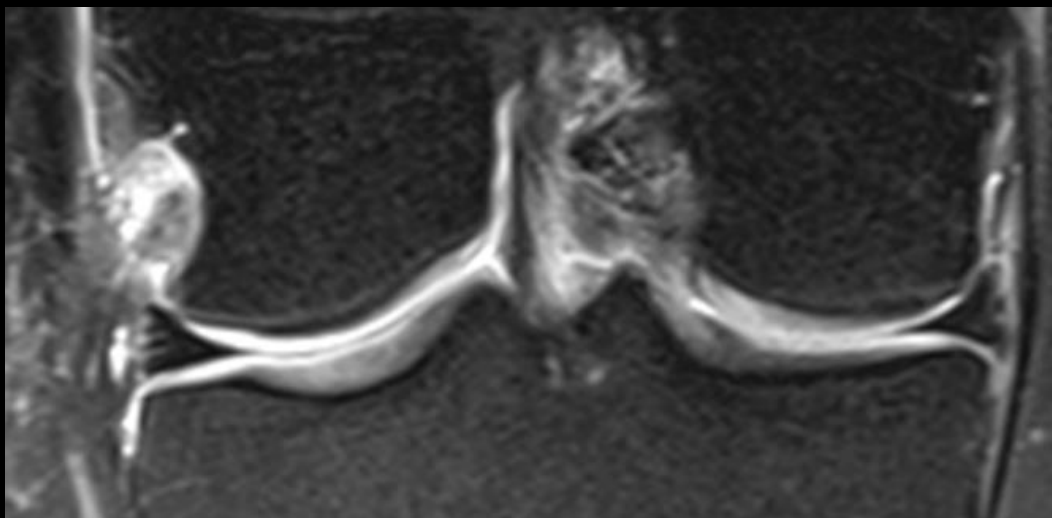
Sagittal

DP FS

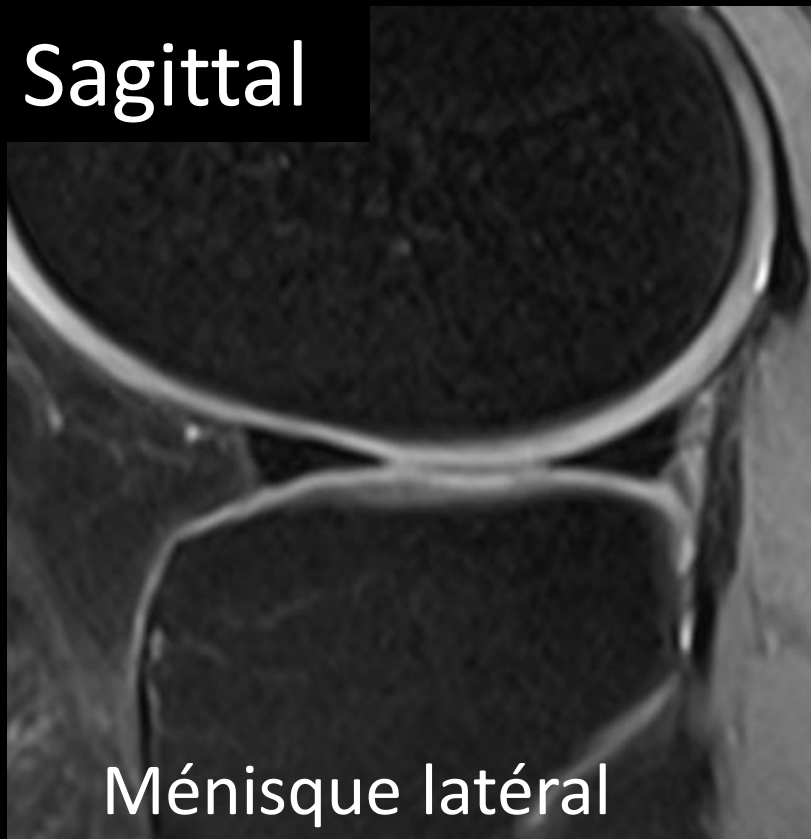


Coronal

Coronal



Sagittal



Ménisque latéral

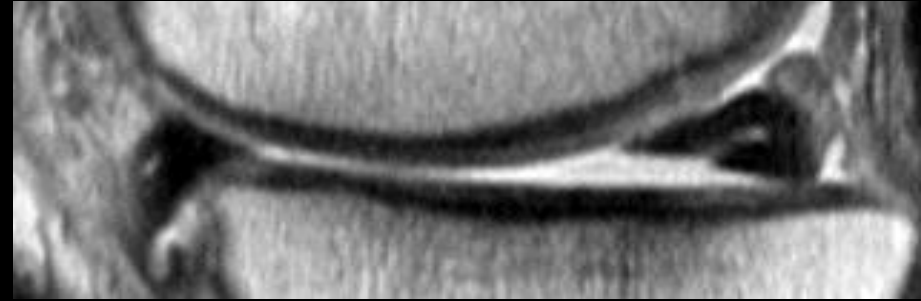


Ménisque médial

Objectifs

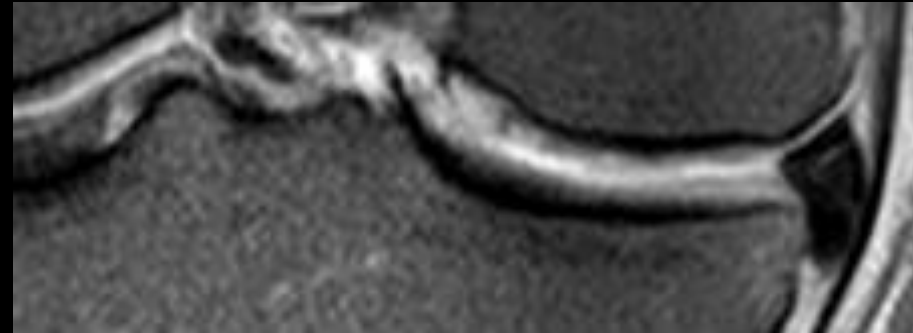
- Anatomie normale
- Lésions méniscales élémentaires
- Pièges: variantes anatomiques/post opératoire
- Lésions associées

Fissure



Flap/fragment

Fragment de localisation anormale



Perte de substance

Forme anormale



De Smet AA, MR diagnosis of Meniscal tears of the knee: importance of high signal in the meniscus that extends to the surface. AJR 1993;161:101-7.

De Smet AA, et al. Use of the "two-slice-touch" rule for the MRI diagnosis of meniscal tears. AJR 2006;187:911-4.

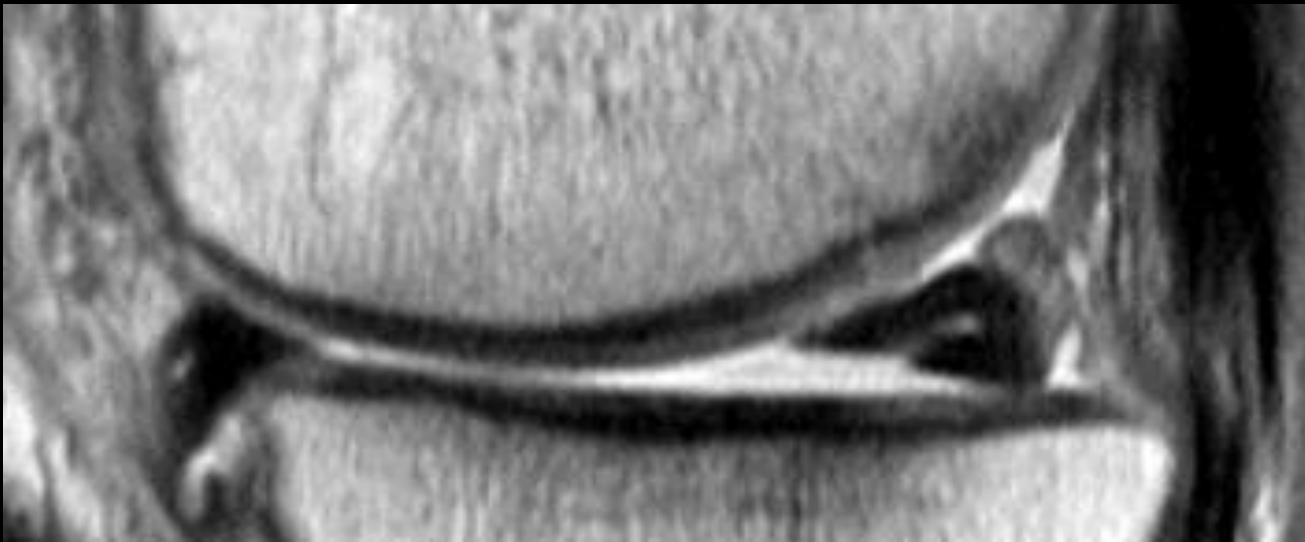
Fissure méniscale: Critères IRM *

1. Anomalie de signal méniscale

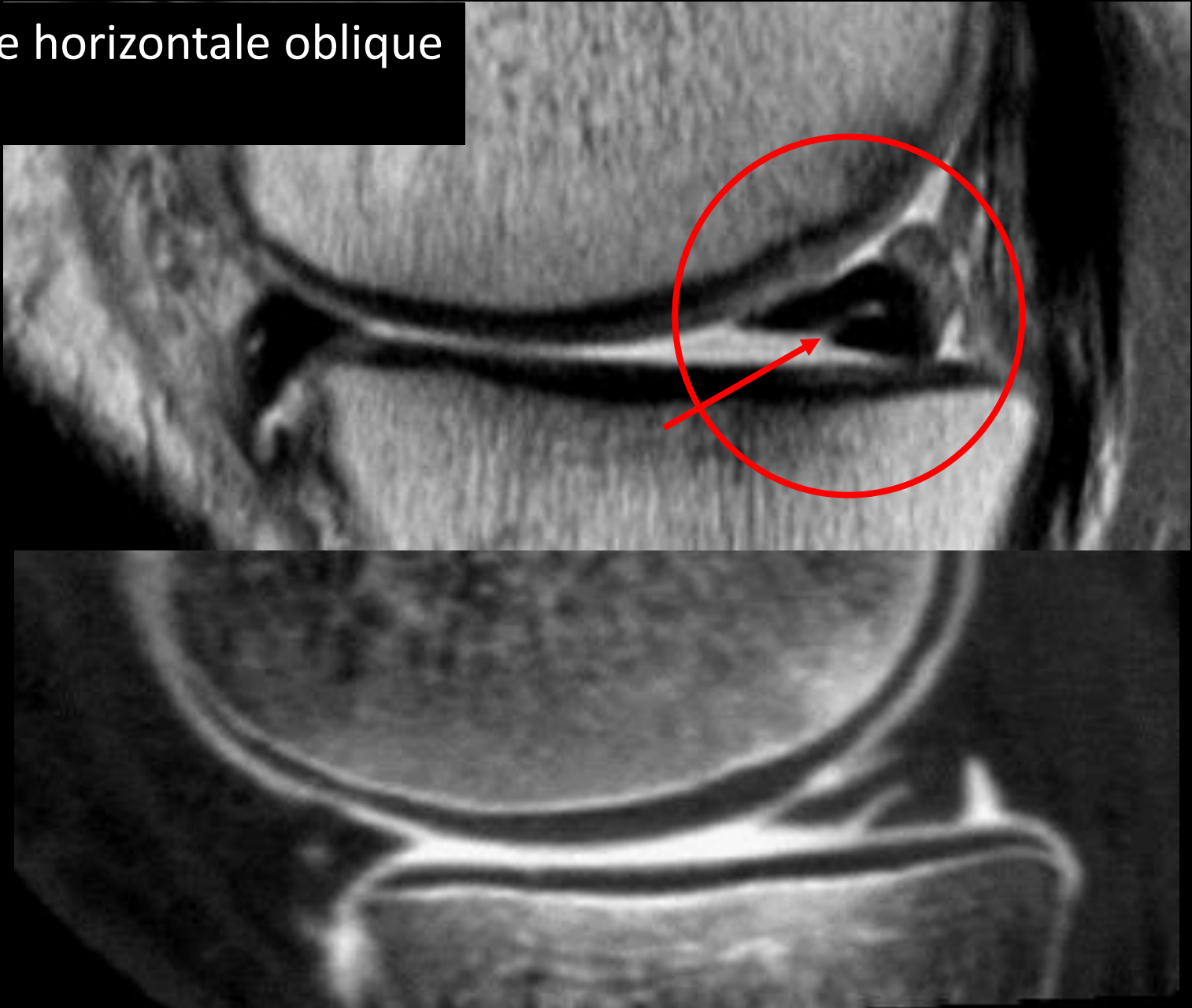
"augmentation du signal interne sur une image à court-TE sans équivoque en contact avec une surface articulaire du ménisque"

2. forme méniscale anormale

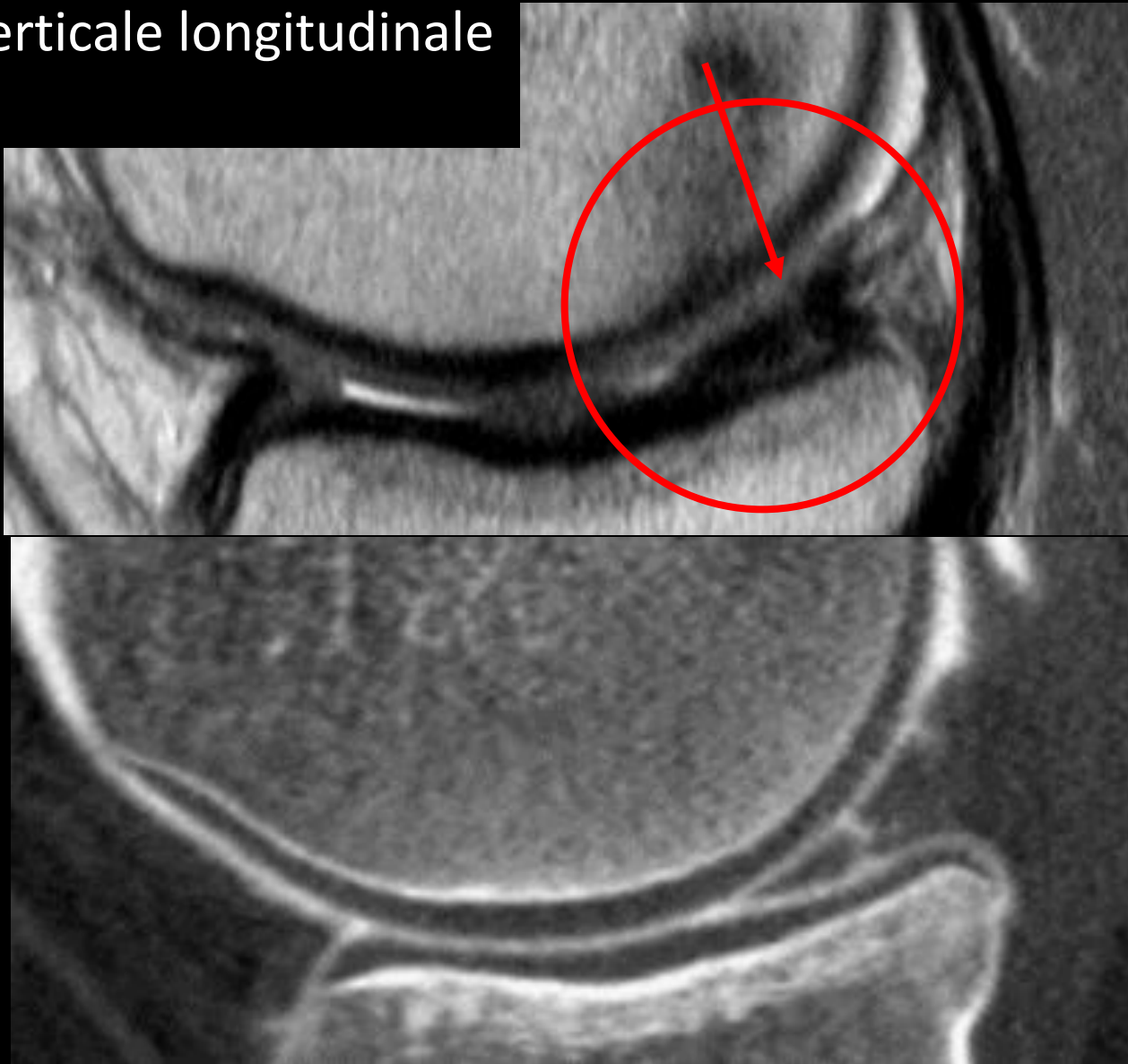
* en l'absence de chirurgie méniscale préalable, chondrocalcinose



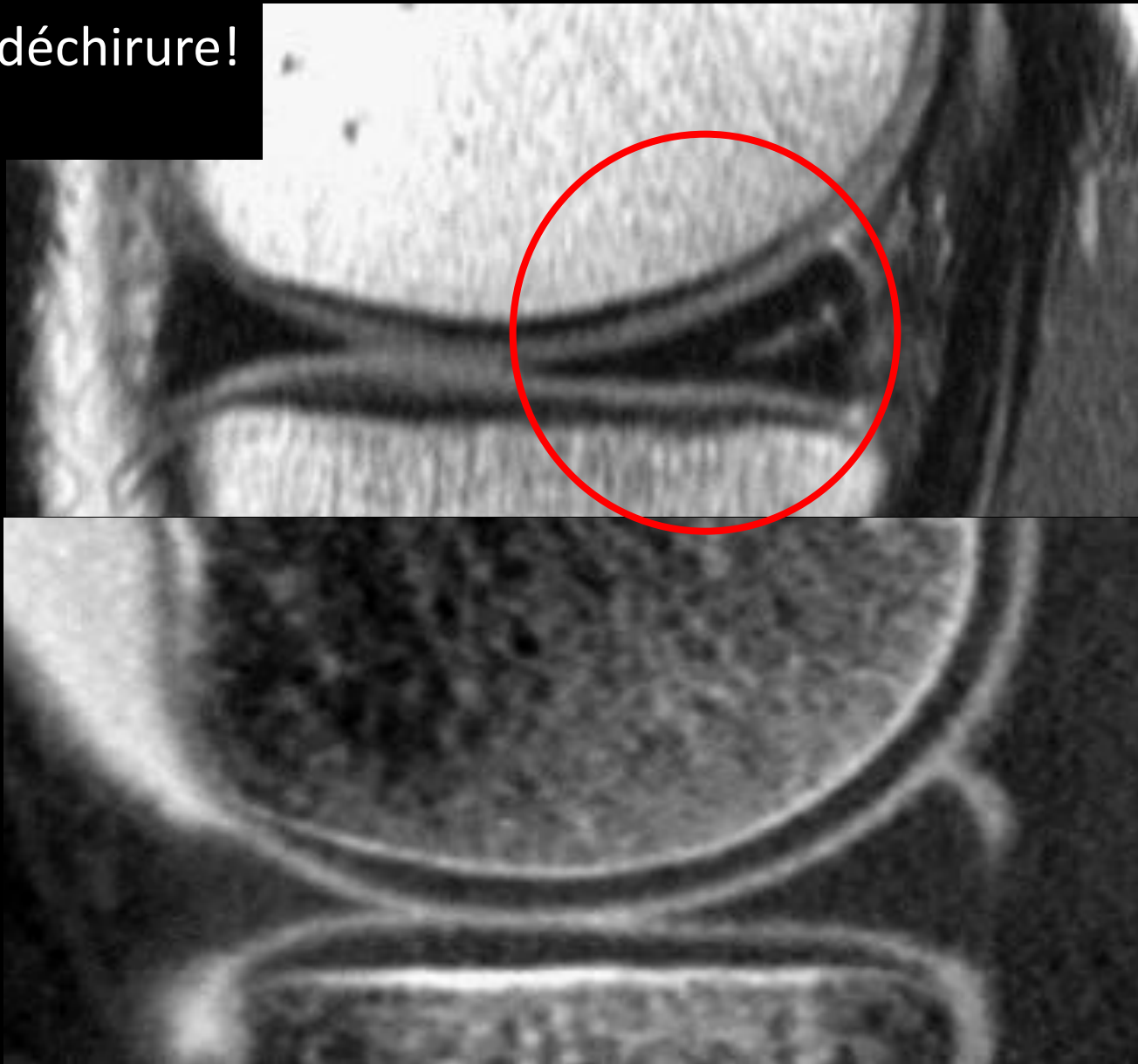
Fissure horizontale oblique



Fissure verticale longitudinale



Pas de déchirure!



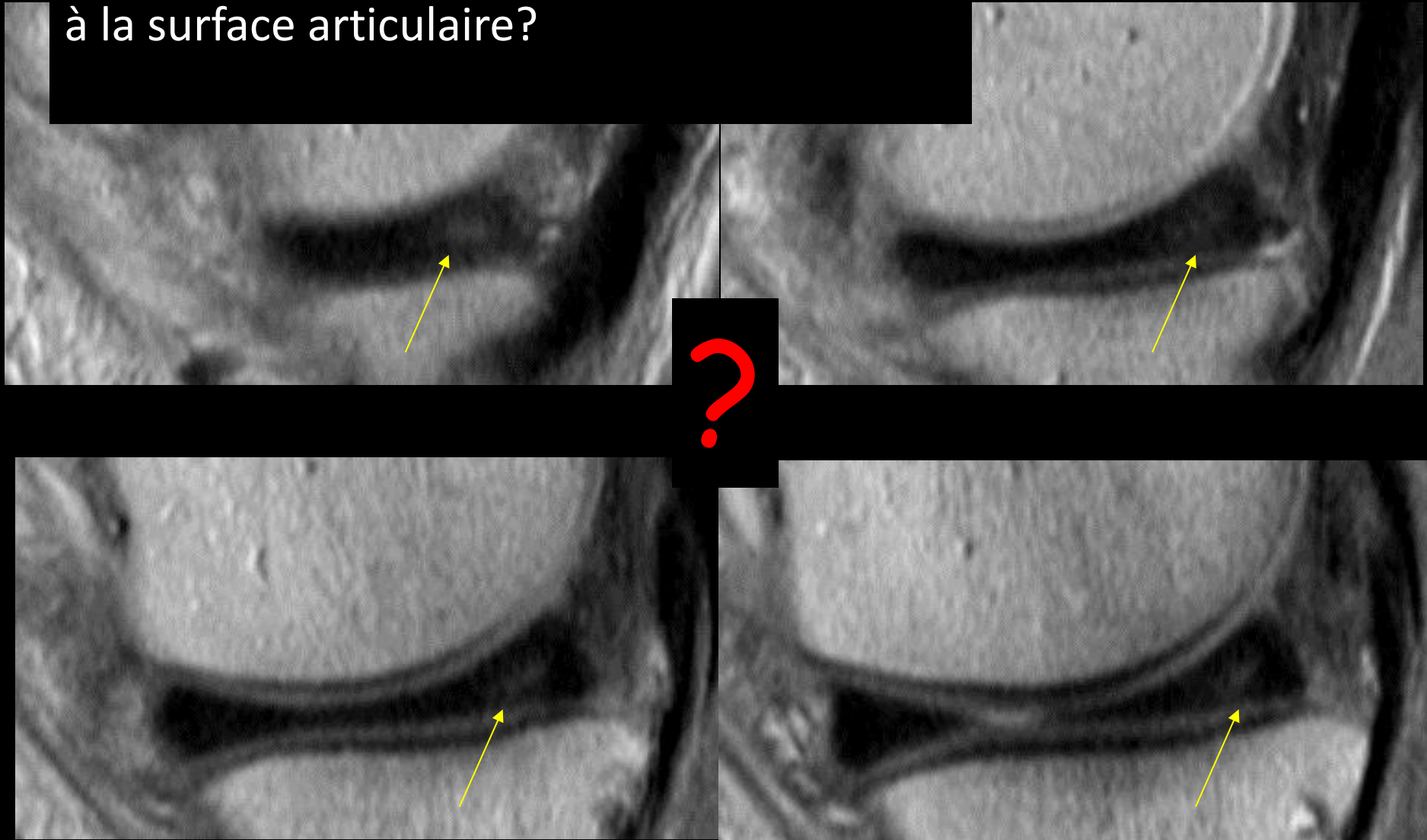
Fissure méniscale: critère diagnostique

VPP	Anomalie de signal élevée en T2/DP atteignant au moins une surface articulaire méniscale	
	1 coupe	2 coupes consécutives / 2 plans différents
Ménisque médial	43 %	94%
Ménisque latéral	18%	96%

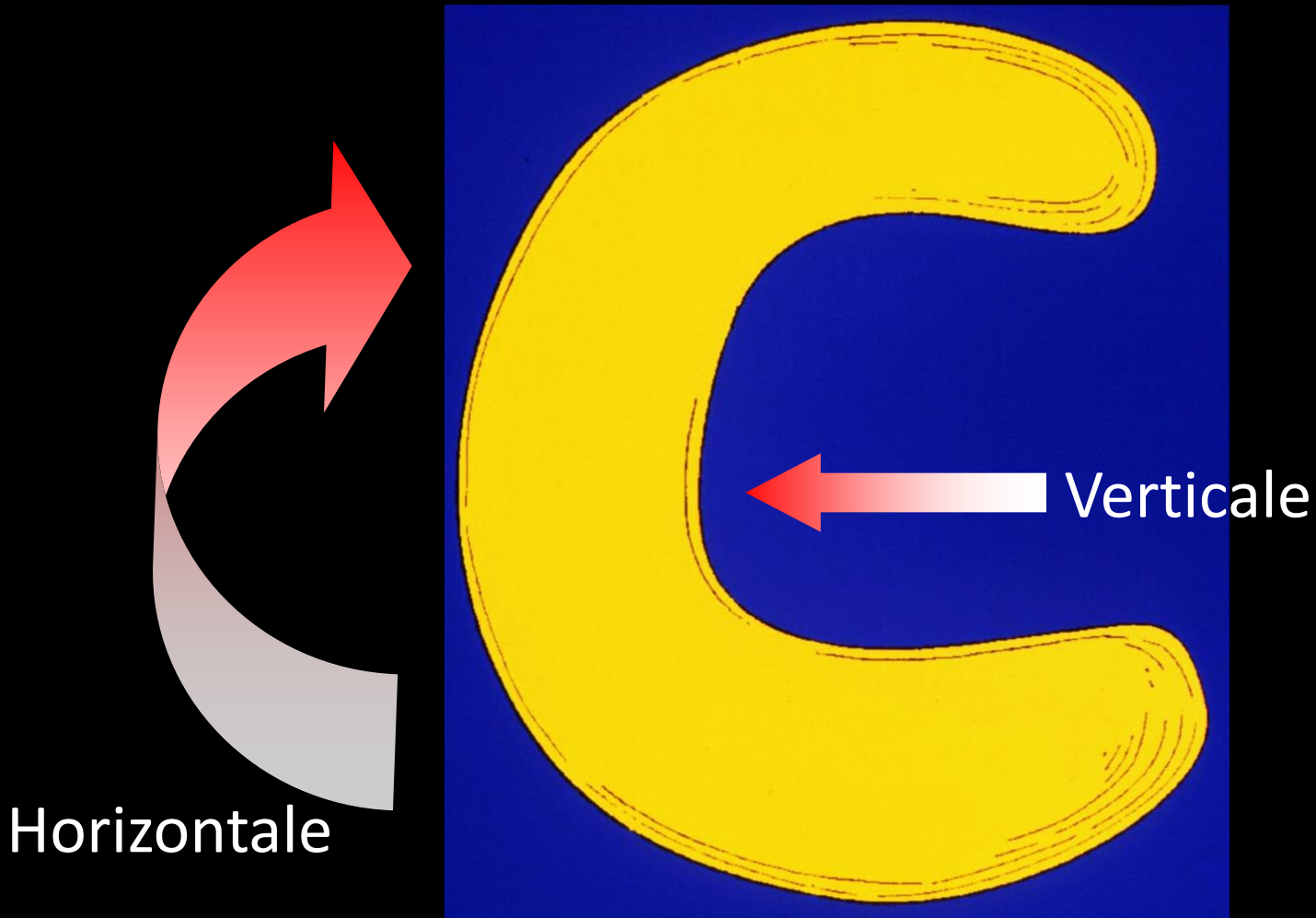
De Smet AA, Norris MA, Yandow DR, Quintana FA, Graf BK, Keene JS. MR diagnosis of meniscal tears of the knee: importance of high signal in the meniscus that extends to the surface. AJR Am J Roentgenol 1993; 161(1):101–107.

De Smet AA, Tuite MJ. Use of the “two-slice-touch” rule for the MRI diagnosis of meniscal tears. AJR Am J Roentgenol 2006;187(4):911–914.

Signal anormal qui s'étend sans équivoque
à la surface articulaire?



Fissure méniscale : classification anatomique



Types de fissures méniscales

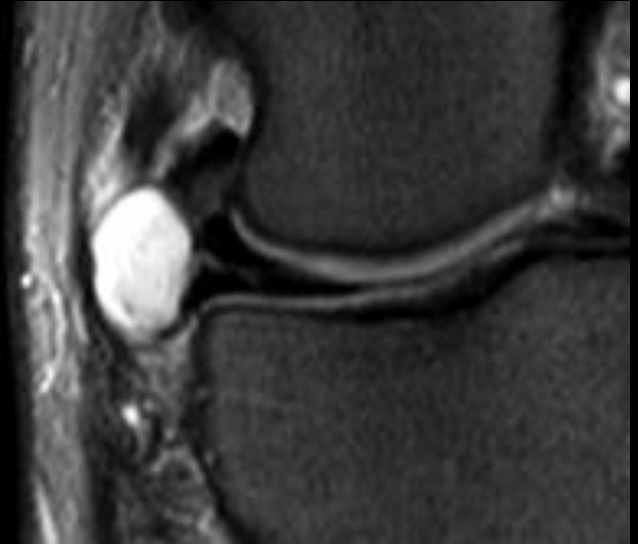
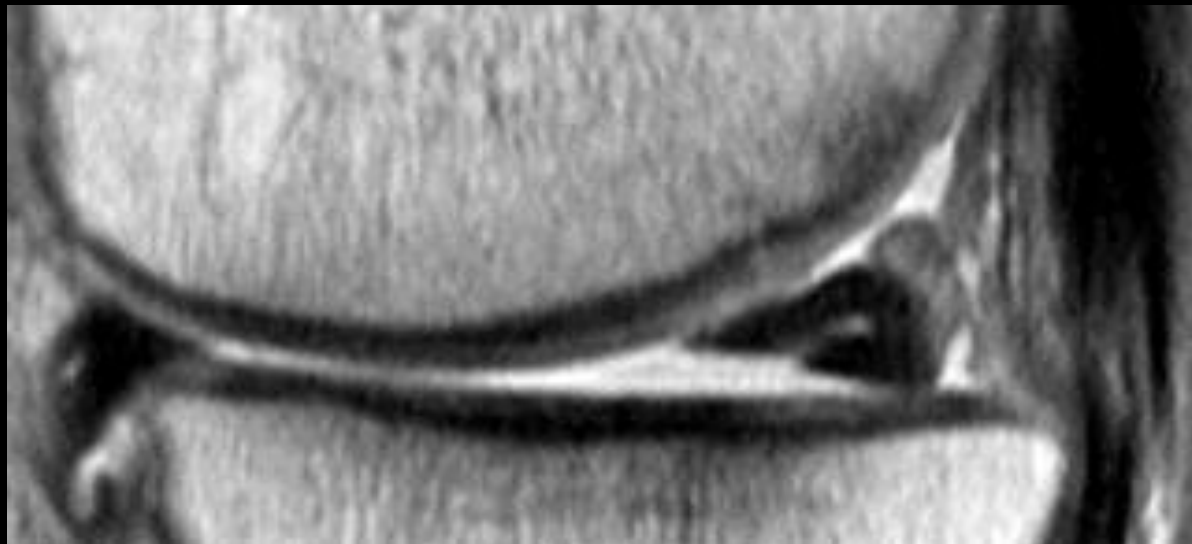
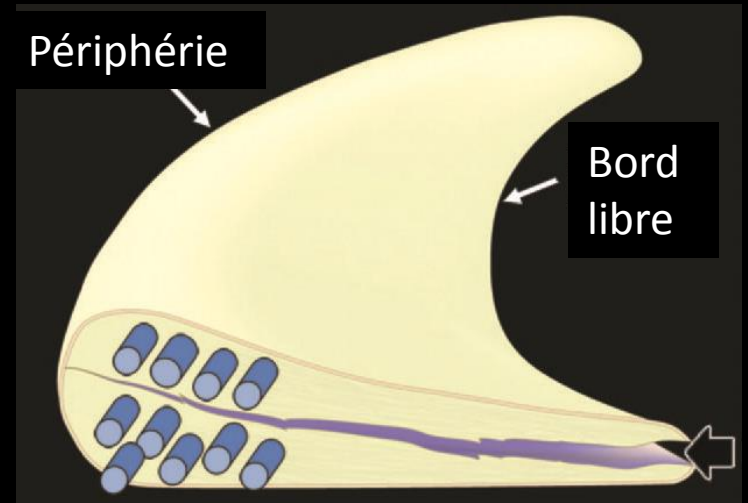
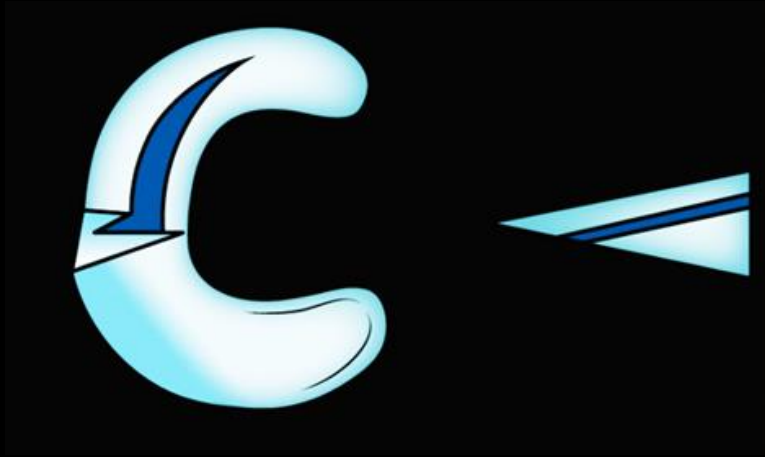
- Horizontale/oblique
- Fissure verticale
 - ✓ Longitudinale
 - ✓ radiaires/ root tear
 - ✓ Radiaires obliques (« bec de perroquet »)
 - ✓ Capsulo méniscale
- Lésion complexe
- Lésion déplacée/anse de seau

Types de fissures méniscales

- Horizontale/oblique
- Fissure verticale
 - ✓ Longitudinale
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 - ✓ Capsulo méniscale
- Lésion complexe
- Lésion déplacée/anse de seau

Fissure horizontale oblique

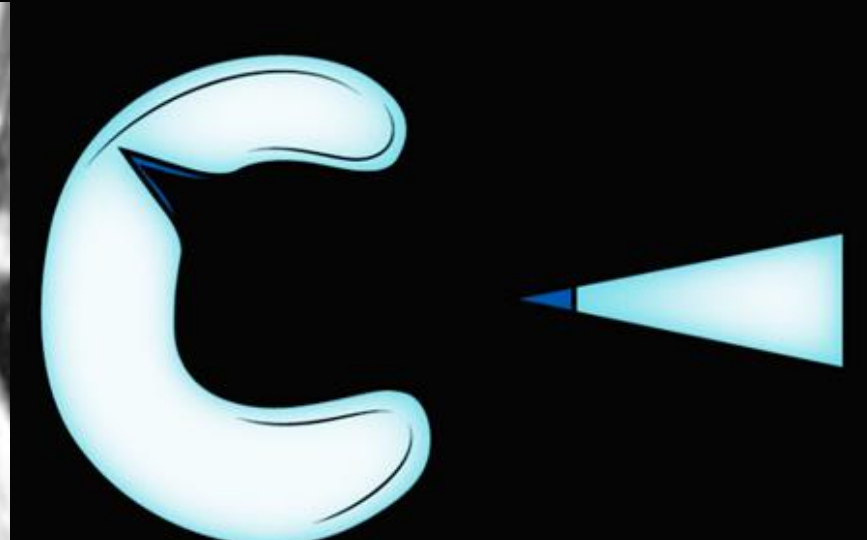
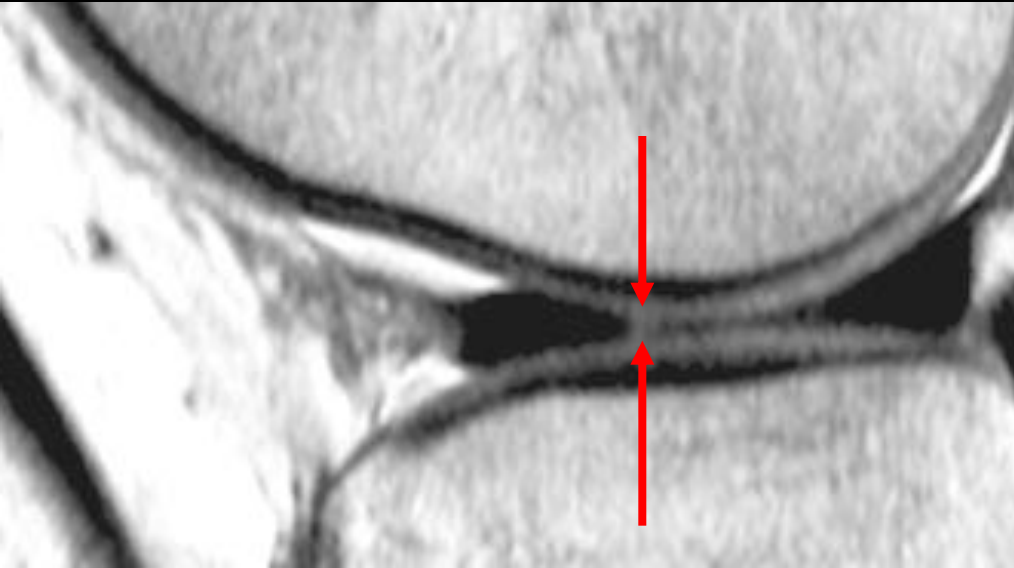
- Lésion dégénérative



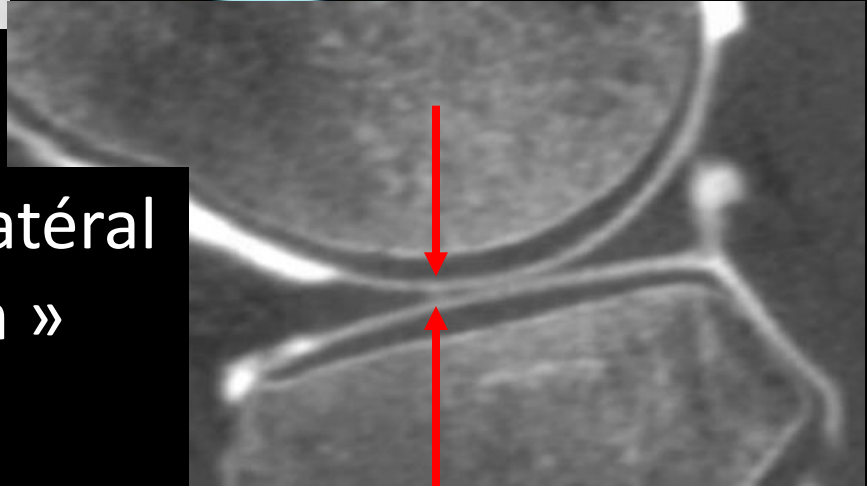
Types de fissures méniscales

- Horizontale/oblique
- Fissure verticale
 - ✓ Longitudinale
 - ✓ radiaires/ root tear
 - ✓ Radiaires obliques (« bec de perroquet »)
 - ✓ Capsulo méniscale
- Lésion complexe
- Lésion déplacée/anse de seau

Fissure radiaire



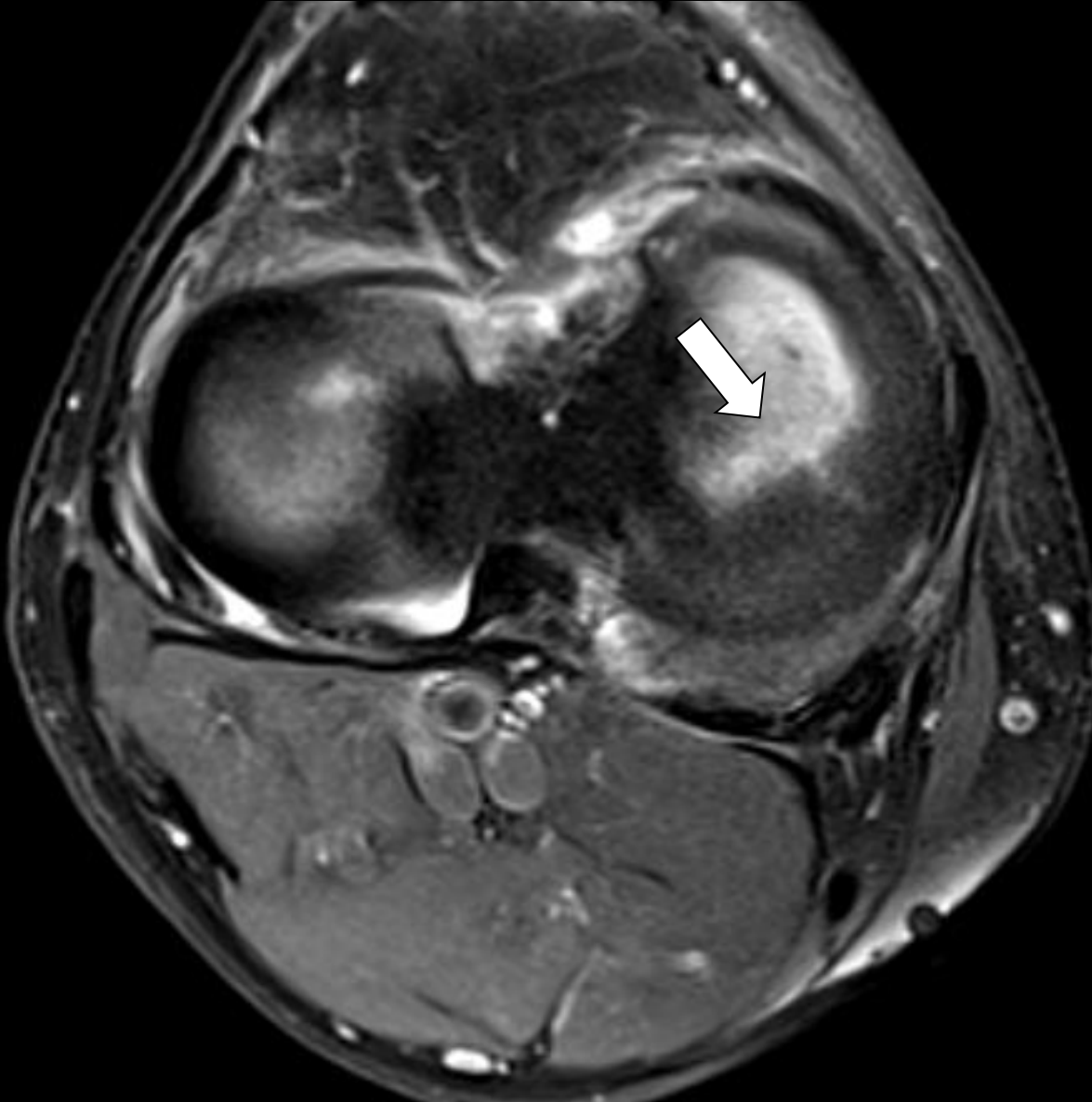
Corne antérieure du ménisque latéral
< 3 mm: « Leave me alone lesion »



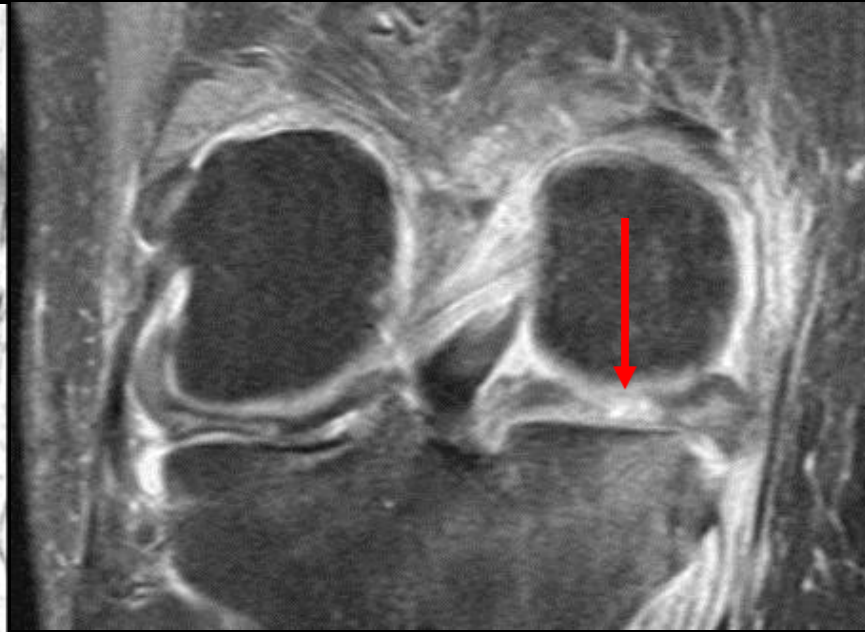
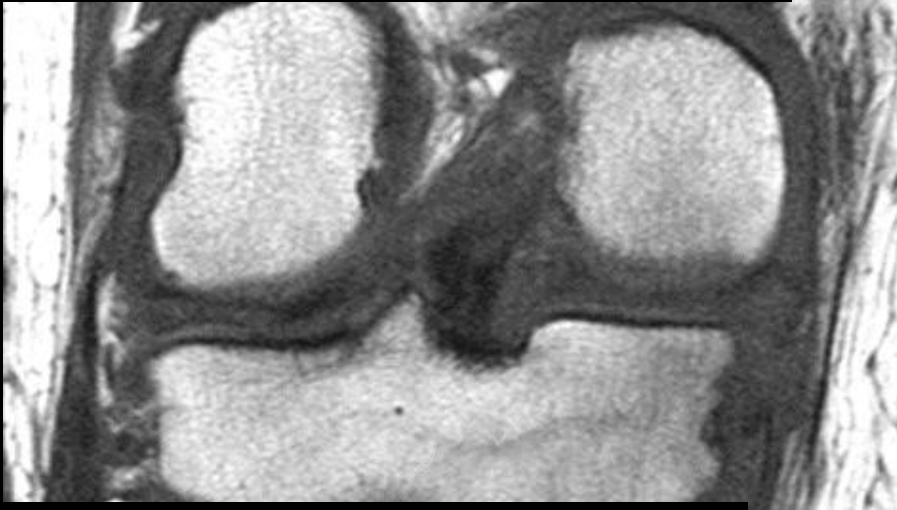
Lésion radiaire difficile à visualiser!!!



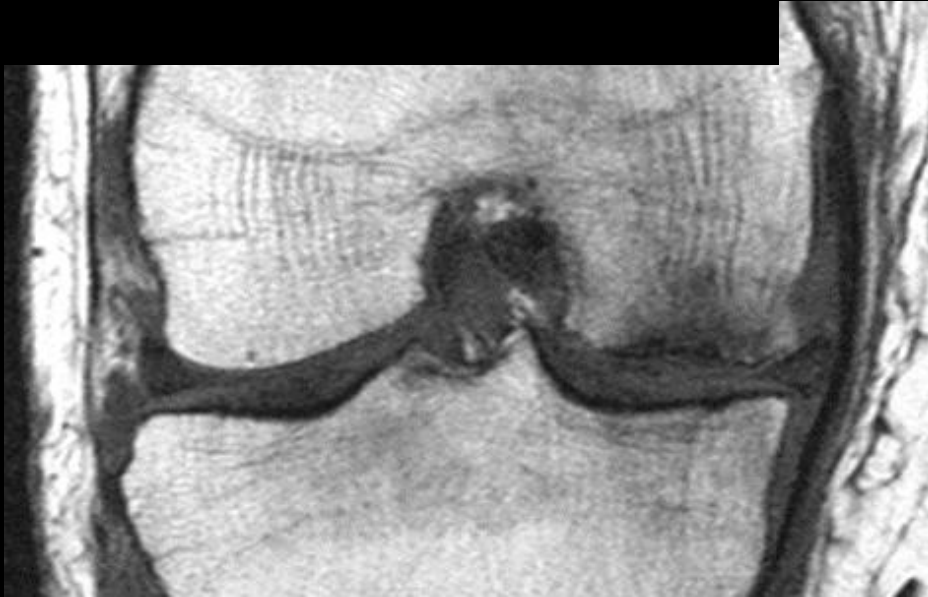
Importance coupes axiales
Coupes fines!!!!



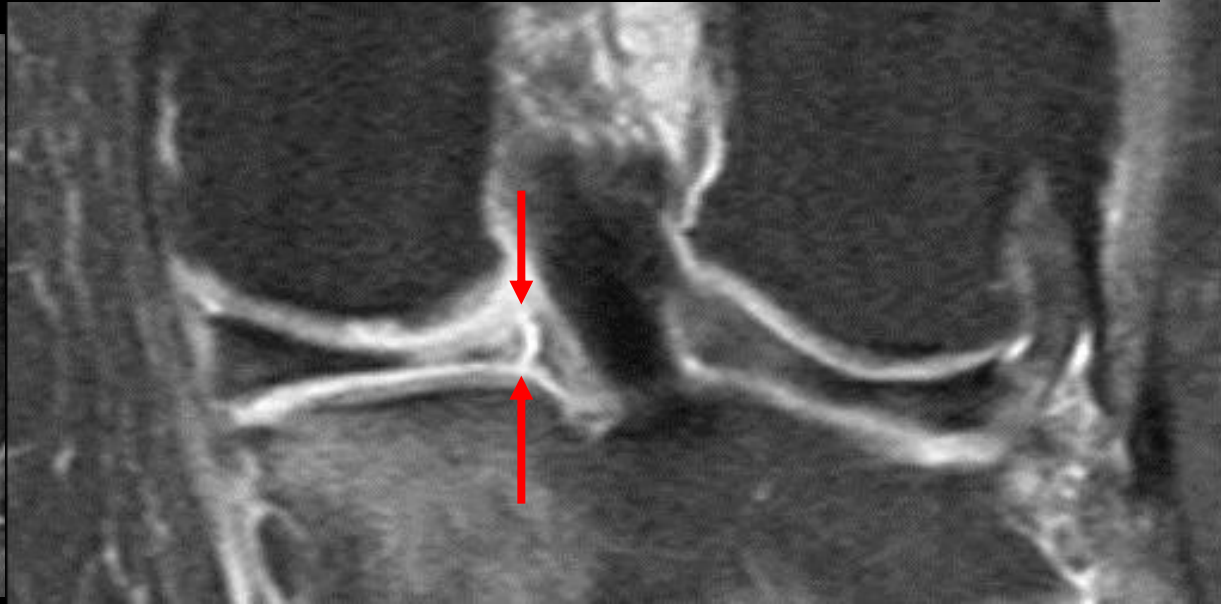
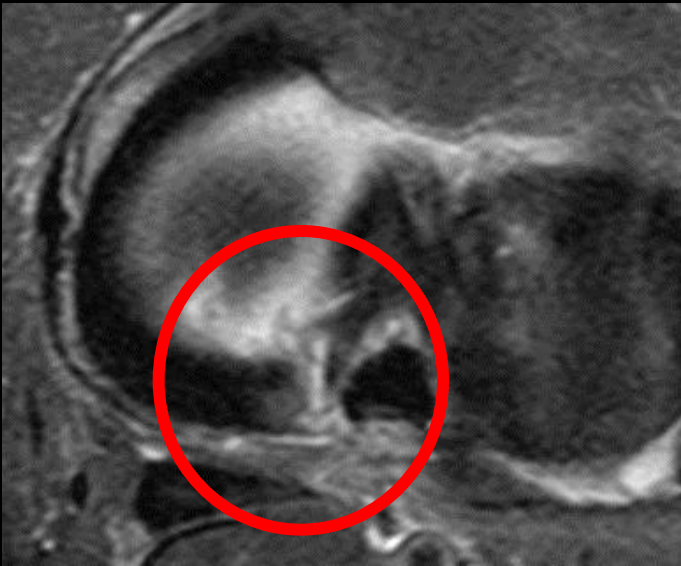
Fissure radiaire de la corne postérieure

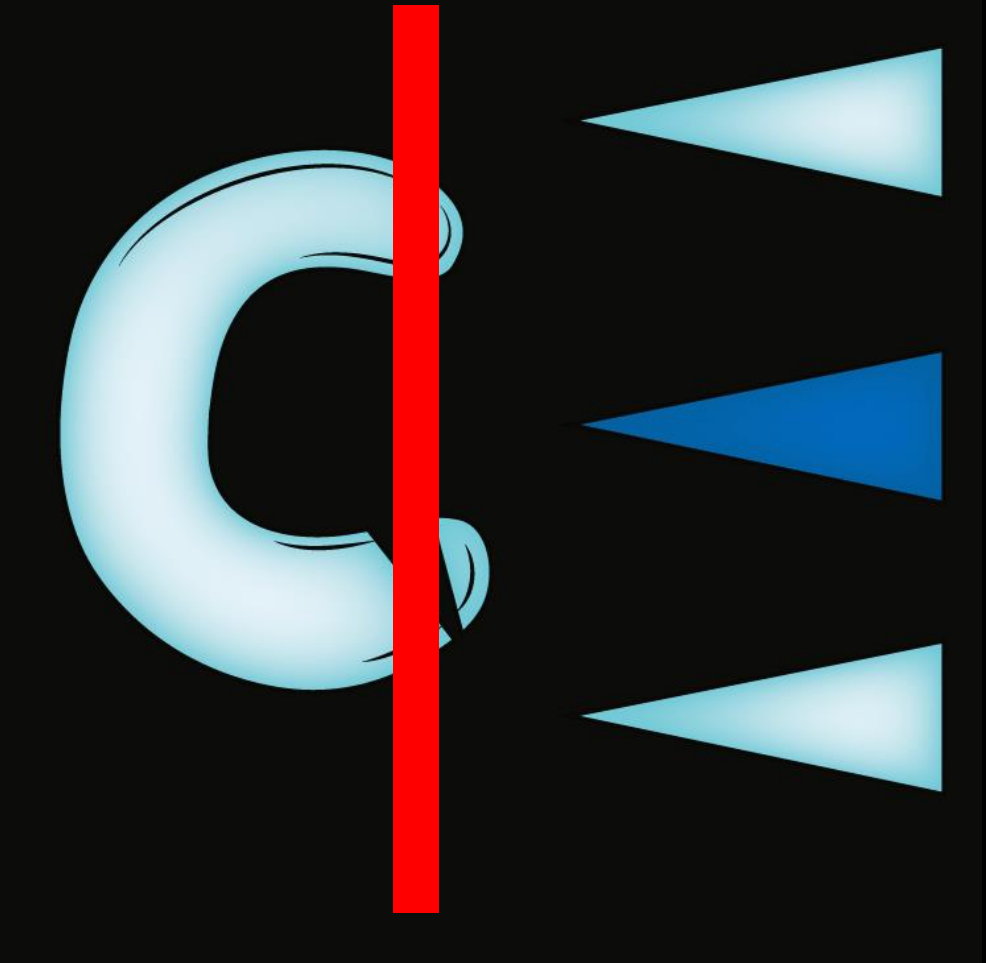


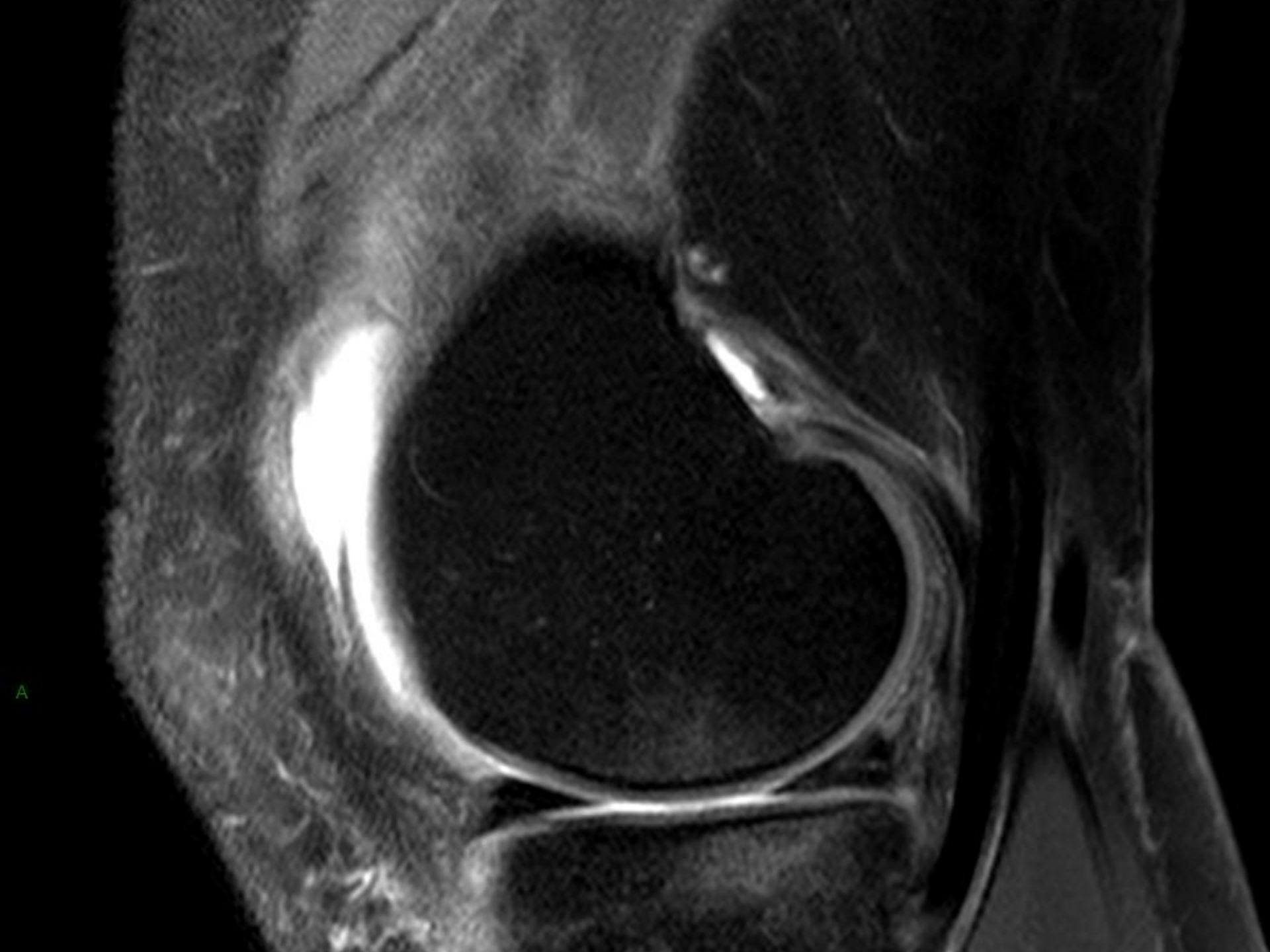
Subluxation du corps méniscal
SONK/impaction de condyle médial



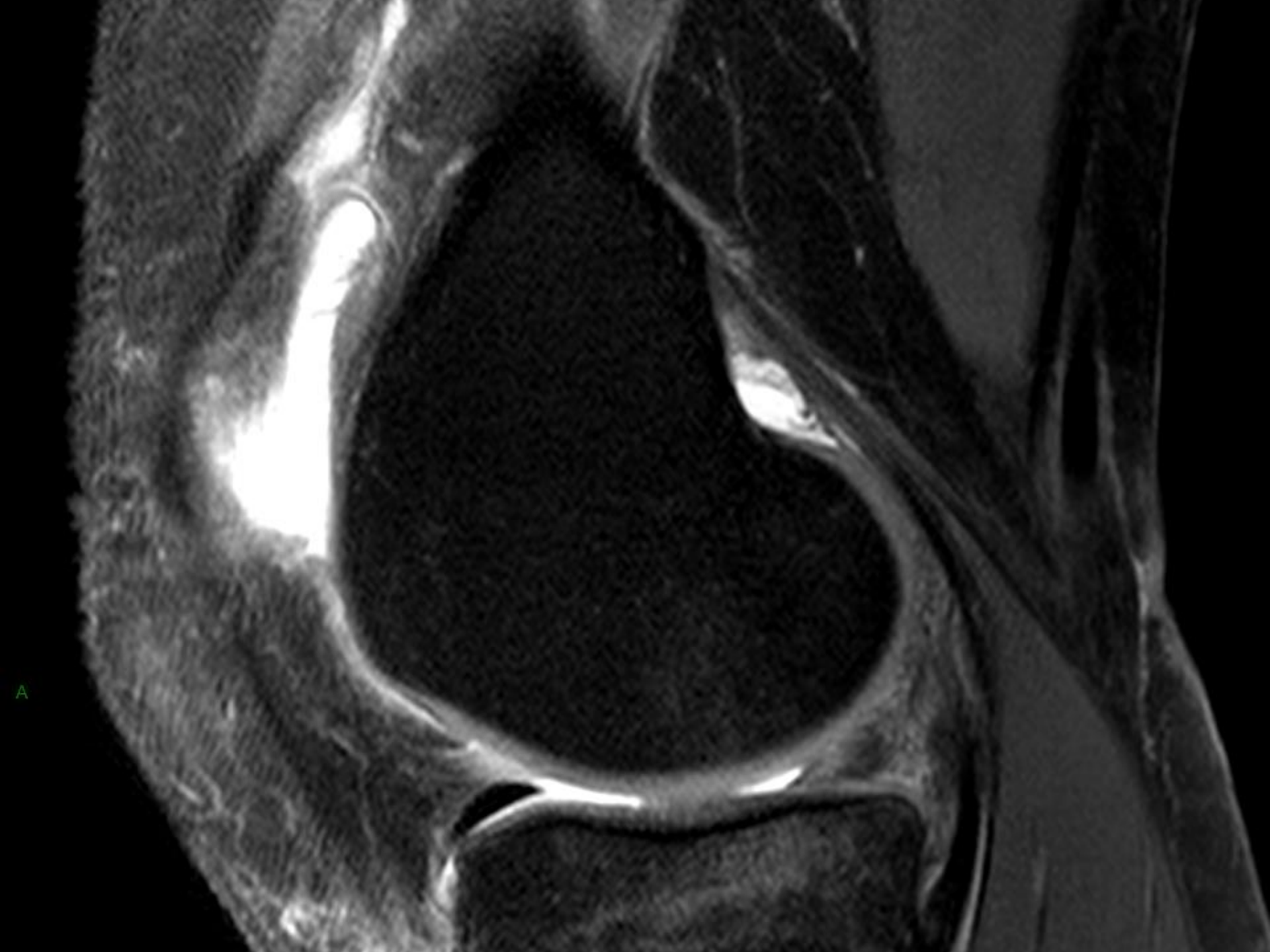
Fissure radiaire de la racine méniscale postérieure (root tear)

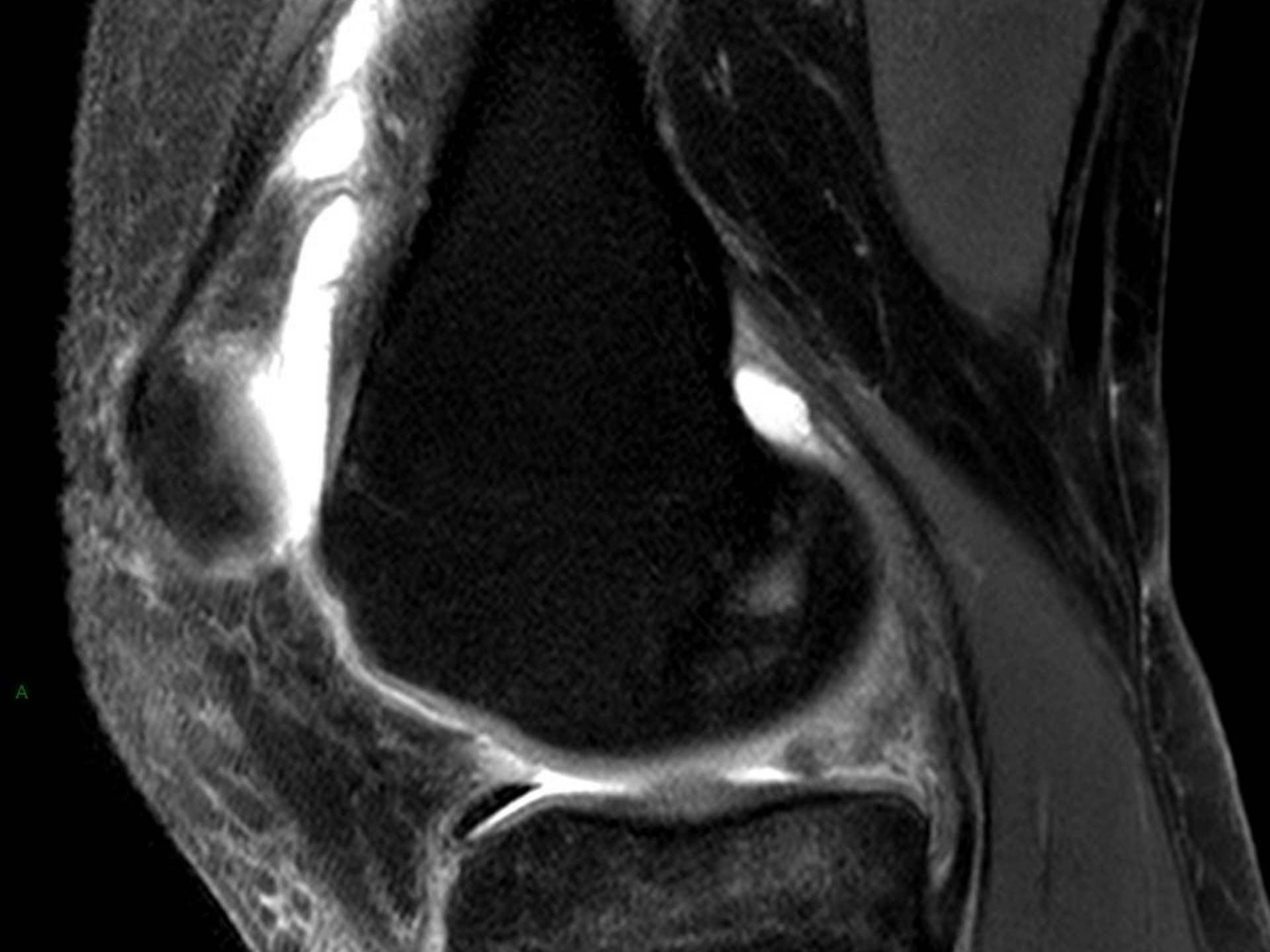




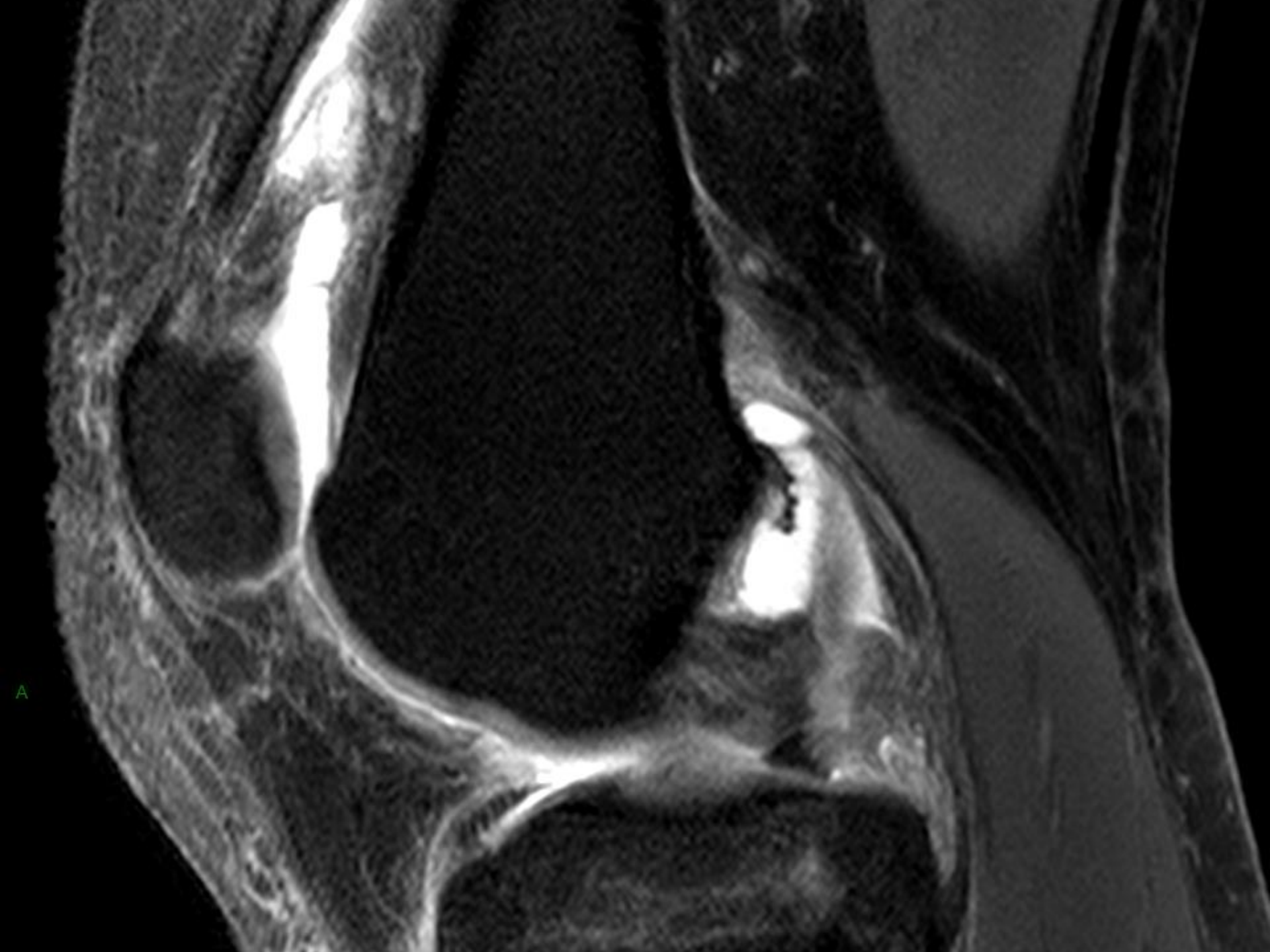


A

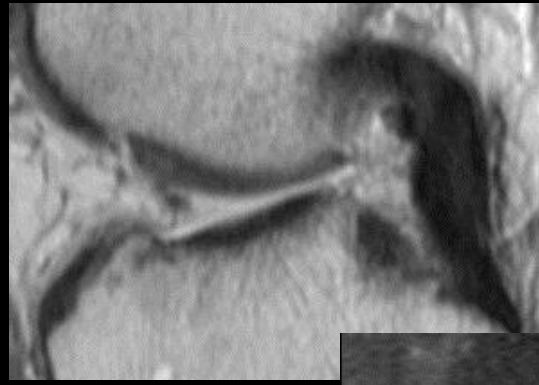
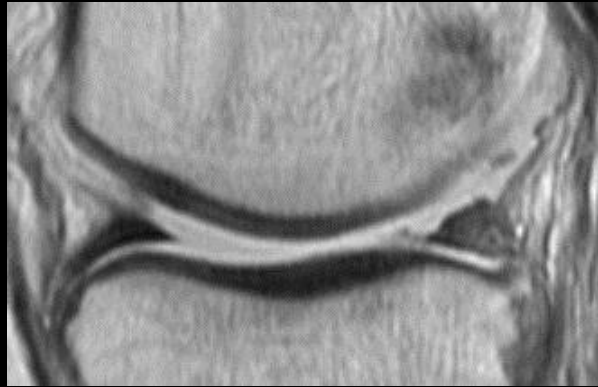
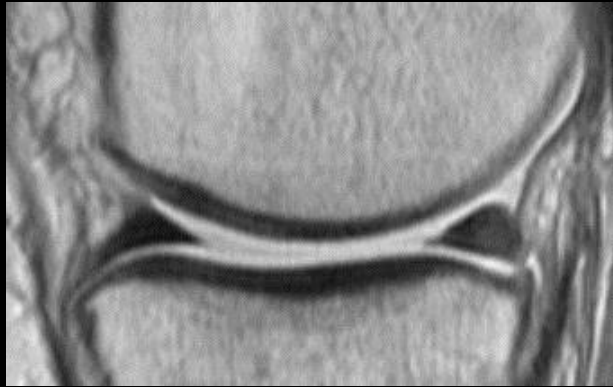




A



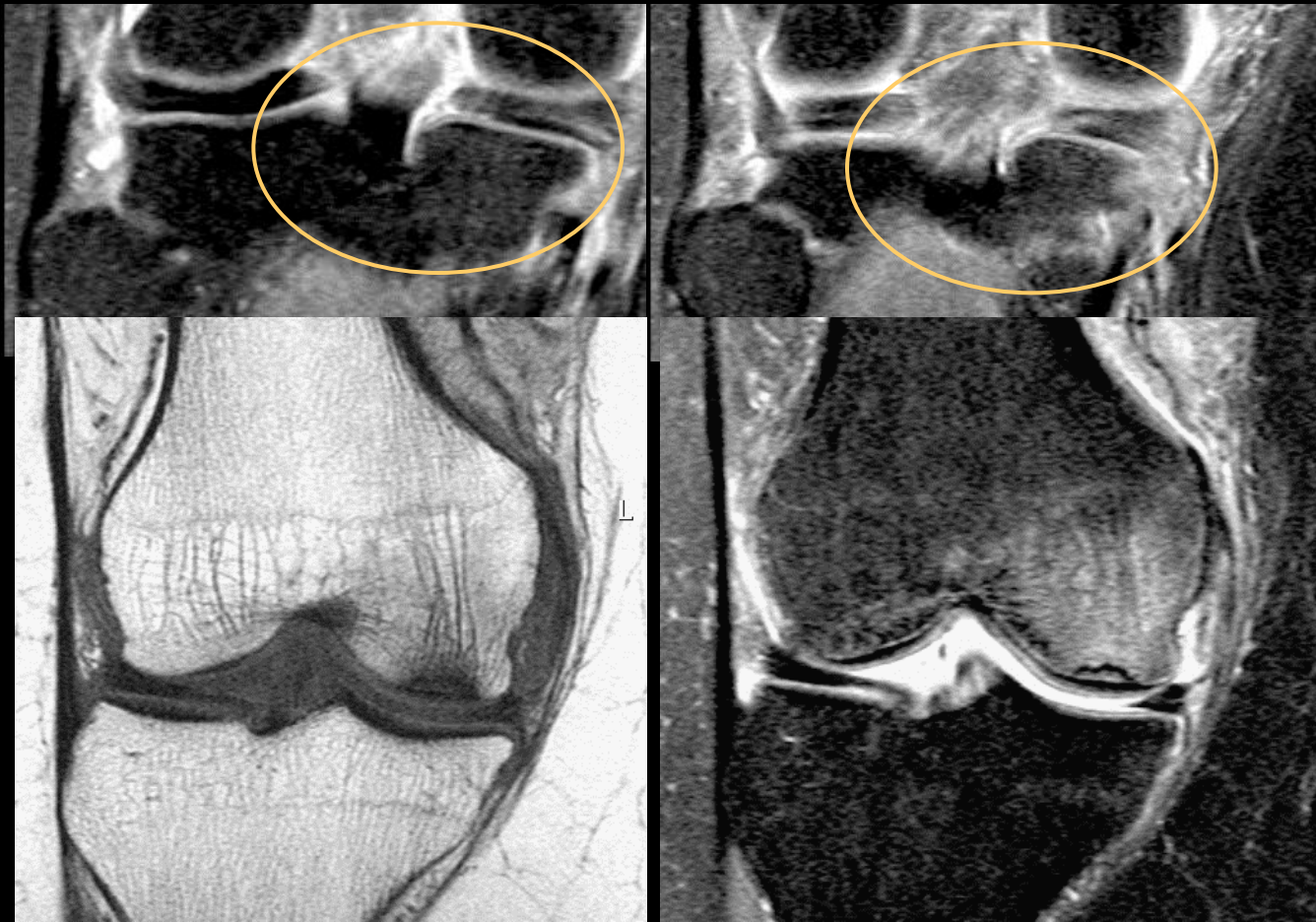
A



Fissure radiaire de la racine
facilement négligée
En sagittal



« Root tear » facilement négligées en raison des changements de moelle associés

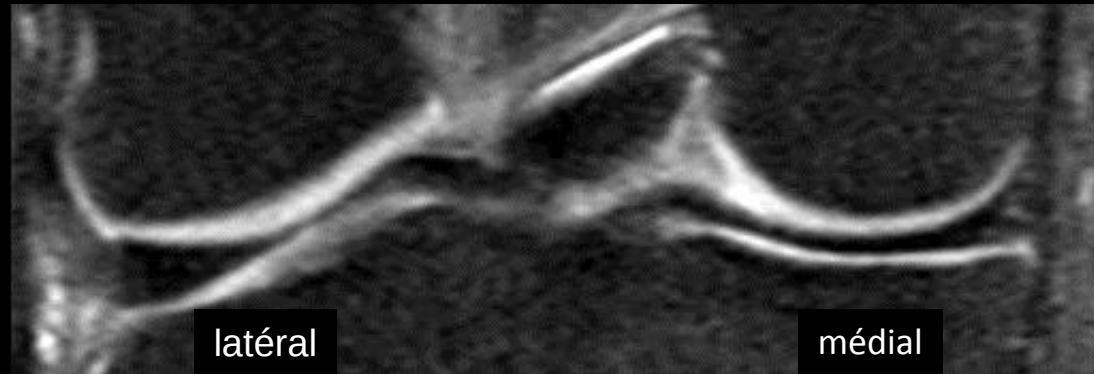




Attache méniscale (freins méniscaux)

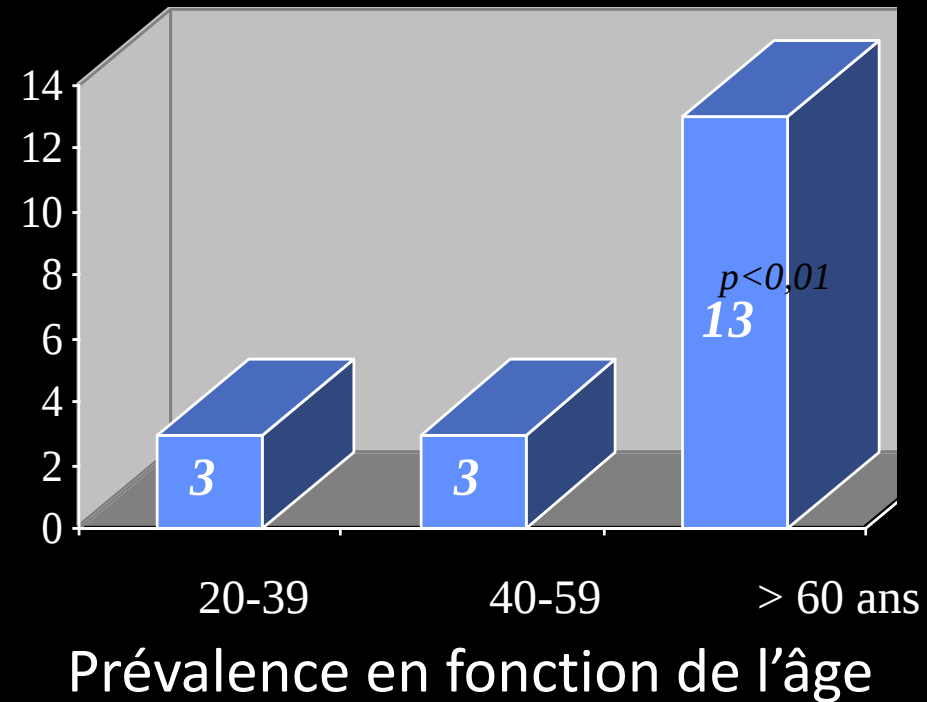
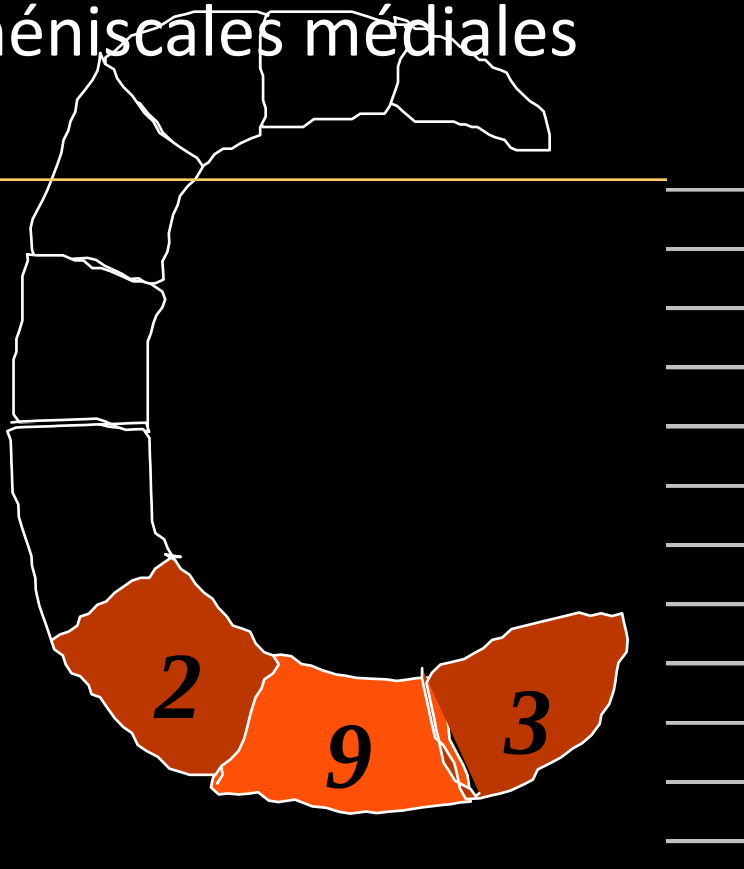
- Sites de fixation à l'éminence tibiale médiale
- Lésion racines postérieures +++

- Médial:
 - ✓ Médial au LCP
 - ✓ Lésion dégénérative



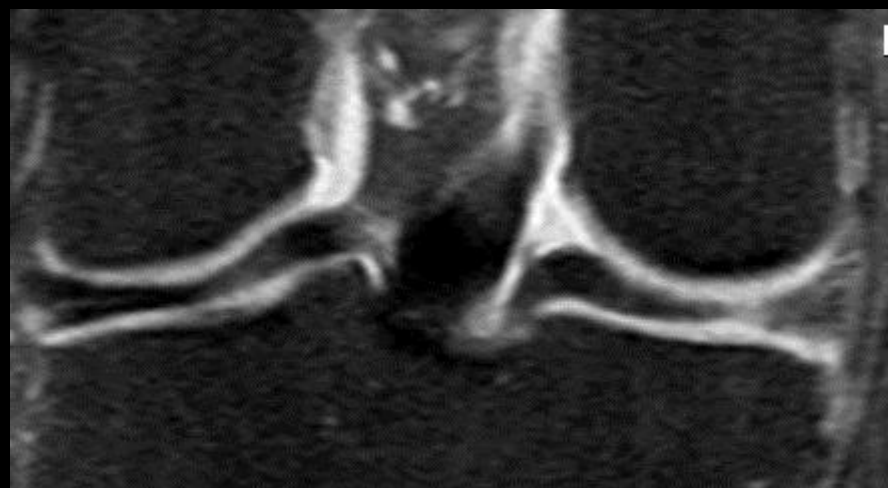
- Latéral:
 - ✓ Fixation tibiale postérieure au LCA
 - ✓ Lésion traumatique

Épidémiologie des fissures radiaires de la corne postérieure du ménisque médian parmi 204 fissures méniscales médiales



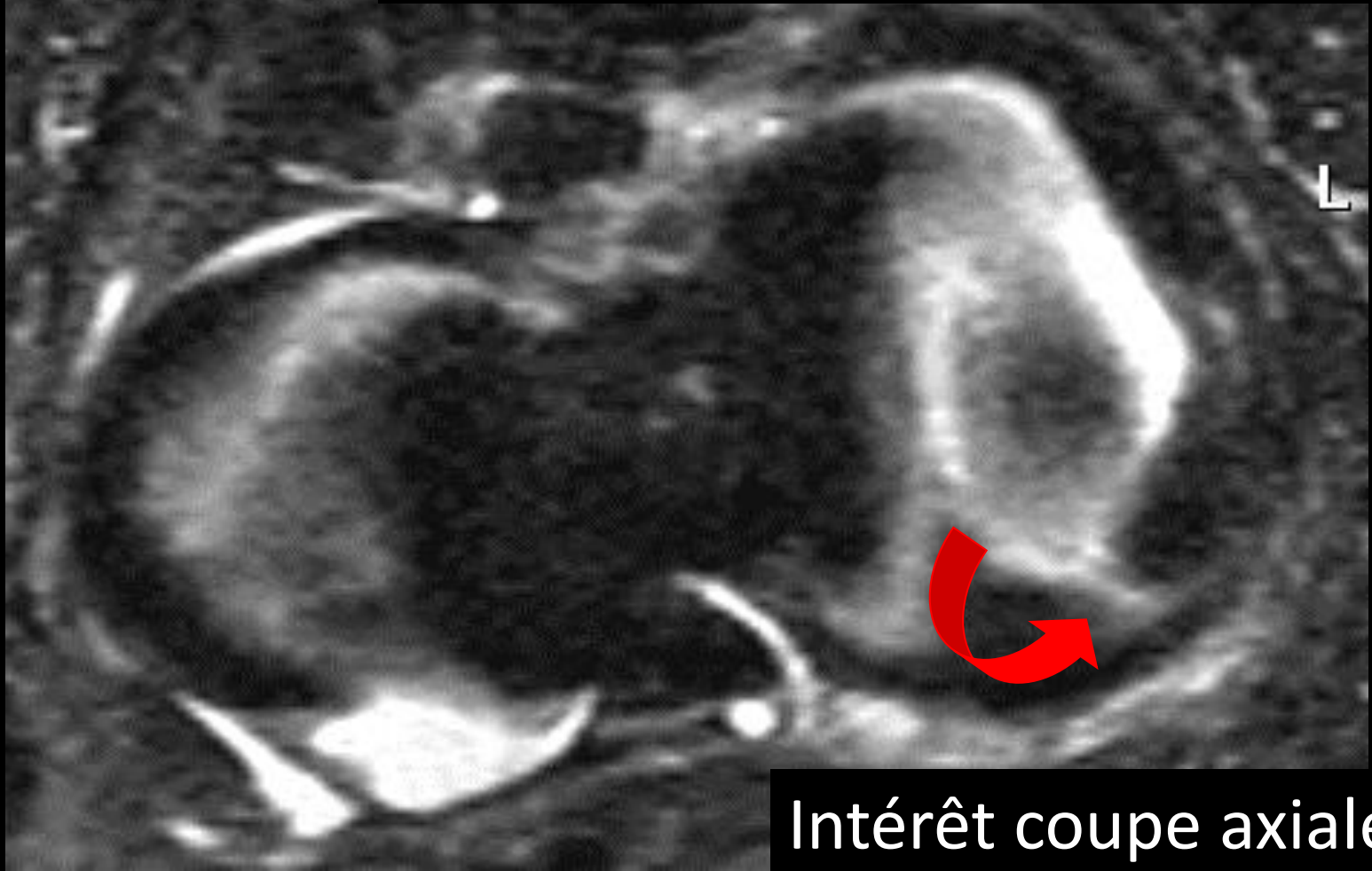


Déchirure verticale longitudinale?

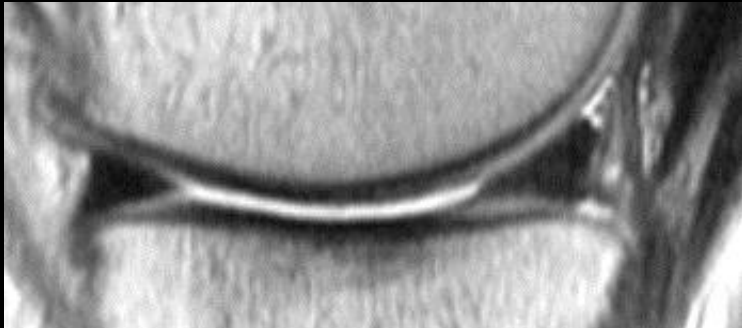
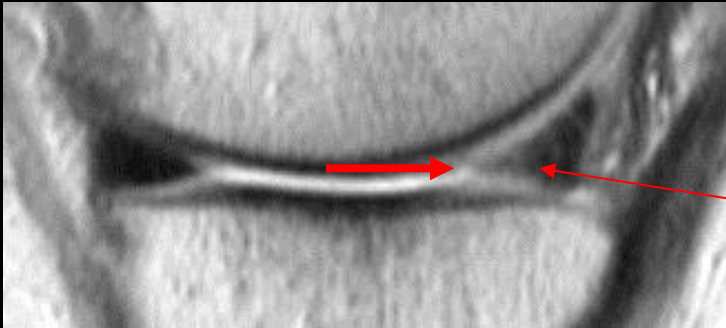
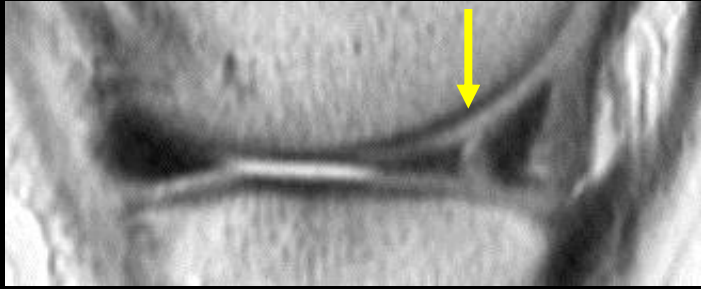




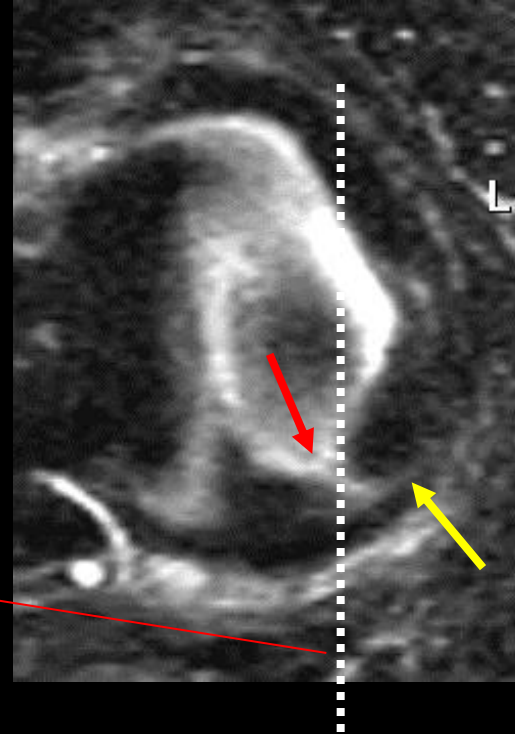
Fissure radiaire oblique:
“bec de perroquet”



Intérêt coupe axiale!!

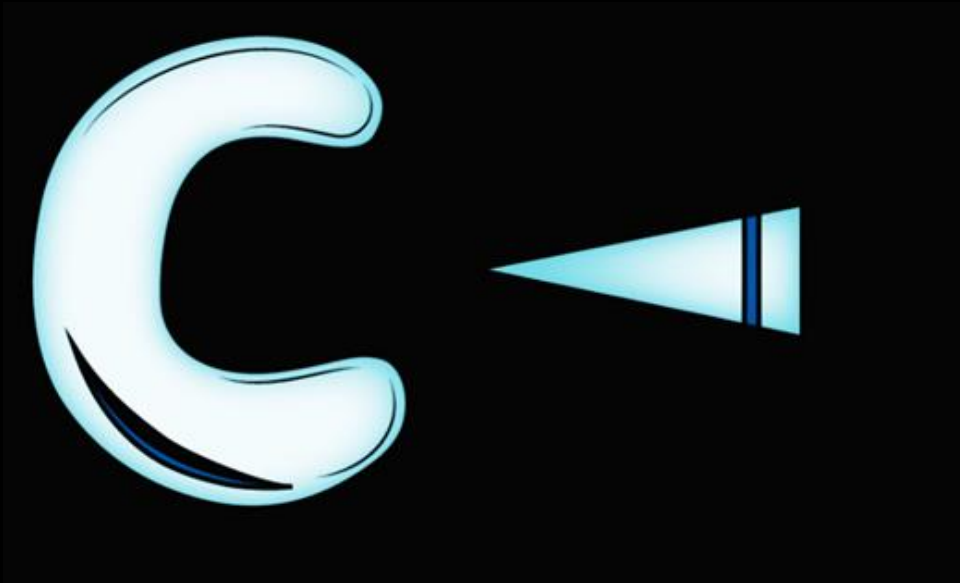
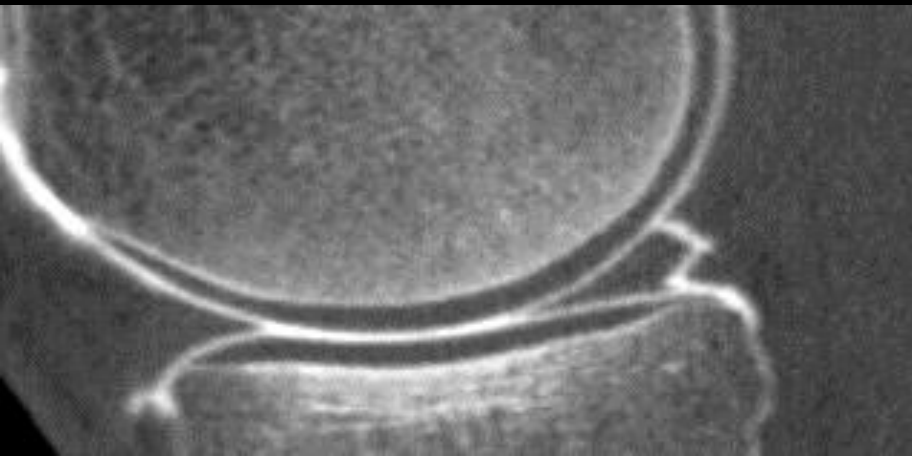
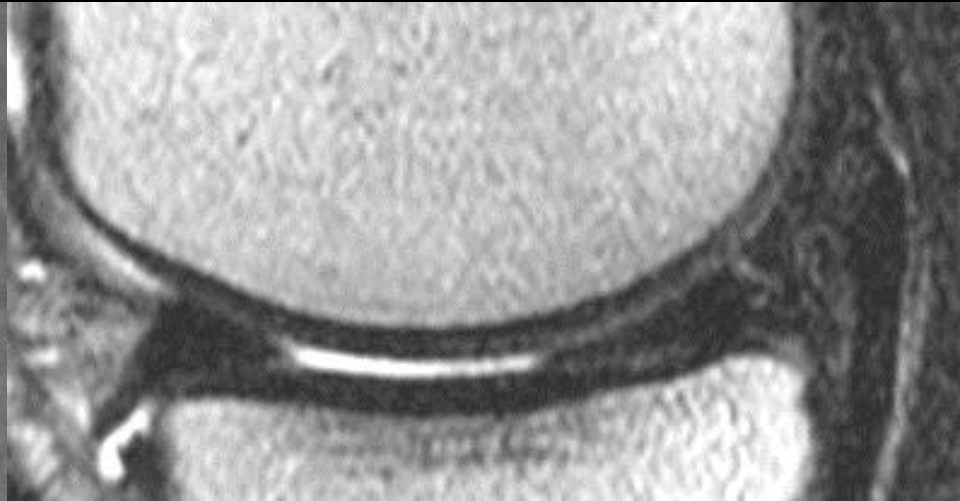
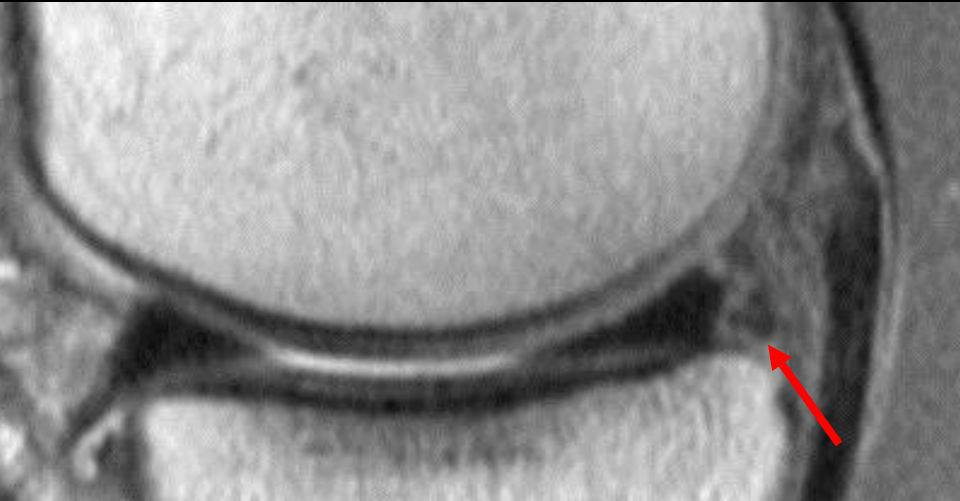


Radiaire oblique



Composante radiaire

Fissure verticale de la corne postérieure

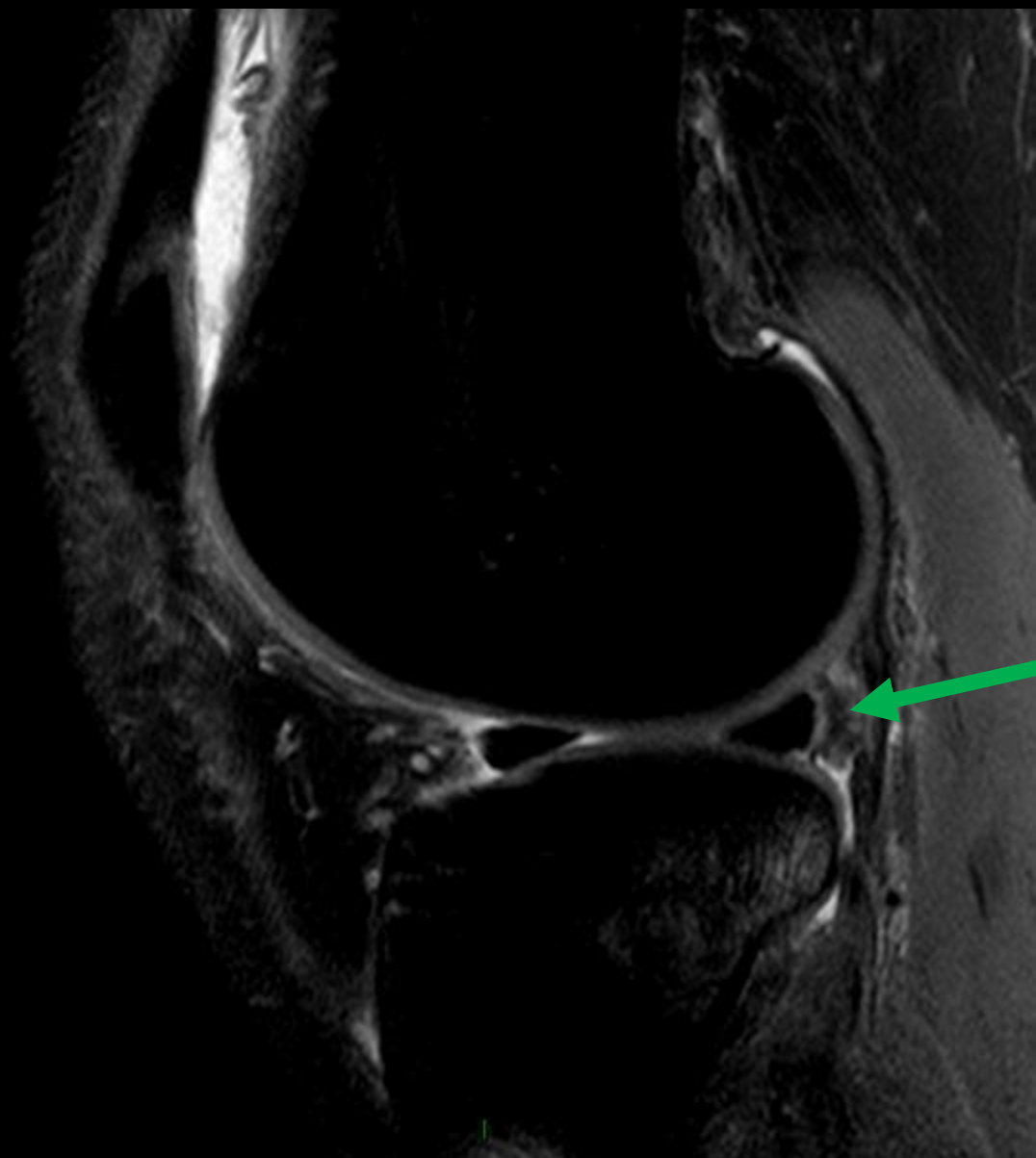


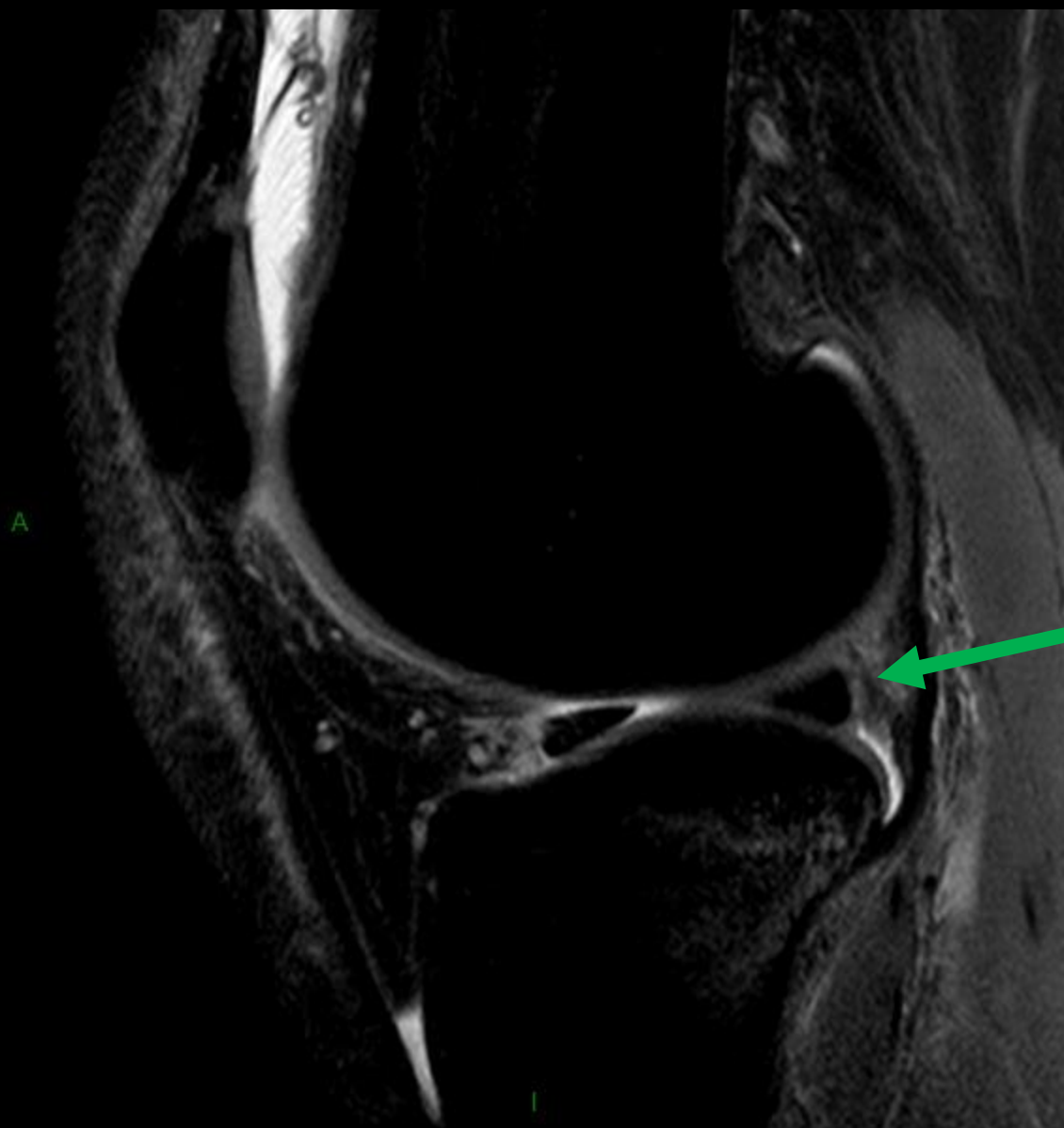
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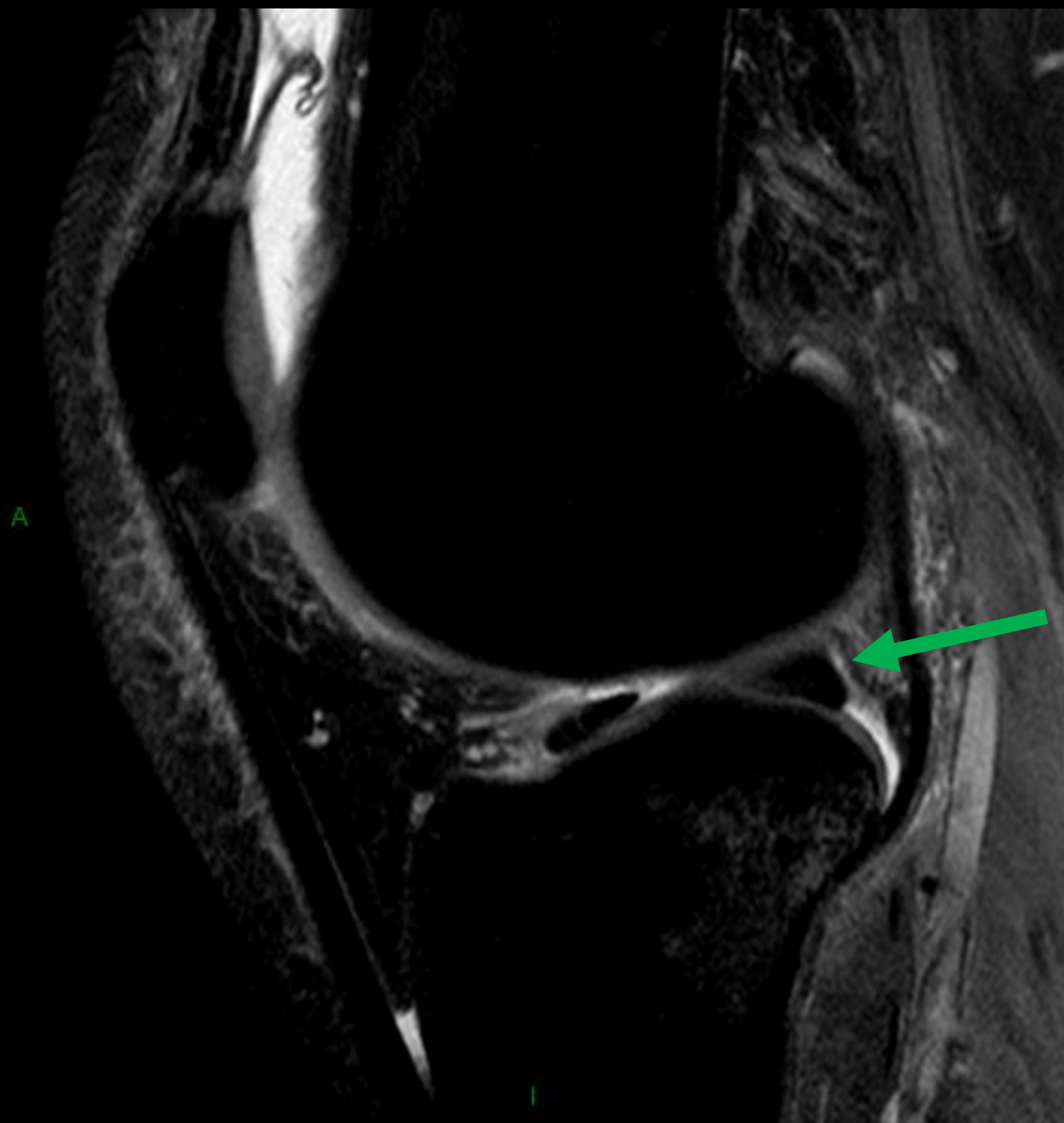


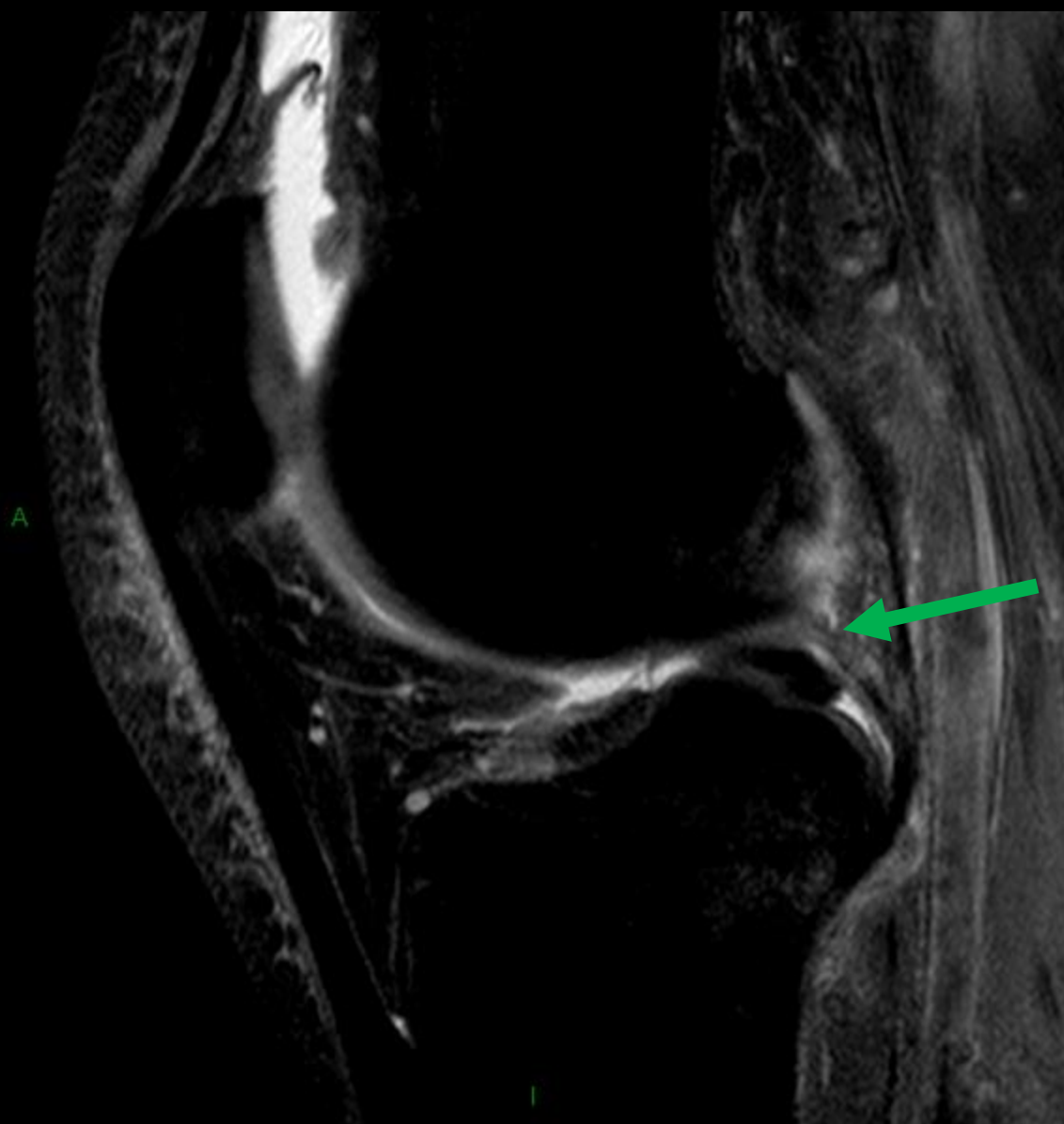
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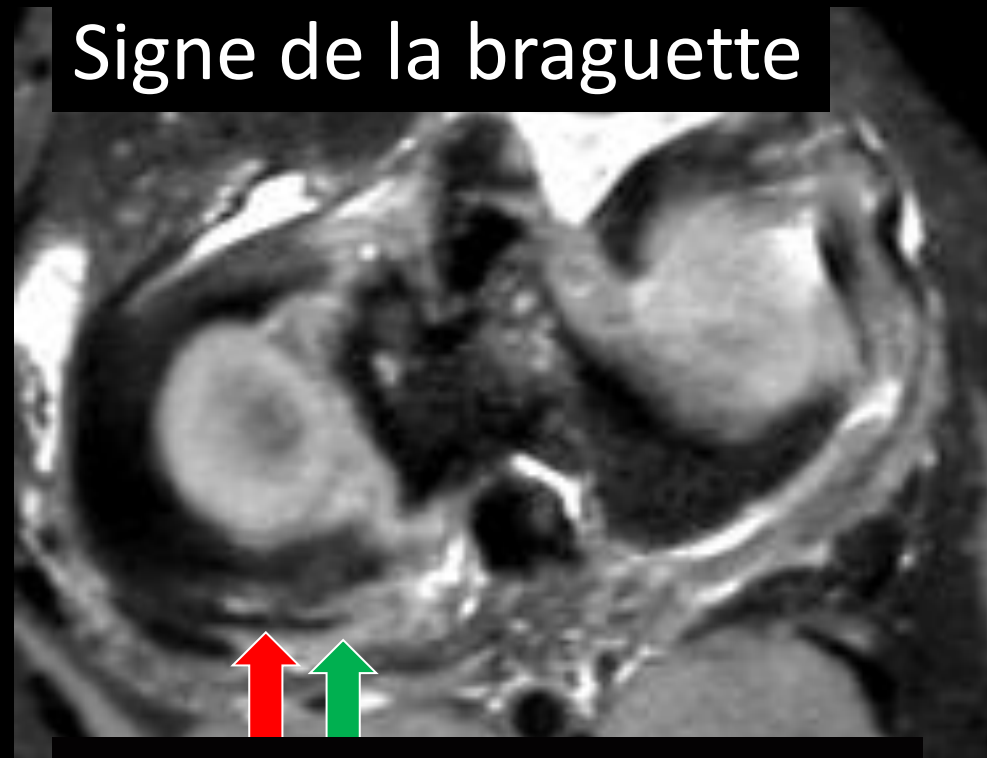






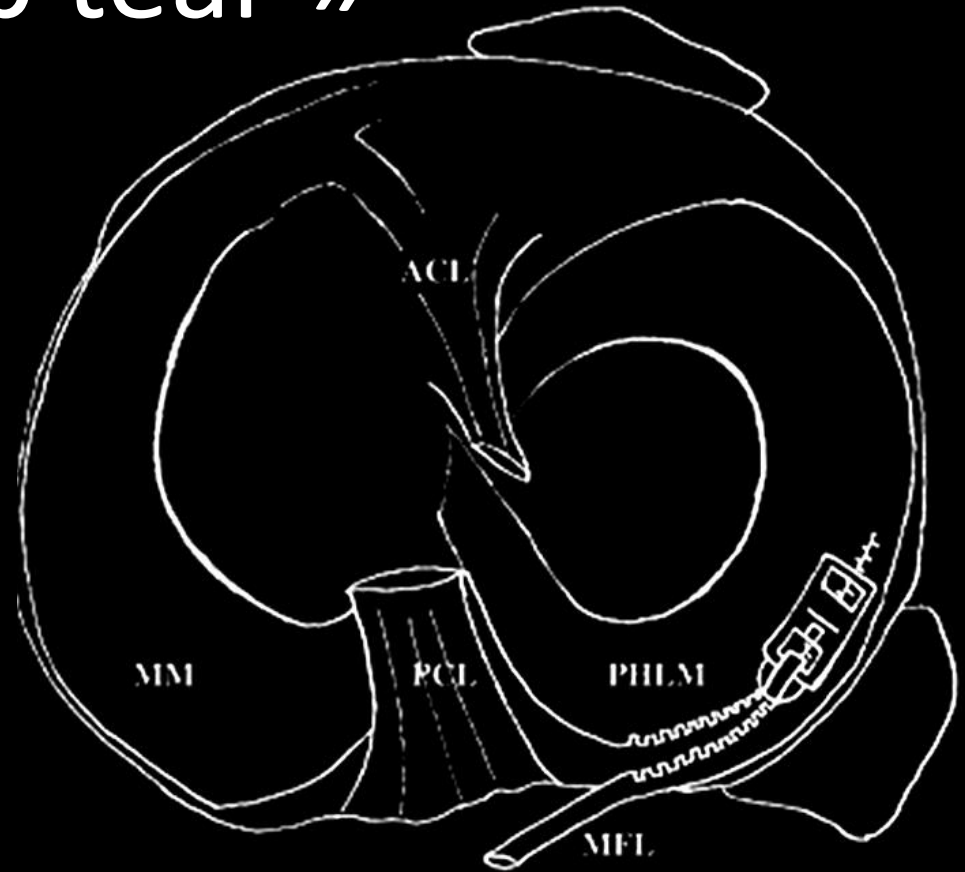


Signe de la braguette



« Zip tear »

- Ménisque latérale
- LCA

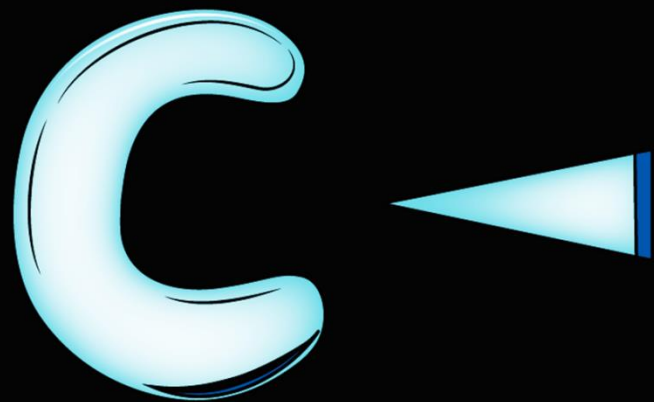
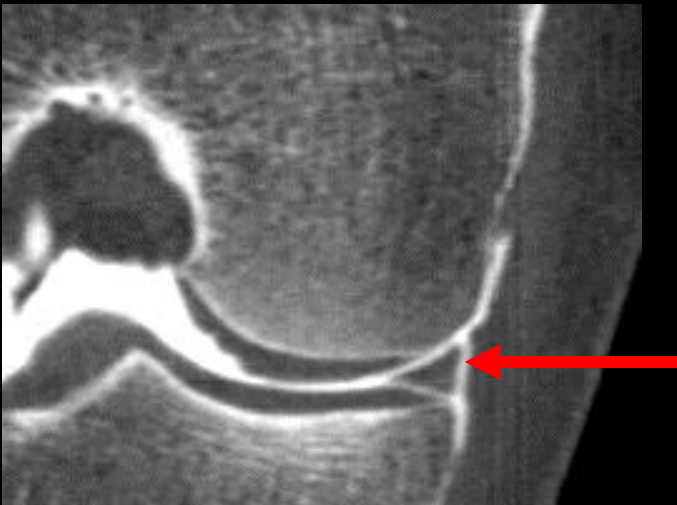
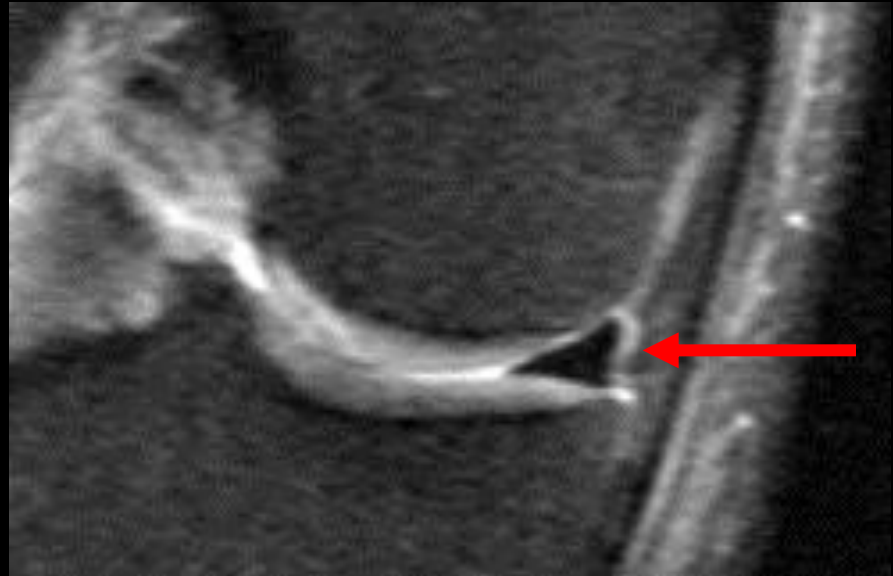


Park LS, et al Posterior horn lateral meniscal tears simulating meniscofemoral ligament attachment in the setting of ACL tear: MRI findings. Skel Radiol. 2007

Savoye et al. MR diagnosis of posterior horn tears of the lateral meniscus using a thin axial plane: the **zip sign** : a preliminary study. Eur Radiol 2011

Nl<14mm; < 4 x 3 mm sagittal slices

Désinsertion capsulo méniscale





Réparation: zone rouge!



MRI Characteristics of Healed and Unhealed Peripheral Vertical Meniscal Tears

Richard Kijowski¹
Humberto G. Rosas¹
Kenneth S. Lee¹
Arnold Cheung¹
Alejandro Munoz del Rio^{1,2}
Ben K. Graf³

OBJECTIVE. The objective of our study was to retrospectively compare the MRI characteristics of surgically confirmed healed and unhealed peripheral vertical meniscal tears.

MATERIALS AND METHODS. The study group consisted of 64 patients with 86 peripheral vertical meniscal tears diagnosed on MRI who subsequently underwent knee surgery. The MRI examinations were retrospectively reviewed to assess the following tear characteristics: tear location relative to the meniscocapsular junction, tear width, tear length, tear extension through one or both surfaces, sequences on which tear was visualized, signal intensity of tear on T2-weighted imaging, and presence of low-signal-intensity strands bridging the tear on T2-weighted imaging. Multivariate logistic regression models were used to determine whether MRI characteristics could be used to distinguish between healed and unhealed tears at surgery.

RESULTS. Tear location was the most significant characteristic ($p < 0.001$) for distinguishing between healed and unhealed tears: 17 of 18 (94.4%) tears located at the meniscocapsular junction of the medial meniscus were healed and 15 of 68 (22.1%) tears not located at the meniscocapsular junction were healed. For tears not located at the meniscocapsular junction, MRI characteristics significantly associated with healed tears included a tear width

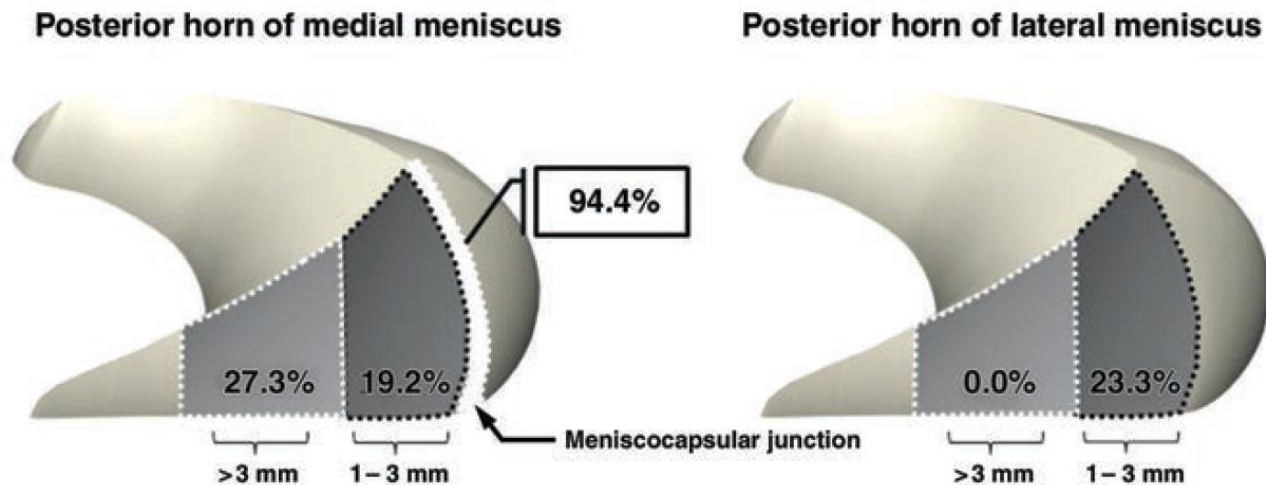
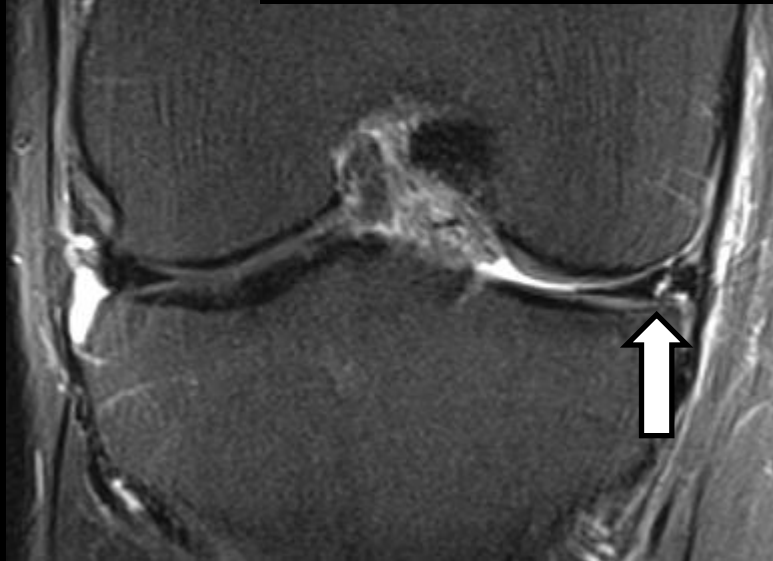
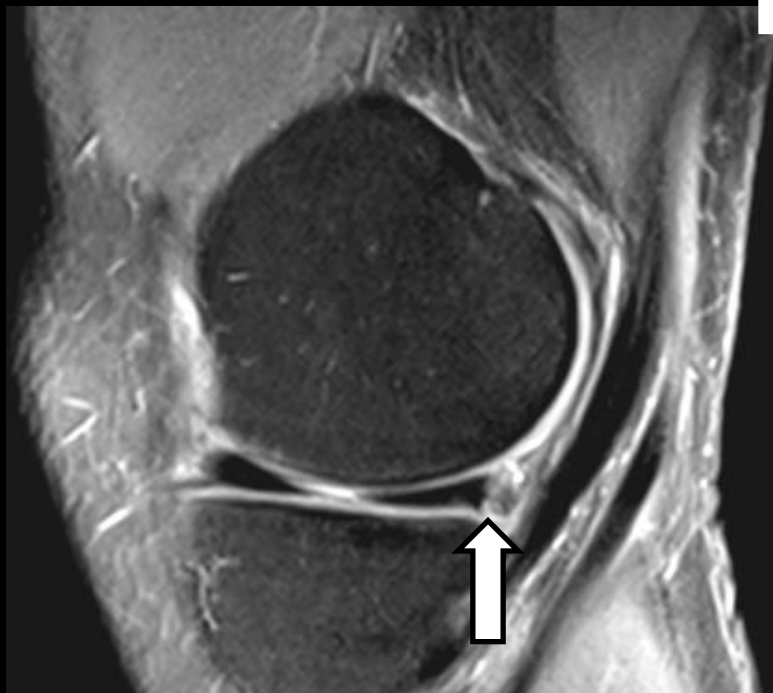


Fig. 3—Three-dimensional illustrations of posterior horn of medial and lateral menisci show rate of spontaneous healing of peripheral vertical meniscus tears according to their location relative to meniscocapsular junction on MRI.

Complication des fissures longitudinales

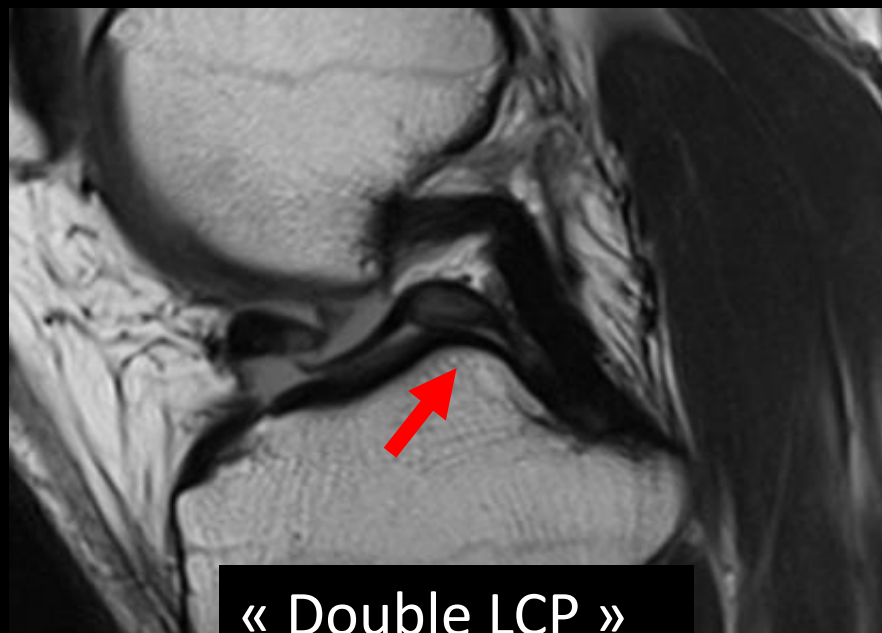


+ 1 an





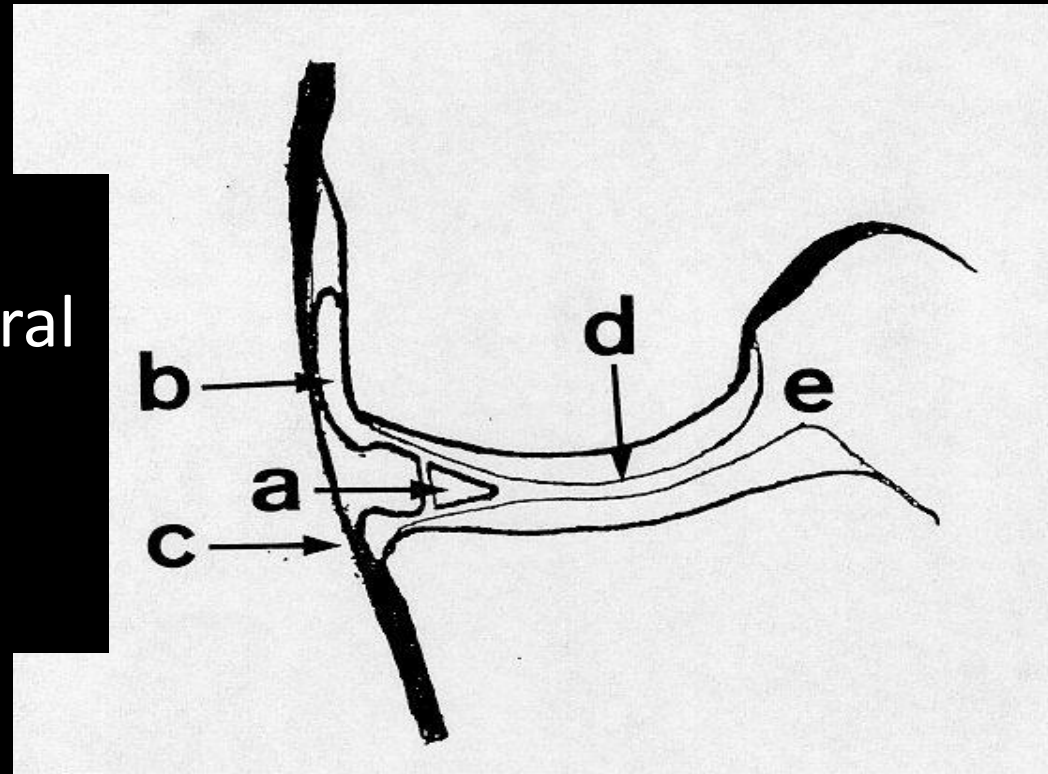
« Anse de seau »



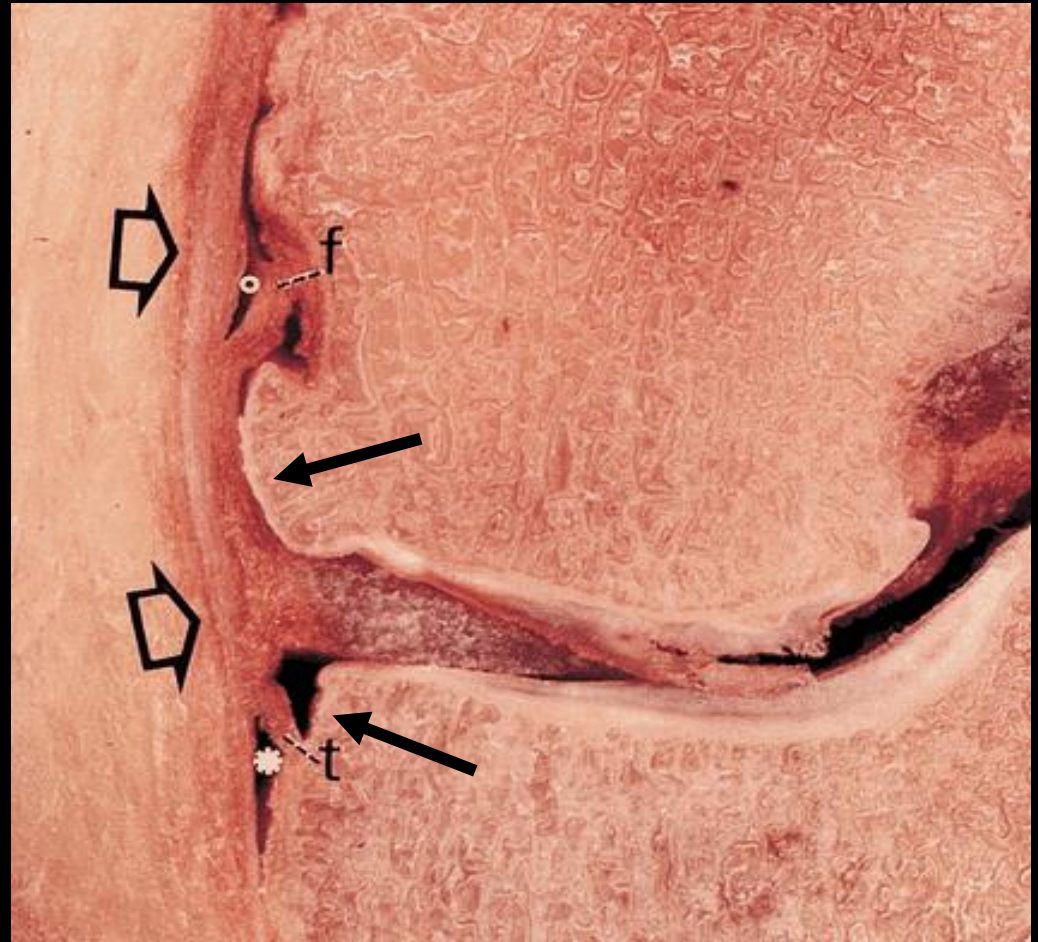
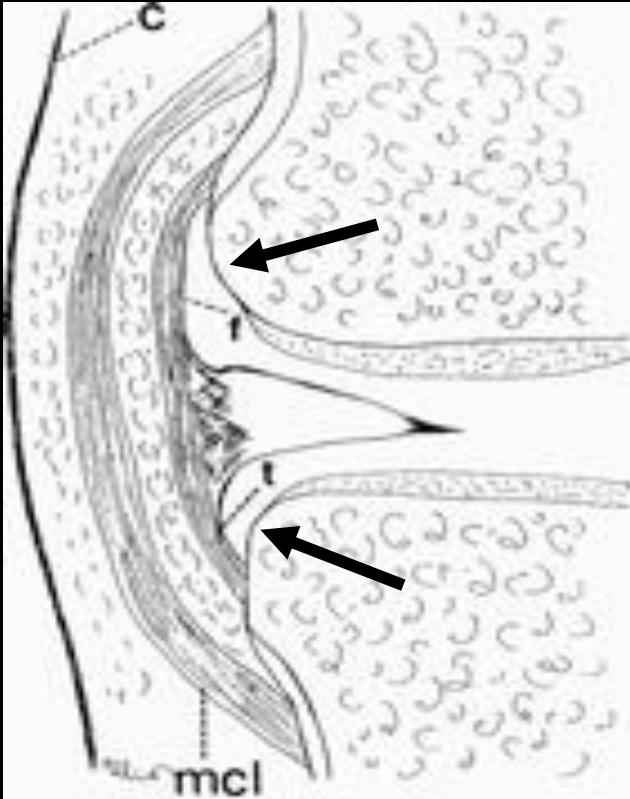
« Double LCP »

Fragments méniscaux déplacés

- a. Pas de déplacement
- b. Récessus ménisco fémoral
- c. Récessus ménisco tibial
- d. Espace articulaire
- e. Espace inter condylien



Cavités méniscal supérieures et inférieures



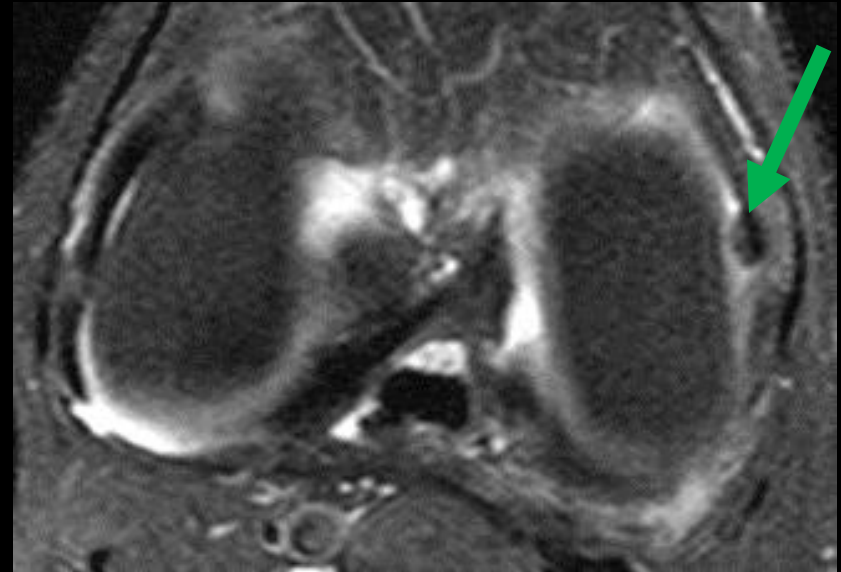
Three Layers of the Medial Capsular and Supporting Structures of the Knee: MR Imaging-Anatomic Correlation¹ Michel De Maeseneer et al Radiographics2000; 20; S83-S89

	Sensibilité	Spécificité
Fissure méniscale	96 %	84 %
Fragment dans l'échancrure	69 %	94 %
Fragment dans un récessus	71 %	98 %

101 genoux opérés – 37 fragments déplacés

Vande Berg BC, Malghem J, Poilvache P, Maldague B, Lecouvet FE.
Meniscal tears with fragments displaced in notch and recesses of knee: MR imaging with arthroscopic comparison. Radiology. 2005;234:842-50.

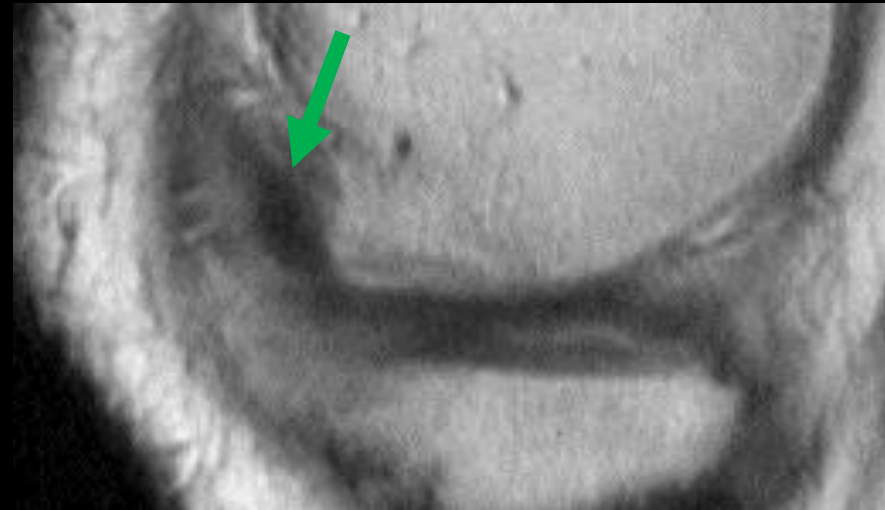
Récessus supérieur



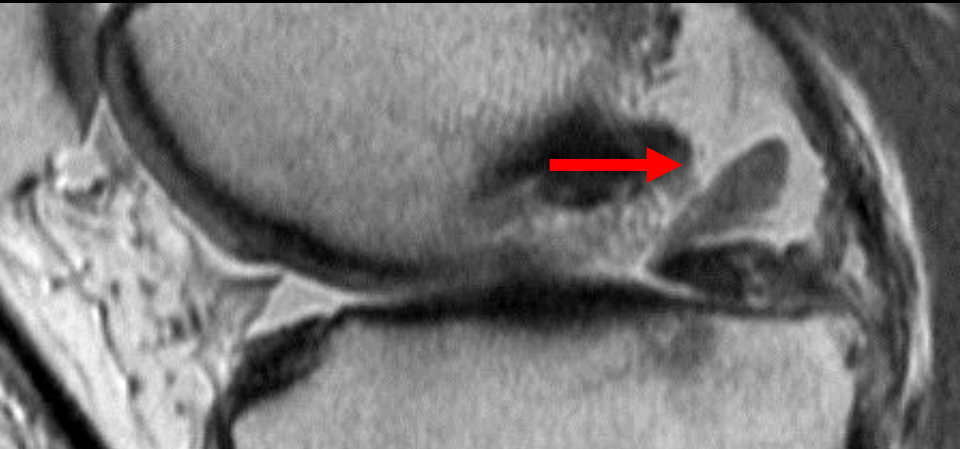
Forme anormale= perte de substance



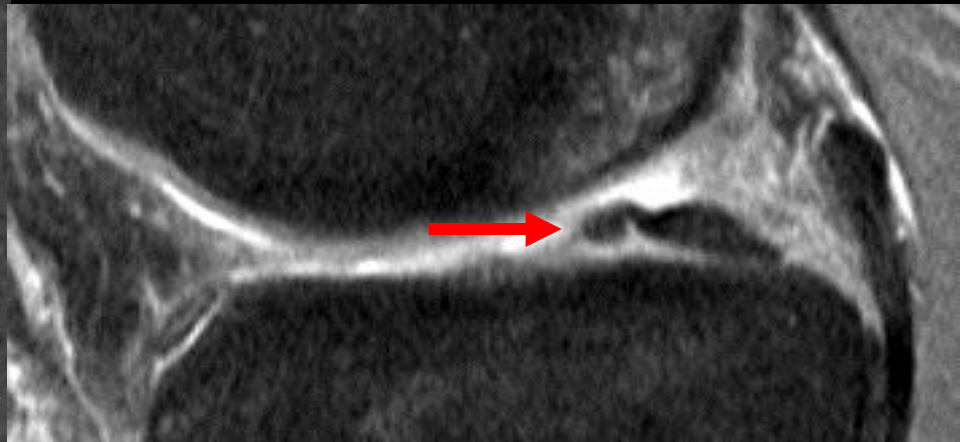
Chasse au fragment



Modèle de migration centrale, postérieur

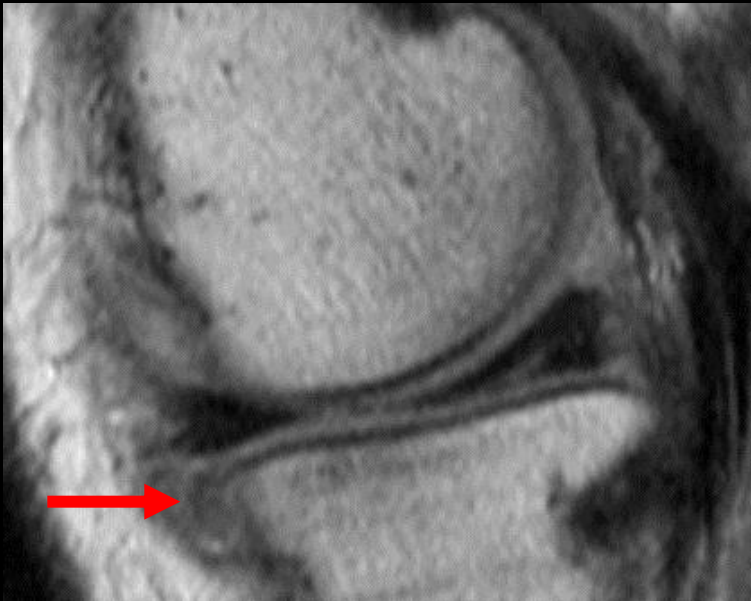
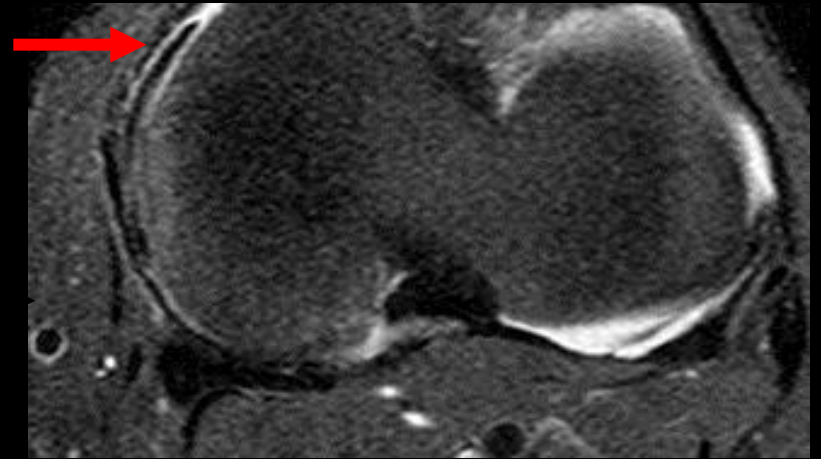


vertical



horizontal

Modèle de migration périphérique, inférieure

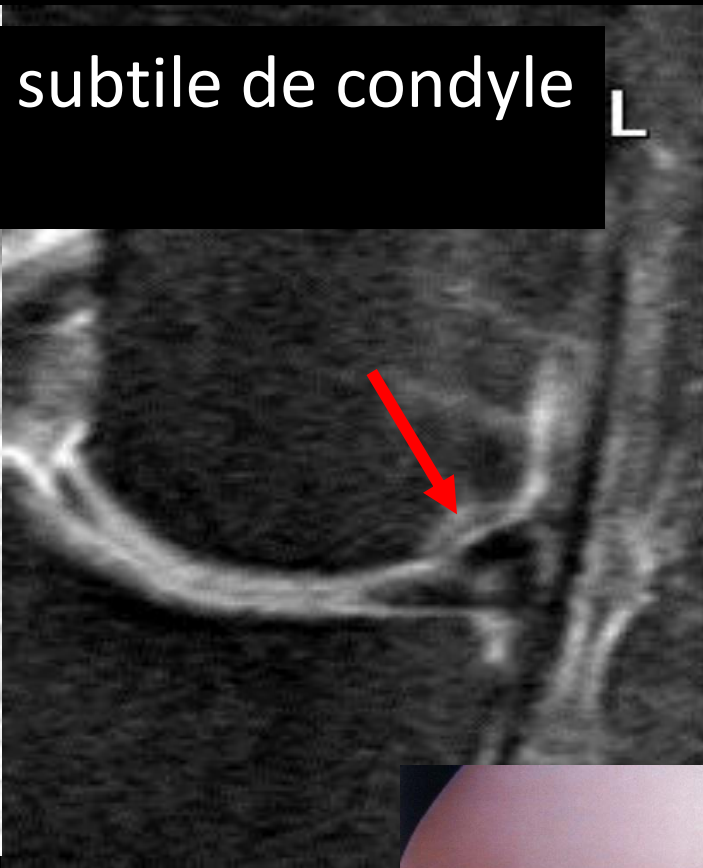


Infiltration de moelle osseuse adjacente

Fragment inférieur



Dépression subtile de condyle L



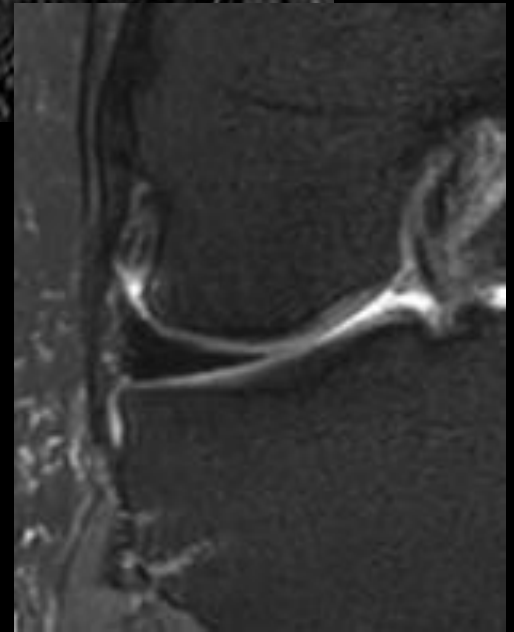
Objectifs

- Anatomie normale
- Lésions méniscales élémentaires
- Pièges: variantes anatomiques/post opératoire
- Lésions associées

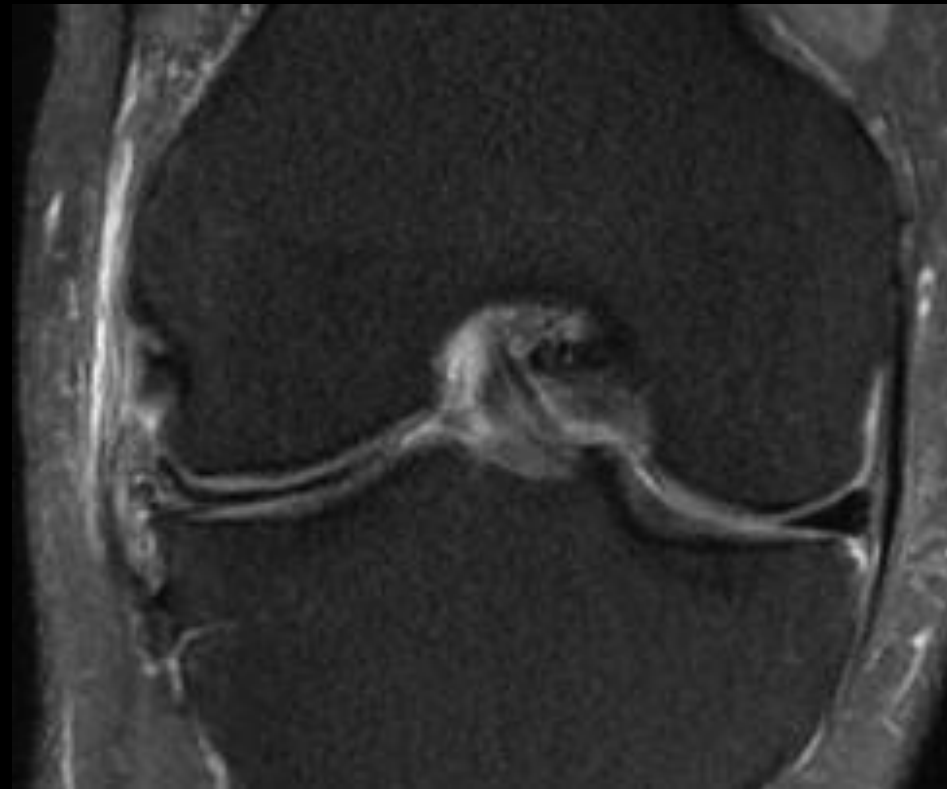
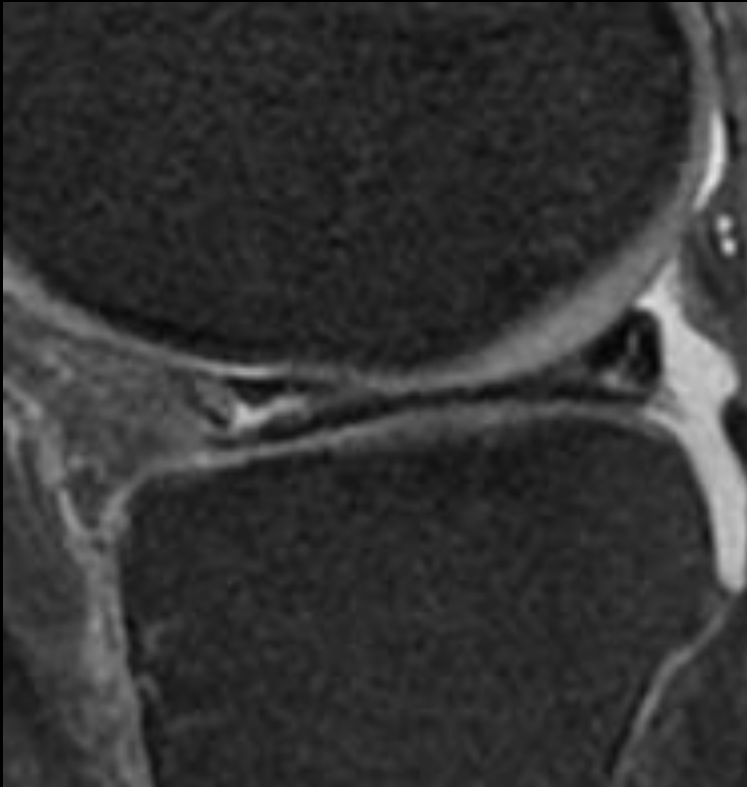
Ménisque discoïde



Ménisque latéral+++

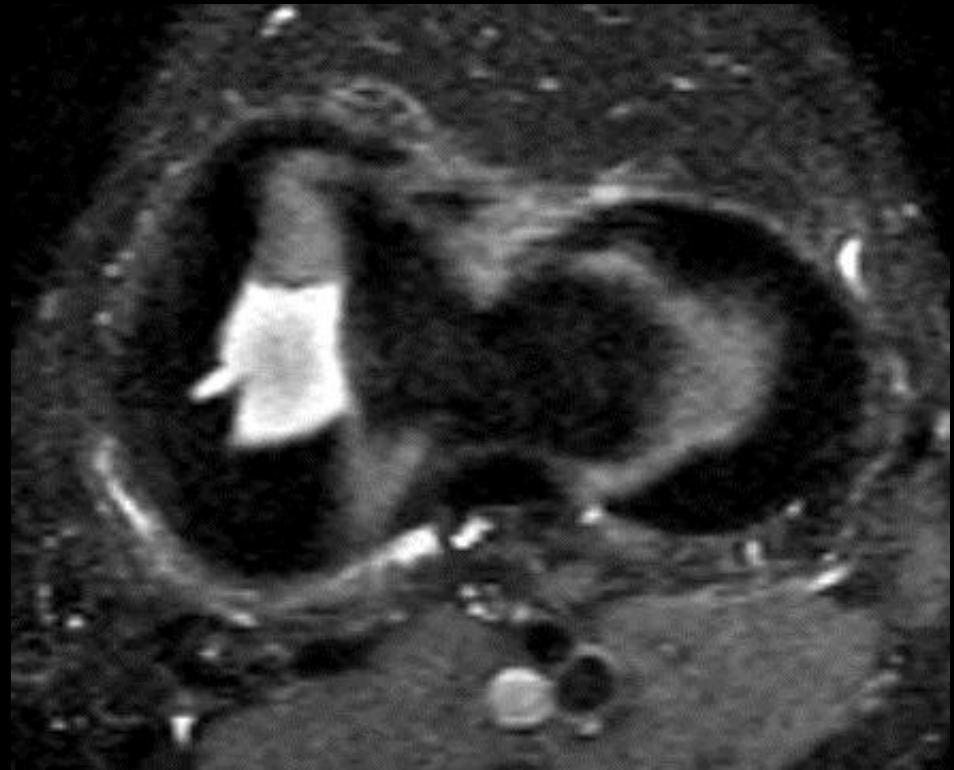


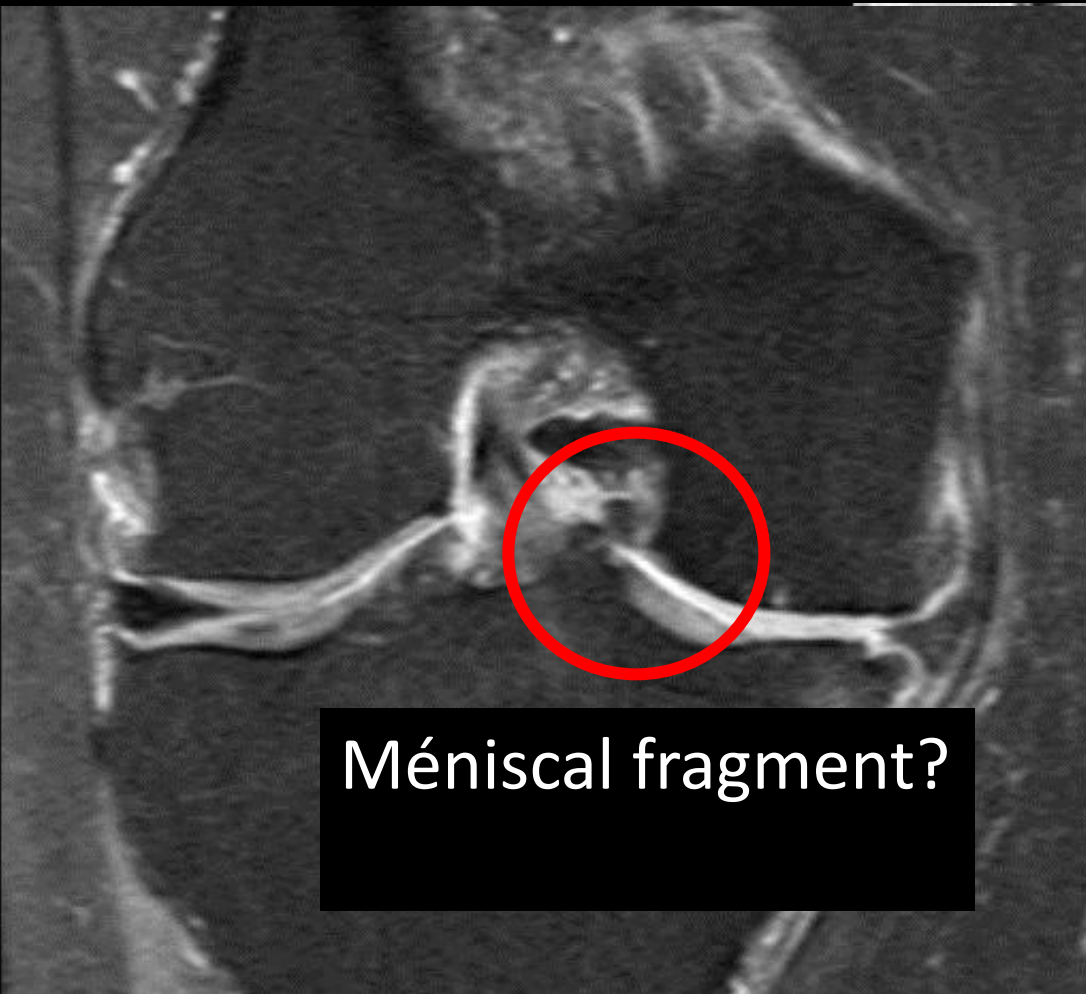
Ménisque discoïde= fissure plus fréquente



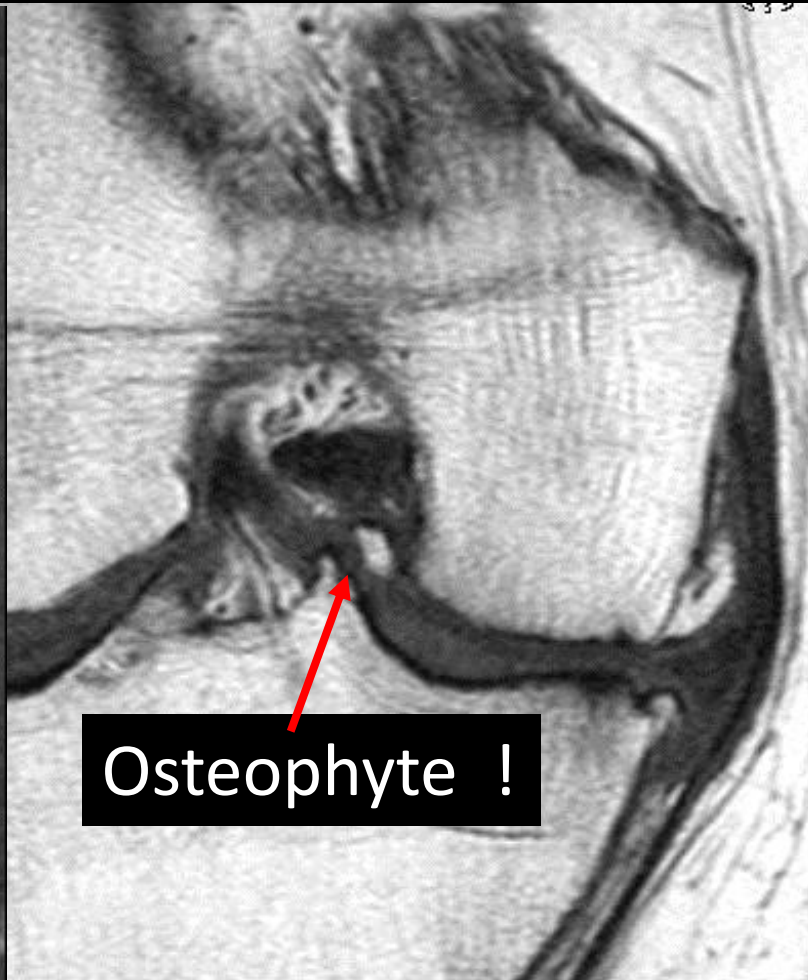
Ménisque « en drapeau » (flounce meniscus)

- Corps du ménisque médial
- Contours ondulés
- images axiales!





Méniscal fragment?



Osteophyte !

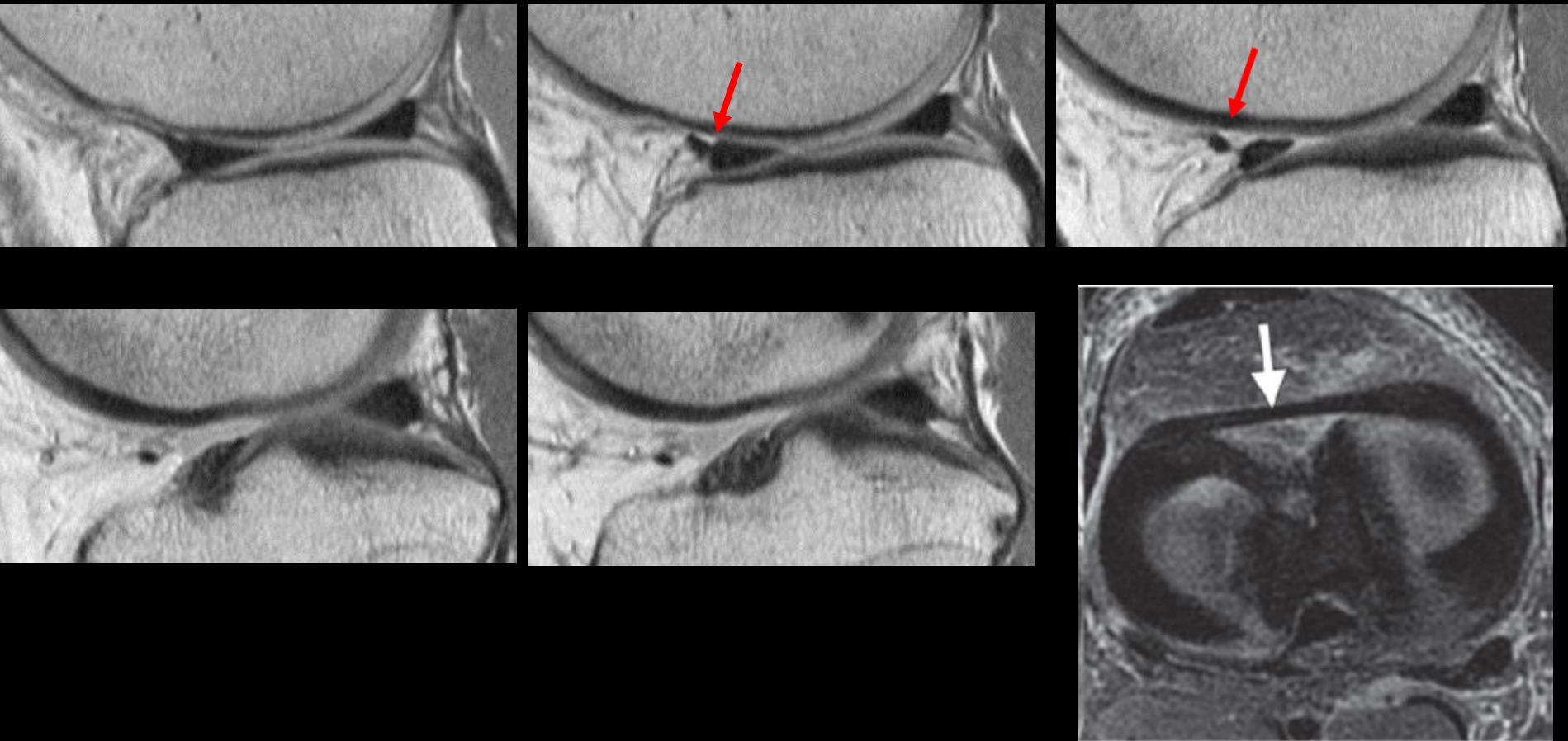
Ossicule méniscal

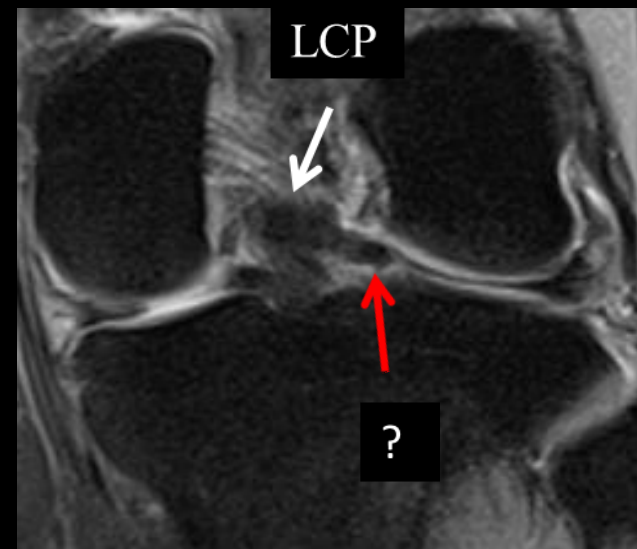
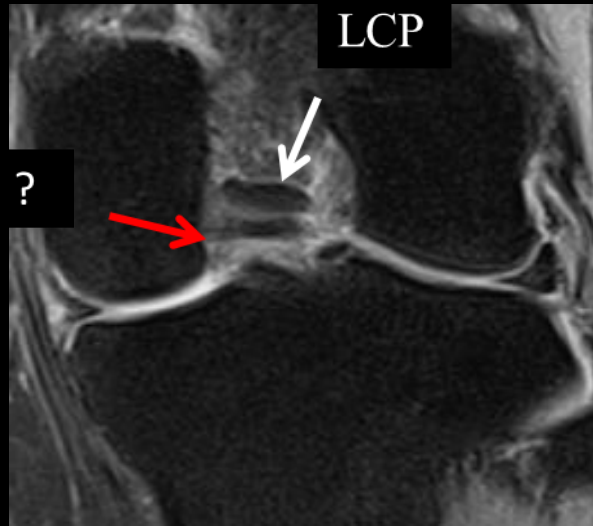
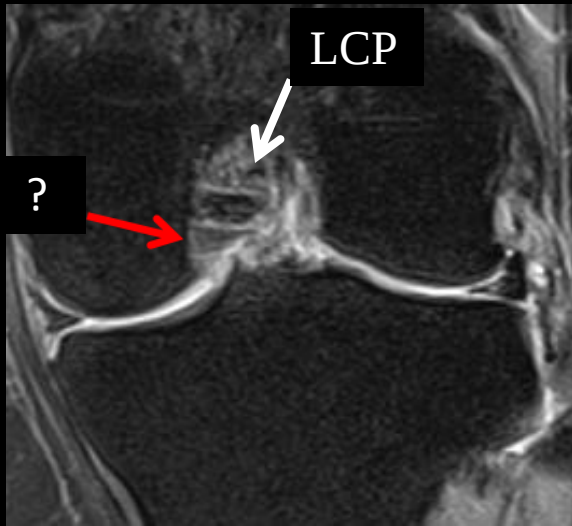


Ligament méniscal transverse

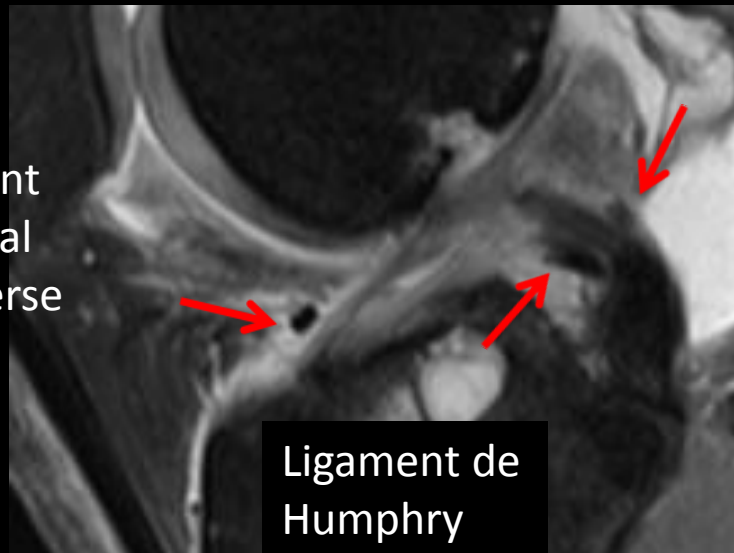
Racine antérieure du ménisque latéral

NB: pas de lésion isolée de la corne antérieure





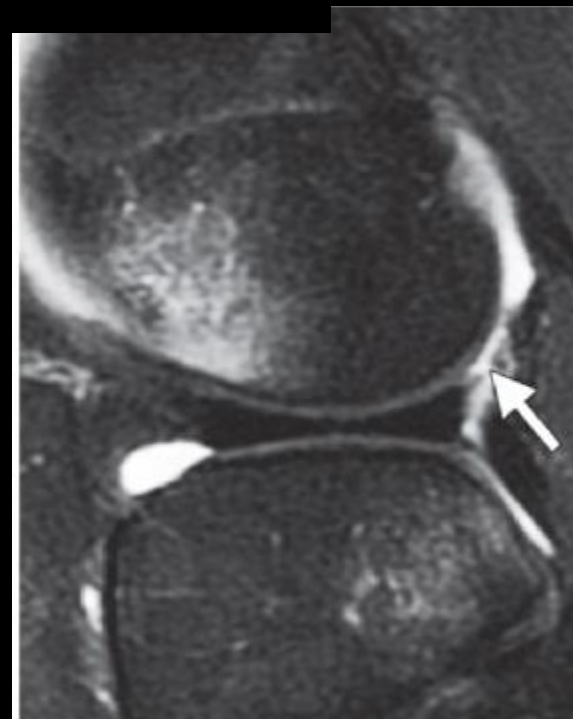
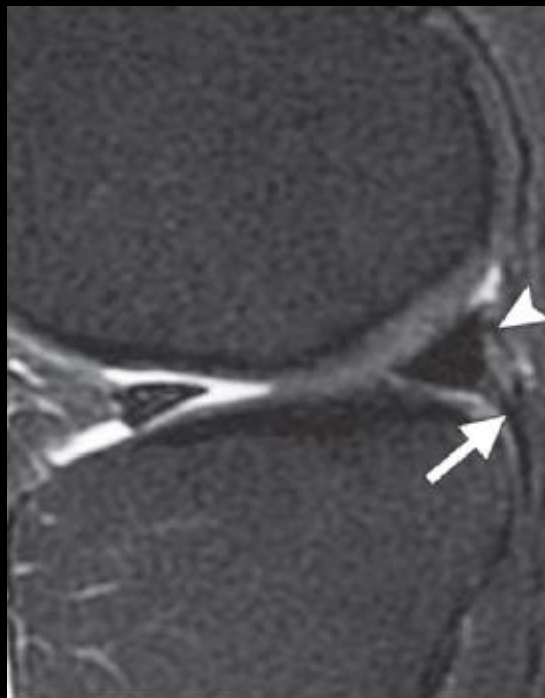
Ligament
méniscal
transverse



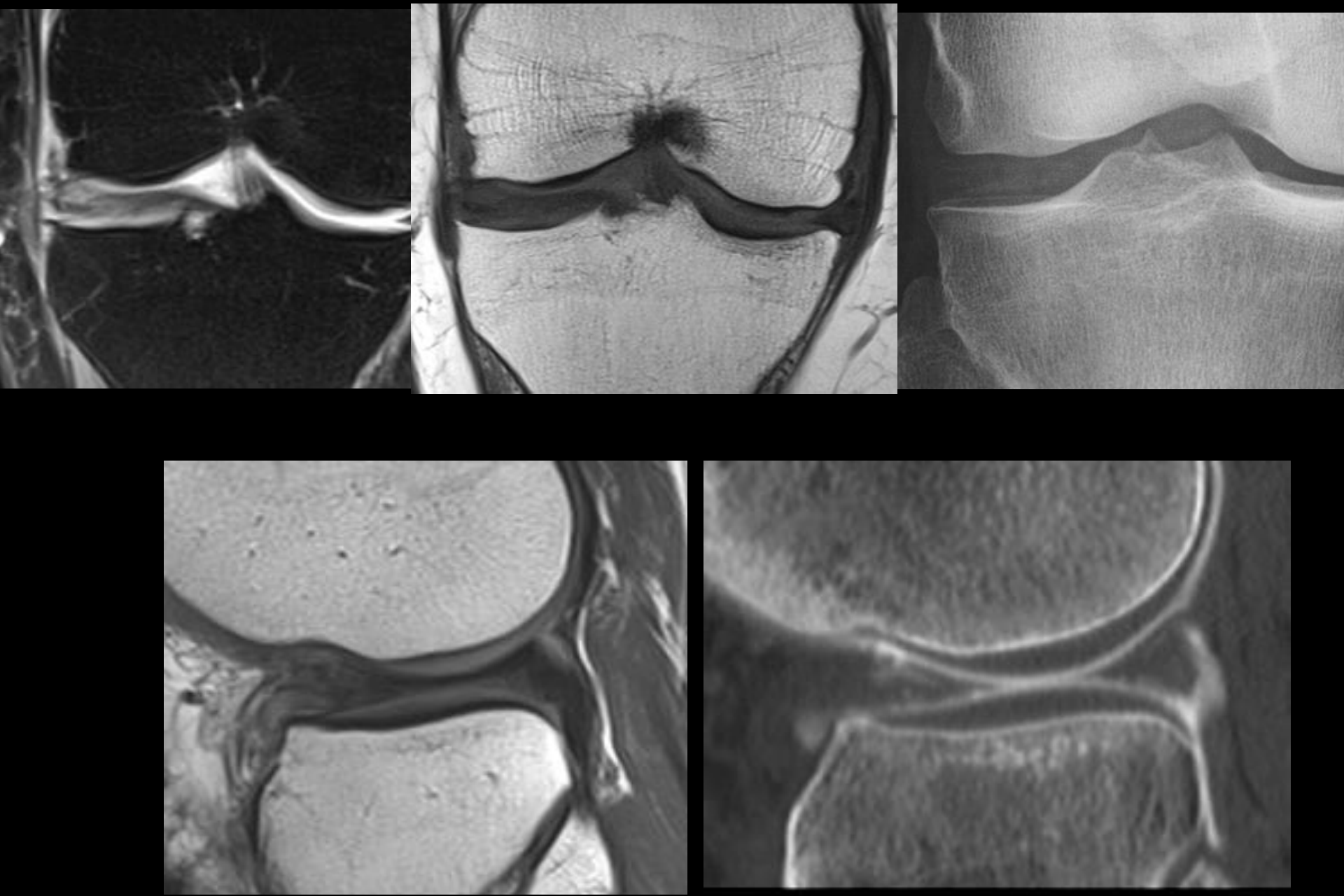
Ligament
de
Wrisberg

Ligaments
ménisco
fémoraux

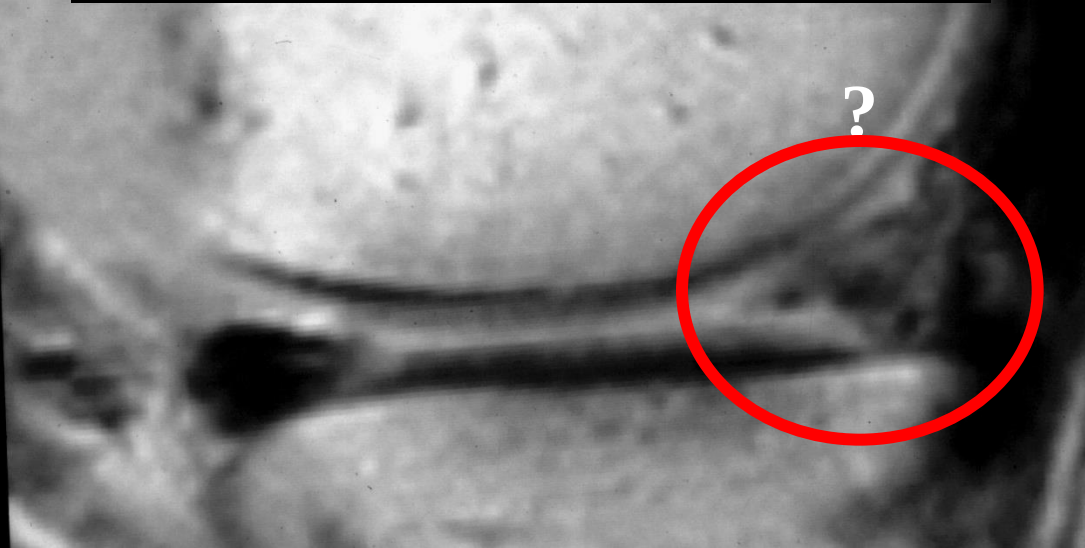
Attaches cornes postérieures



Chondrocalcinose



3mois après ménisectomie partielle



Cicatrisation:
4 mois

12 mois après une ménisectomie partielle



Objectifs

- Anatomie normale
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- Pièges: variantes anatomiques/post opératoire
- Lésions associées

Rupture LCA et lésion méniscale



60% ménisque médial
47-50% ménisque latéral
Un tiers: ML+MM

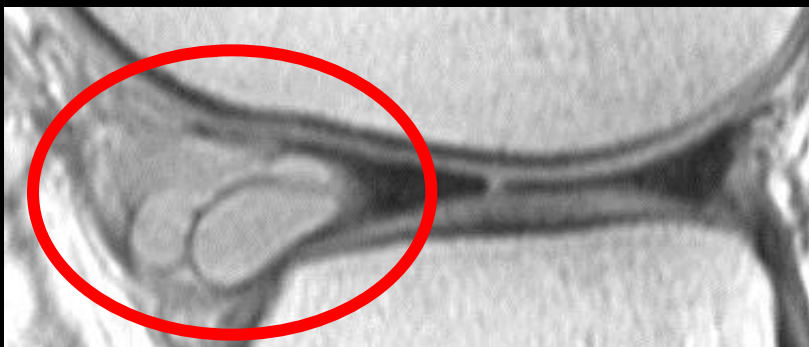
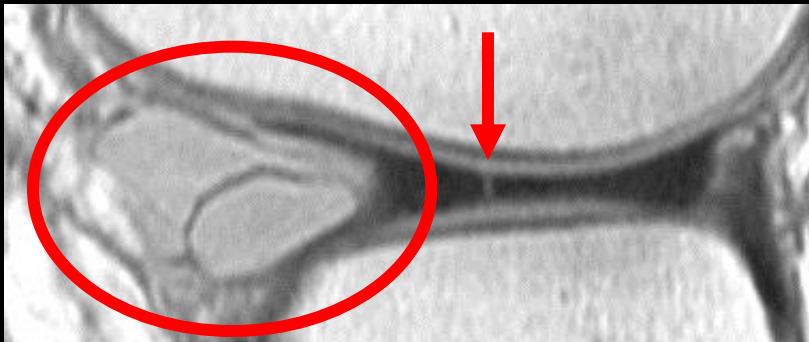
Kyste méniscal

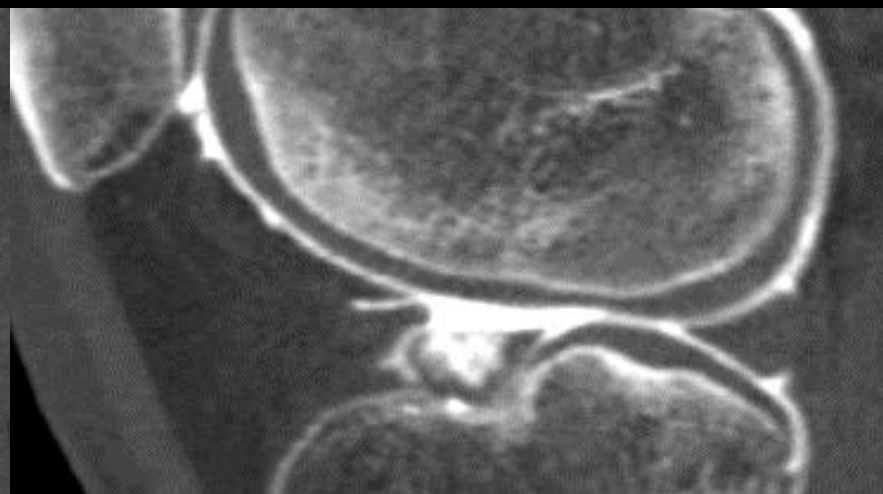
Associé à des déchirures «chroniques»

Effet de masse

Ménisque latéral: extension AP, diminution de la flexion

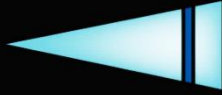
Ménisque médial: extension AP et CC, sans changement de flexion





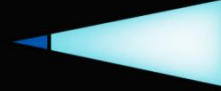
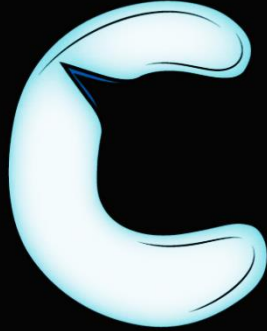
Conclusion

Verticale

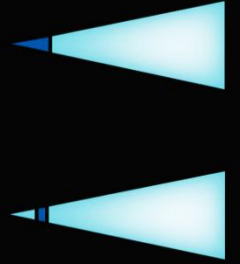
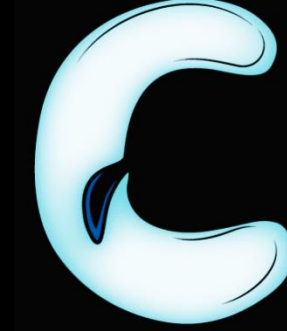


longitudinale

Fissure

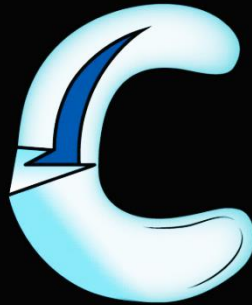


radiaire



Radiaire oblique(bec de perroquet)

Horizontale



Complexe



Conclusion

- Connaitre l'anatomie de base, les lésions élémentaires méniscales, variantes de la normale
- Orientation diagnostique
- Eviter les faux positifs/ arthroscopie inutile