

Lac INLE, BIRMANIE 2016

ZEN ATTITUDE...



DEMARCHE DIAGNOSTIQUE ET PRISE EN CHARGE DES PATHOLOGIES OSTEO- ARTICULAIRES DE L'ADULTE

VOLET IMAGERIE ET RADIOLOGIE INTERVENTIONNELLE

Le 15 Octobre 2020

DR J.M.BONDEVILLE LE HAVRE

REGLES

- ⦿ IMAGERIE UTILE sinon coûteuse, modifie la stratégie thérapeutique.
- ⦿ IMAGERIE NORMALE a parfois un intérêt.
- ⦿ P.N.N. !!! Test thérapeutique non exclus.
- ⦿ Du moins irradiant/invasif au plus I / I (cas)
- ⦿ Bénéfice du guidage du geste .

Tissu osseux

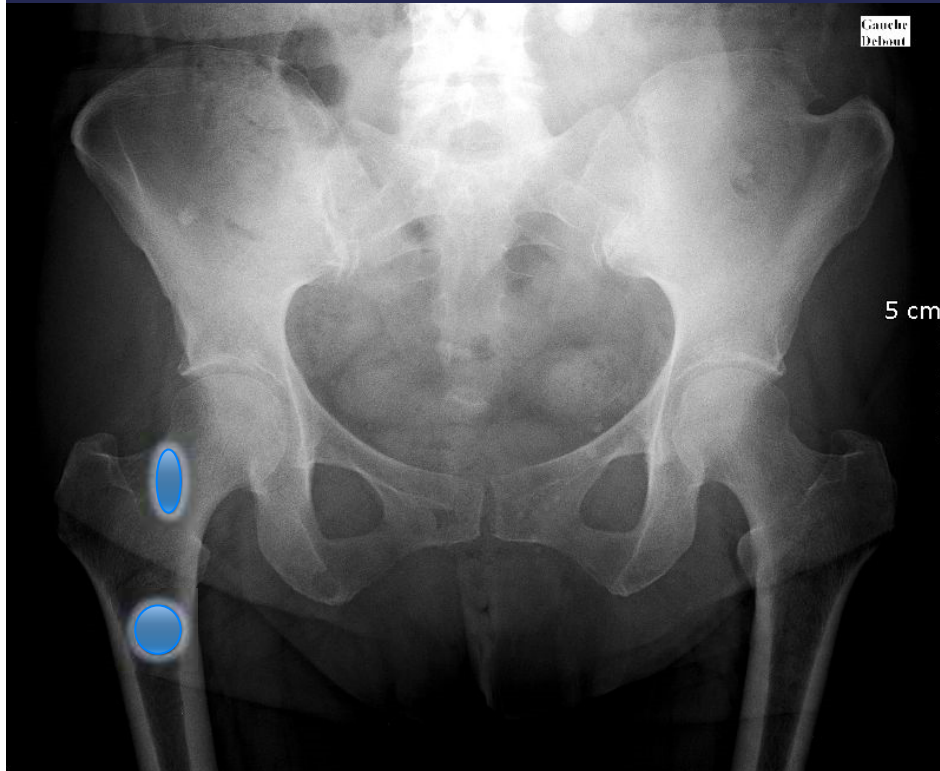
- Corticale: solide
- Périoste : innervé
- Squelette trabéculaire
- Espaces médullaires >RACHIS et BASSIN
Lieu de fabrique (avec origine des membres)
cellules hématopoïétiques de l'Adulte : métastases
- Epiphyse peu vascularisée: pas de métastase

Tissu osseux

- Os longs /courts /plats
- Espaces médullaires Sang
- Biomécanique : corticale/Orientation des travées osseuses



Lignes de force vs espaces médullaires



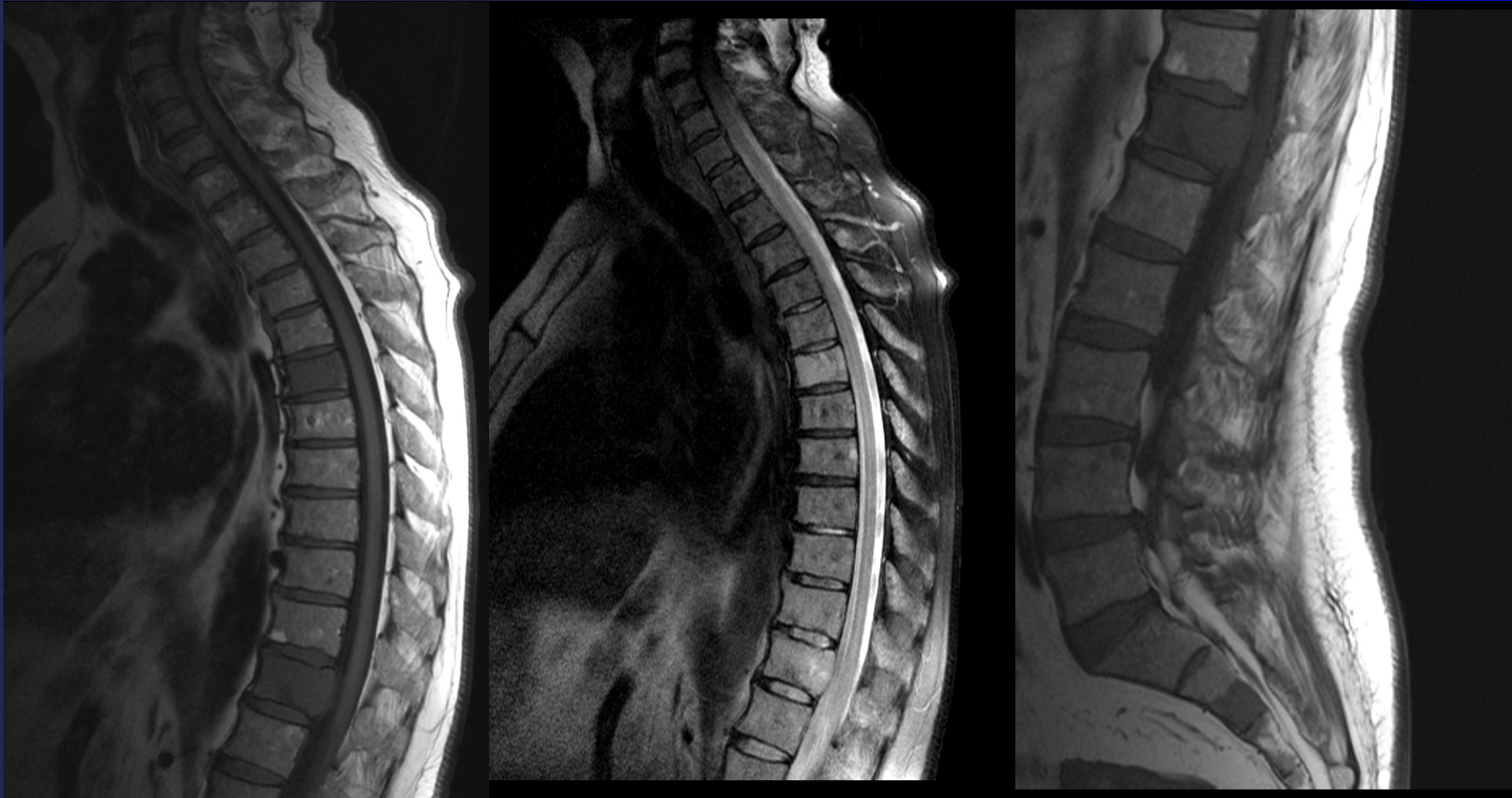
DEBOUT



D DEBOUT



Moelle hétérogène meta

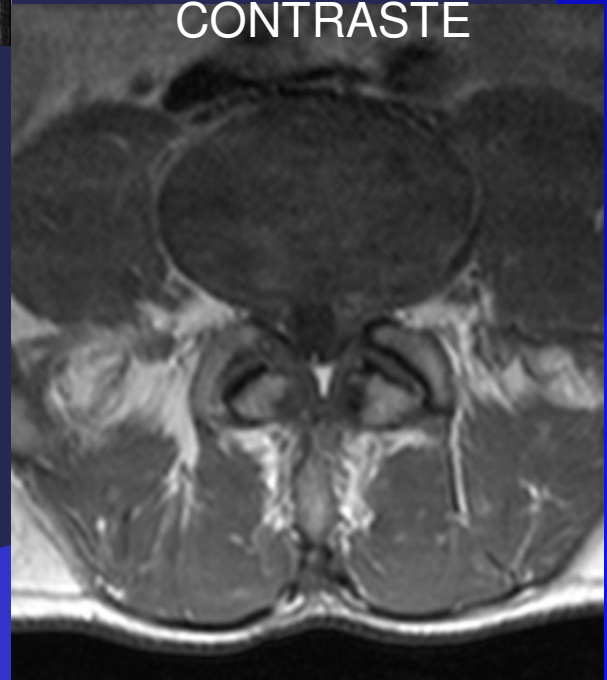
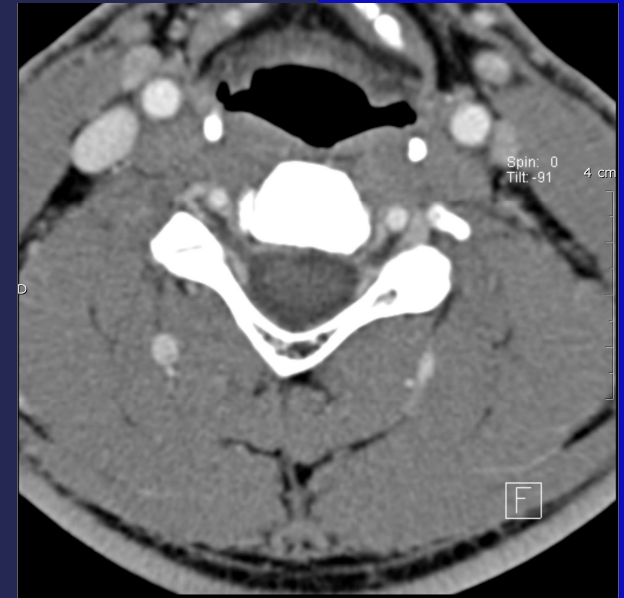


?

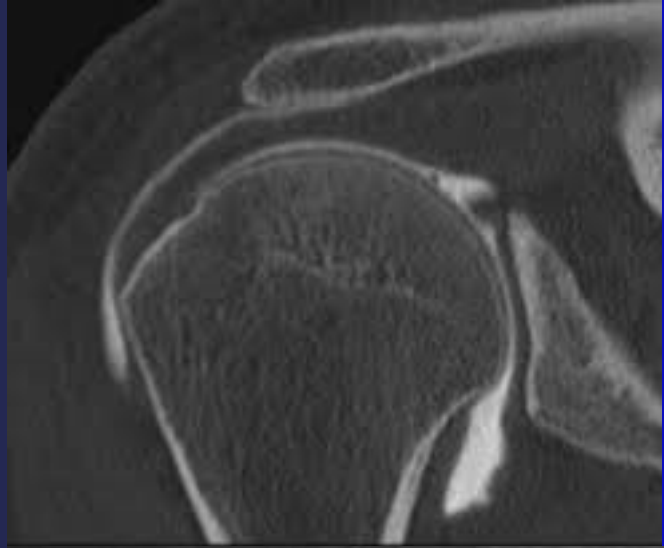
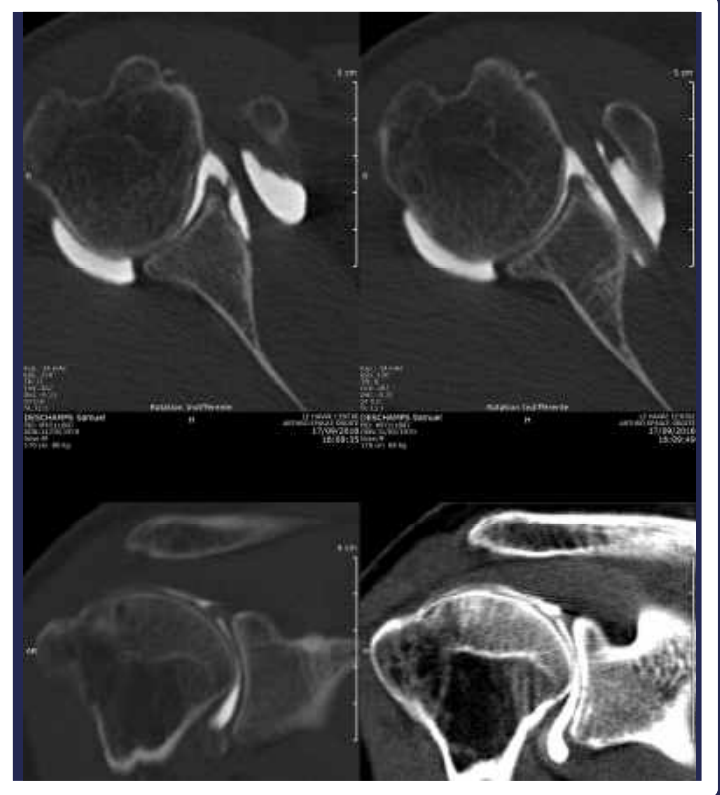


Articulations

- Cartilage
- Plaque osseuse sous chondrale vx
- Synoviale et liquide nutritif
- Capsule et renforts ligamentaires
- La synoviale est vascularisée pas le cartilage .



Contraste iode /gado



EPAULE



EPAULE

- ⦿ Acromio clavulaire : écho /radio
 - ⦿ Gléno-humérale : radio (rot ext face couchée debout)
 - ⦿ Coiffe des rotateurs : échographie + Radiographie (étude acromiale)
- Calcifications
- ⦿ Instabilité : Garth (>bernageau) et profil
 - ⦿ Préopératoire : Arthro-IRM sinon Ao TDM

INSTABILITE

GARTH !

Inclinaison max du tube
en antéro inférieur
dégage le
siège de lésion capsulo-
labrale voire osseuse
(LATARJET)



RUPTURE

PRE OP

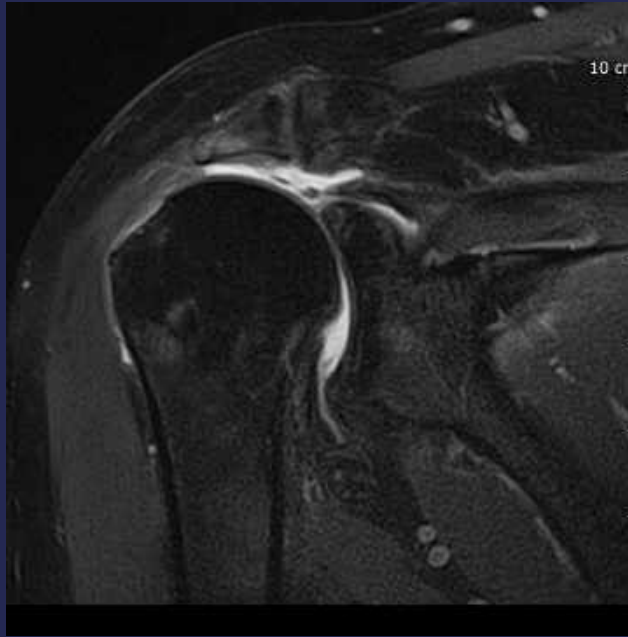
AOIRM

>IRM

>AOTDM



AO-IRM rupture 2 pas indispensable



Grande rupture , car contraste spontané T2 par l'épanchement

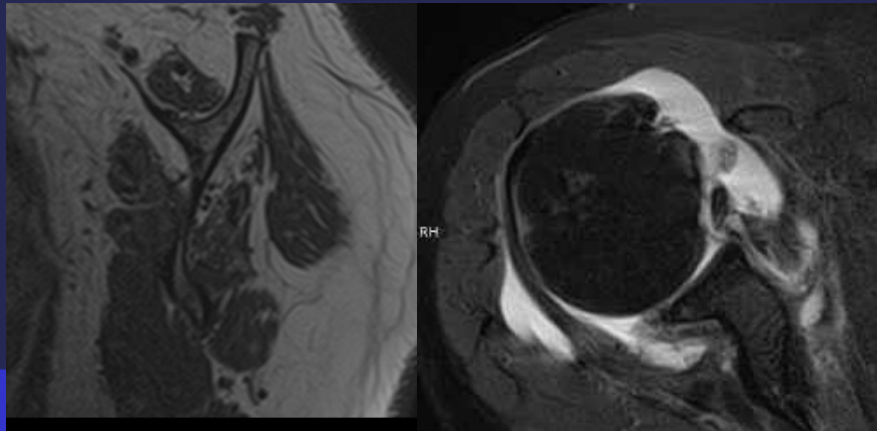
On supprime l'étape arthrographique

TENDON RESTANTS

ANALYSE MUSCULAIRE

GLENE SURFACE ET RETRO
VERSION

PRE-PROTHETIQUE VS
SCANNER



OMARTHROSE

dg rRX

IRM

AOTDM

AOIRM

PRE OP !

Douleur

bcps ! Ce géodes



TENDINOPATHIE CA++

apatite
résorption : accès douloureux
micro cristallin

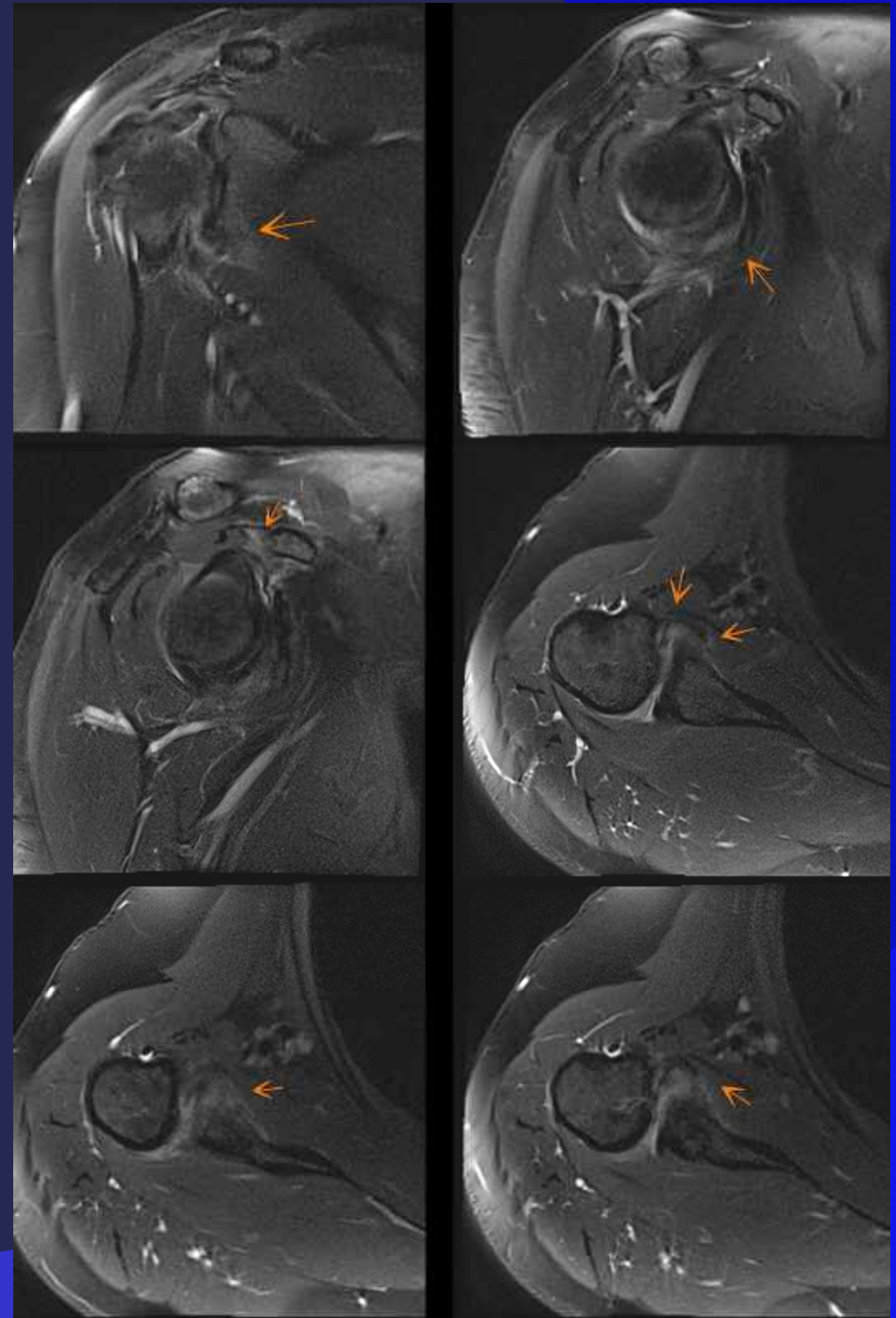


Capsulite

clinique

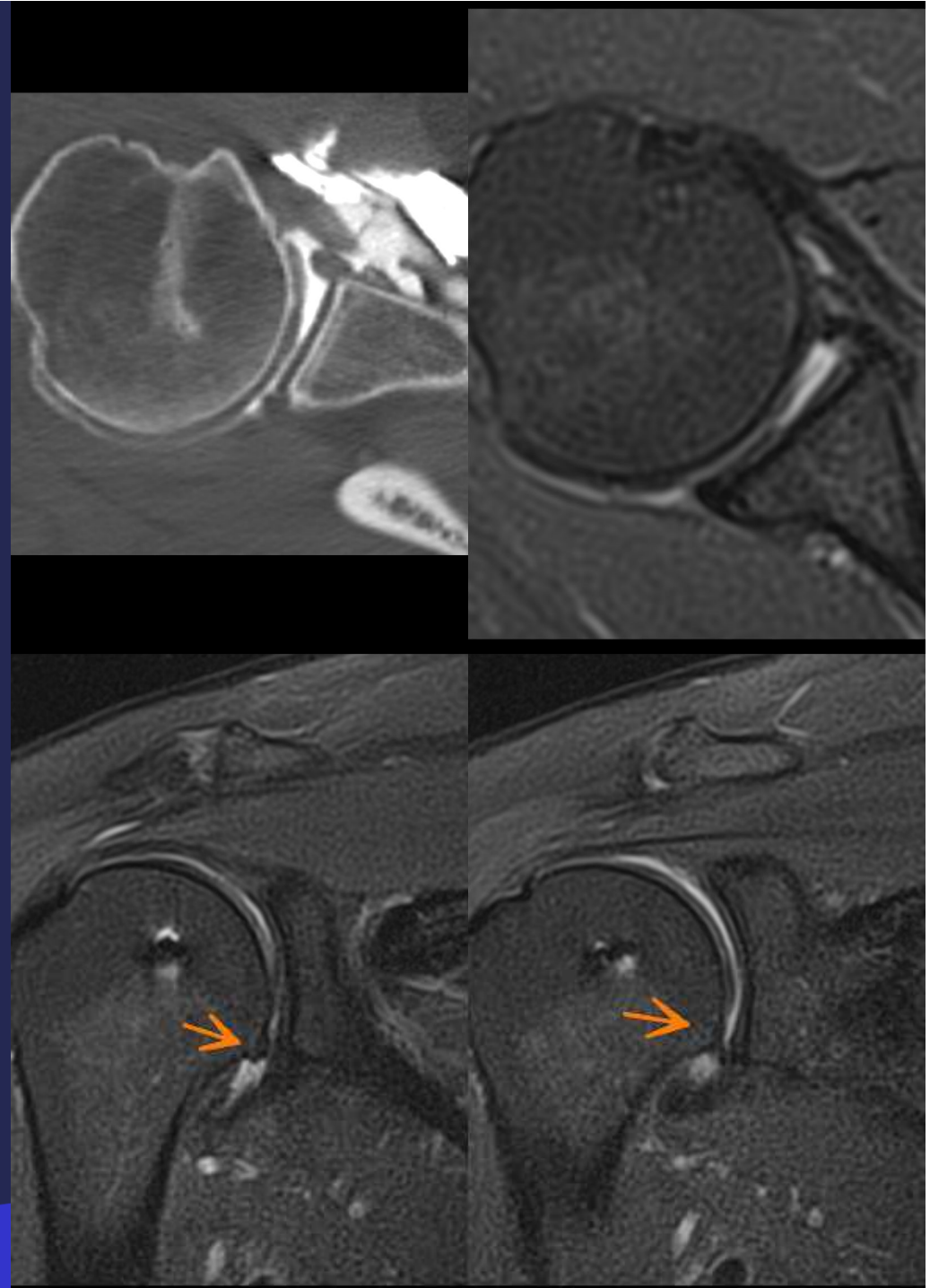
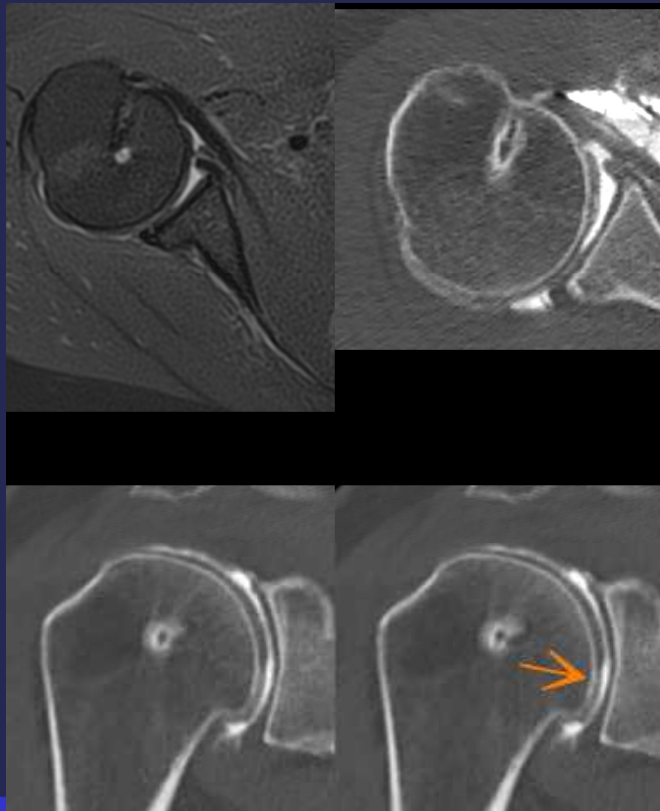
rx et echo +/-
irm

arthro -
distension



EPAULE OPEREE

selon matériel
et clinique



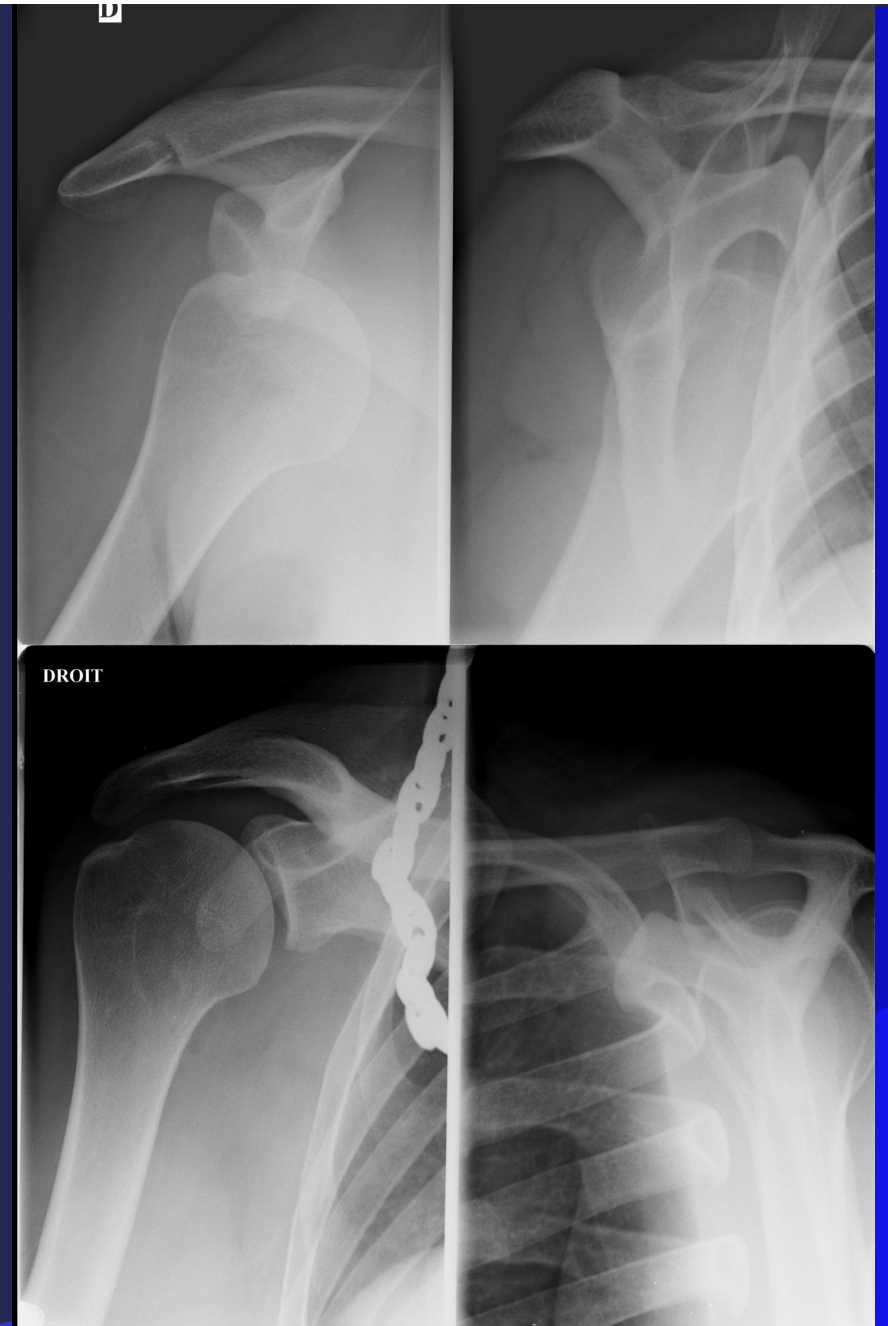
Traumatique

Rx initiales dg et réduction

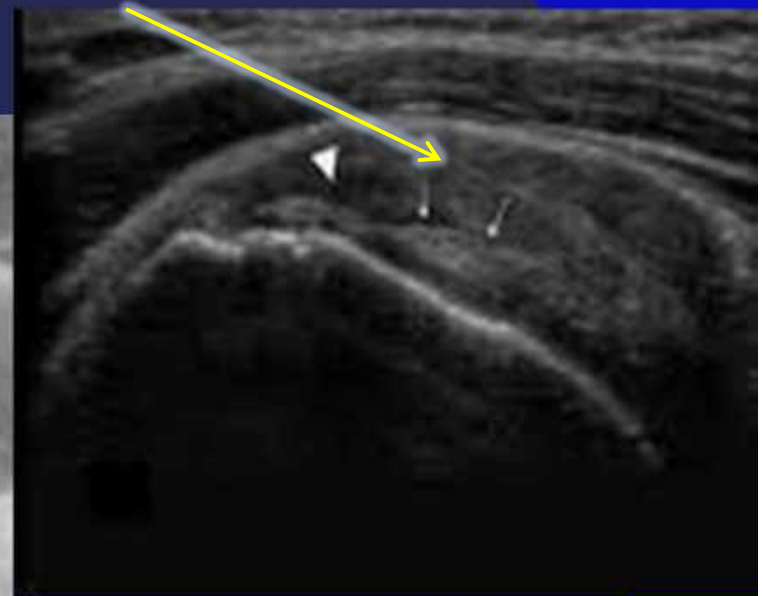
analyse +++ garth

Secondairement
Rx et échographie

Aoirm ou aotdm



Burso-infiltration guidée



COUDE

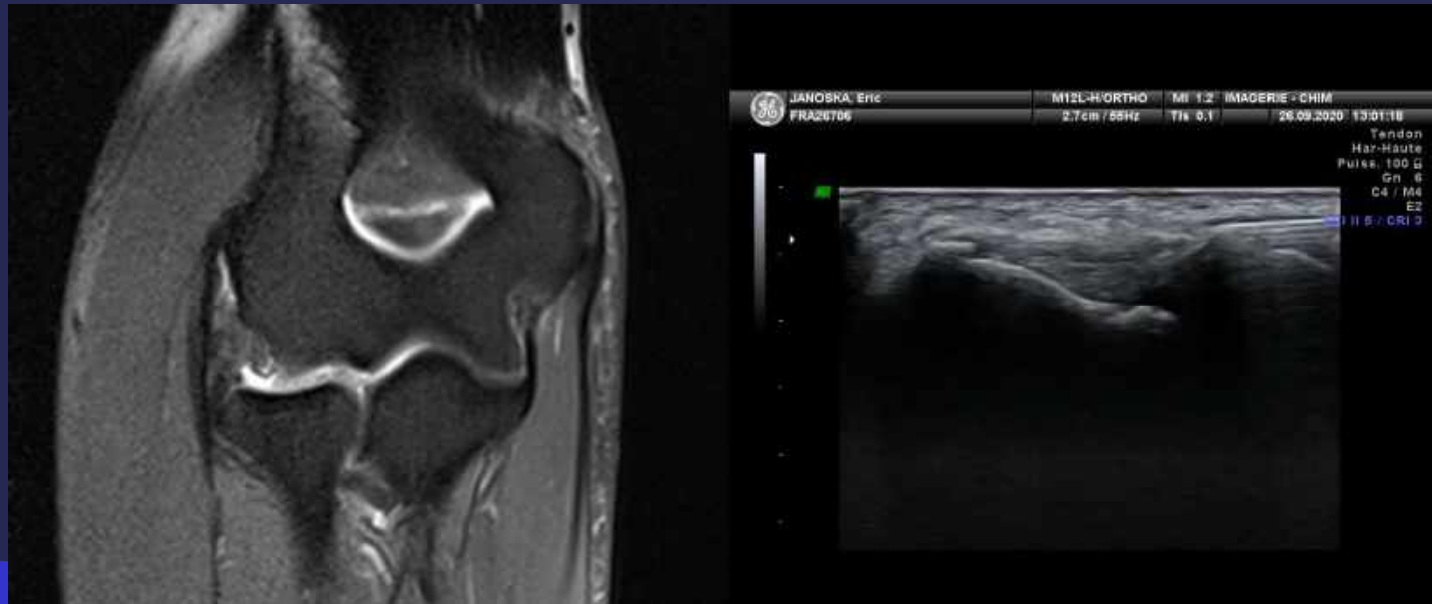
COUDE

- ⦿ Arthropathie : radios
- ⦿ Tendinopathie : échographie
- ⦿ Maladie professionnelle : IRM
- ⦿ Neuropathie : écho/+ IRM difficile
- ⦿ Corps étrangers : arthro-TDM ou Arthro IRM

Profil ligne graisseuse épanchement



EPICONDYLITE LATÉRALE



Clivage

désinsertion
partielle



POIGNET MAIN



POIGNET

- ⦿ Radiographies !!!
- ⦿ Face et profil et inclinaison radiale et ulnaire
- ⦿ Lésion ligamentaire AOTDM vs Aoirm
- ⦿ Kystes arthrosynoviaux : échographie
- ⦿ Fracture IRM >>> Scanner

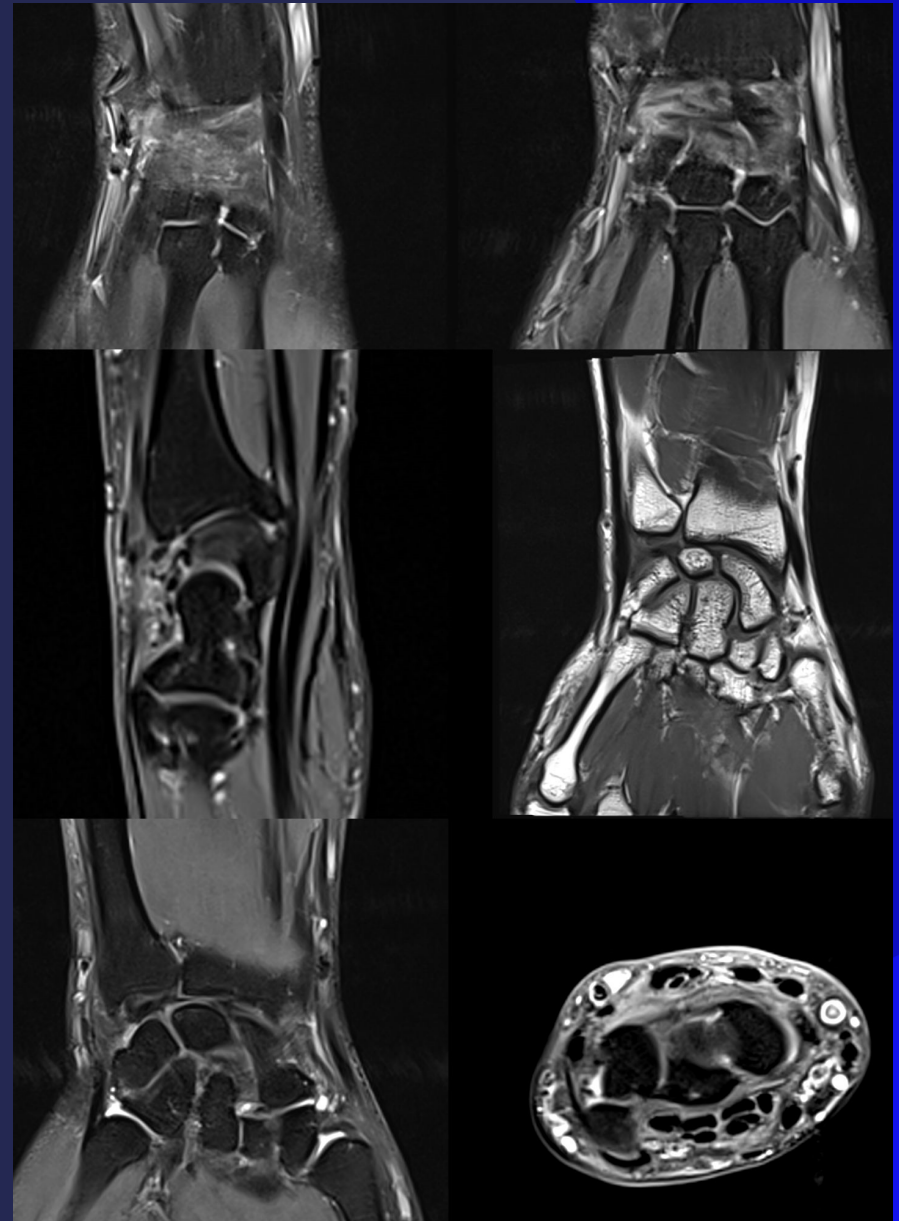
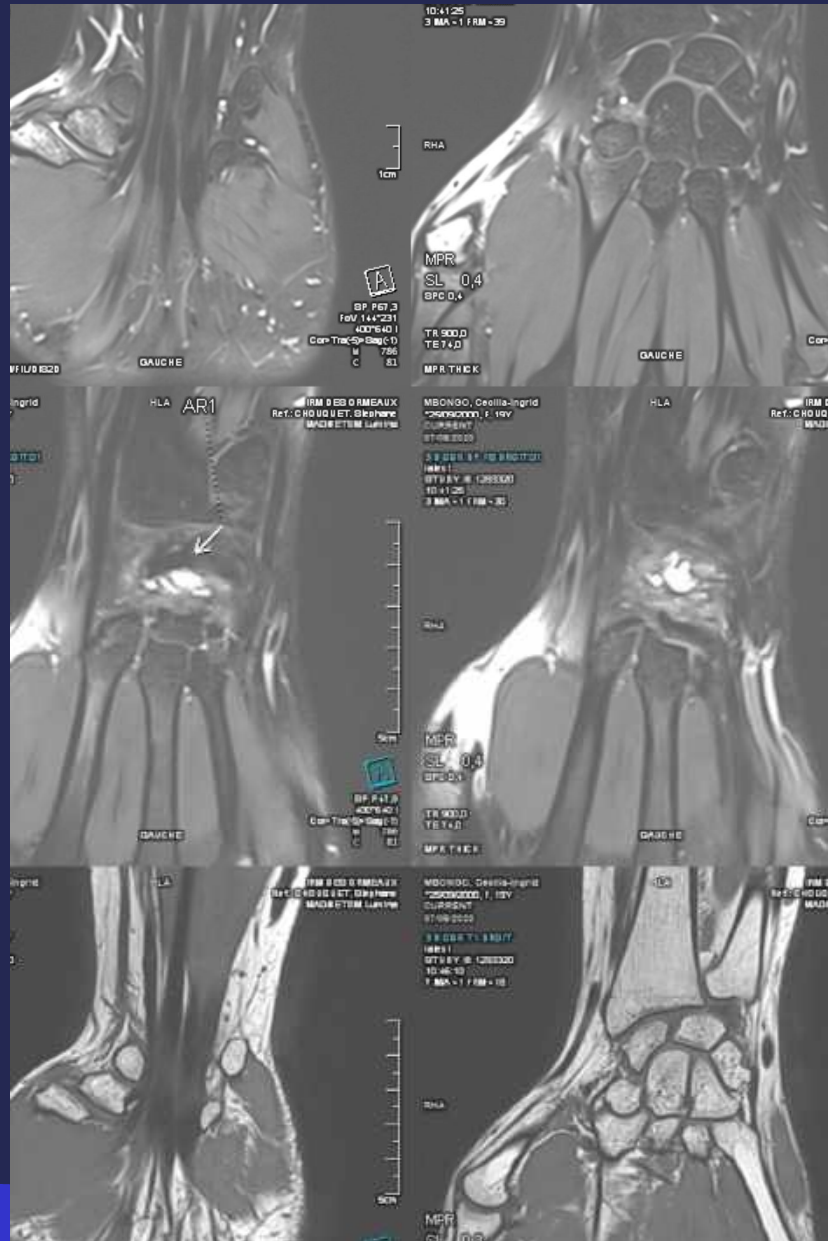
RADIOS QUALITE



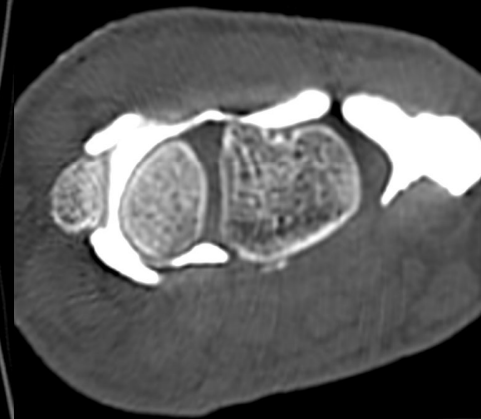
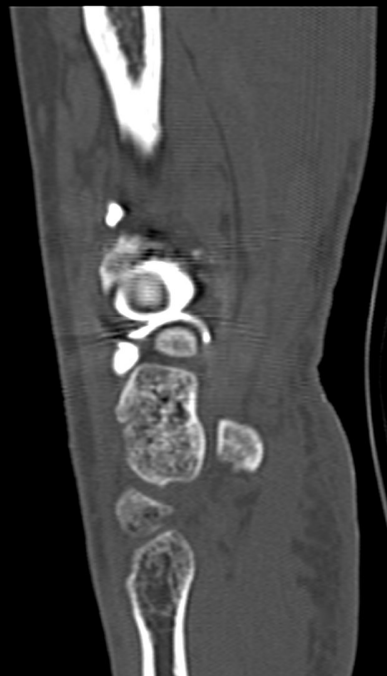
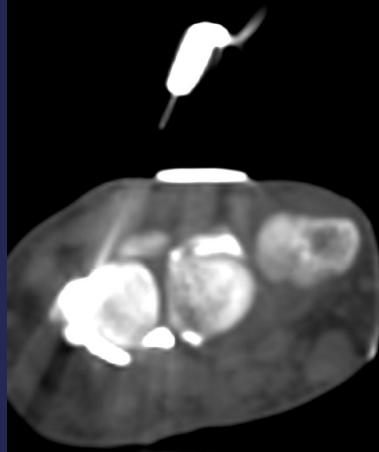
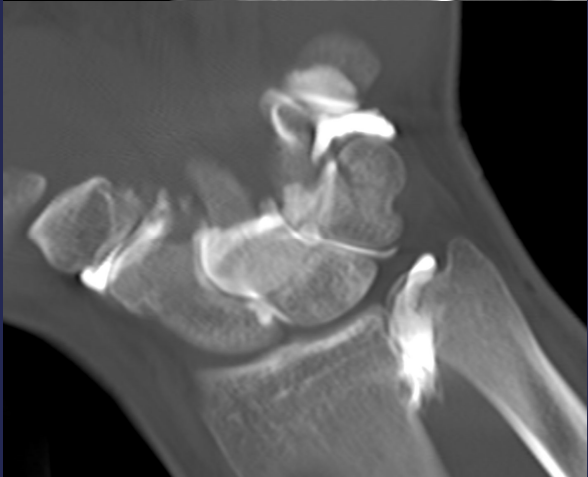
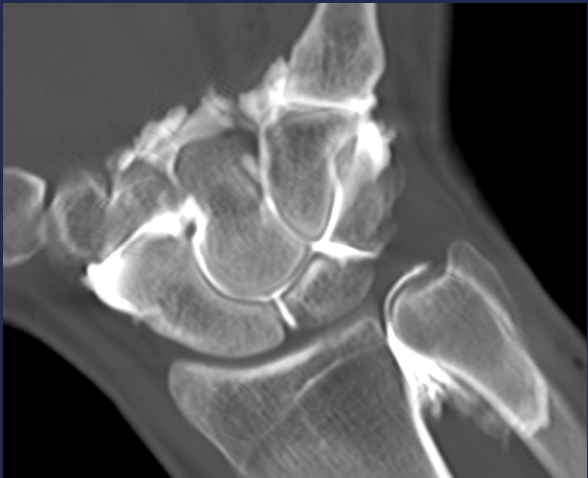
Douleur poignet

- ⦿ Lésion ligamentaire
- ⦿ SL > TFCC > LT
- ⦿ OS TDM / IRM contusion
- ⦿ LIGAMENT AO TDM > AOIRM

IRM

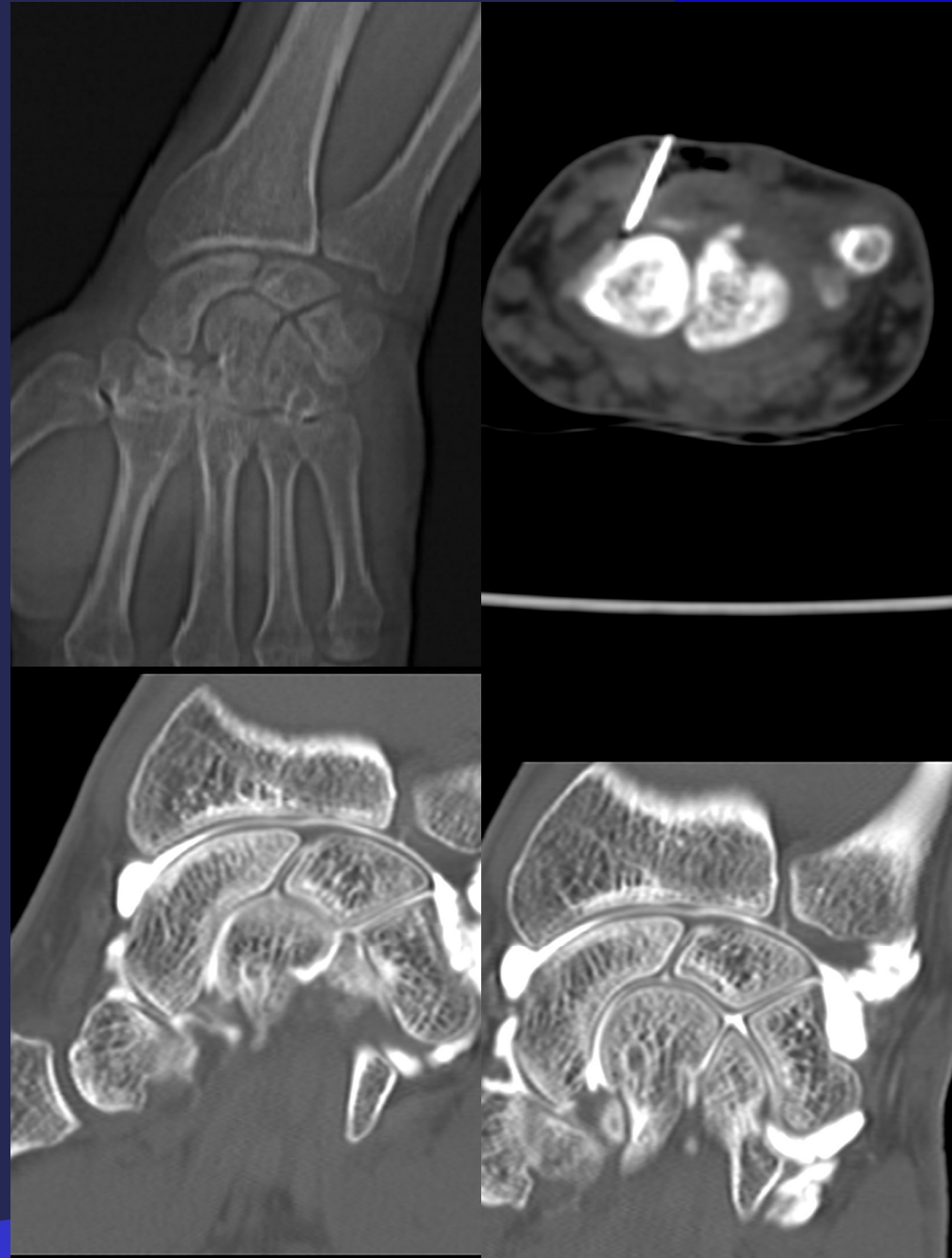


AOTDM 1



AOTDM 2

infiltration



Radiographies des mains

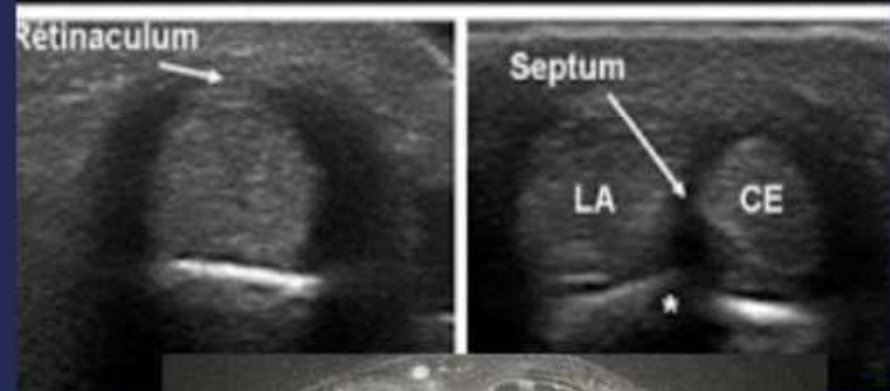
- ⦿ Même cliché déminéralisation
- ⦿ Face + oblique



Douleur bord radial

pathologie de de Quervain
striction par l'épaississement de la gaine.

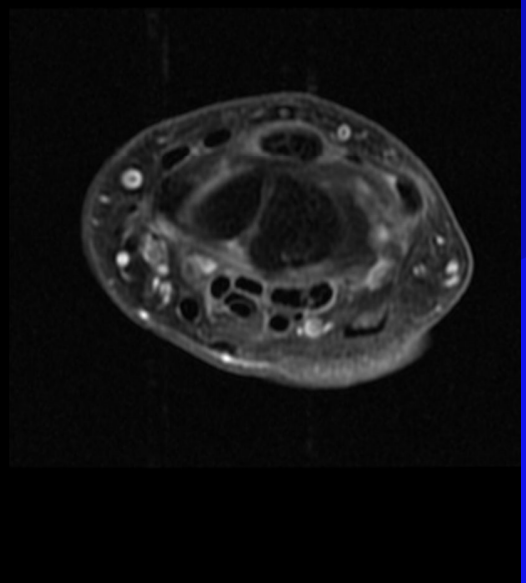
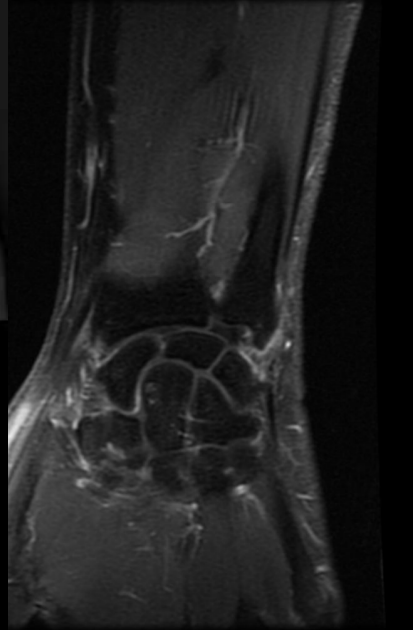
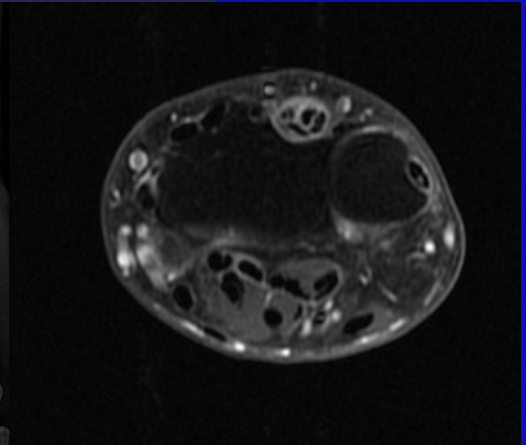
Orthèse /infiltration/
libération



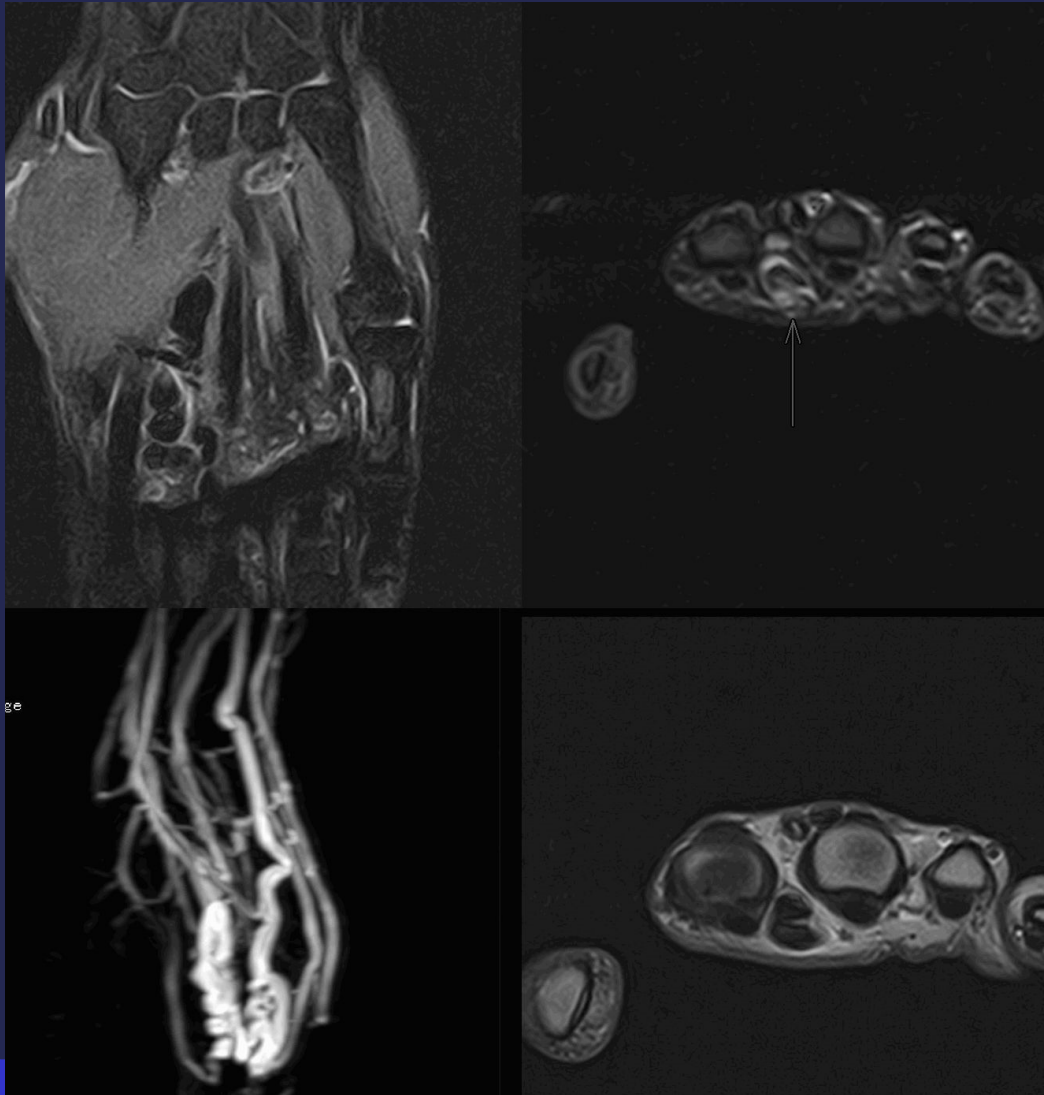
Echoscopie



EMPATEMENT



Douleurs ...



ALGORITHME SYNTHÈSE

INTERLIGNES CONSERVES

INTERLIGNES PINCES

INTERLIGNES DETRUIITS

GEODES

PHYSIO

METABOLIQUES

PR

SVN

EROSIONS

RHUM
INFLAMMATOIRE

EROSIF PUP

PR
SPA

MIXTE
PSO
SPA

DIFFUS

LOCALISE

DEGENERATIF

AOSE
ST TM

CCA
ST RC MC
HEMOC
RC+/-MC

ISOLE
STILL

OS
DETRUIT

PR
SPA
SCLERODERMIE
NEURO
AOPATHIES

DESAXATIONS

CCA
PR

CARPITE

PR
SPA
STILL

DEMINERALISATION

PR
SPA
ALGODYSTROPHIE

RHUMATISMES

Déminéralisation (œdème)

Pincement articulaire

Érosions voire Géodes

Autres lésions extra-articulaires:

Osseuses

Houppes phalangiennes

ALGORITHME +++

3 ENTREES:

Interlignes articulaires d'épaisseur
conservée entrée I

Un ou plusieurs interlignes pincés II

Un ou plusieurs interlignes détruits III

Ex 2

Analyse:
Déminéralisation-
Géodes << Érosions
carpe

interlignes détruits
DIFFUS ipp ipd

Constructions +



Ex 1

- Analyse
- Carpe ipp ipd
- Interlignes pincés atteinte diffuse
- Géodes +
- Constructions os

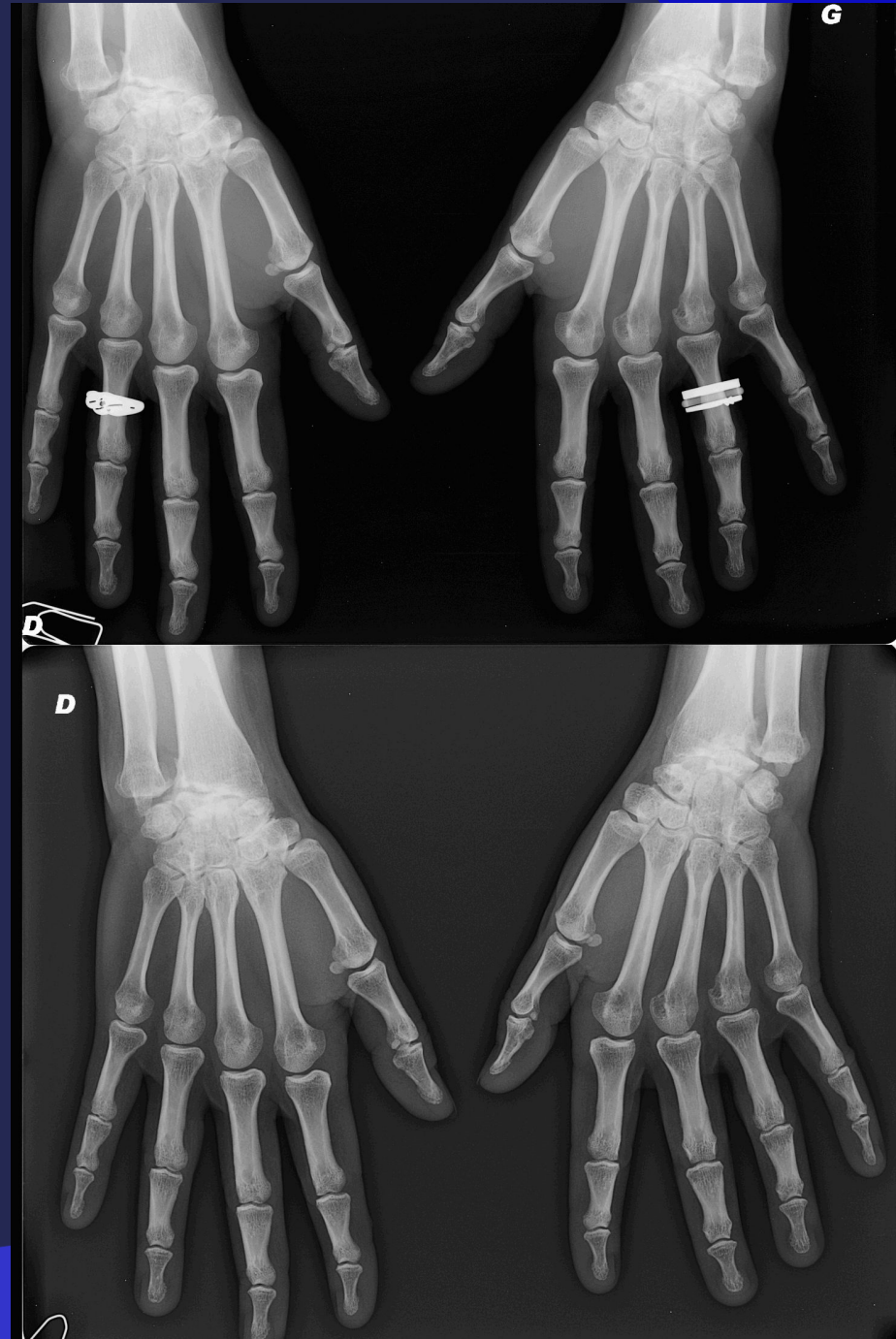
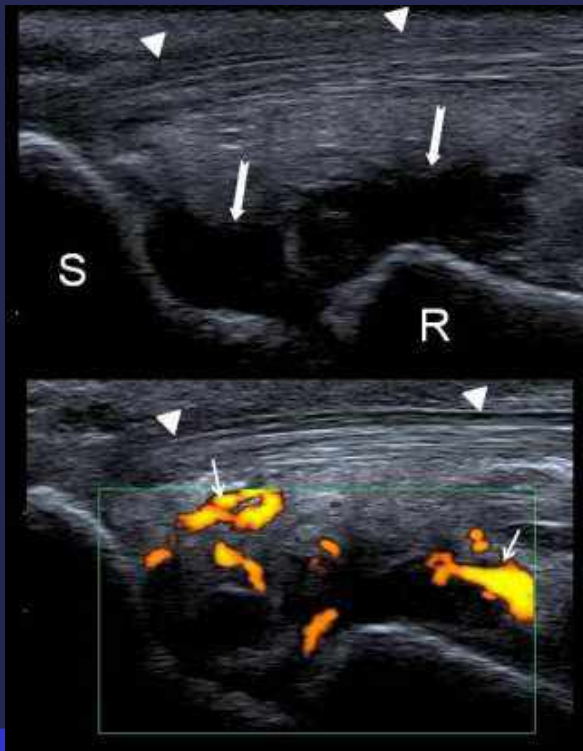


HEMOCHROMATOSE

EVOLUTION

R.I.

⦿ RX ET ECHO



RACHIS STATIQUE



Epiphysose vertébrale de croissance





POST OP

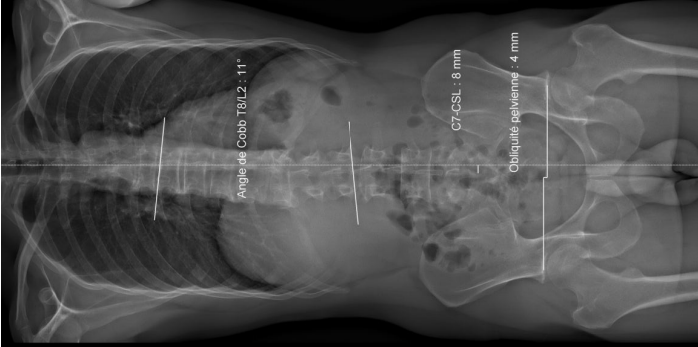


PSR
GAMMA



STATIQUE SUJET AGE





Orthologie Post-Scout® - La France

Posture globale

Statistique générale

SAIS (°)	27°	Angle de rotation (°)	15°
Angle hyperlordose (°)	13°	Angle de rotation (°)	15°
Angle de rotation (°)	15°	Angle de rotation (°)	15°

Opportunités (°)

Opportunité (°)	30°	Opportunité (°)	40°
Opportunité (°)	40°	Opportunité (°)	40°

EOS Imaging



Orthologie Post-Scout® - La France

Valeurs de référence

Paramètre	Min	25%	50%	75%	Max
Incidence pelvienne	21°	24°	24,5°	25°	26°
Angle sacro-coccygien	42°	47°	47°	47°	48°
Obliquité pelvienne	0°	1°	1°	1°	2°

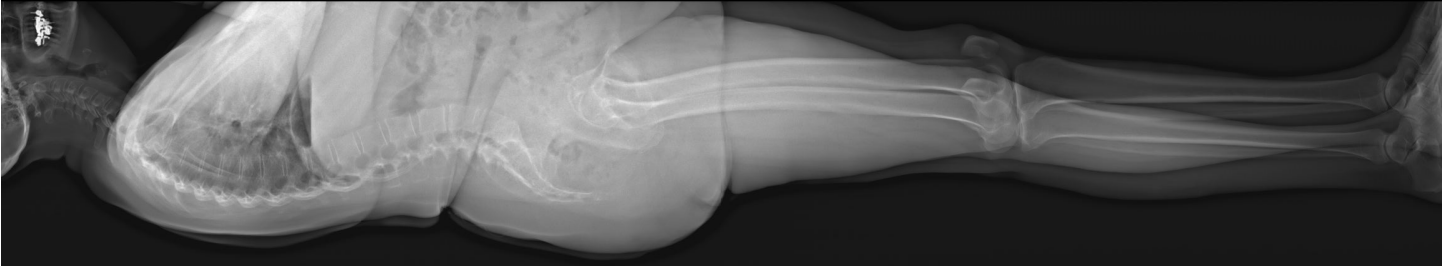
Statistique générale

Paramètre	Min	25%	50%	75%	Max
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Angle sacro-coccygien	42°	47°	47°	47°	48°
Obliquité pelvienne	0°	1°	1°	1°	2°

Opportunités (°)

Opportunité (°)	30°	Opportunité (°)	40°
Opportunité (°)	40°	Opportunité (°)	40°

EOS Imaging



EOS M.INF.

BASSIN - MEMBRES INFÉRIEURS

- bilan avant prothèse (genou, hanche)
- inégalité des membres inférieurs
- mesures, angles
- planification chirurgicale (échelle 1:1)

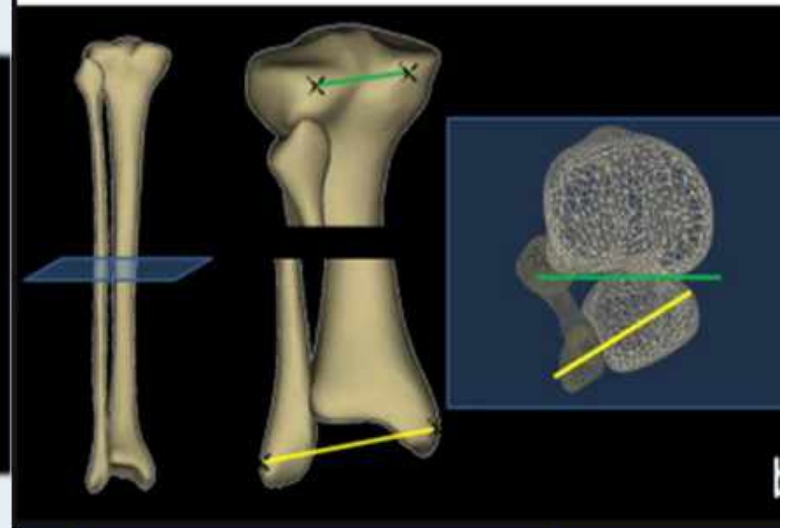
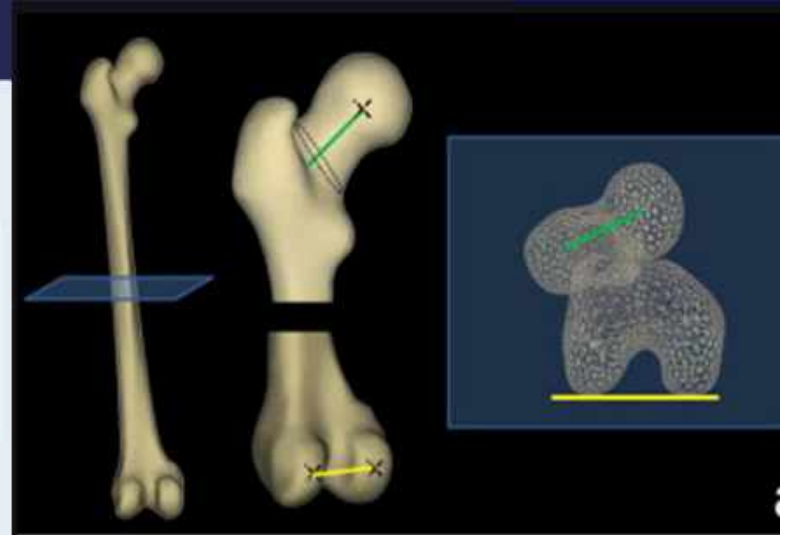
L. fémur (G) :

L. fonctionnelle

Valgus (G) : 1°

L. tibia (G) : 35

3D Fa

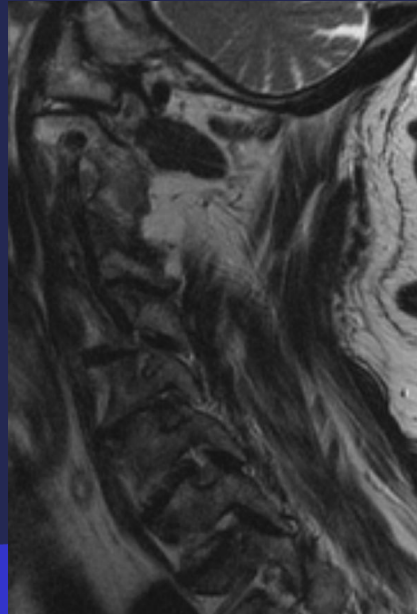


Rachis rhumatologique



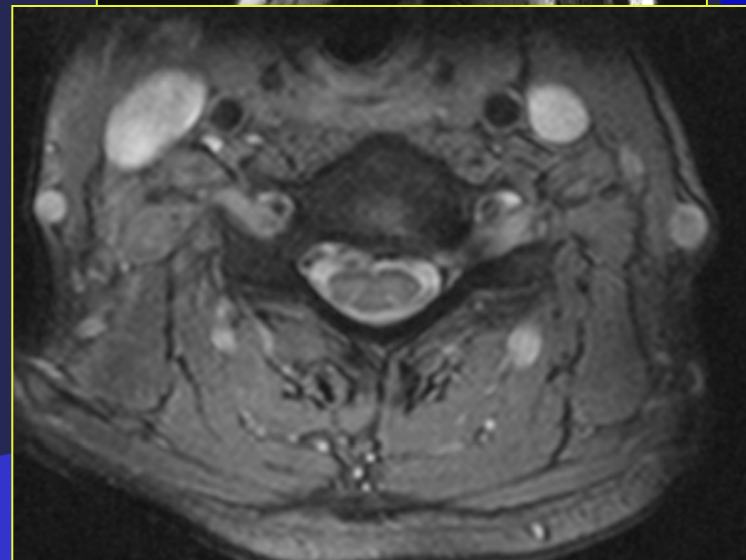
R CERVICAL

- ◎ STENOSE CANALAIRE
- ◎ Canal ETROIT (spontané) vs RETRECI (acquis)
- ◎ TORG : $NL > 0.8$



RACHIALGIES CERVICALES

- Rx Standard : oui
Cervicalgies
- **NCB :**
 - IRM
 - TDM en préopératoire ou si composante osseuse prédominante (iode et rx)



R CERVICAL ET RHUM

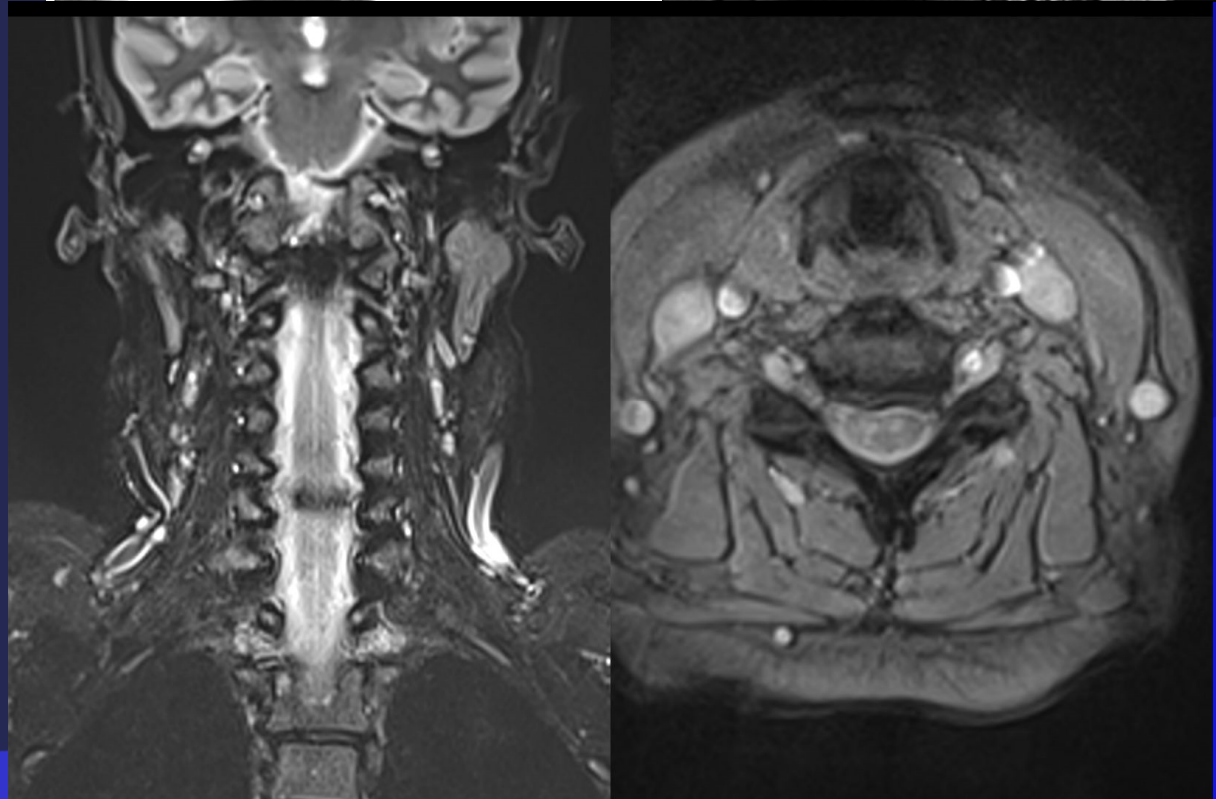


ncb

● Corrélation

● EMG/IRM

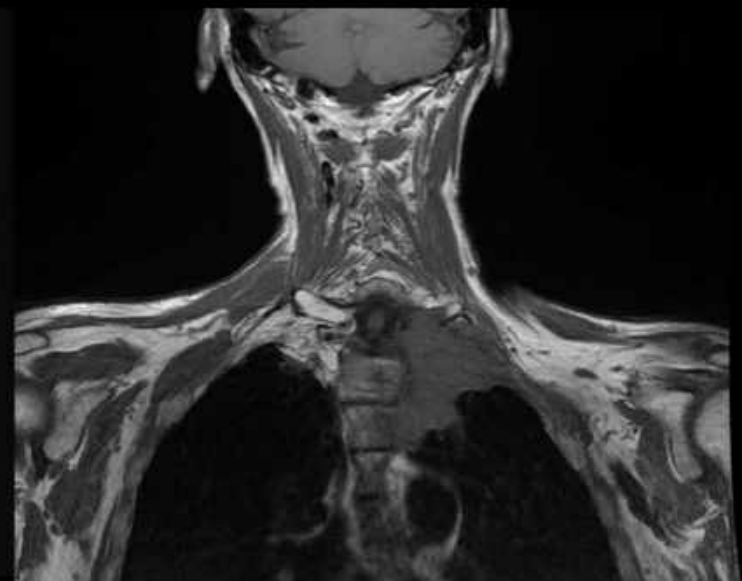
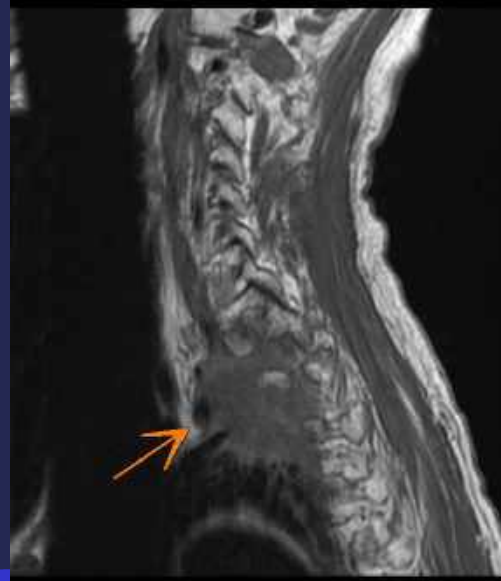
● tt



Rachis cervical

Ncb atypique

Irm !!!



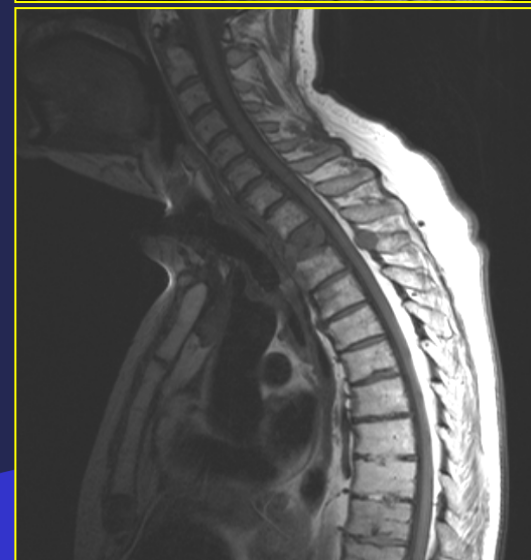
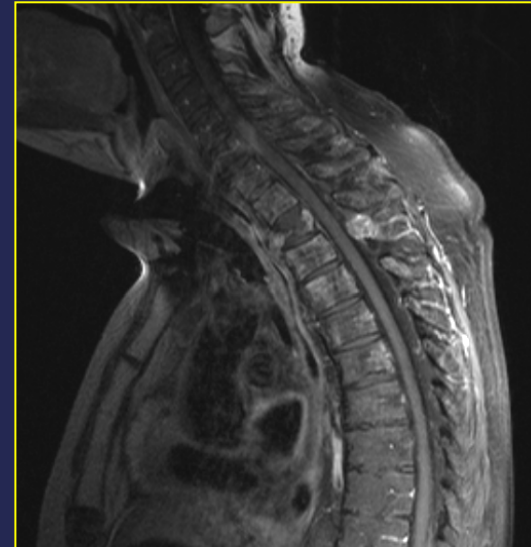
Définition radiologique CLE



- Diamètre AP canal < 10 mm
- Surface sac dural $< 75-100$ mm²
- Capacité de réserve épидurale
- 20% sujets > 50 ans sténose IRM

RACHIALGIES DORSALES

- Imagerie peu contributive
- Rx standard : en 1^{ère} intention
- IRM >>scintigraphie si persistance
 - Os
 - Méninge
 - Moelle
 - Racine

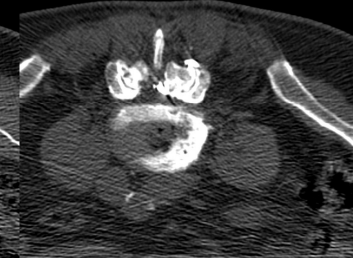
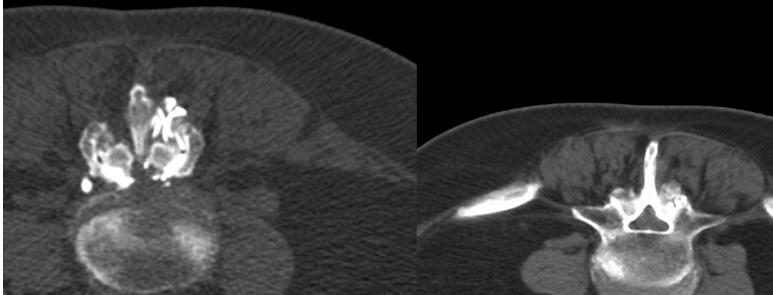
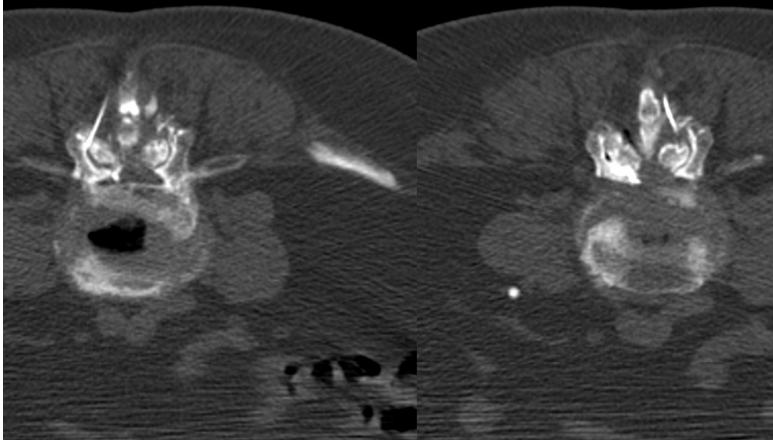
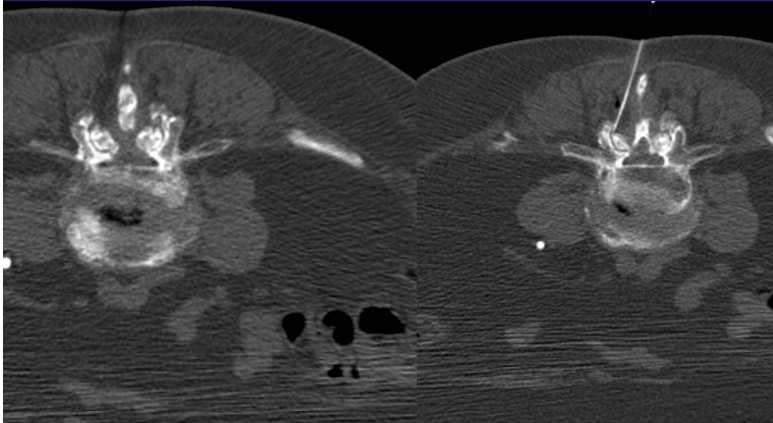


Tassements porotiques

- ⦿ Angulation (ciment ou kyphoplastie)
- ⦿ Masse osseuse
- ⦿ Statique



R interv SOUS TDM



Accession Number: 337602.1156008
Patient ID: HPE23143
Exam Description: infiltration

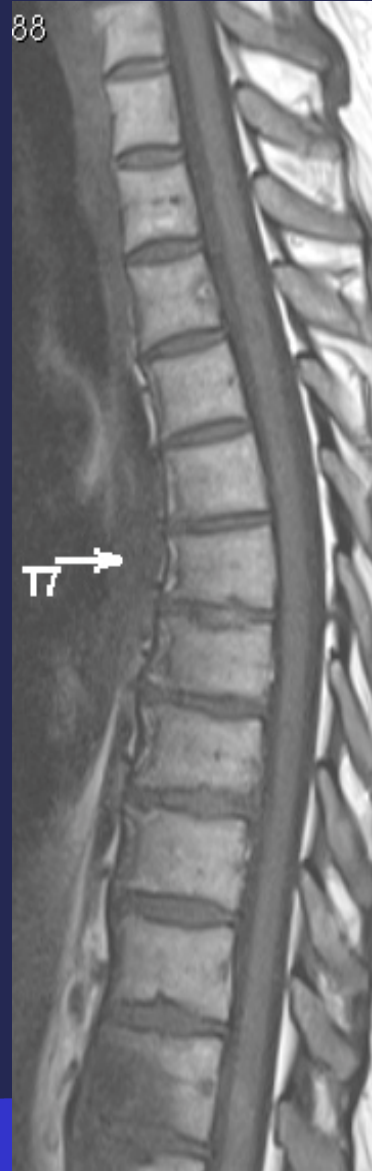
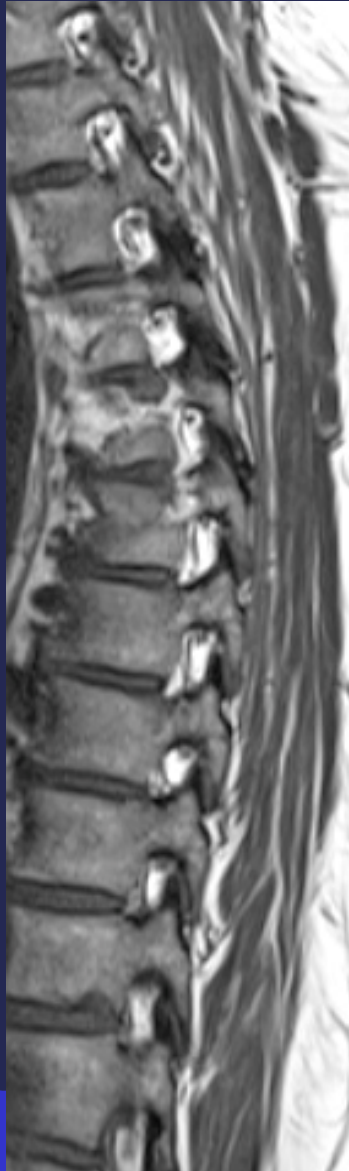
07 oct. 2019
Optima CT540

Rapport de dose

Series	Type	Scan Range (mm)	CTDIvol (mGy)	DLP (mGy-cm)	Phantom cm
3	SmartStep	S18.250-S15.750	3.87	1.93	Body 32
3	SmartStep	S18.250-S15.750	3.87	1.93	Body 32
3	SmartStep	S16.750-S14.250	3.87	1.93	Body 32
3	SmartStep	S16.750-S14.250	3.87	1.93	Body 32
3	SmartStep	S16.750-S14.250	3.87	1.93	Body 32
SmartStep Accumulated DLP:				25.12	
Total Exam DLP:				57.04	

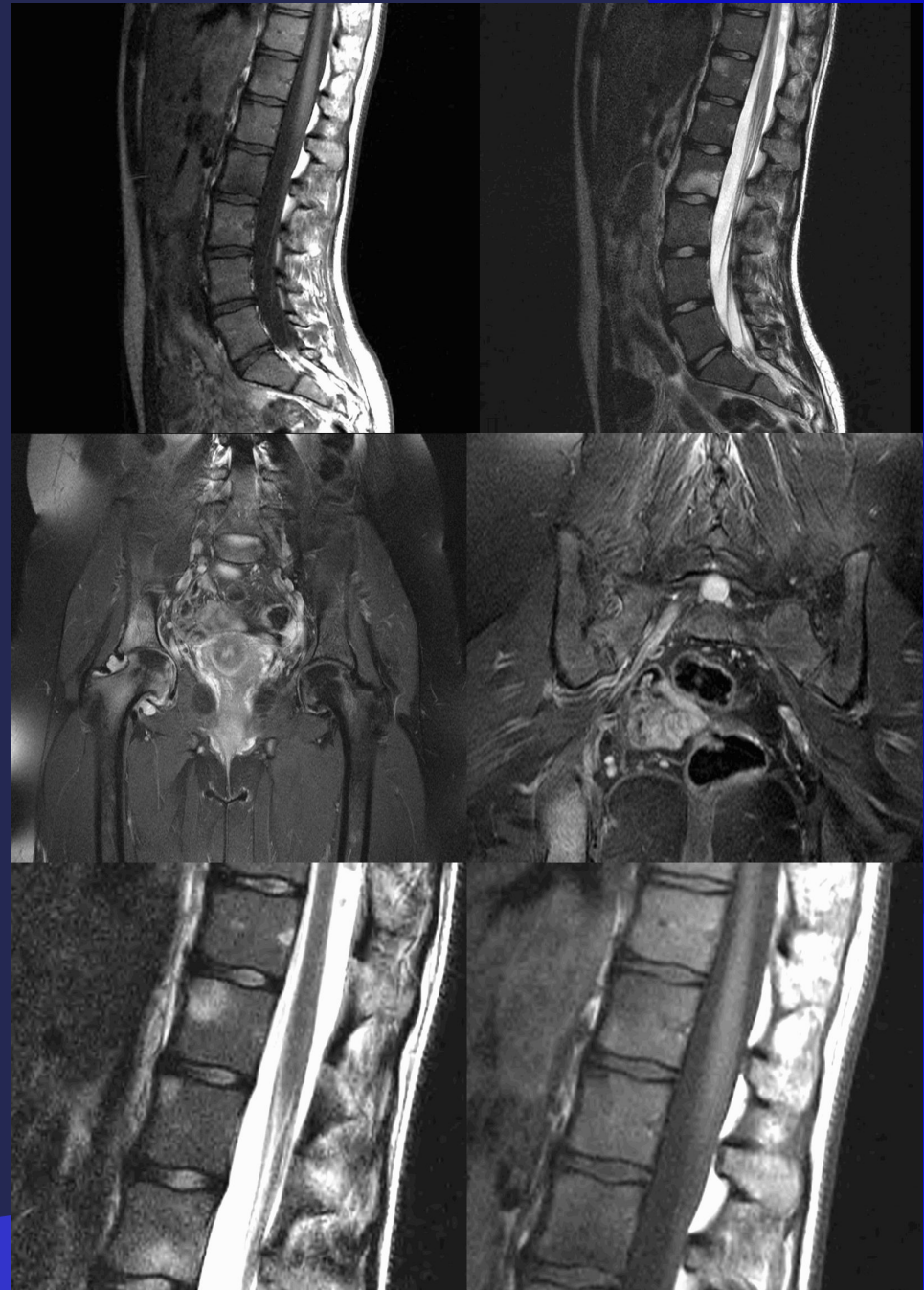
SmartStep Accumulated Exposure time 00:00:13.0

Spondylo arthropathie évolutive



RHUM PSO

ÉTUDE RACHIS
THORACO- LOMB + SI



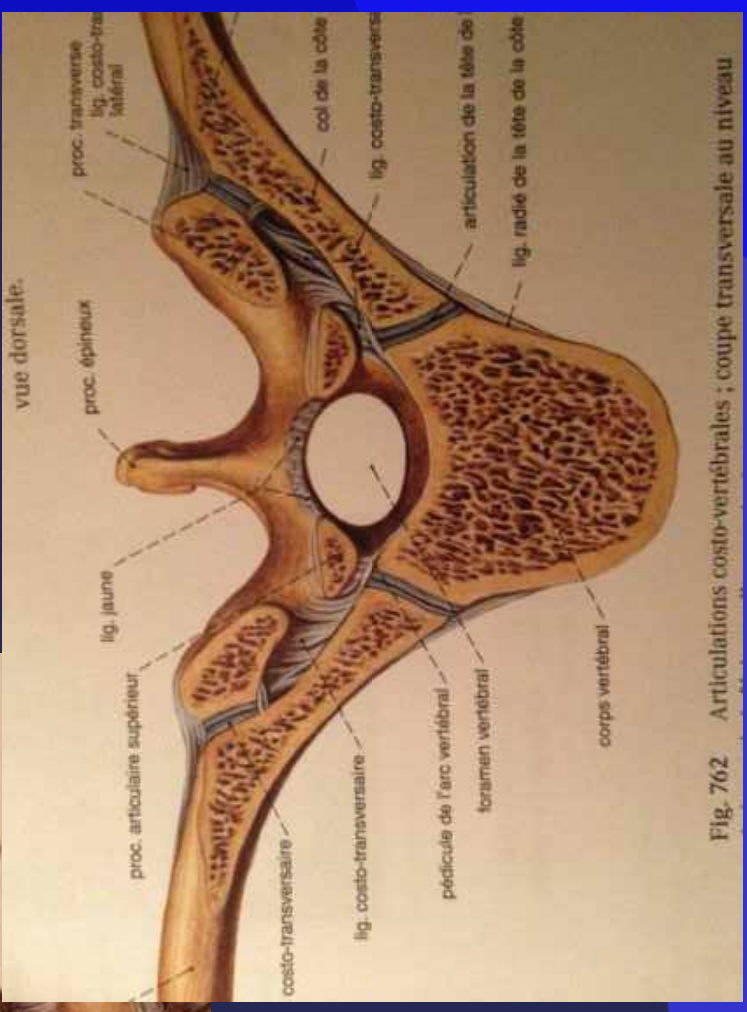
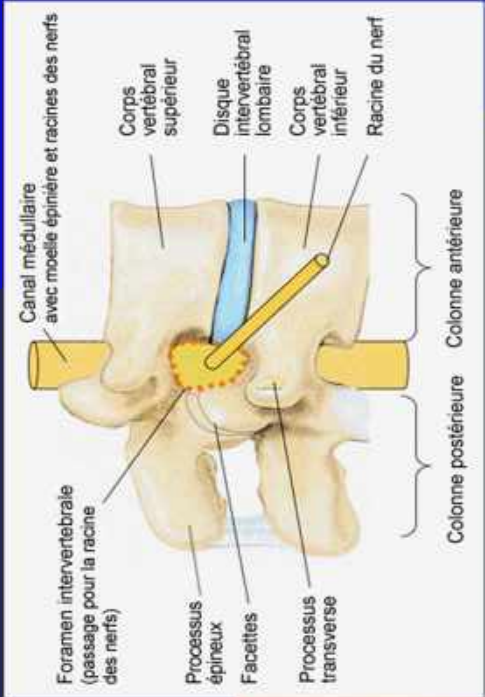
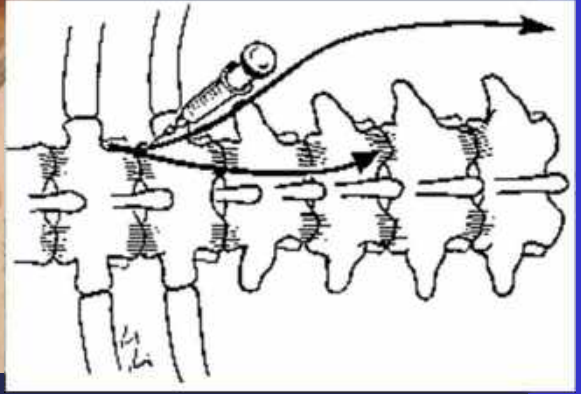
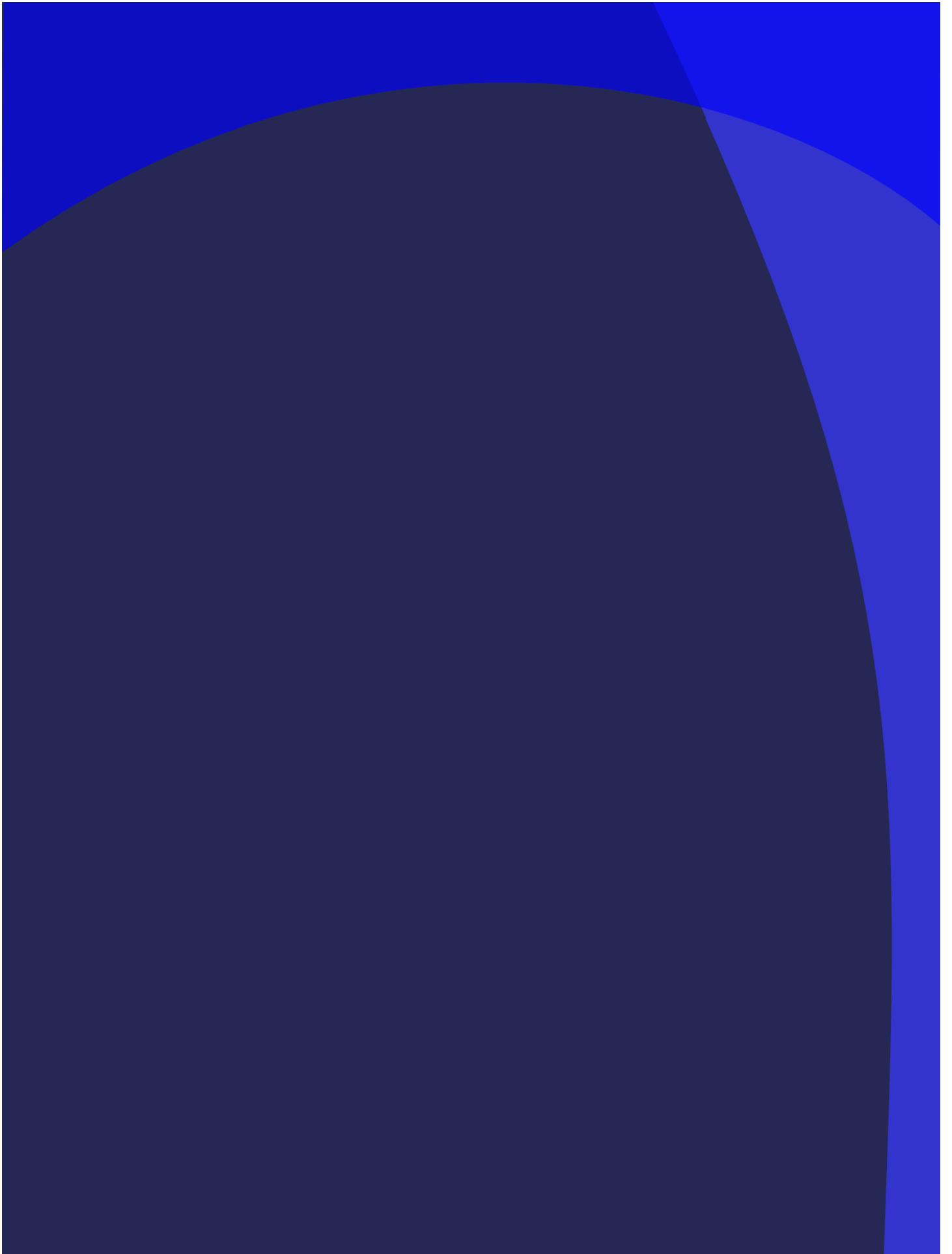


Fig. 762 Articulations costo-vertébrales ; coupe transversale au niveau





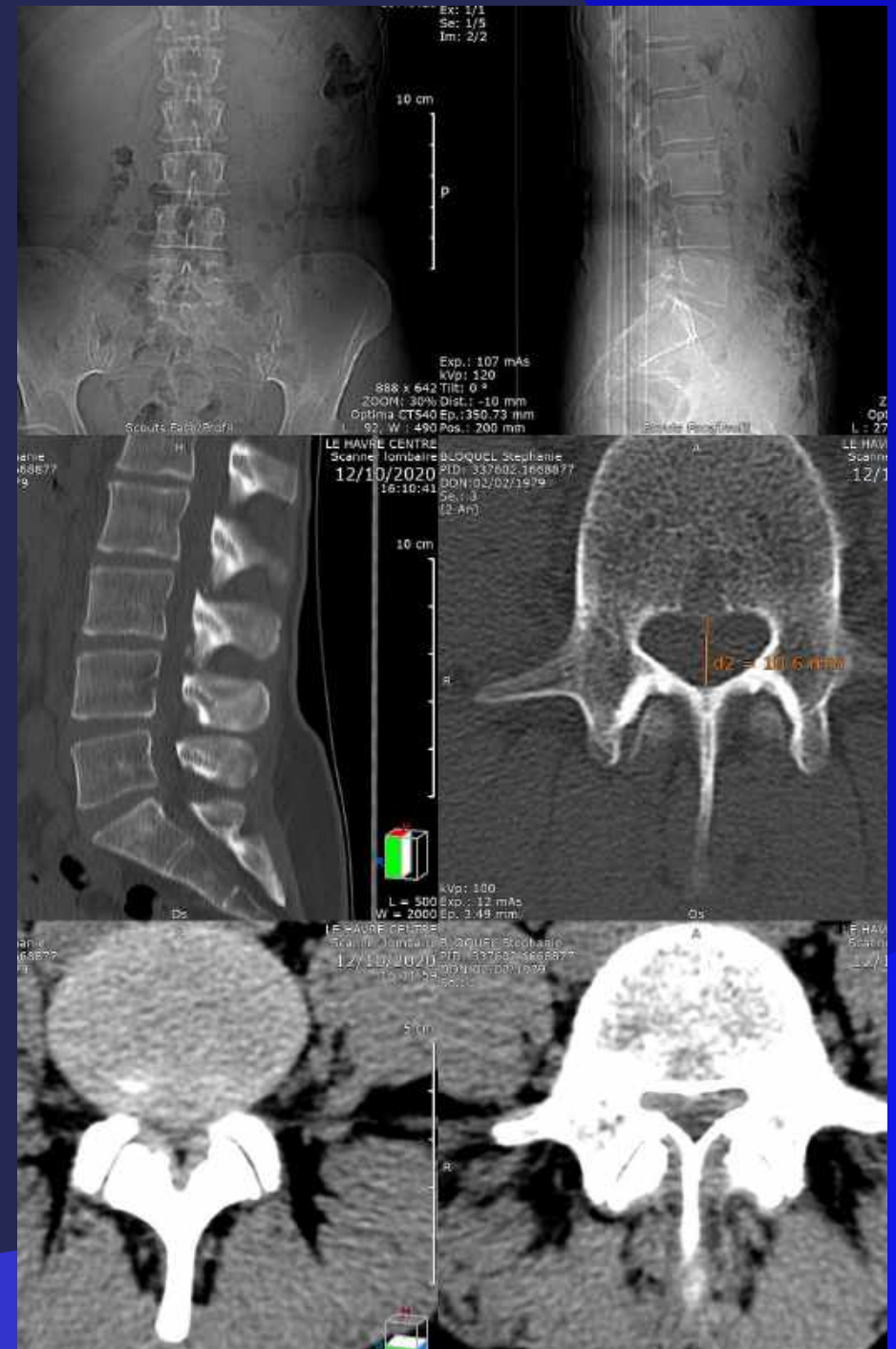
LOMBALGIES DE L'ADULTE

Tout n'est pas de l'arthrose

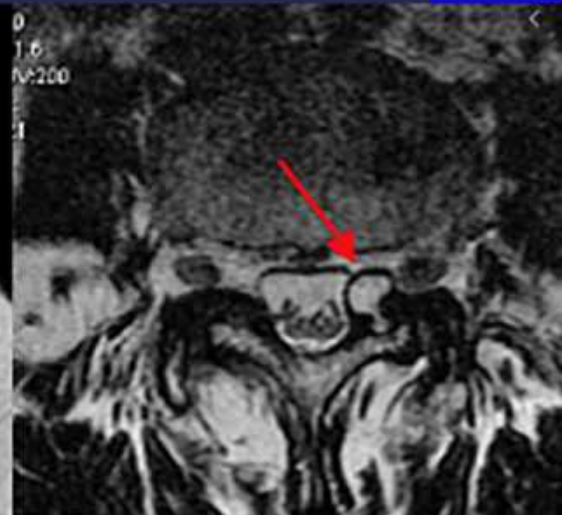
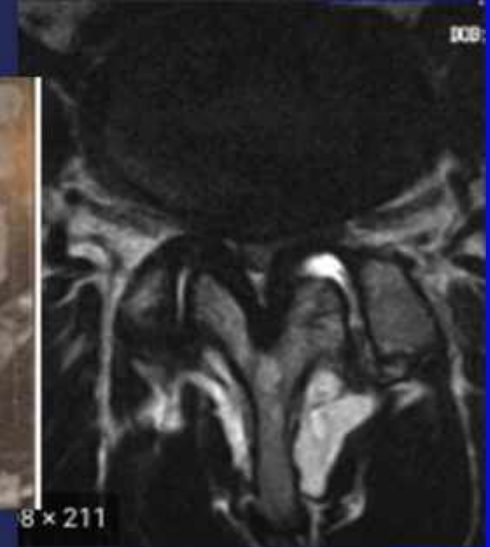
- L'ostéoporose
- L'HVA ou maladie de Forestier
- Les spondylarthropathies
- Les arthropathies microcristallines



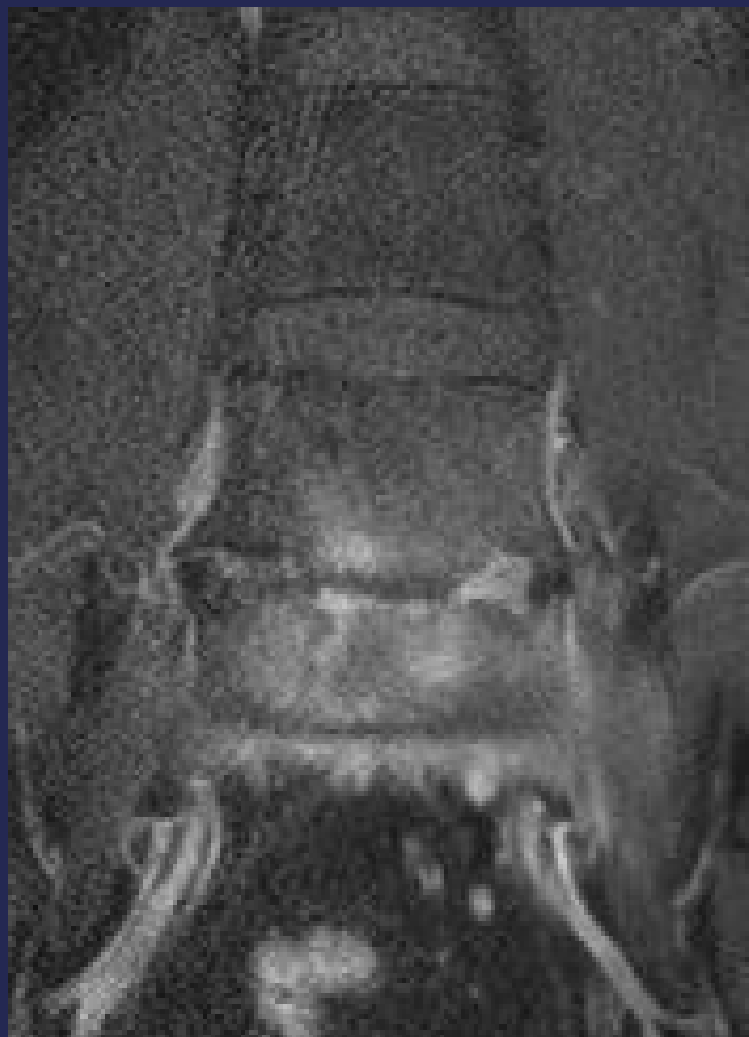
STENOSE IDIOPATHIQUE



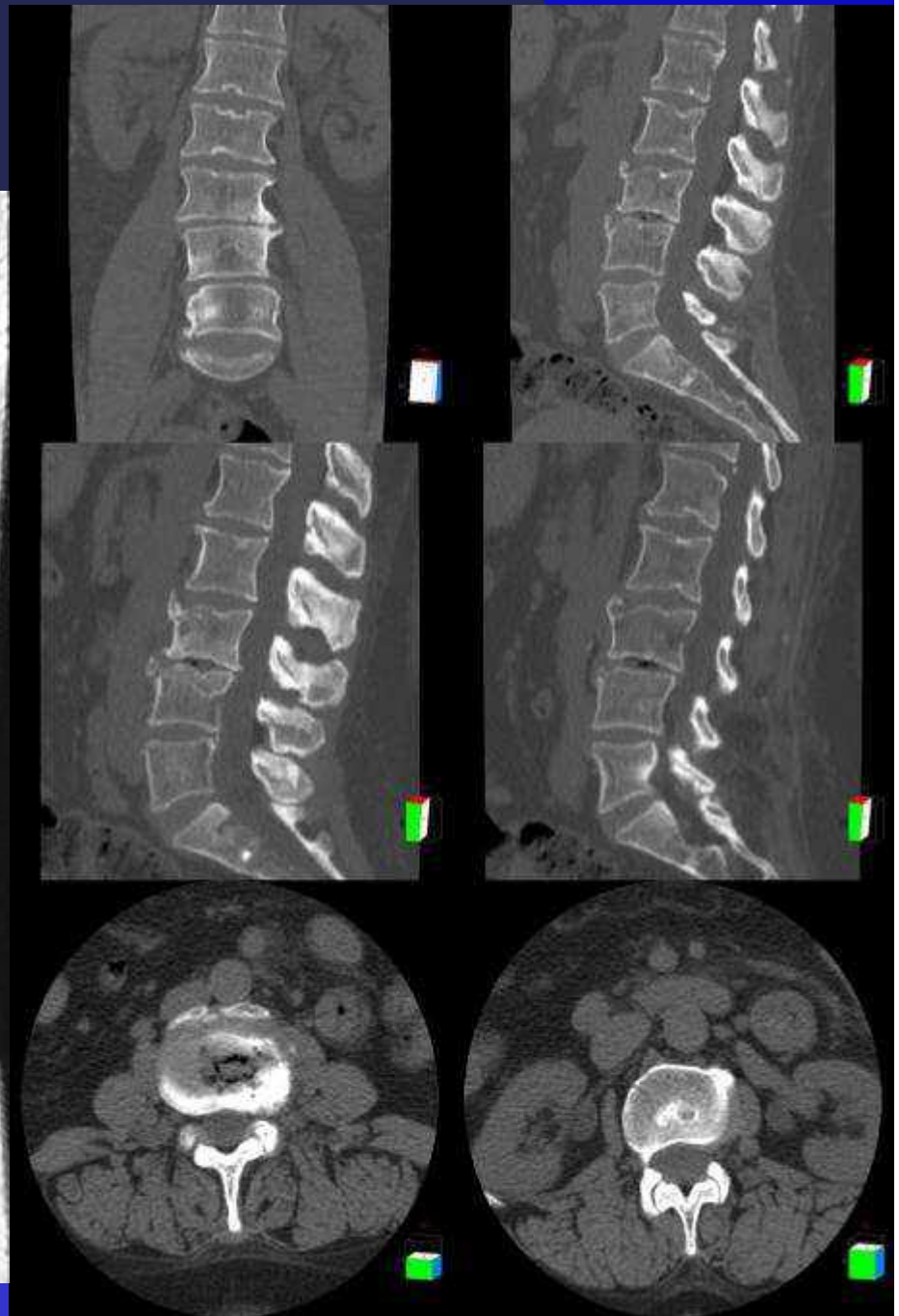
R Lomb Retreci



TOUT CE QUI BRILLE... PSR?



DIAGNOSTIC DIFFERENTIAL



LOMBALGIE COMMUNE

- ⦿ Rx standard : posé en 1^{ère} intention (De Seze, profil, charnière)
- ⦿ Autre technique si seulement si traitement spécifique



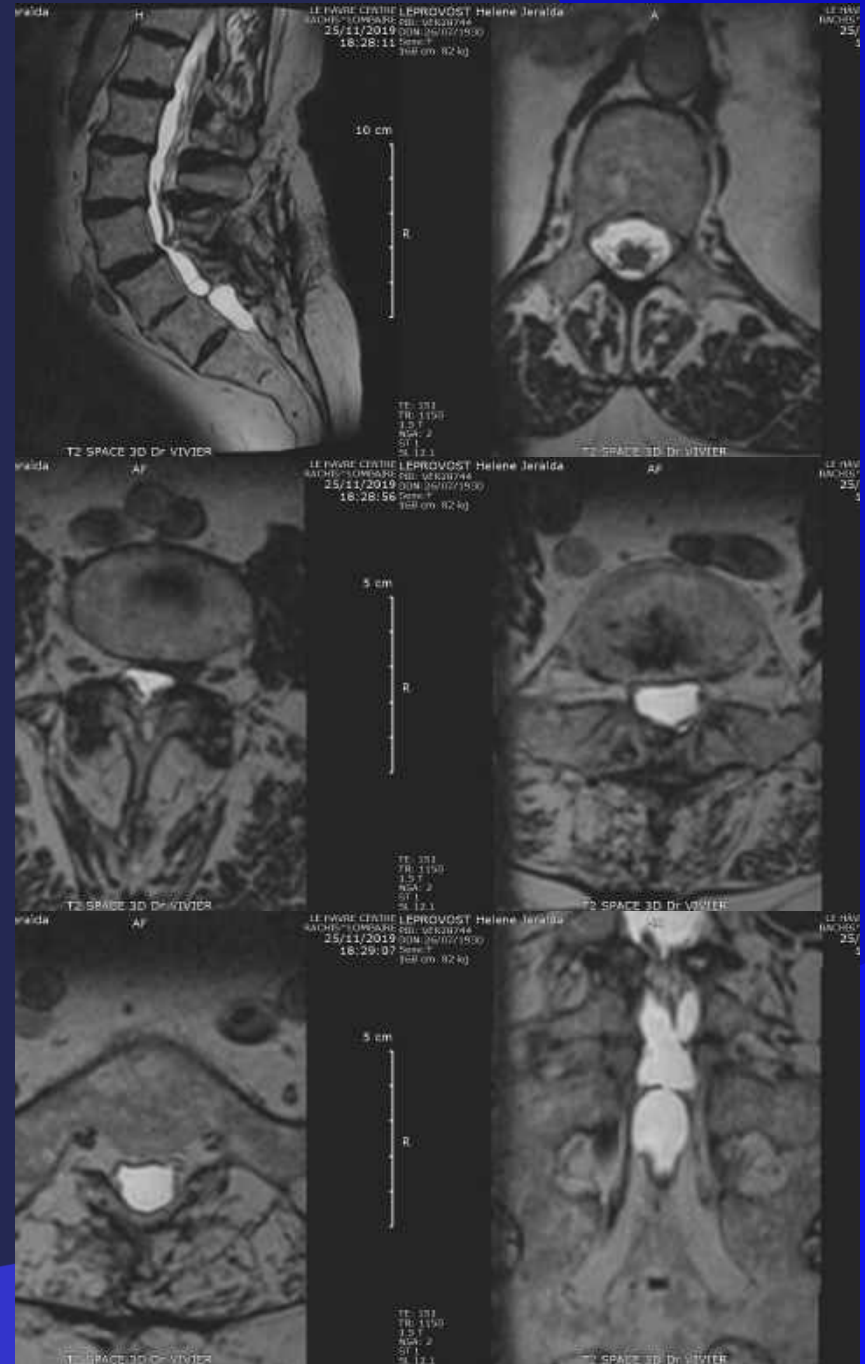
LOMBOSCIATIQUE

- ⦿ Rx standard
- ⦿ IRM en 2^{ème} intention
- ⦿ TDM si composante osseuse prédominante
- ⦿ Hernie + granulome
- ⦿ Esp épidual



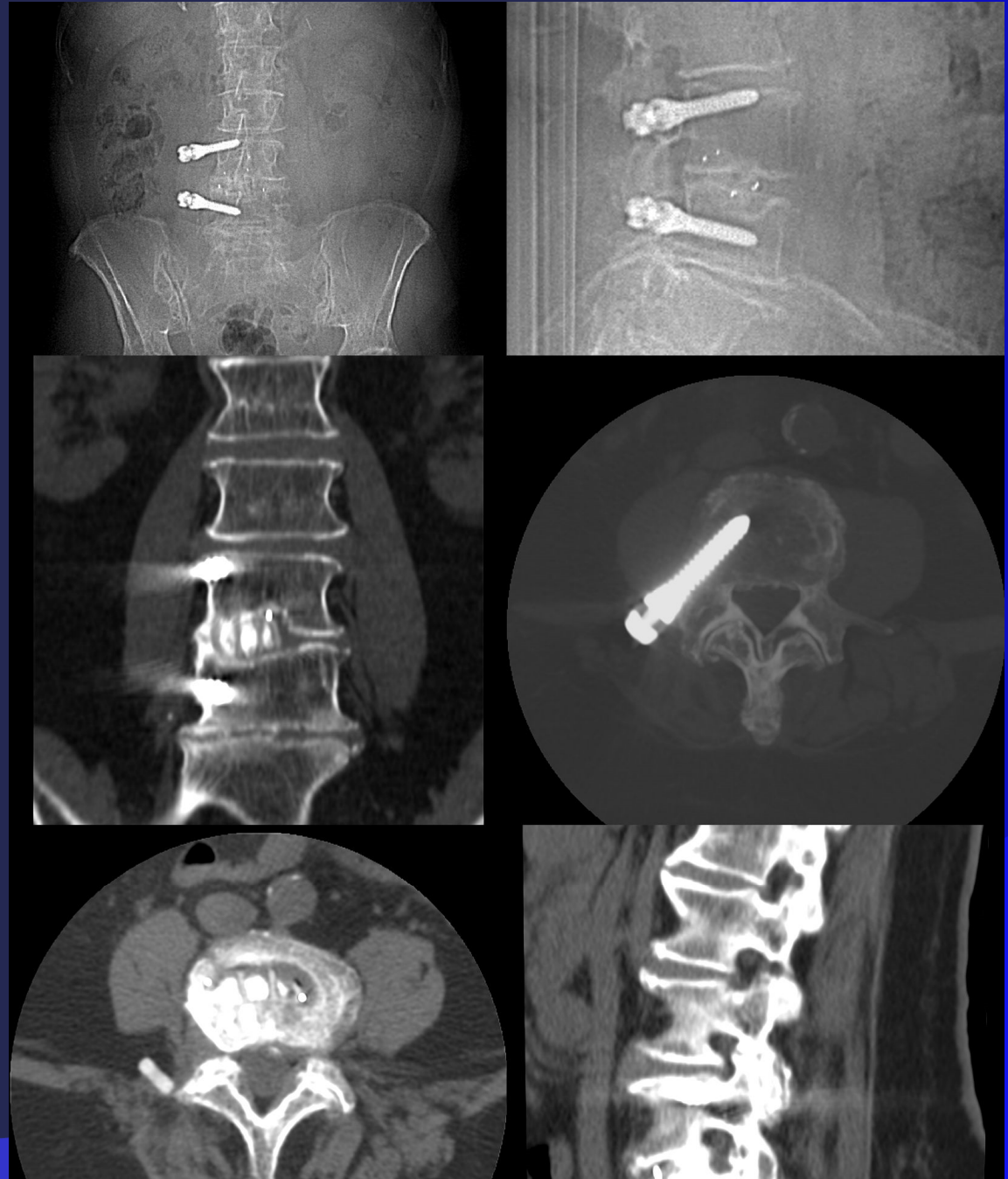
Hernie et arthrodièse évolution/complications

- Irm
- Récidive , racines
- En T1 : fusion
- Scanner : matériel
- Consolidation
- Arthrodièse et greffe : plif –tlif alif



AODESE

- IRM
- TDM



TASSEMENT VERTEBRAL

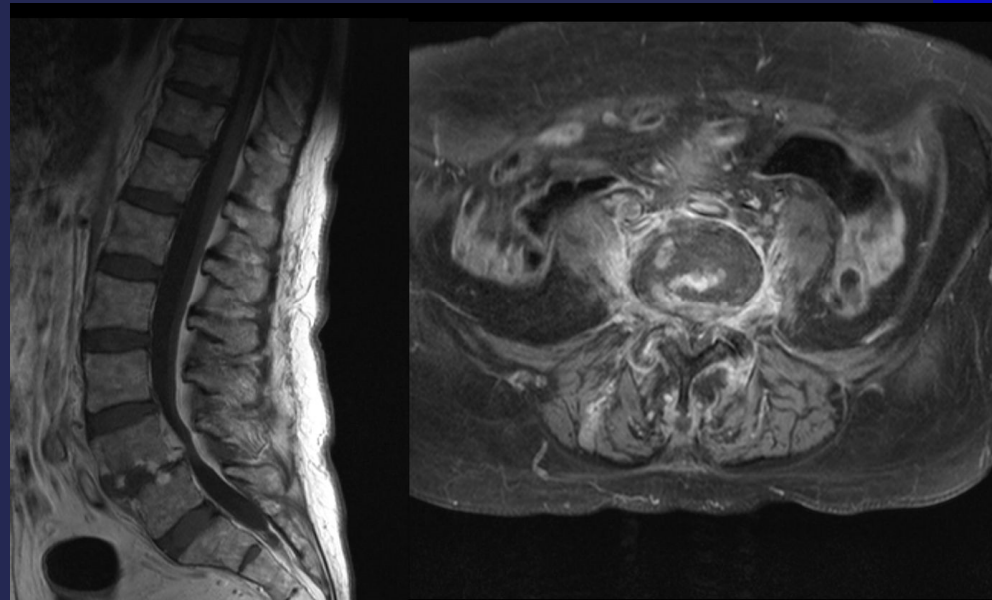
- Rx standard
- IRM +++ Gadolinium
Bénin ou malin
- TDM : fragments osseux
- Scinti : âge du tassement



LOMBALGIE SYMPTOMATIQUE

(rappel)

- ⊙ Parésie et atteinte nocturne ou troubles sphinctériens
 - URGENCE
- ⊙ Douleurs et dysesthésies
 - BOF +++
 - RX STANDARD
 - IRM >>TDM>>SCINTI



HYGIENE



PAS D'IMPASSE ! RESPECT DIFFUSION TRACABILITE

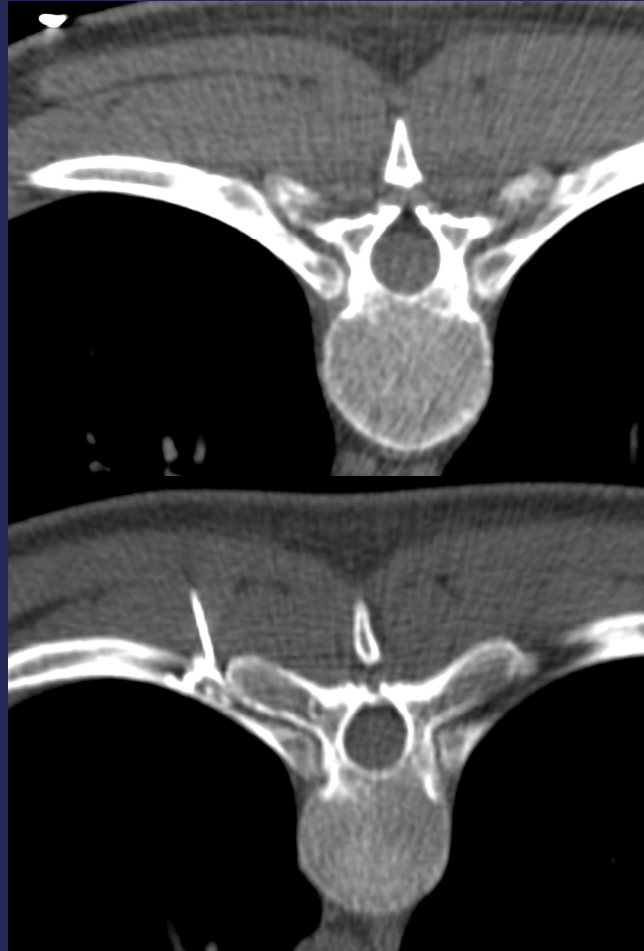
Pharmacologie

- Anesthésique Lidocaïne versus Bupivacaïne
- Lidocaïne effet 60/120 minutes
- 5mg/ml
- Dose max 200 mg soit 2flacons

- Bupivacaïne (marcaïne)
- Dose < 150 mg ! 1,5 flacon
- Rachis dose <20mg soit 4ml !
- Demi vie 2H30
- Effets sec 10% aspirer !

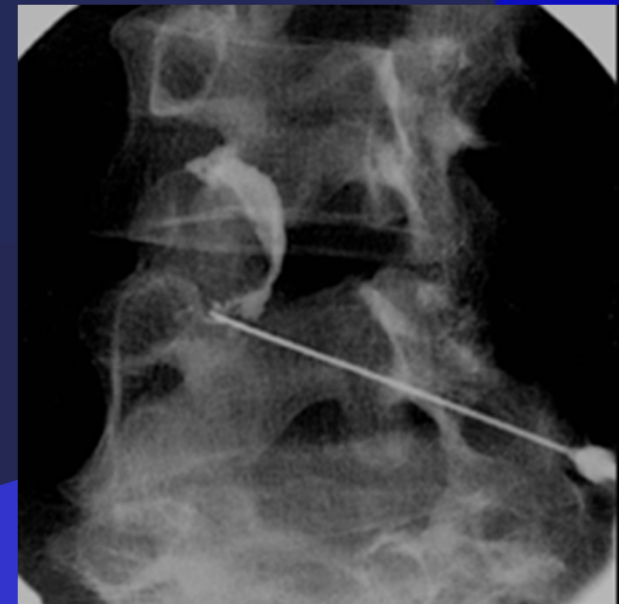
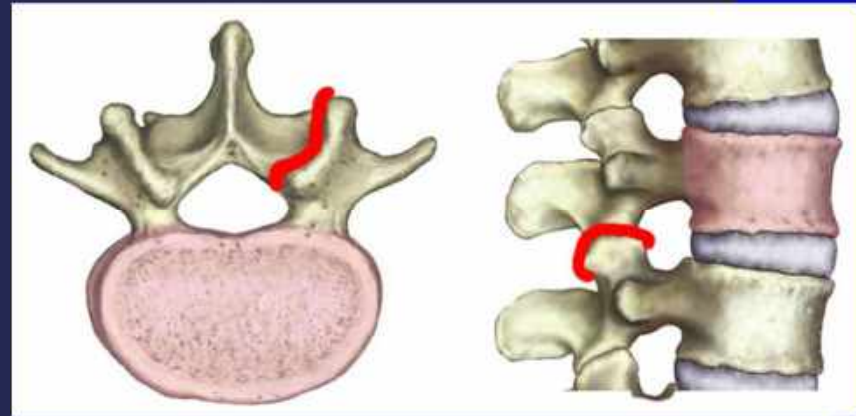


Test anesthésique

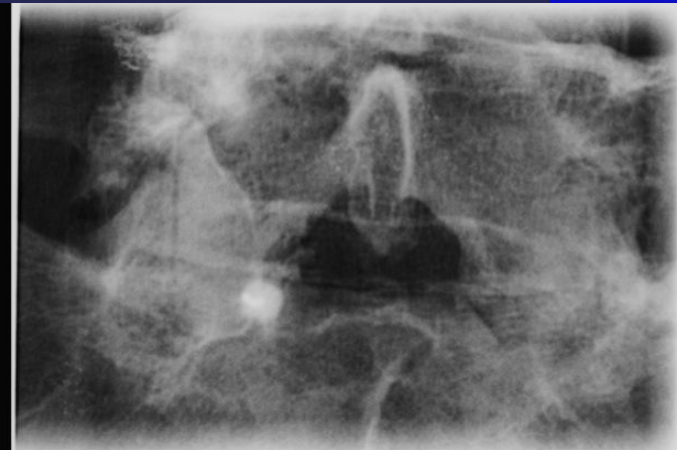
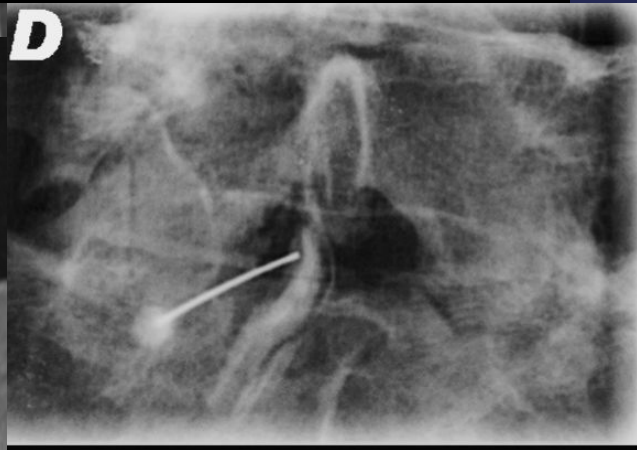
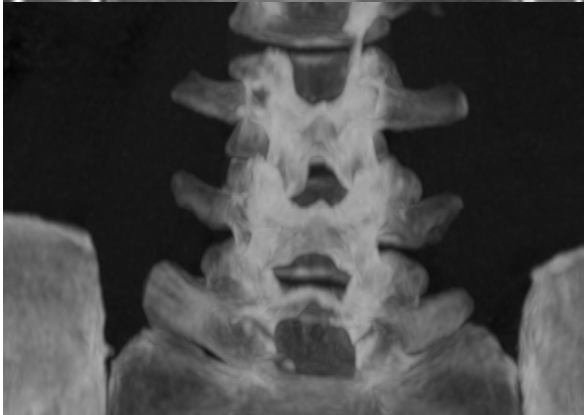
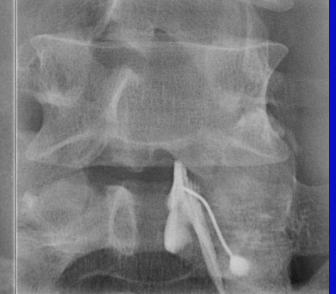
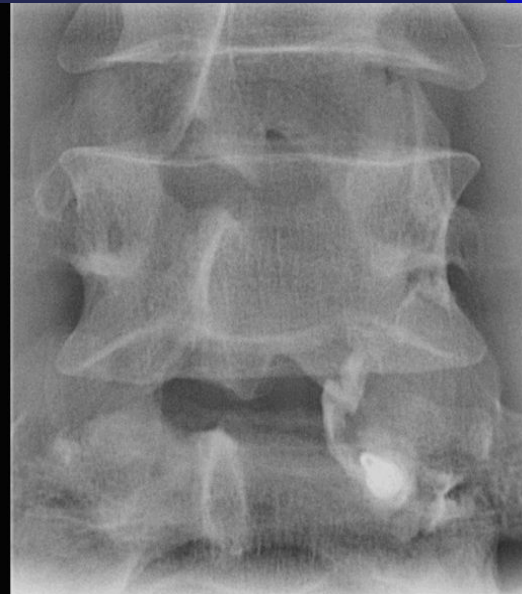
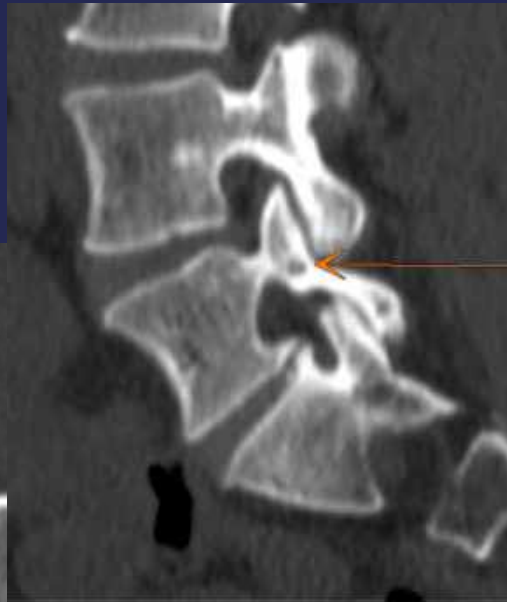


Rachis interventionnel

- IAP : plan variable



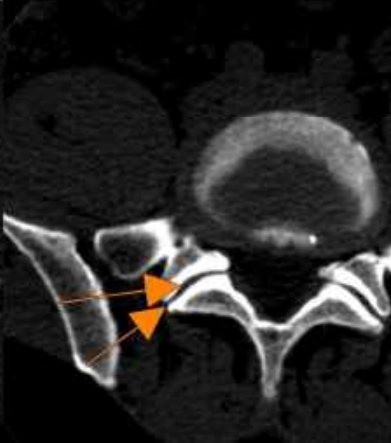
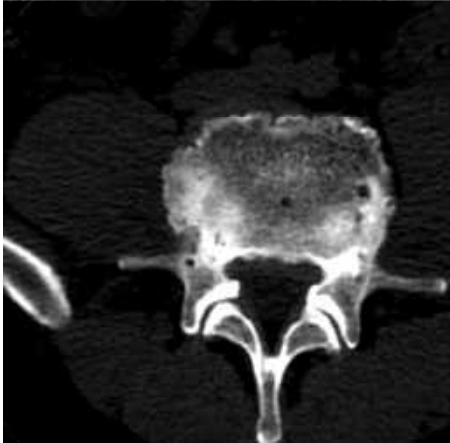
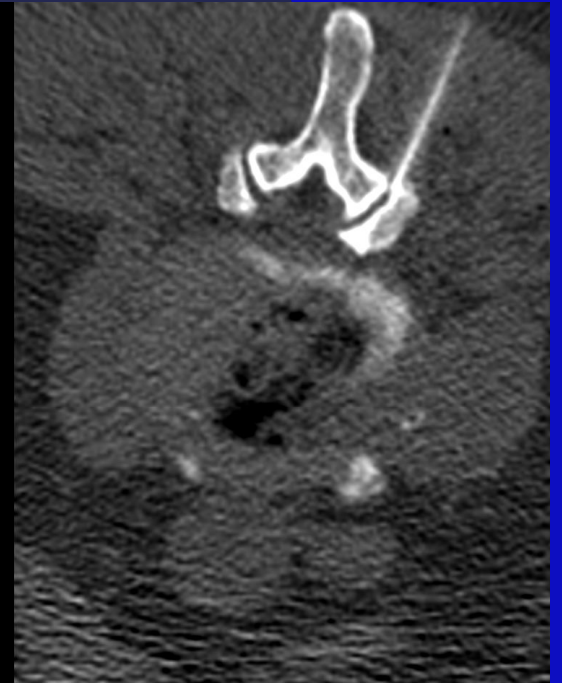
Iap RX



IAP ET EPIDURALE LE MEME TEMPS

IAP TDM

opéré
obese
âgé



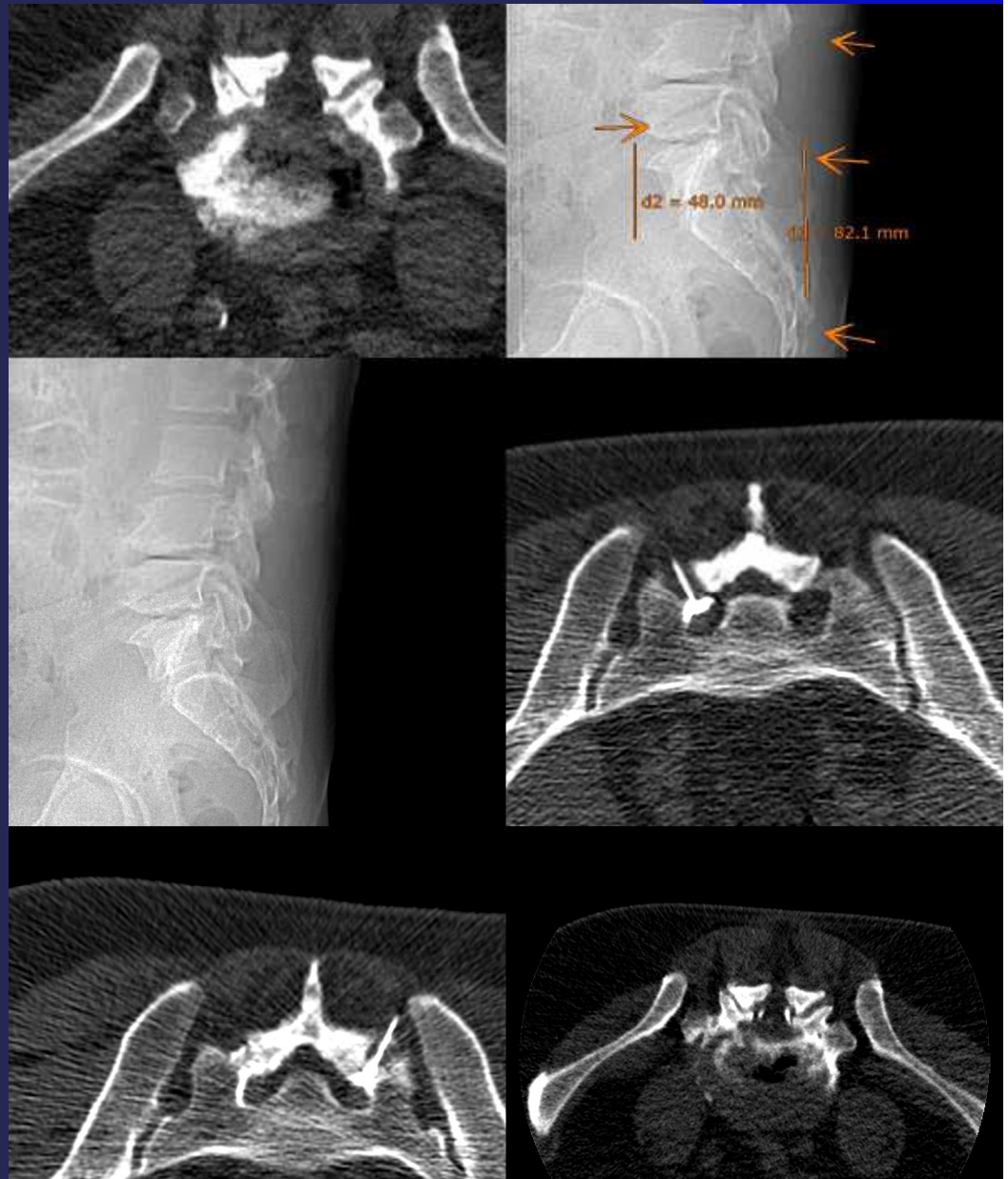
HIATUS SC

- POST OP L5-S1
- Difficile
- Diffusion aléa



TROU SACRE

- Sous scanner précis
- Diffusion évaluée

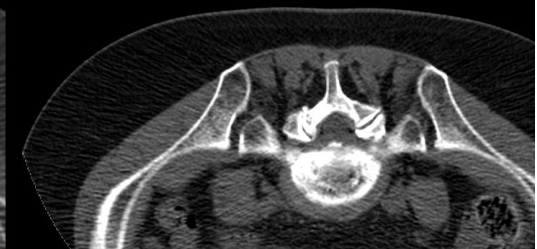
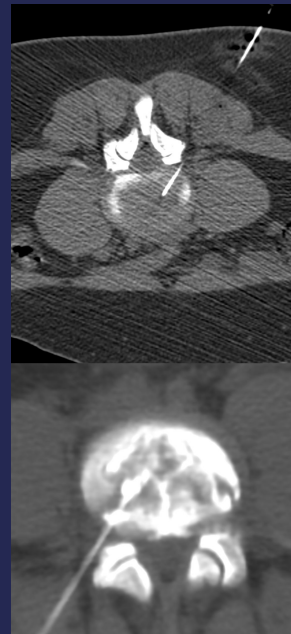
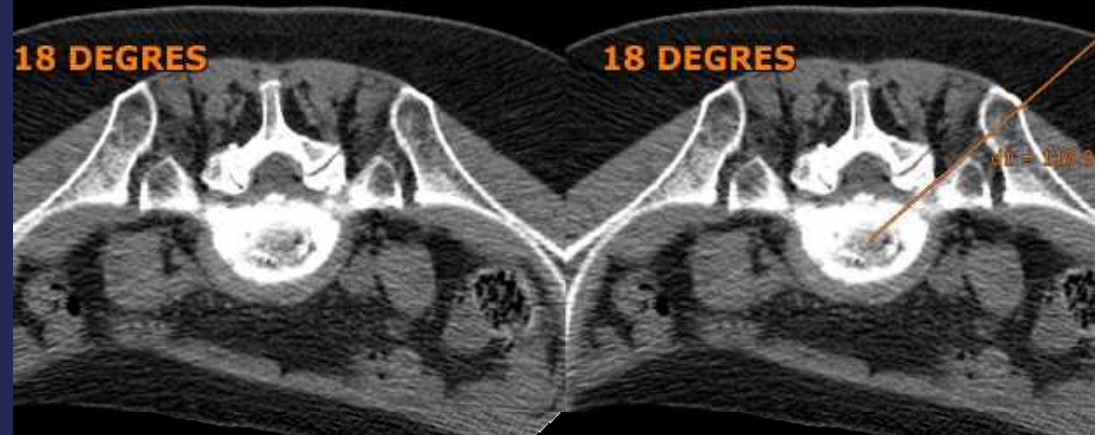


Disco tdm

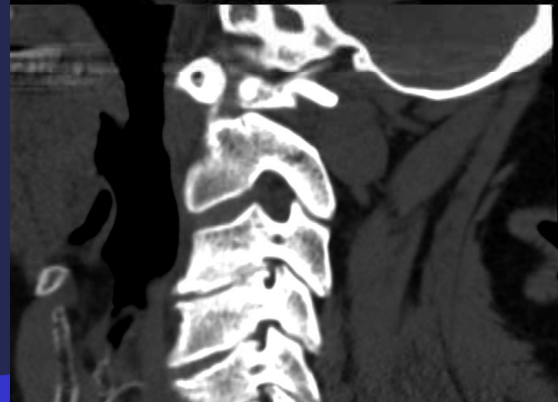
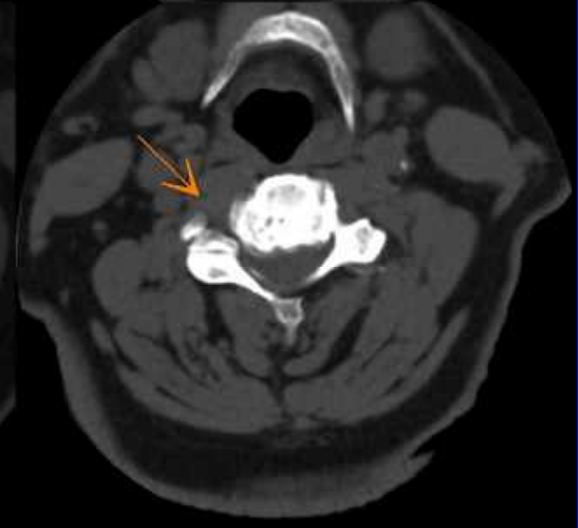
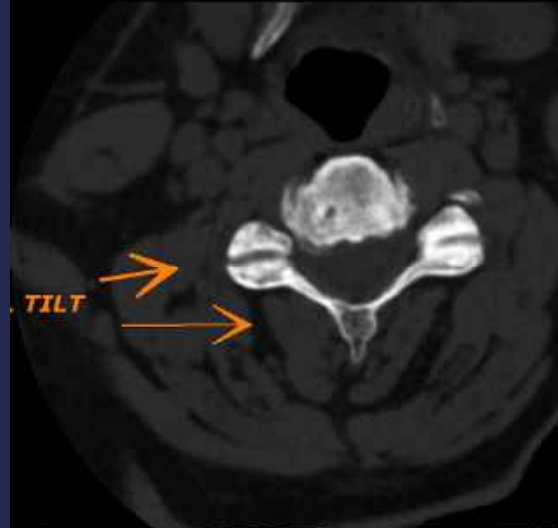
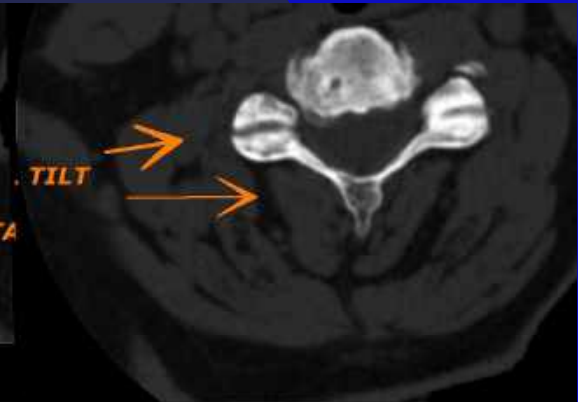
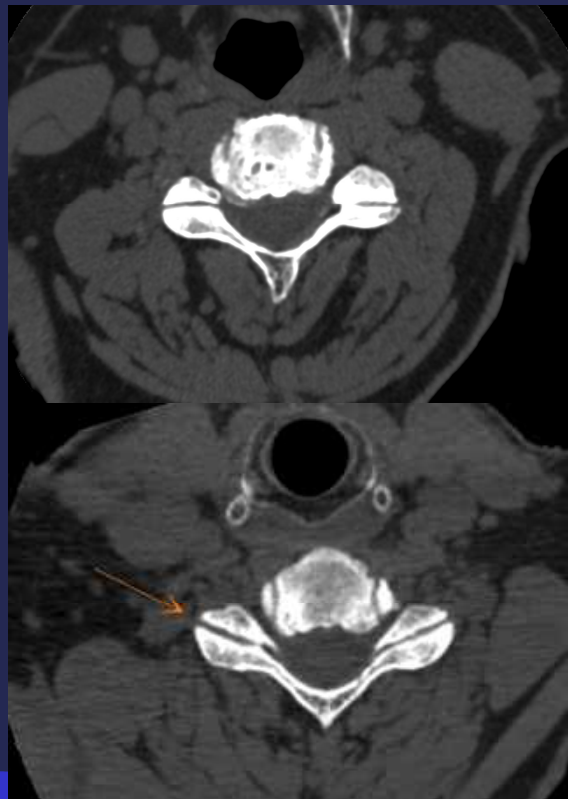
● Difficile:FACILE

● hydroC

● PRP



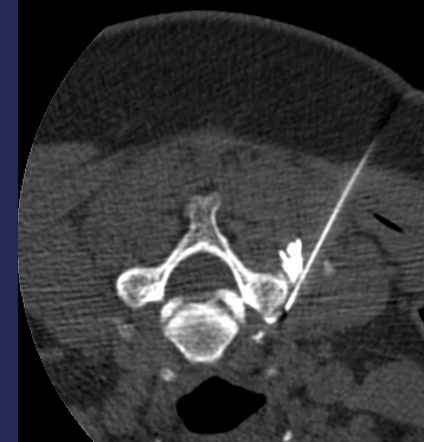
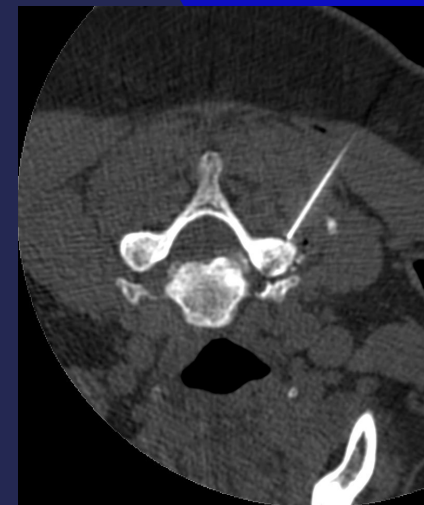
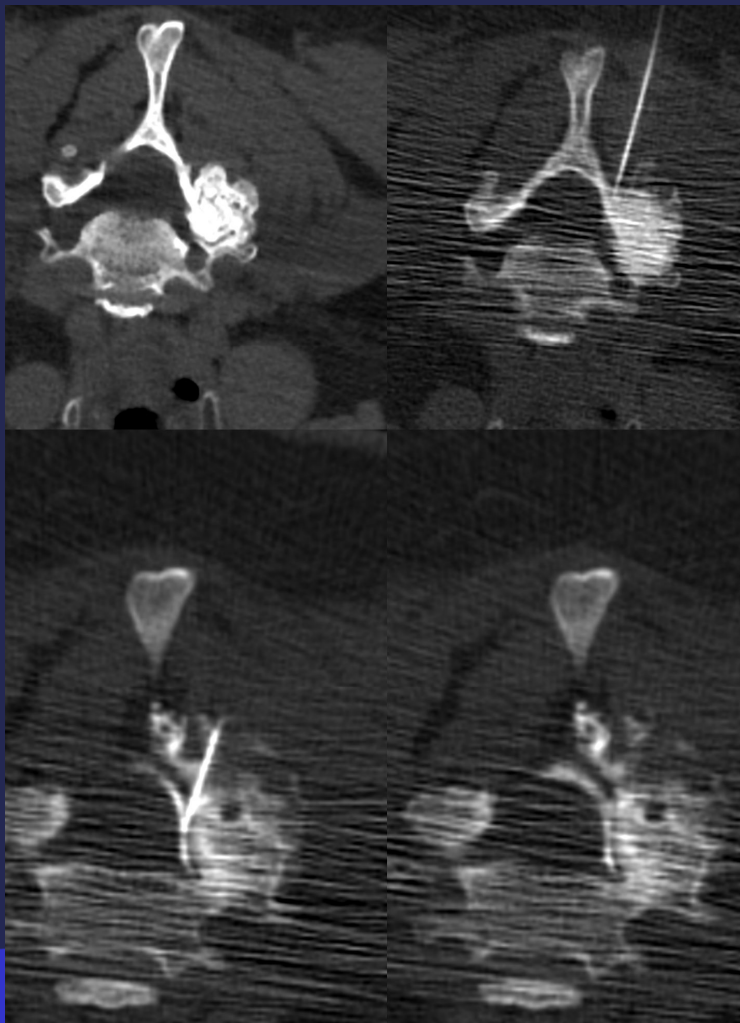
R CERVICAL



R CERV

rcp

dexaméthasone



BASSIN HANCHE

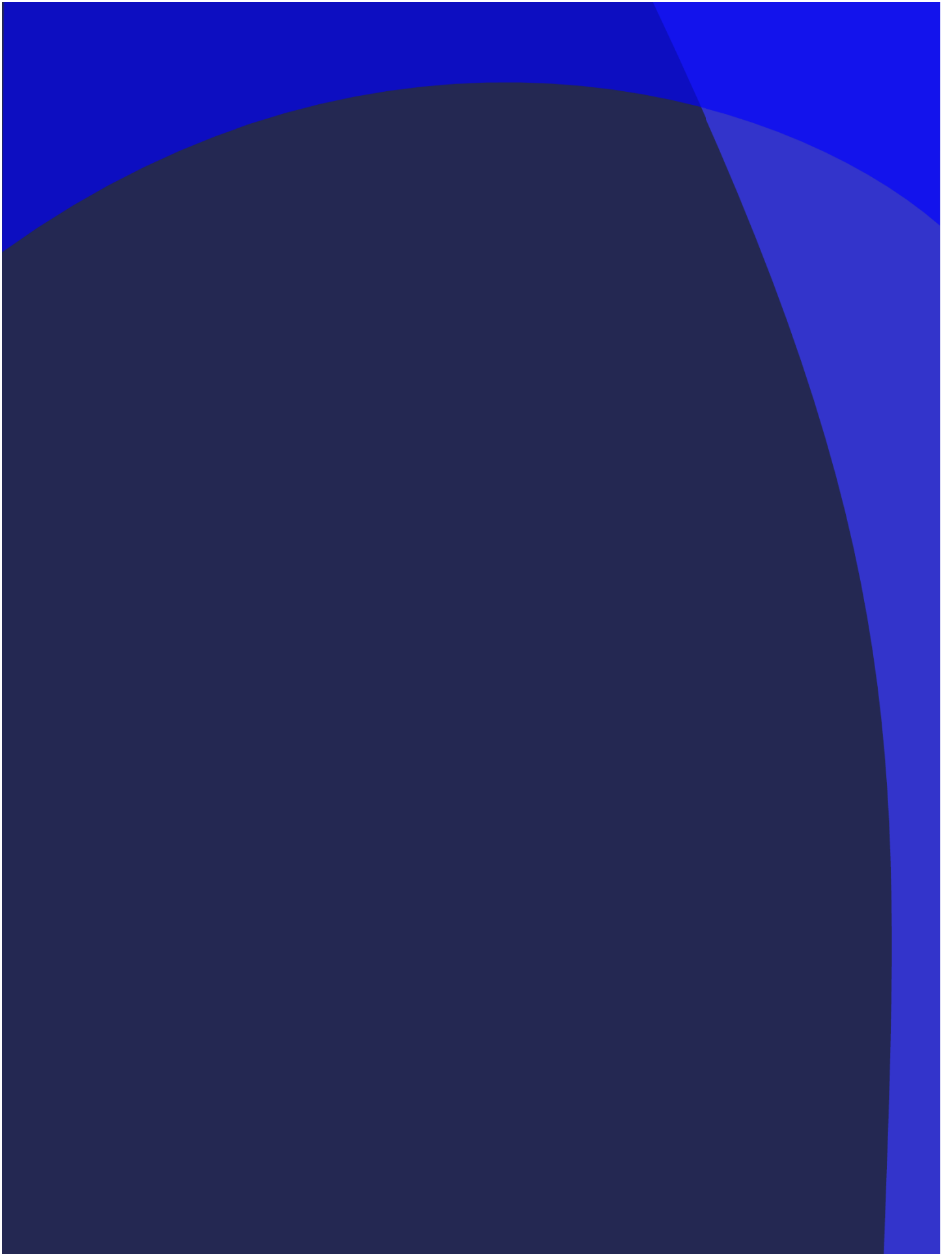


BASSIN

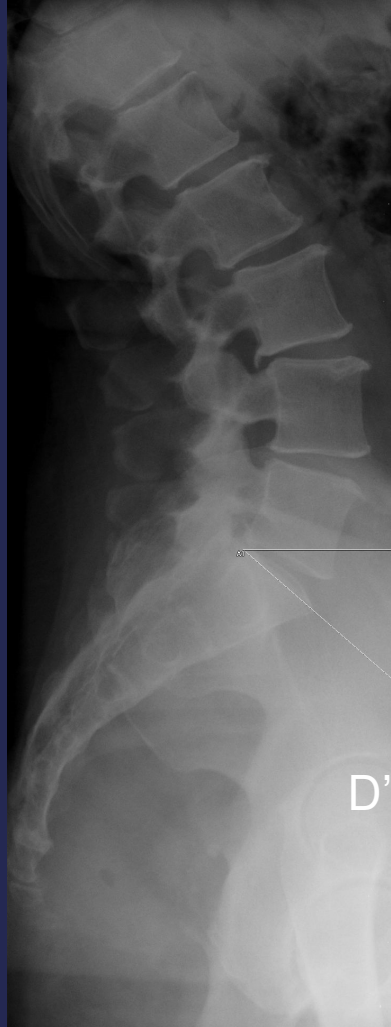
- CHARGE lien rachis/m inf
- Plate forme sacrée : pente et inclinaison
- Frontale : attitude scoliotique
- Sagittale : pente et incidence pelvienne

- Trauma sujet âgé :
- appui difficile et col fémoral nal : fracture probable TDM !

- Pubalgie : rhum et infection sujet âgé
- Sacro iliaques plud de radio , IRM/ scanner
-



INCIDENCE

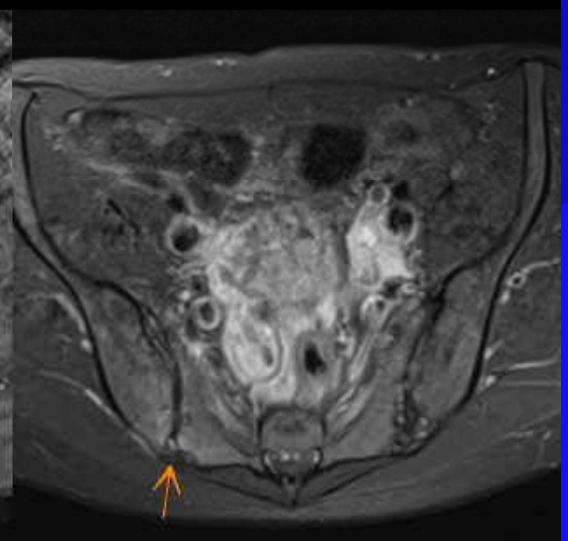
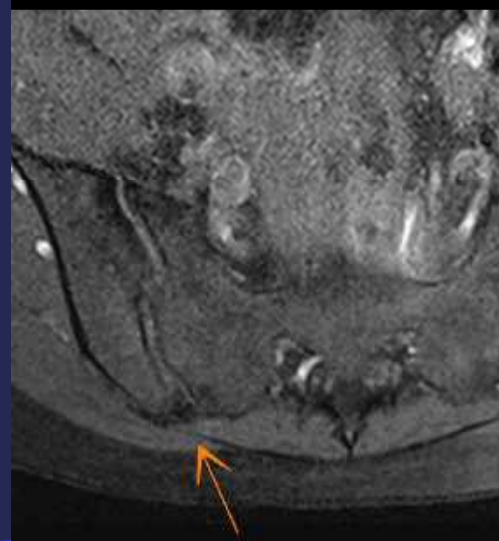
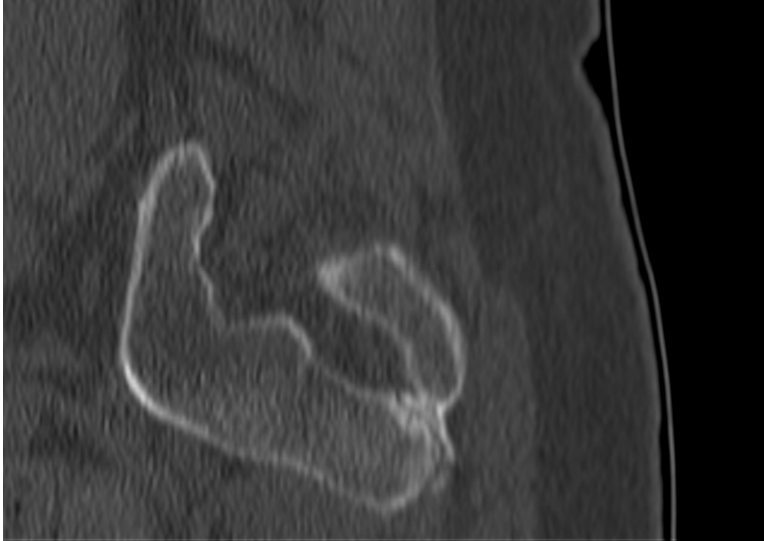
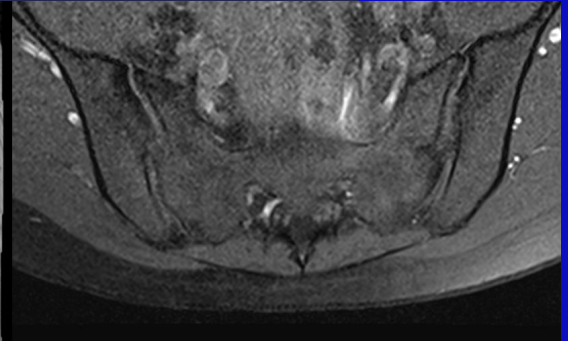
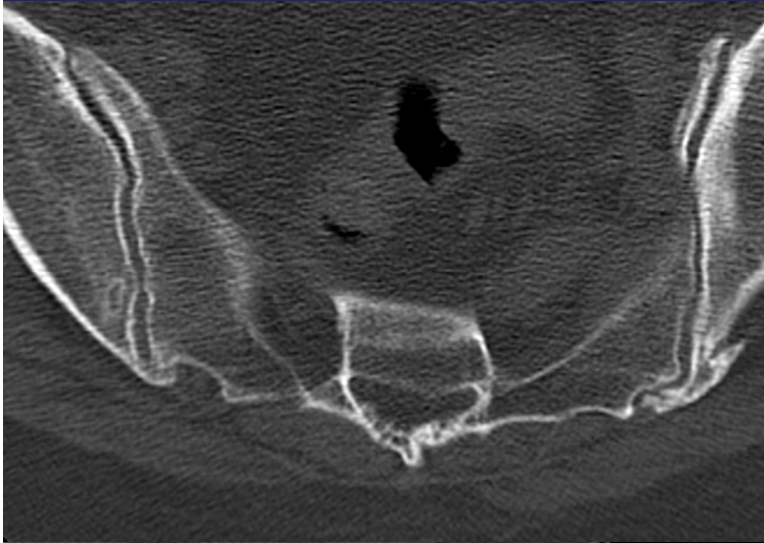


D'après dr G.Morvan

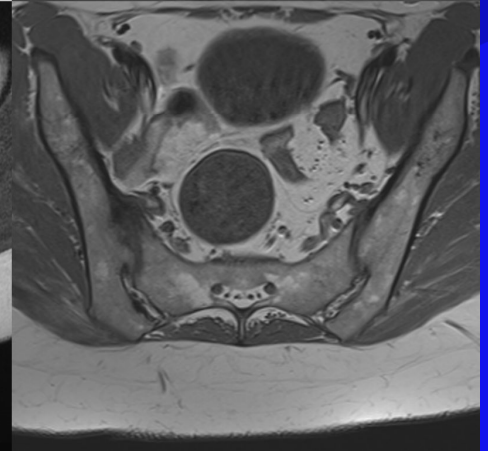
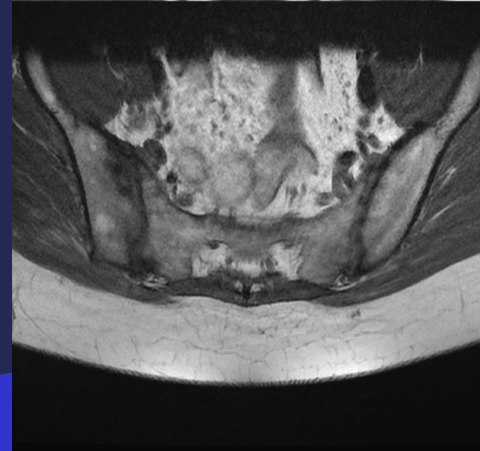
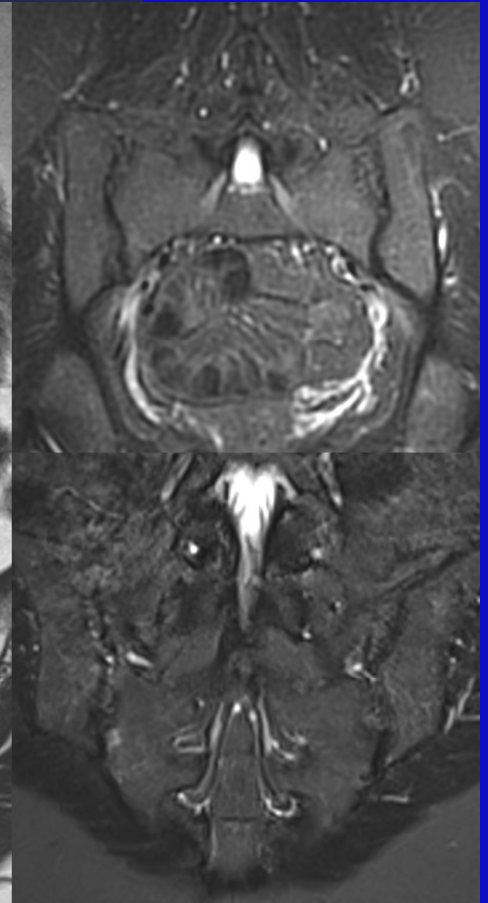
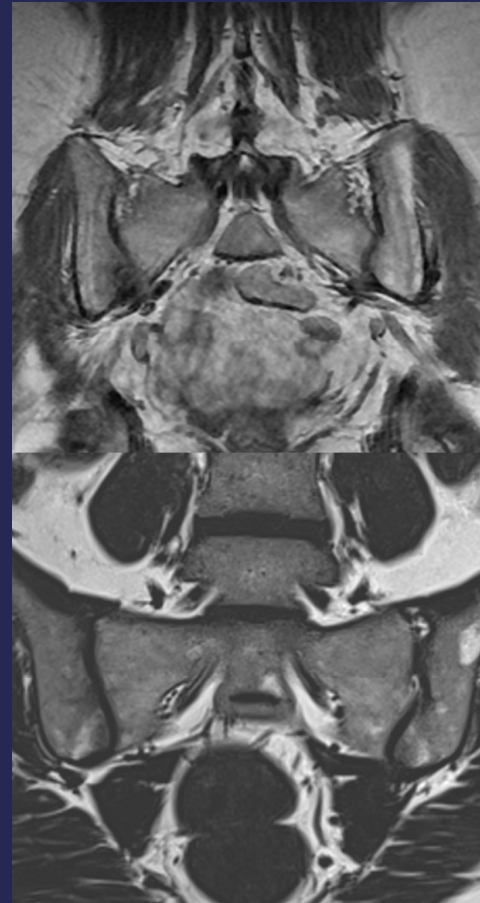
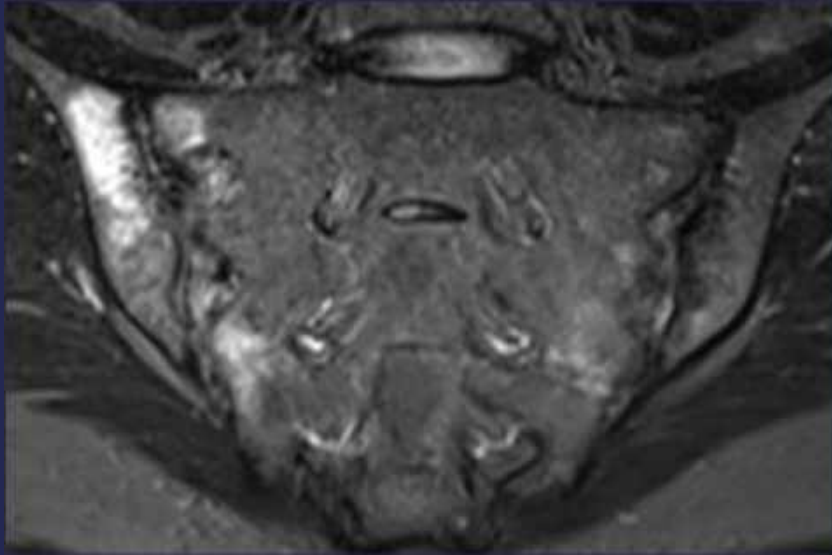


Incidence faible)) courbures faibles))marge d'adaptation

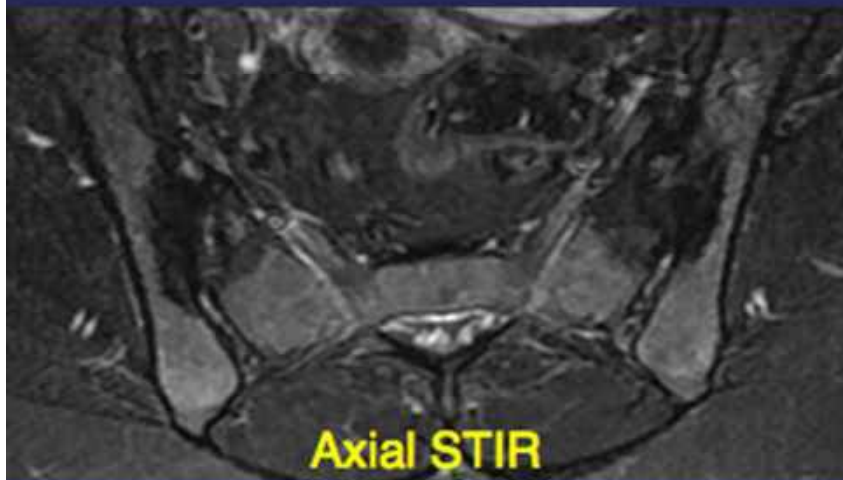
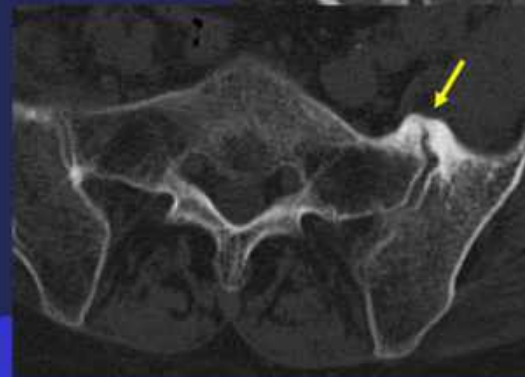
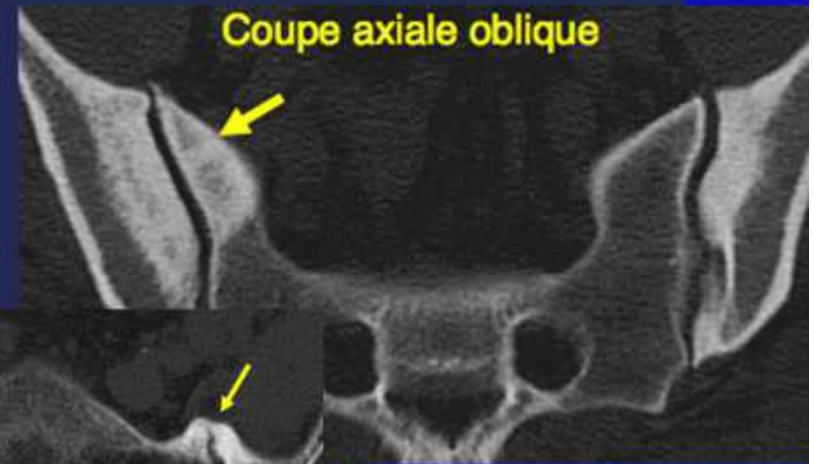
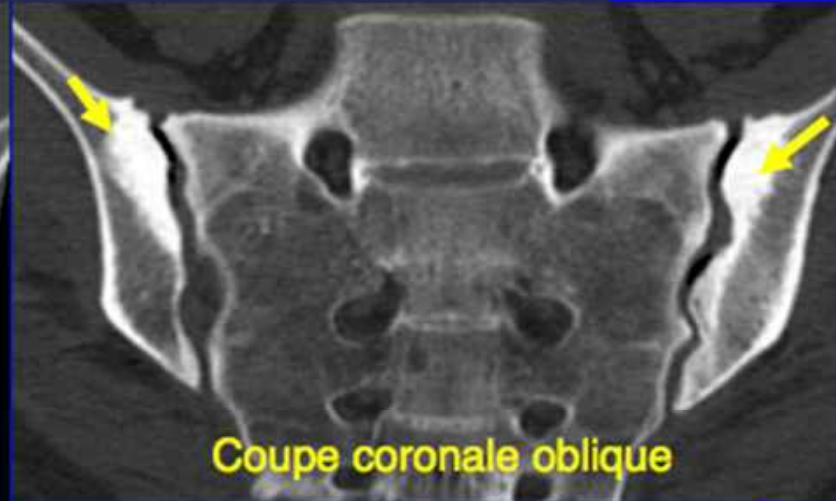
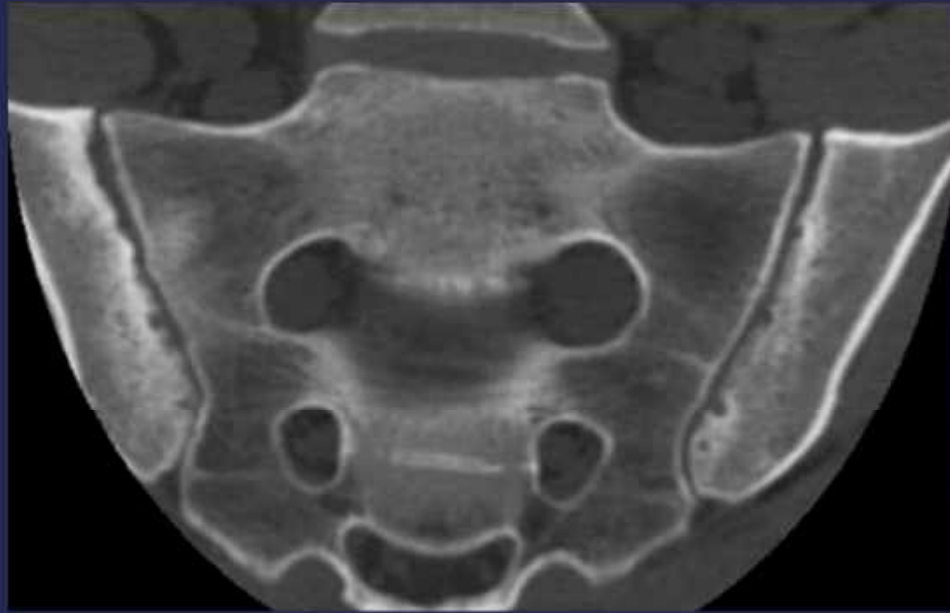
Sacro iliaques : difficile



PSR IRM EN 1^{ER}

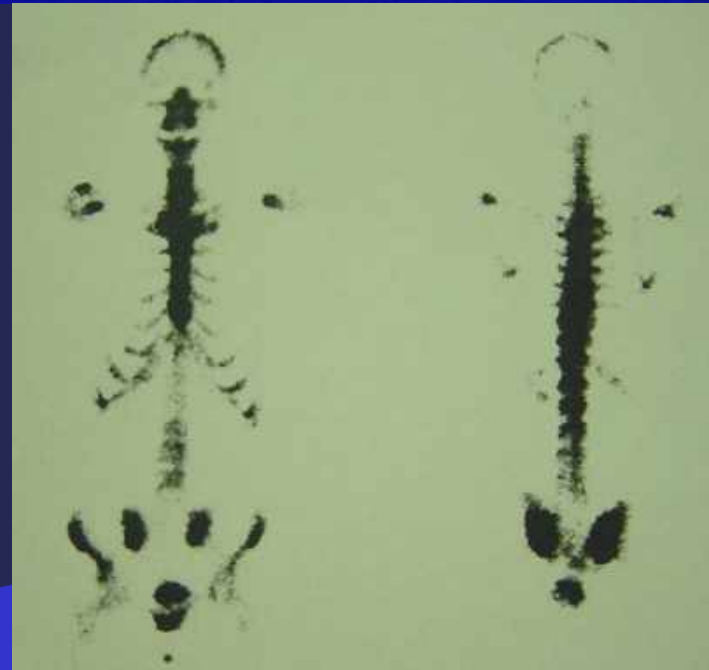
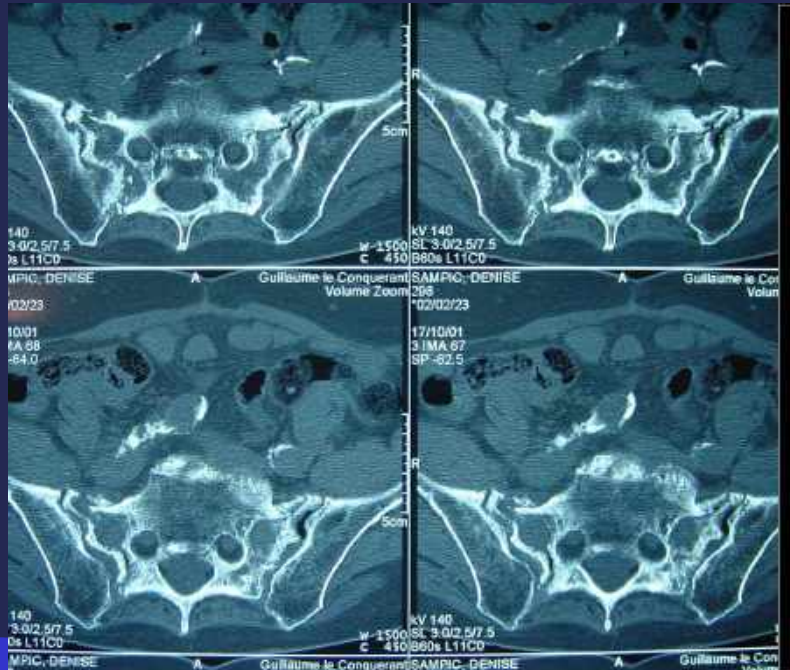
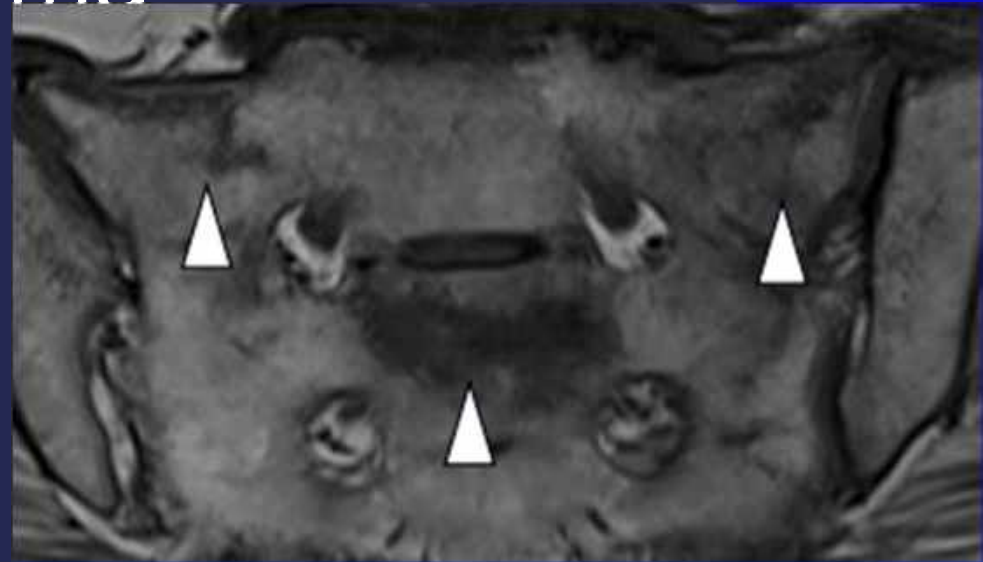


DOUTE PSR :TDM (irradiation)

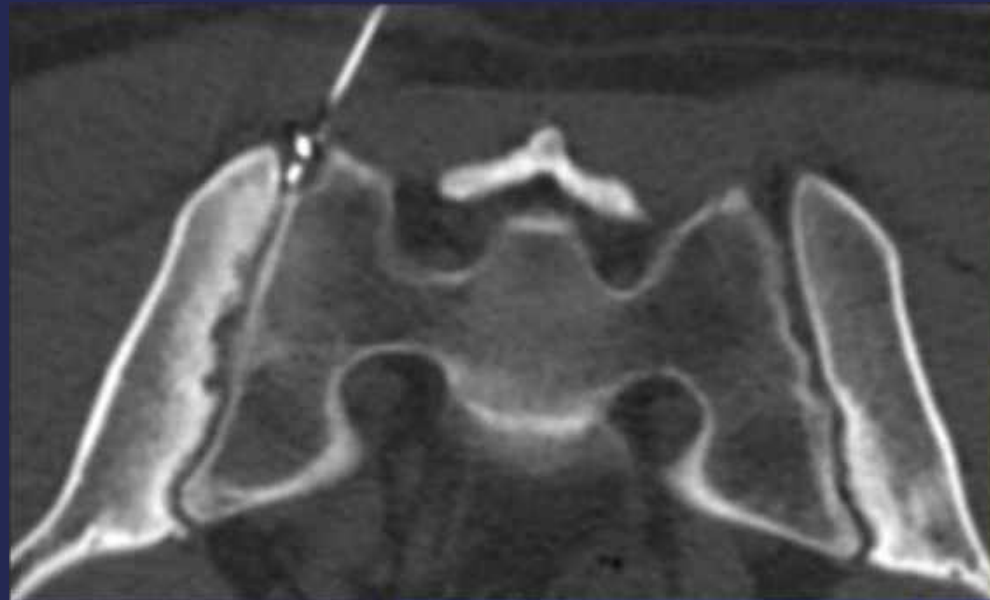
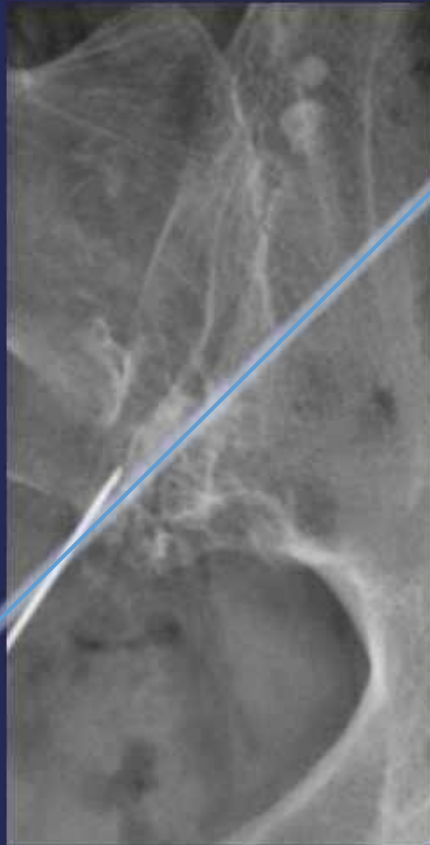


Douleurs +/- trauma

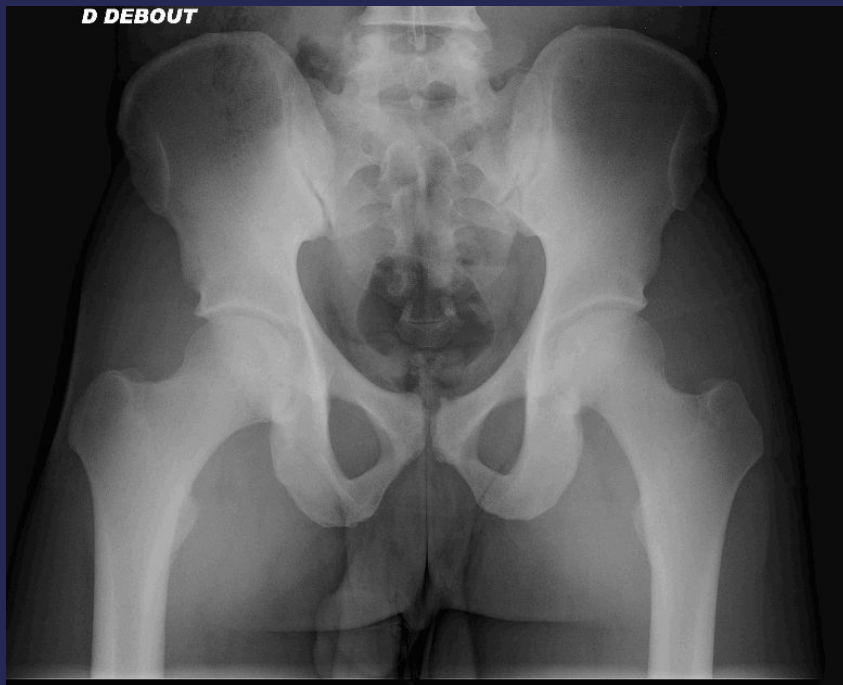
- Fracture ailerons
- IRM > scintig



Infiltration: tdm difficile diffusion



Pubalgie et rx appui monopodal en charge clinique !



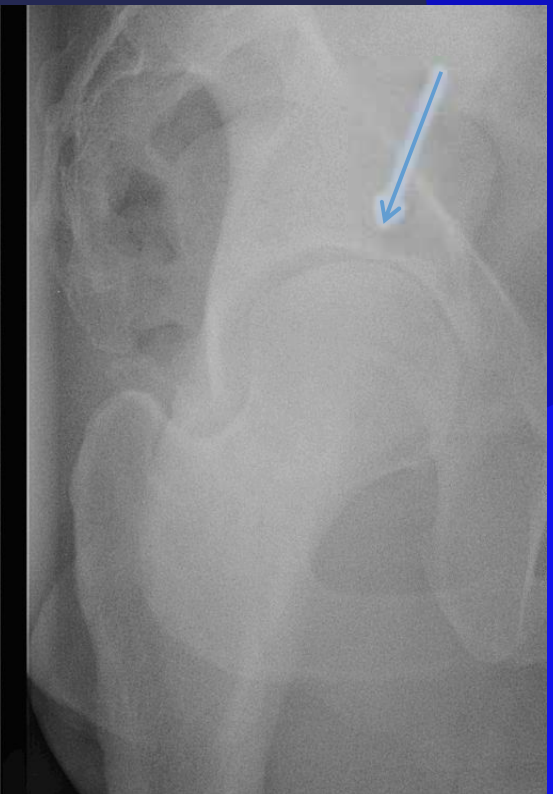
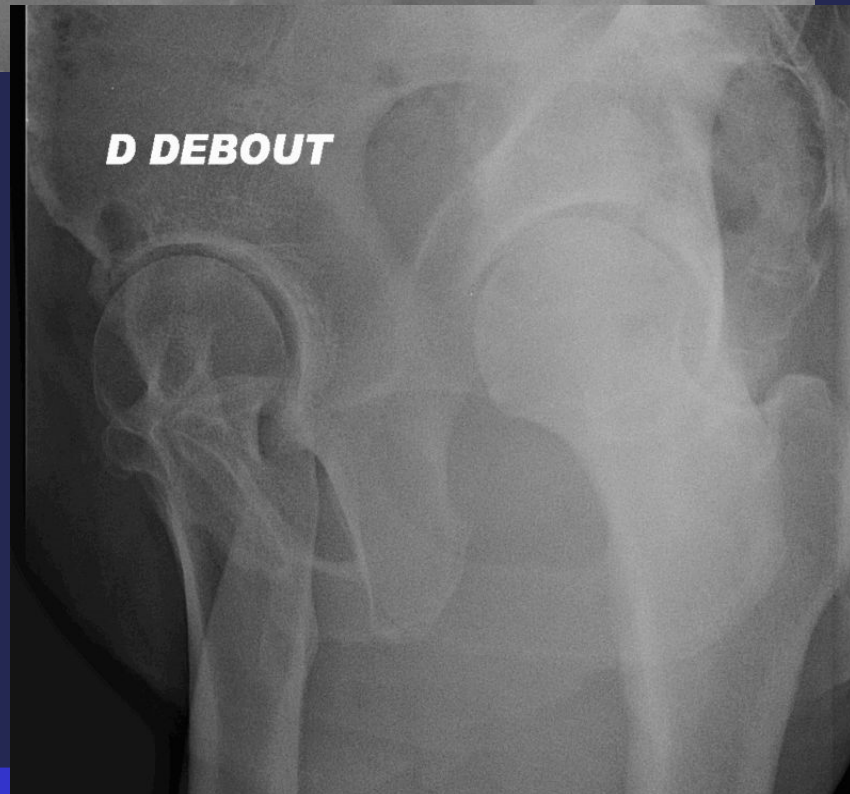
PATHOLOGIE DE LA HANCHE

- ⊙ Rx standard : indispensable
- ⊙ Écho : si péri-articulaire ou épanchement
- ⊙ IRM : devenue l'exploration princeps :
 - Ostéo nécrose
 - Algodystrophie
 - Coxite et rhumatisme

Hanche

- ⊙ Coxarthrose (nerf fémoral et td pt glutéal)
- ⊙ 10% antéro médiale : FP Lequesne inversé
- ⊙ Douleurs antérieures :
Bursite/kyste lab/ h Ing / cfa
- ⊙ Latérales : tdopathie et bursite mg tfl
- ⊙ Postérieures: sciatique/conflict cf/ piriforme/SI

FP LEQUESNE INVERSE



COXARTHROSE SECONDAIRE

Dysplasie de hanche

- Trop forte obliquité du toit du cotyle HTE $> 12^\circ$
- Insuffisance de couverture latérale VCE et antérieure de la tête fémorale VCA $< 20^\circ$

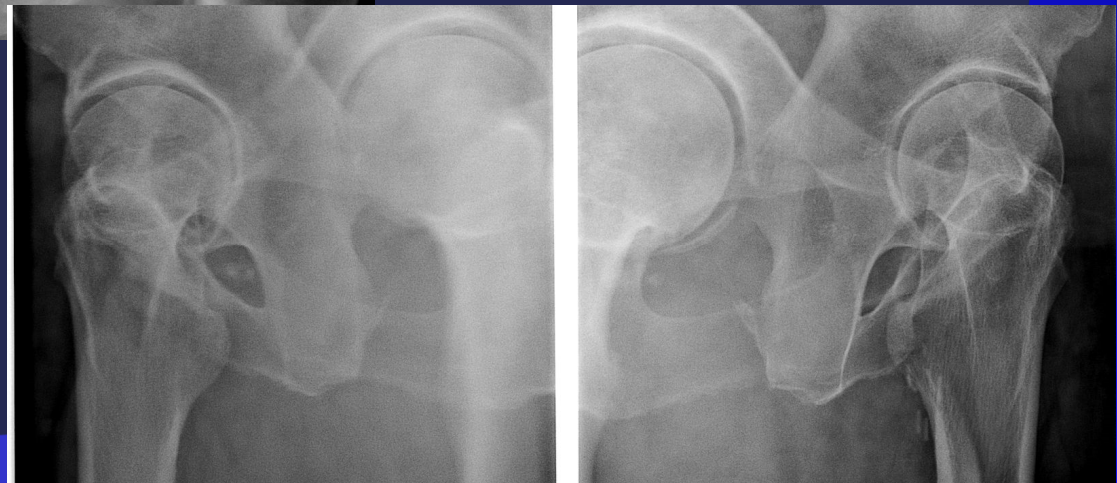
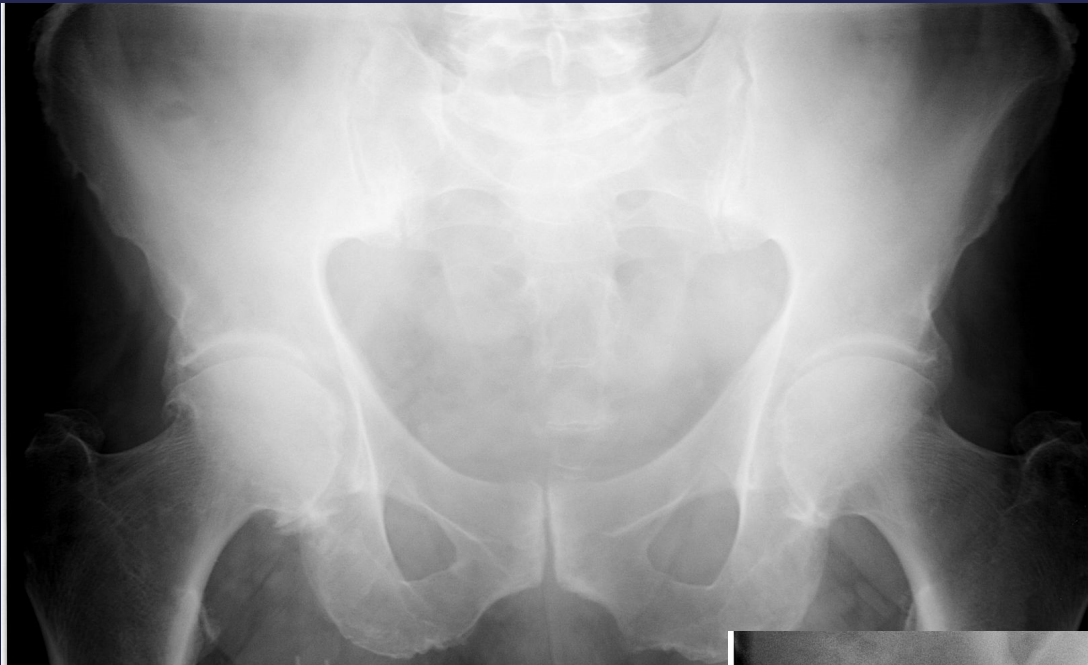


C.Miceli

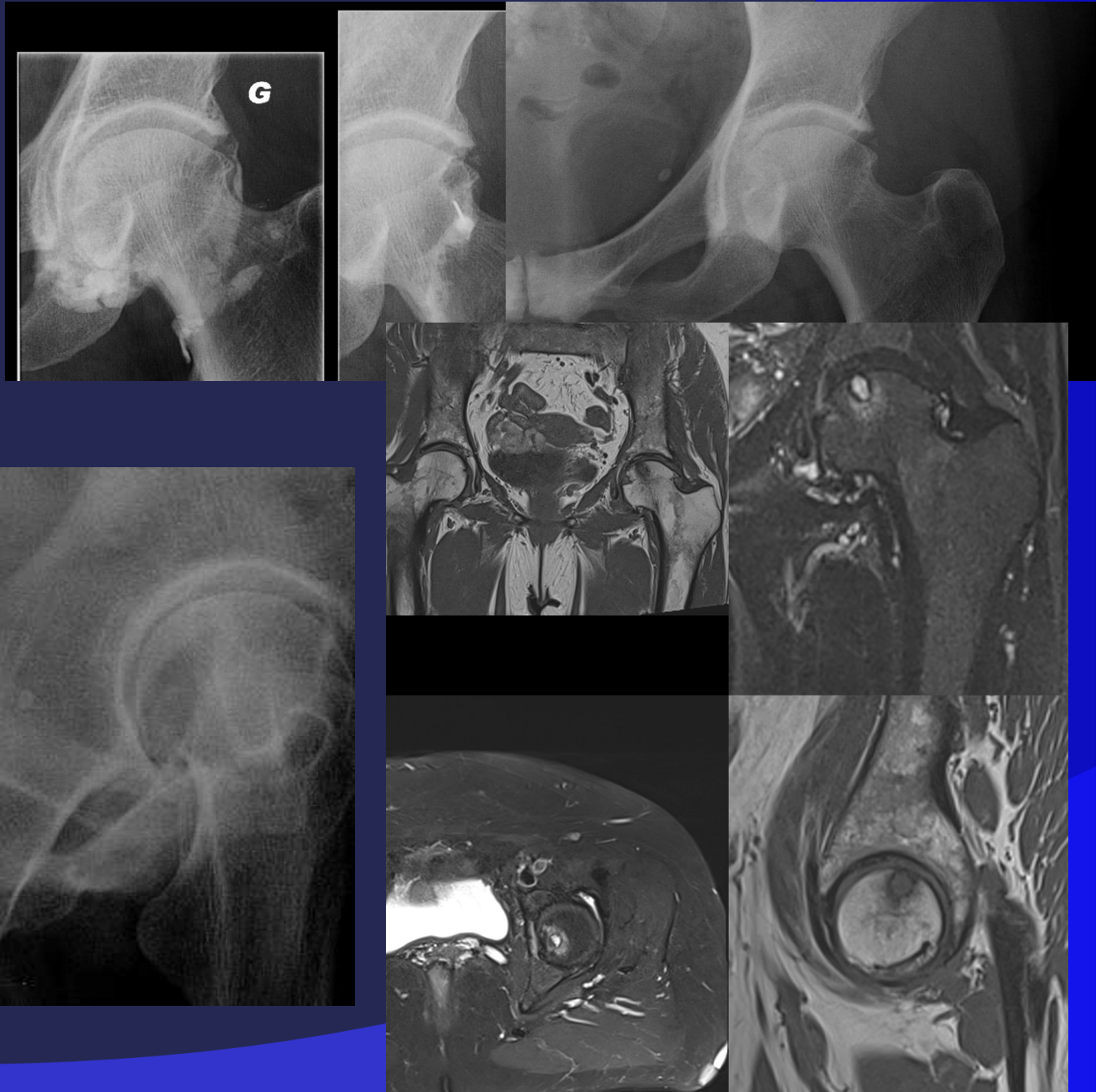


Évolution vers la coxarthrose

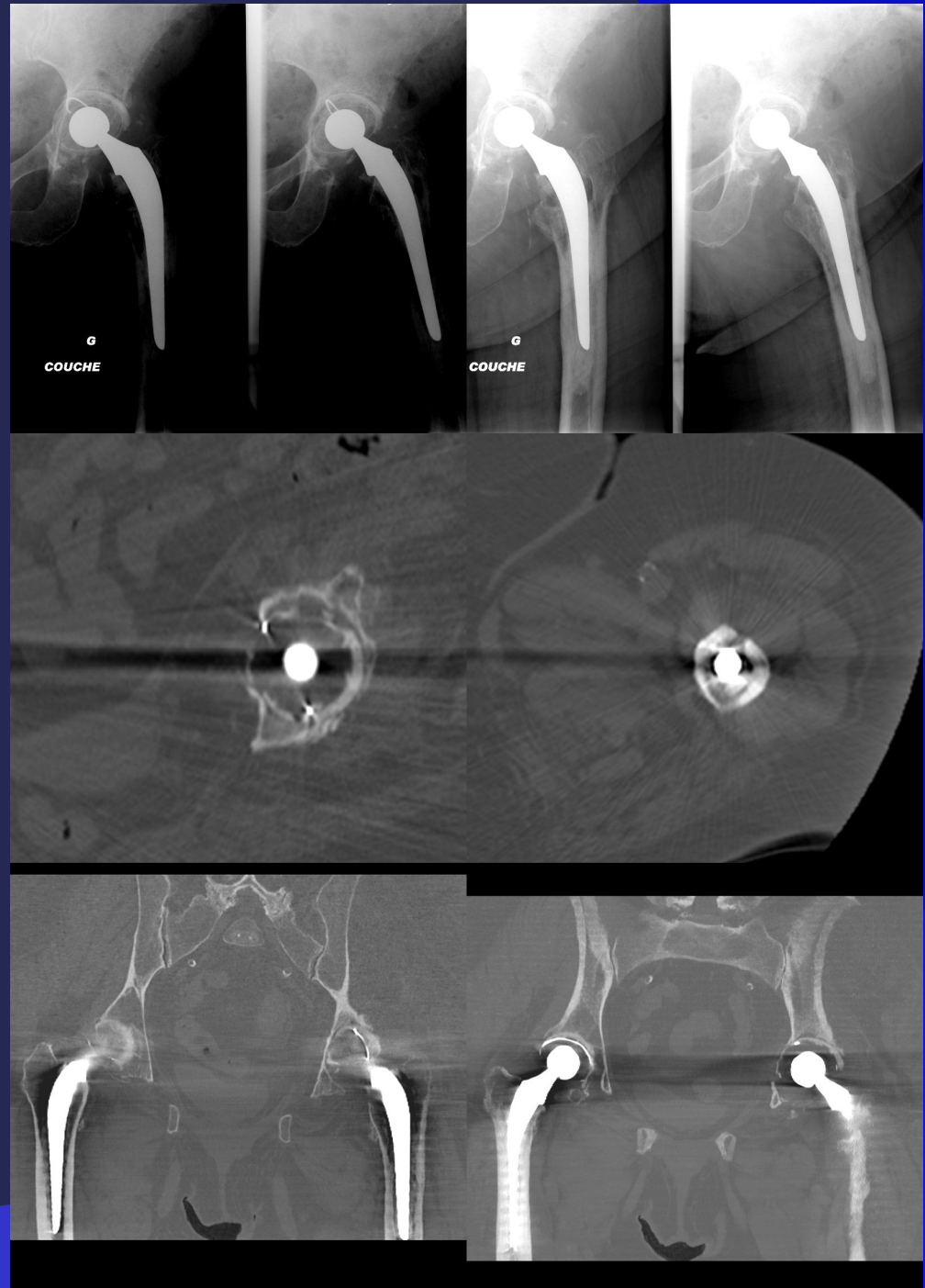
Coxarthrose protrusive



Coxarthrose évolution



RADIOS
comparatives
/temps

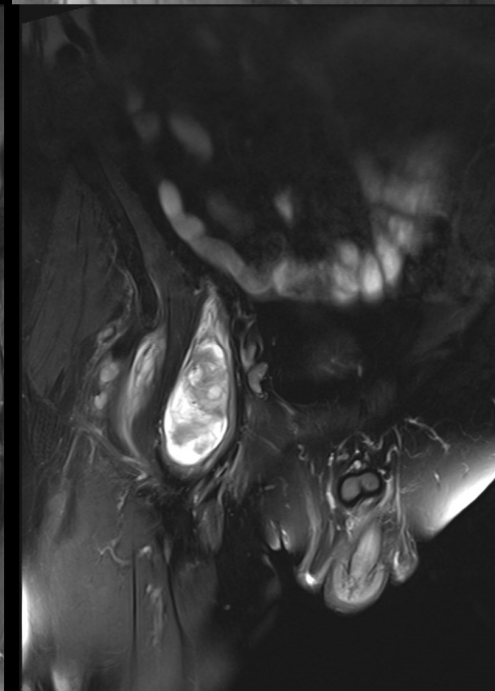
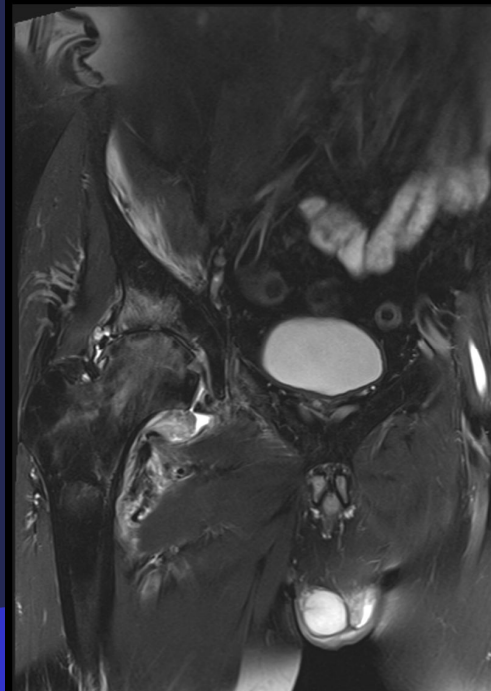
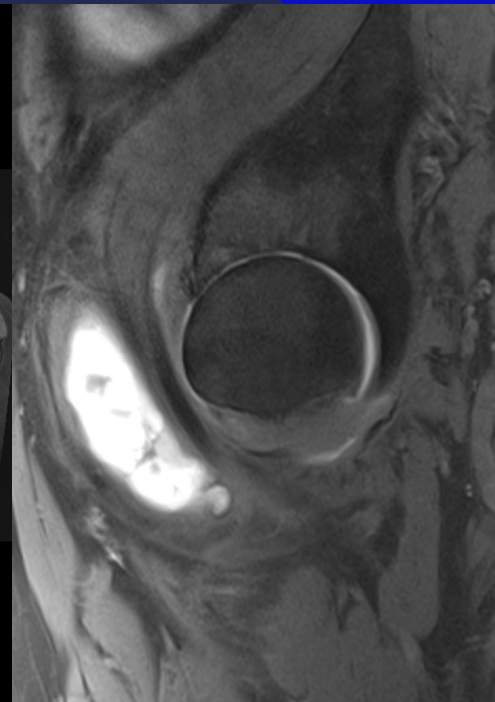
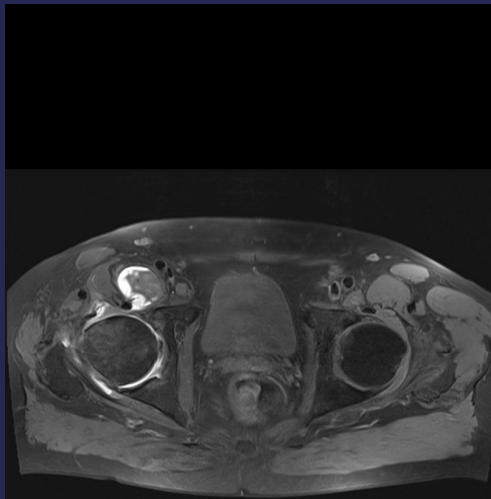


douleur et omi brutal ?

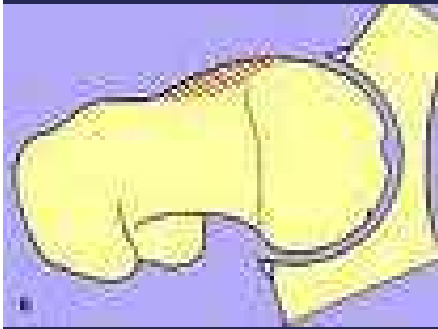


HANCHE

kyste arthrosynovia
comprerssif



CFA et problèmes à ressaut

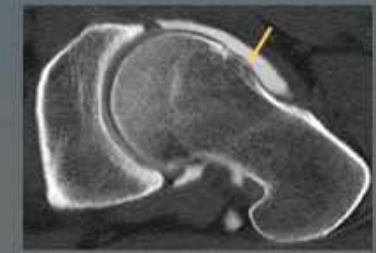


Effet came

– Saillie osseuse jonction tête col++



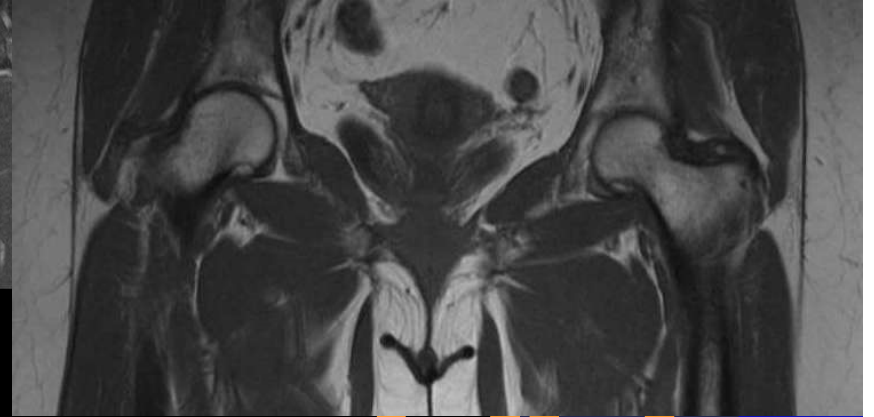
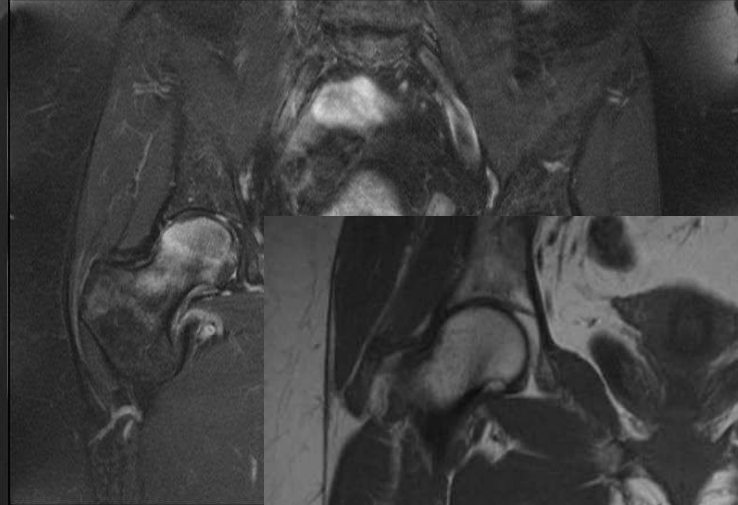
hanche droite de face



Coupe dans l'axe du col



C
4



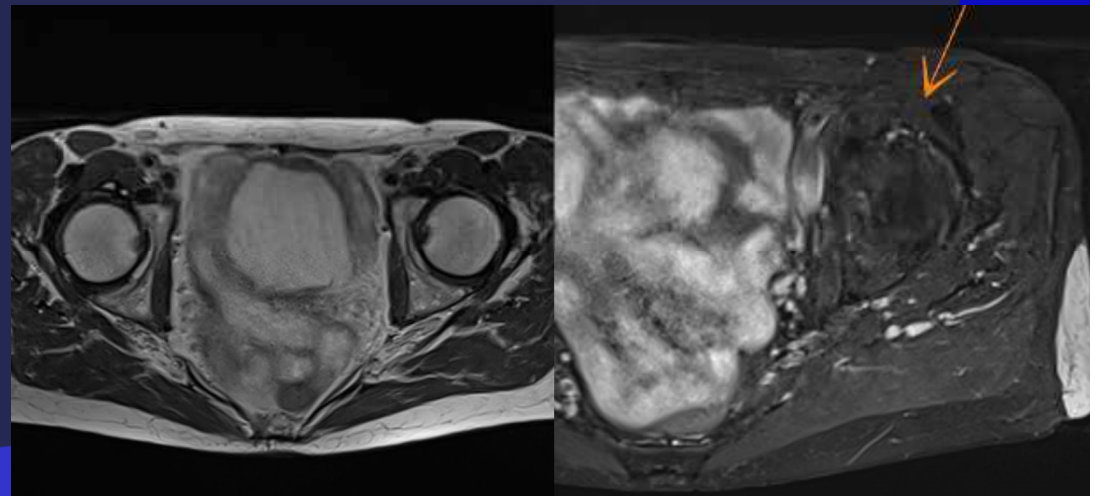
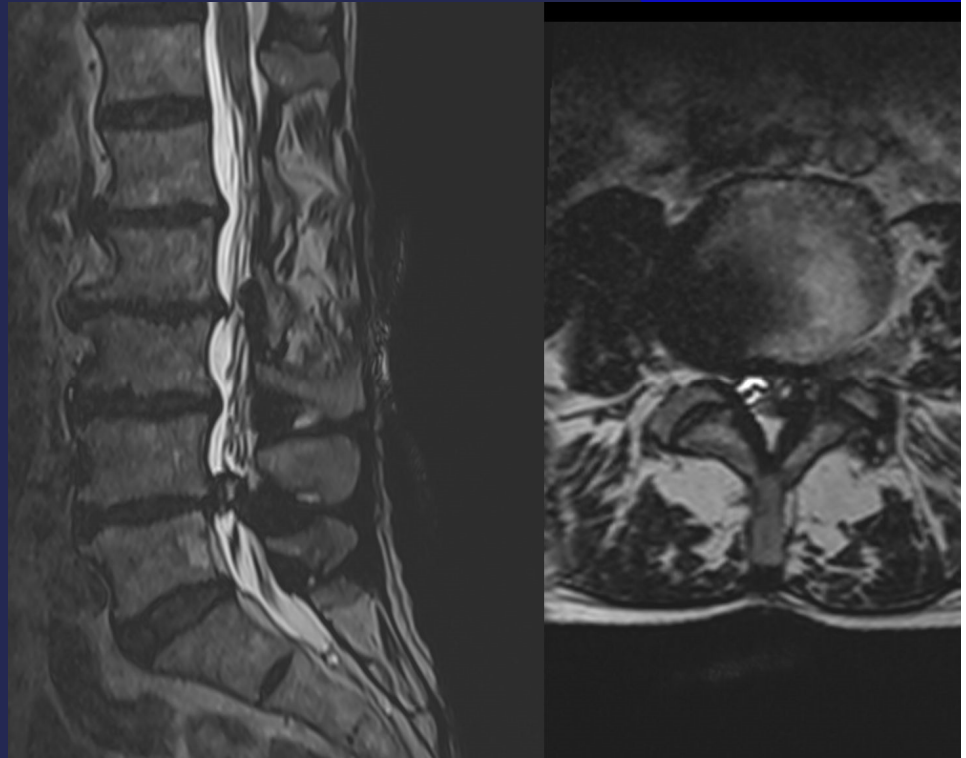
gadolinium



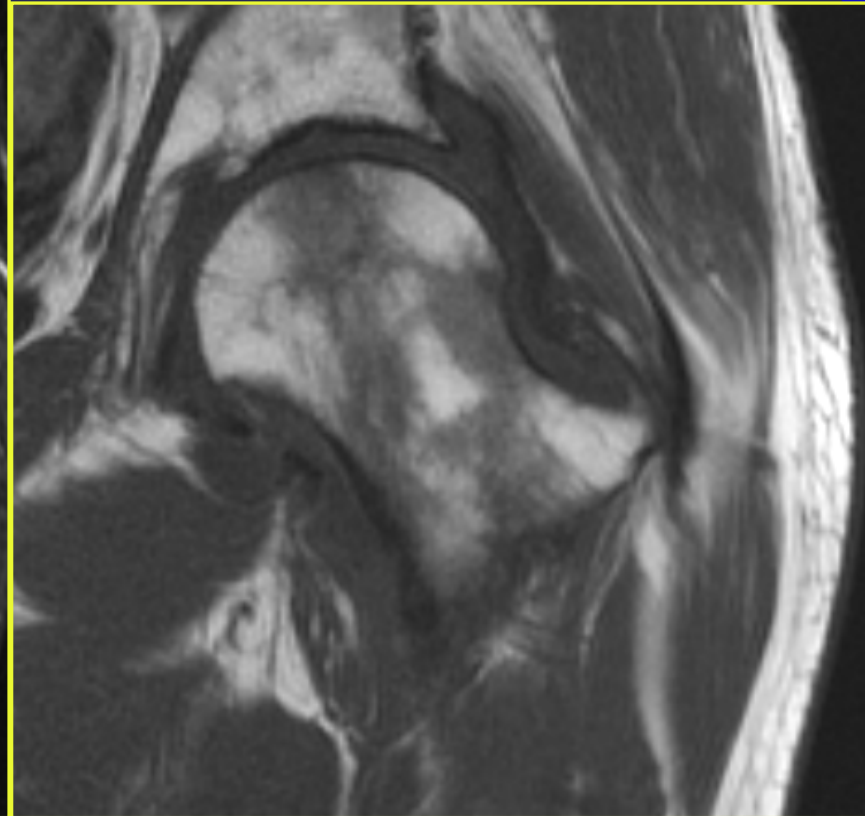
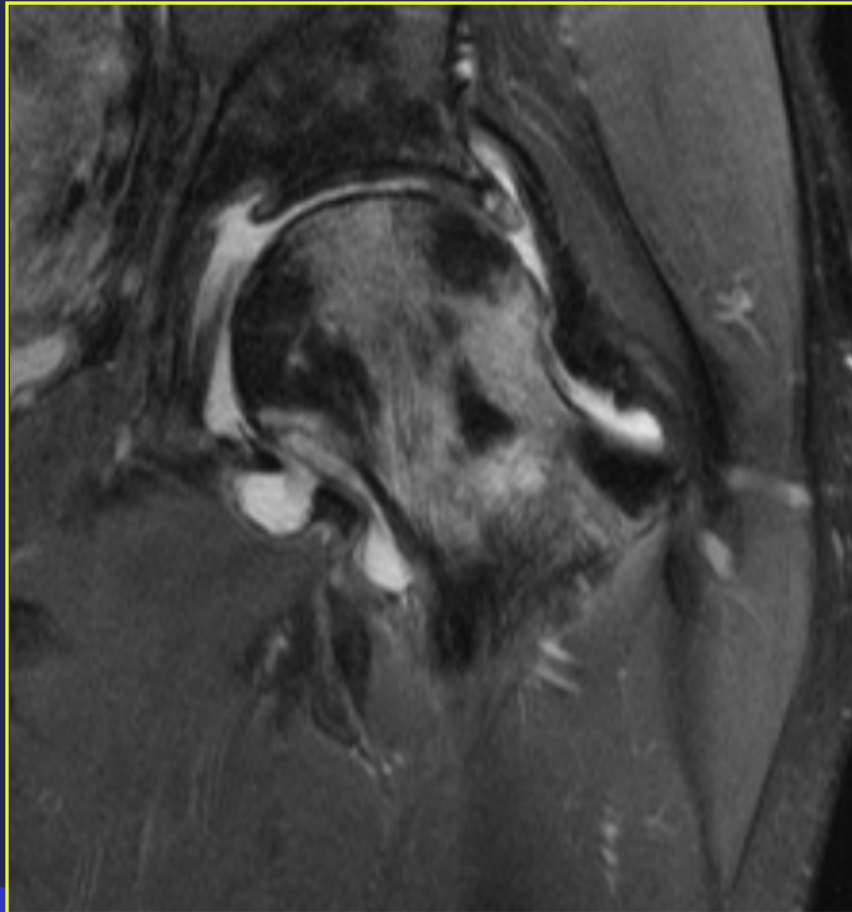
HANCHE INTRICATION

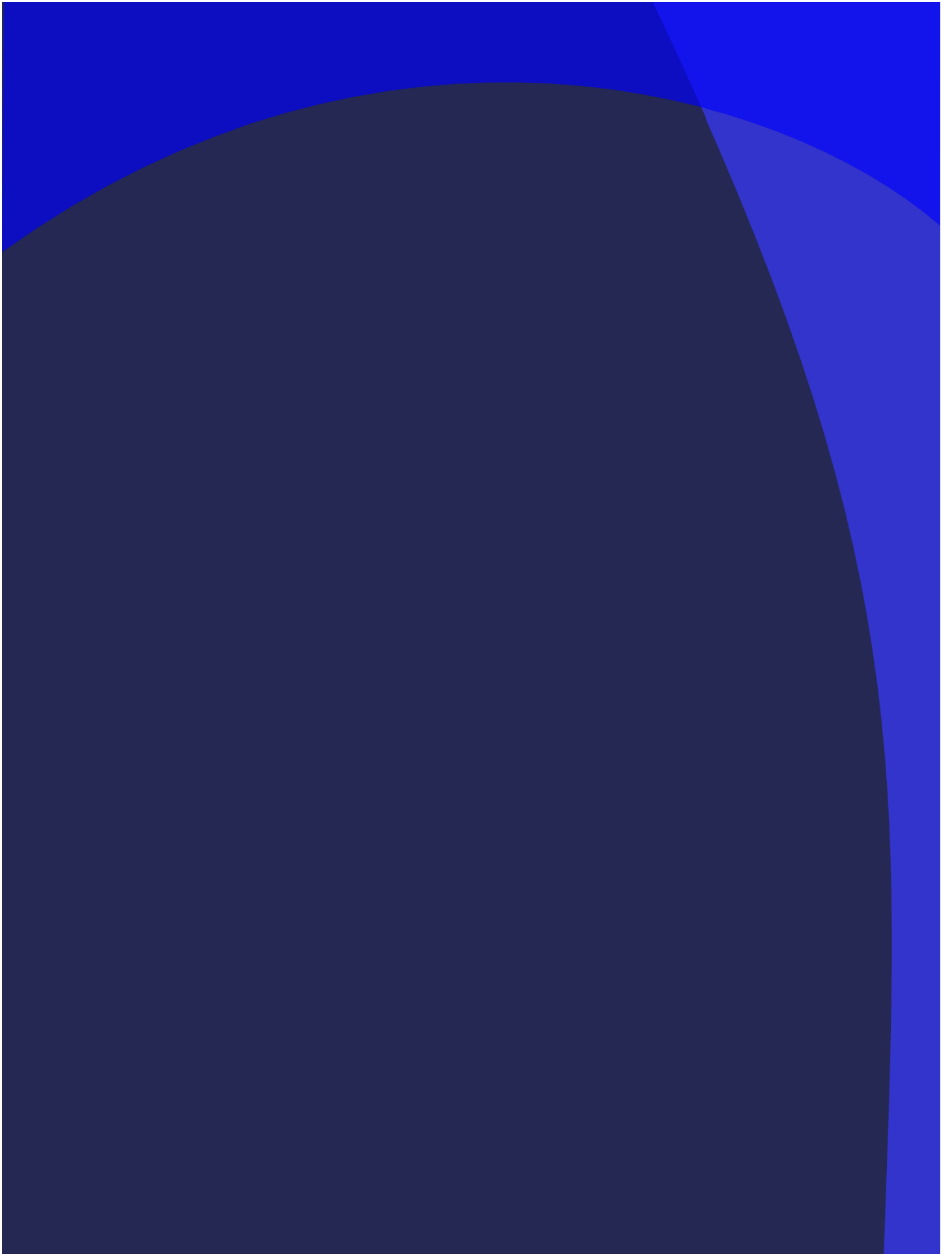
CLINIQUE +++

TEST THERAPEUTIQUE:
XYLOCAINE /BUPIVACAINE
CORTICOÏDE



Complexe





GENOU

GENOU

- RADIOGRAPHIES :IMAGERIE FONDAMENTALE
en complément de la clinique

FACE , PROFIL (-30° DE FLEXION)

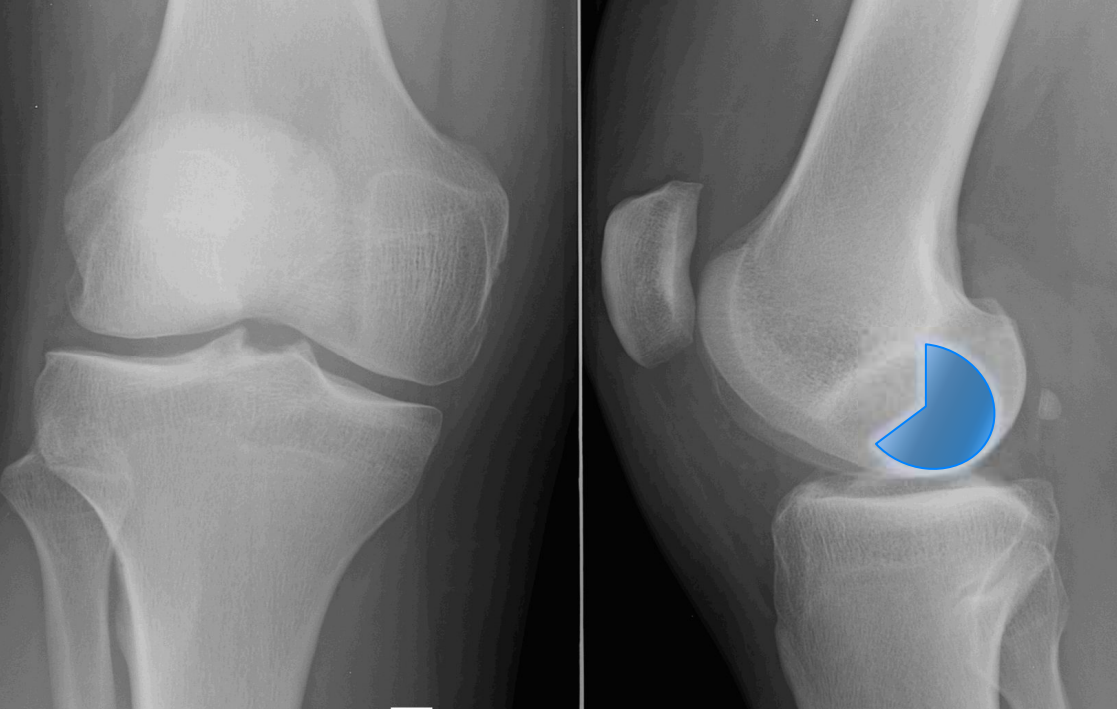
SCHUSS (40)

AXIALES 30° (INST) 45° /60° (AOSE)

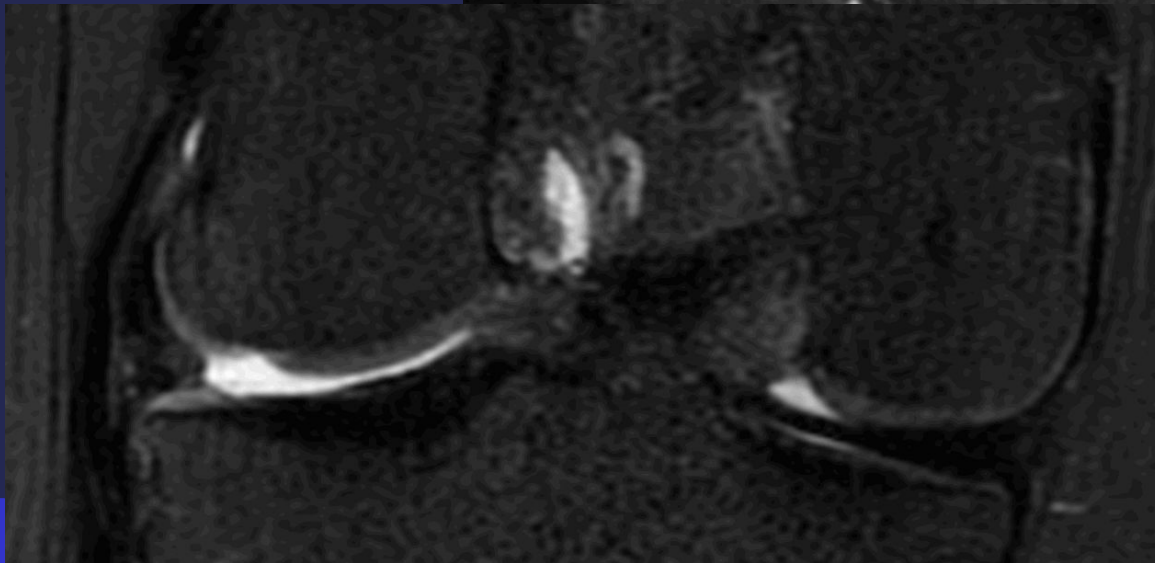
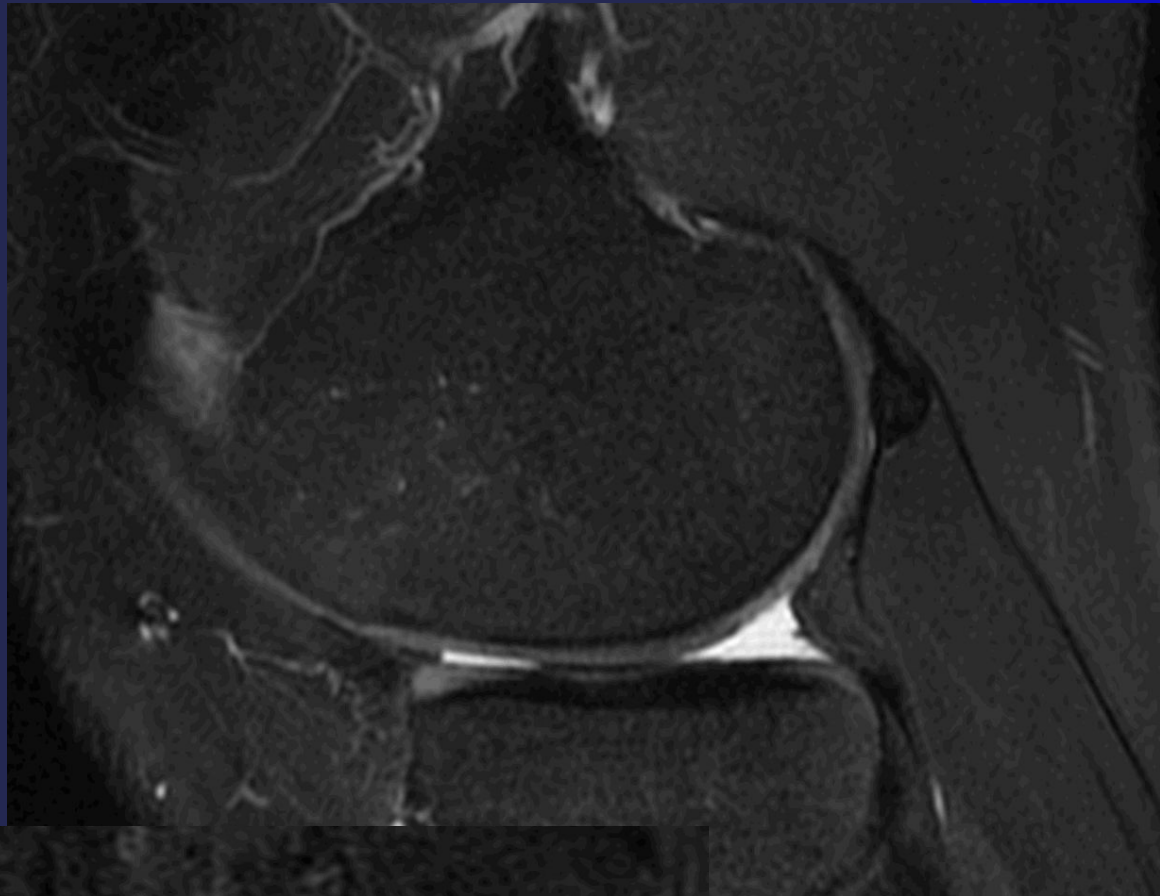
IRM +++

TDM –AOTDM-AOIRM : pb spécifiques

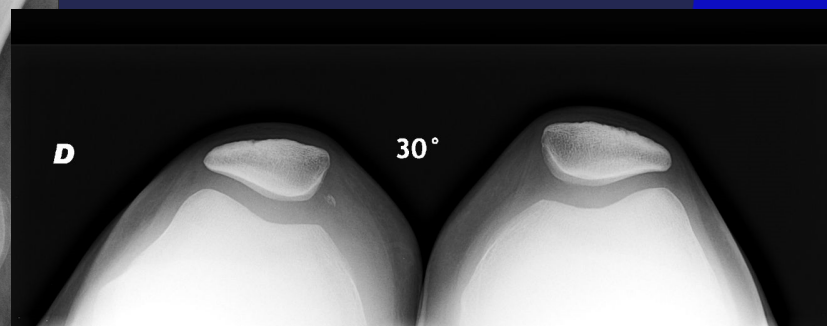
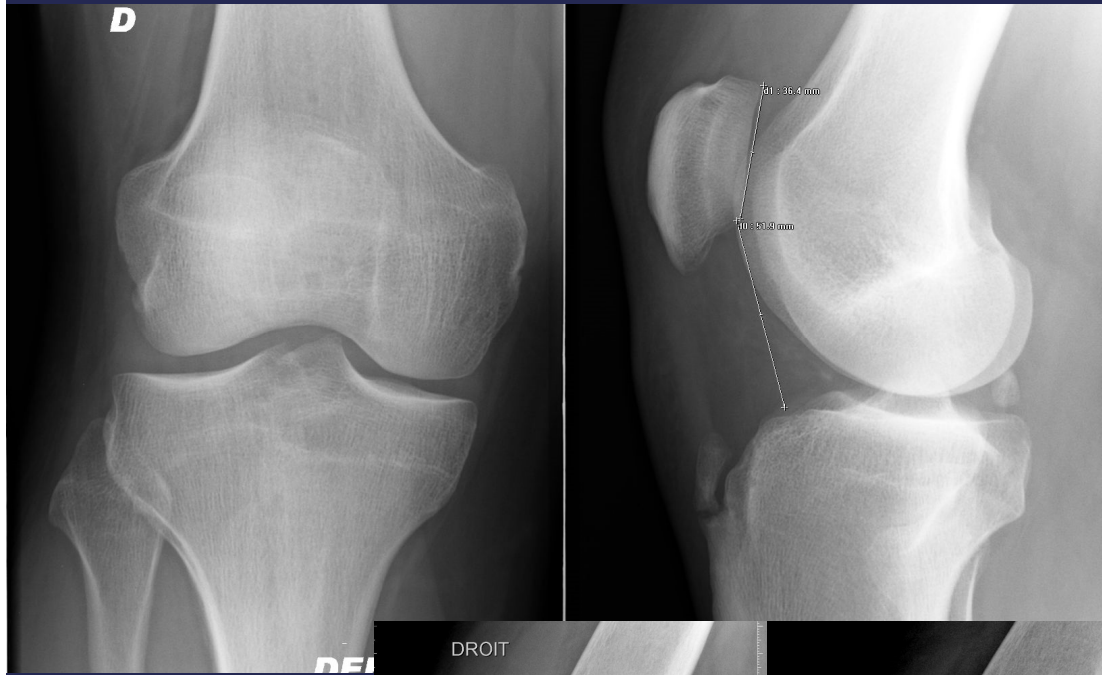
TOUT SCHUSS !



IRM

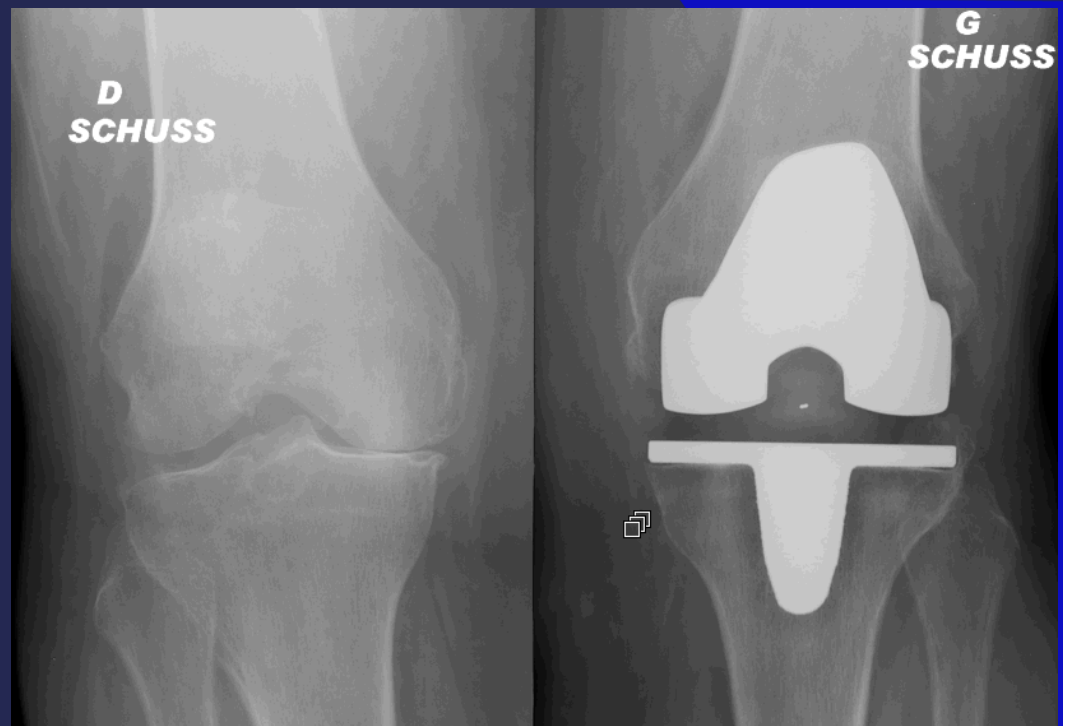


GENOU ANTERIEUR

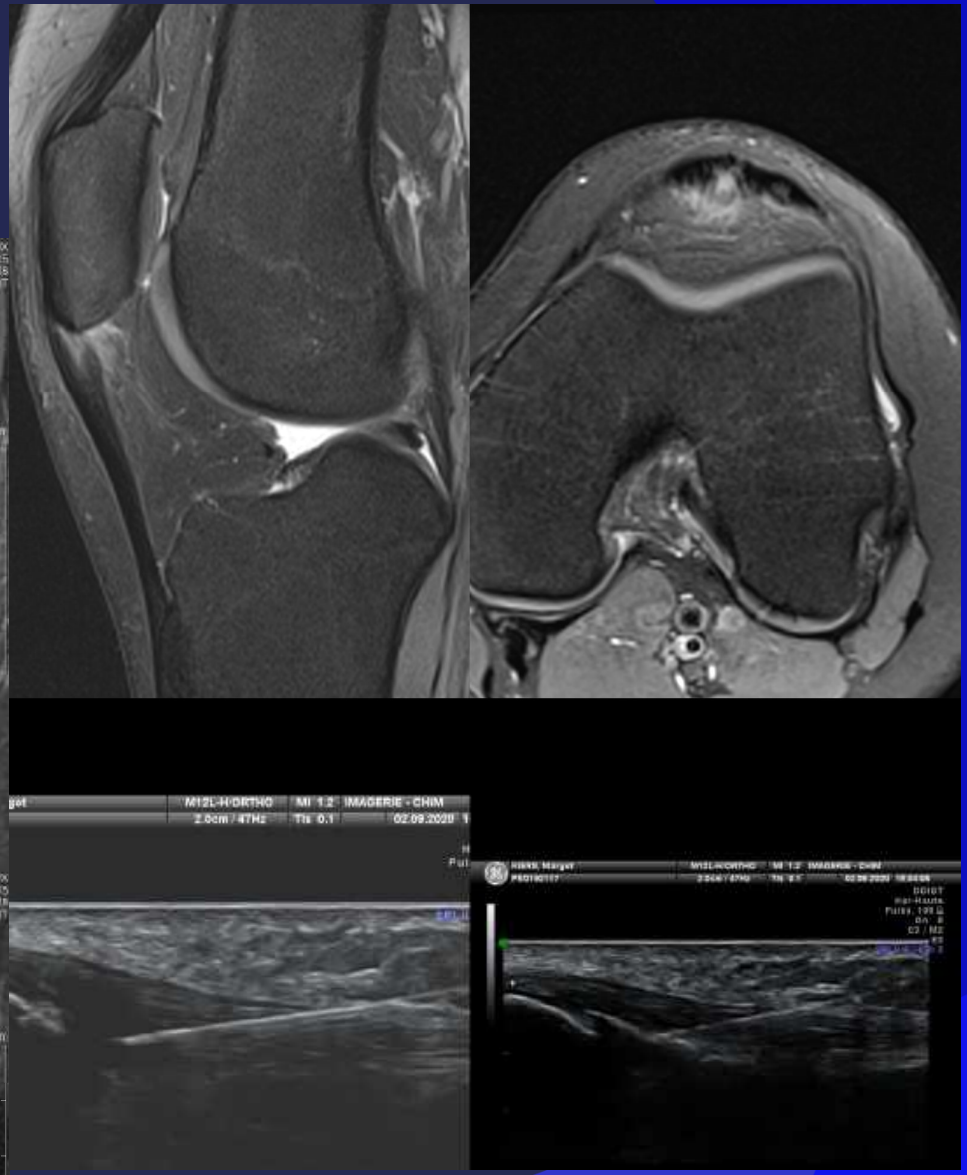


OPERE

- LIGAMENT IRM
- PTG RX
- SCANNER
- IRM



INTERET IRM



PIED



PIED

- ⊙ PIED = CHARGE !
- ⊙ Radio en charge asap
- ⊙ Pied creux enfant : mie neurologique
- ⊙ Affaissement du pied (poids !
Contraintes, âge)
- ⊙ Arrière pied : tibial postérieur et valgus
- ⊙ Médio tarse : sagittal naviculo-cunéenne
et Lis franc

PIED EVOLUTION



ARRIERE PIED

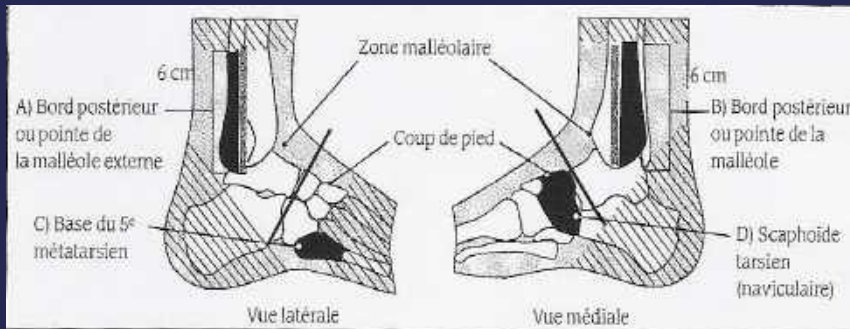
- ⦿ ARTICULATION TALOCRURALE :
- ⦿ Fréquence LCL 3 faisceaux LTFA +++
- ⦿ Décollement capsulo-périsoté AL (nerf fib sup)
- ⦿ Au dessus syndesmose LTFA et Post
- ⦿ Lésion instable d'**appui** déchirure mbne interosseuse

ARRIERE PIED

- ⦿ SOUS-TALIENNE = rare Lgt interosseux puissant
- ⦿ Syn fibrose et synostose : douleurs fréquentes
- ⦿ Chopart : en S talo-naviculaire et calcanéocuboidienne
Eversion/inversion

FAUT-IL FAIRE DES CLICHES ? OTTAWA 2 !!!

6000 entorses par jour en France



Règle d'Ottawa puis de Buffalo

Figure 7 - Critères d'Ottawa et de Buffalo

(Selon Stiell IG et al. Implementation of the Ottawa ankle rules. JAMA 1994 ; 271 : 837-832.)

MARCHE 2 PAS

AGE) 55 ANS OU (15
ANS, clichés comp.

SIGNES PHYSIQUES:

DOULEURS

6 CMS SUS MALLEOLES

LATERALE OU MEDIALE

QUELS CLICHES ?

- FACE
- PROFIL
- ROTATION INTERNE
- +/- PIED
- VALGUS FORCE ET TIROIR ANTERIEUR
En 2e intention pour évaluer l'instabilité



PROFIL

- LIGNE GRAISSEUSE TALO-CRURALE et épcht
- ART TALO-NAVICULAIRE et ligt dorsal équin forcé
- ART SOUS-TALIENNE ET COALITION
- OS TRIGONE



ROTATION INTERNE

- ⊙ 5^E METATARSIEN
- ⊙ TROCHLEE DU TALUS
- ⊙ ARRACHEMENTS OSSEUX



Dynamiques et autovarus

+++



CE QUI EST TRAUMATIQUE

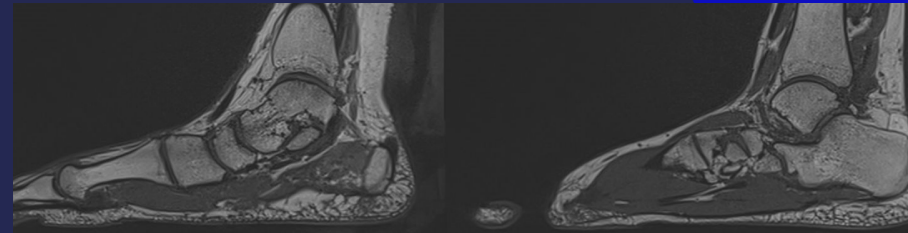
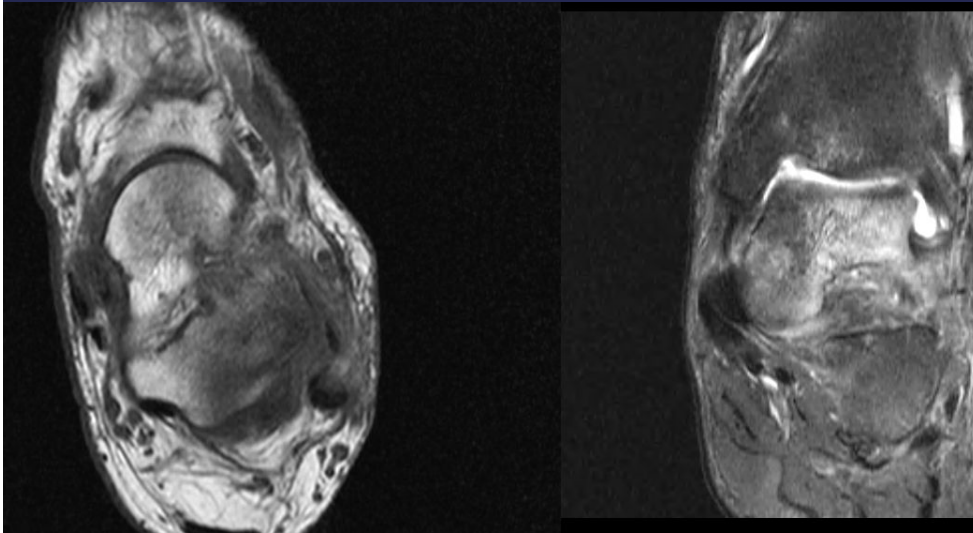
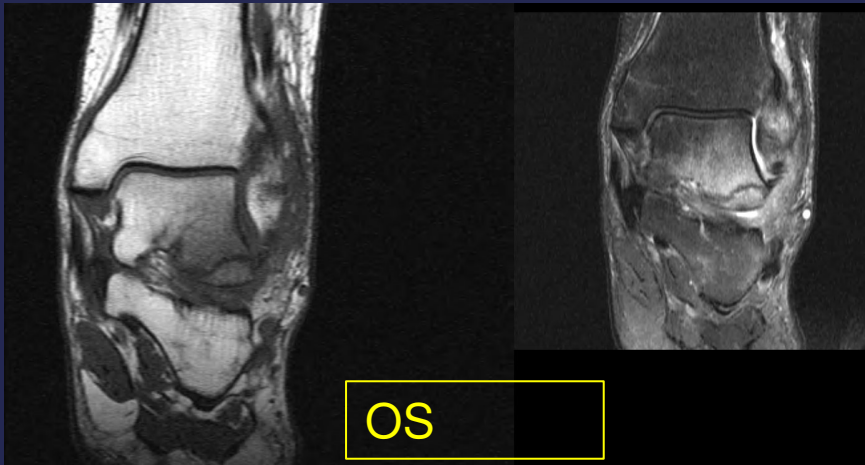


RADIOS

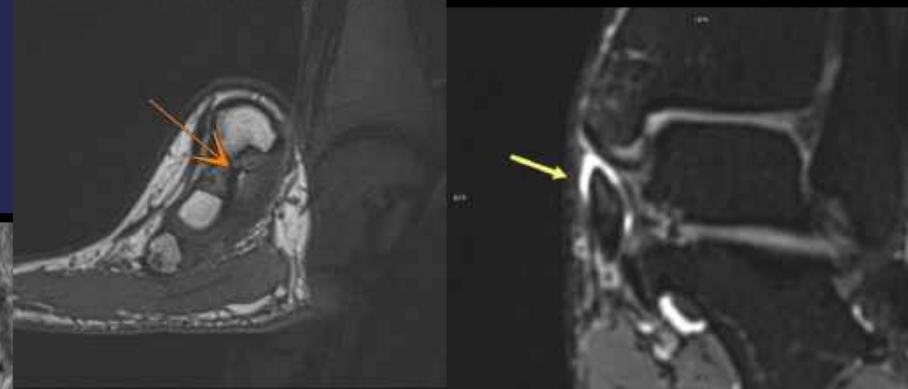
Atteinte trabéculaire: condensation linéaire



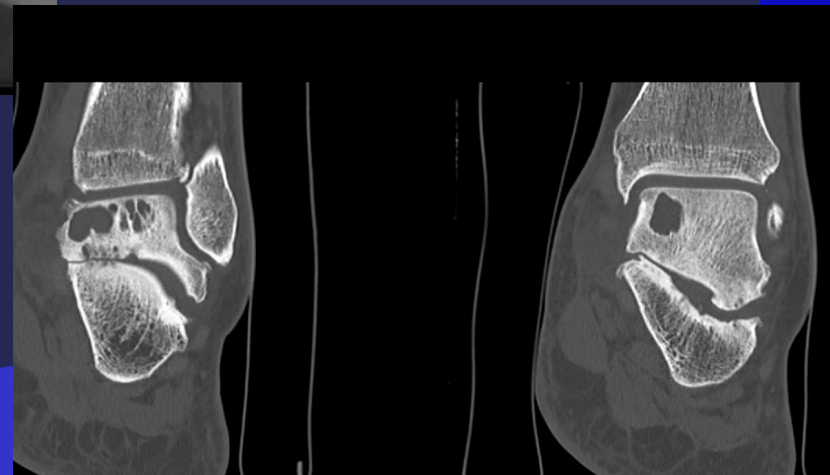
IRM >>> SCINTI si LOCALISATION



TENDON

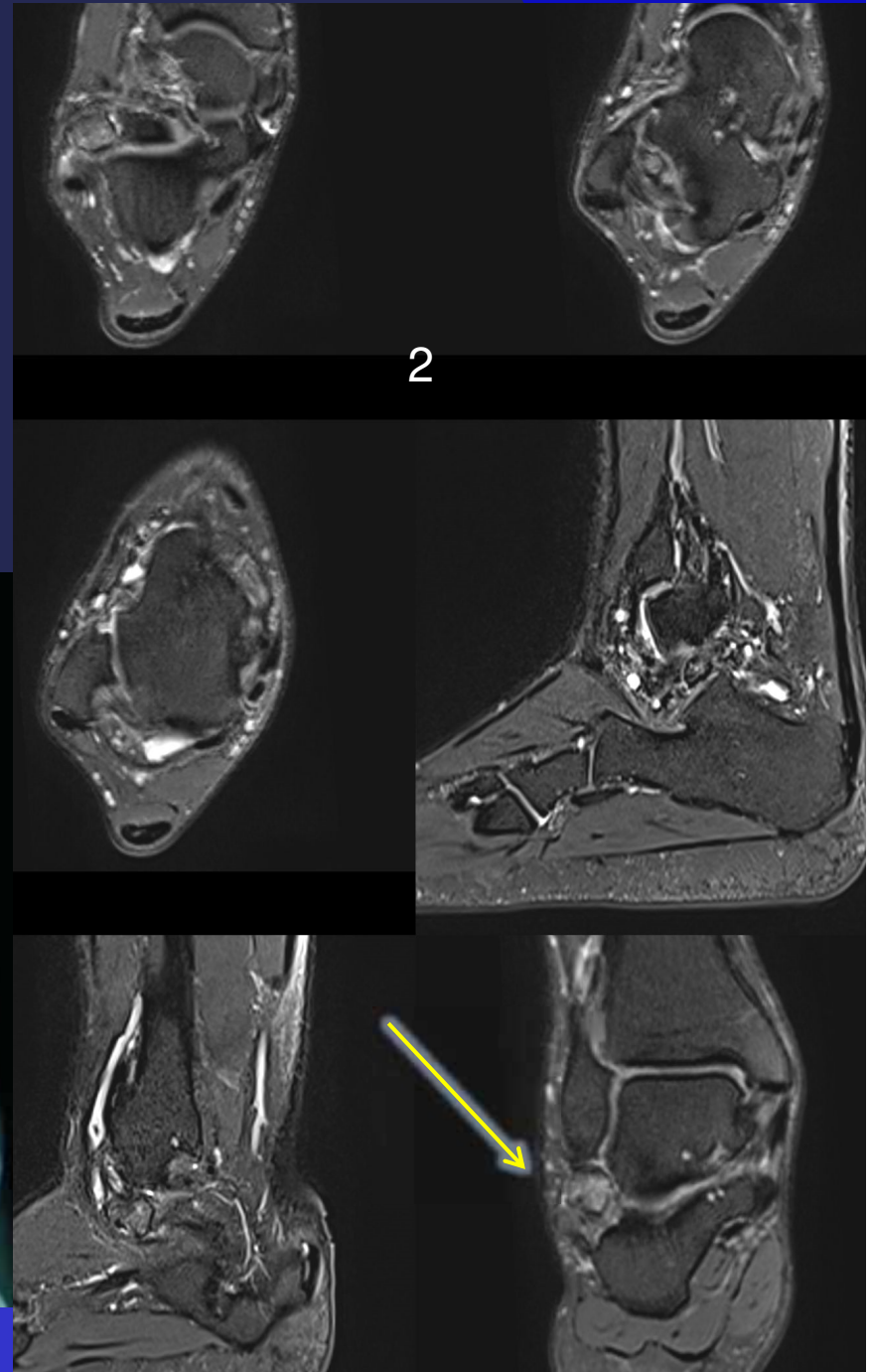


SOUS TALIENNE/ RX < TDM < IRM



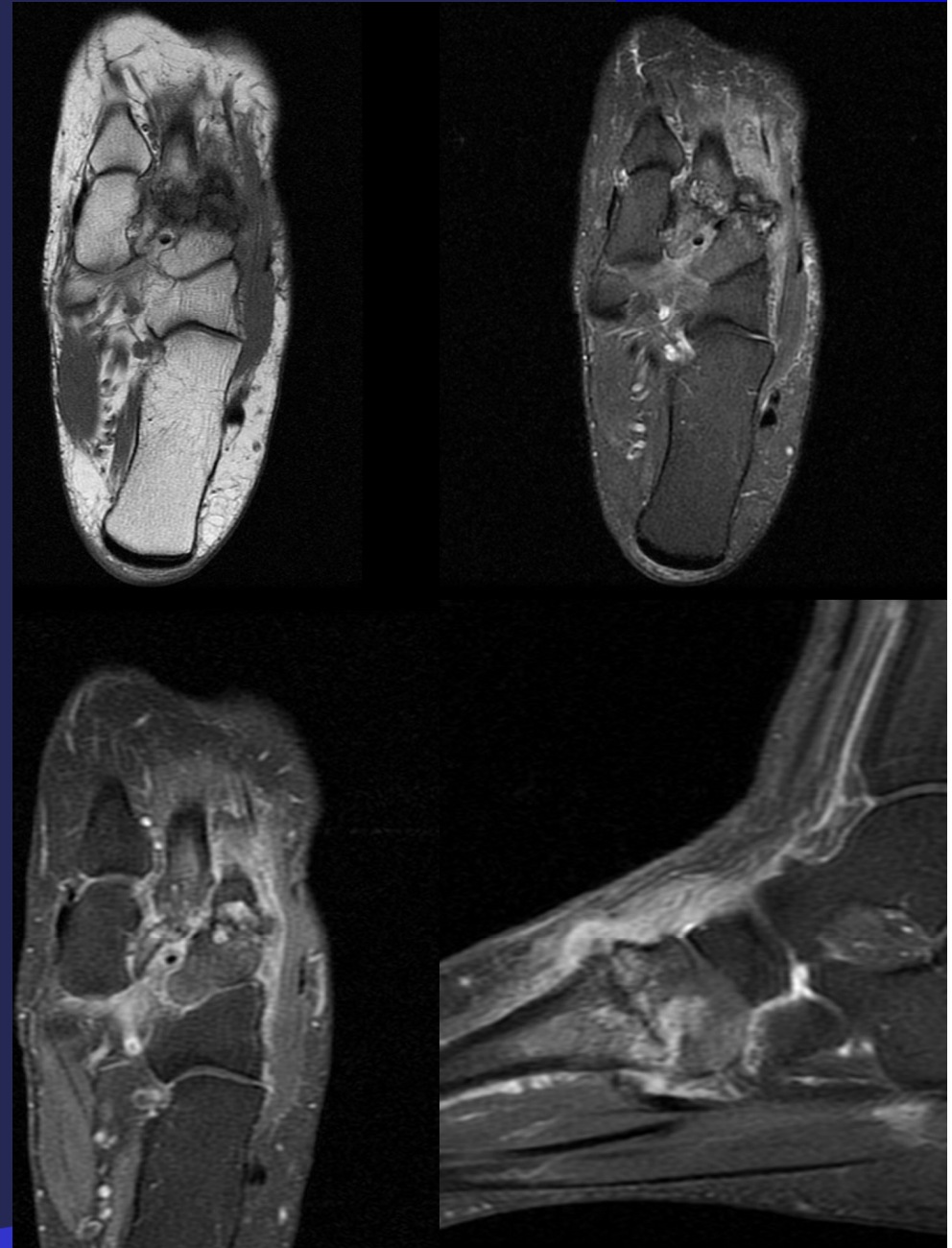
CE QUI NE L' EST PAS

- POUR DEDOUANER L' ENTORSE ET L' AT
- POUR EXPLIQUER LES IMAGES :CHEVILLE FOOT



MEDIOTARSE

◉ TRIOMPHE DE L'IRM



AVANT PIED

- Fréquence
- Hallux valgus et complications statiques
Névrome/ bursite et plaque plantaire
- Fissure de stress
- Rhum inflammatoire:
PR goutte ...

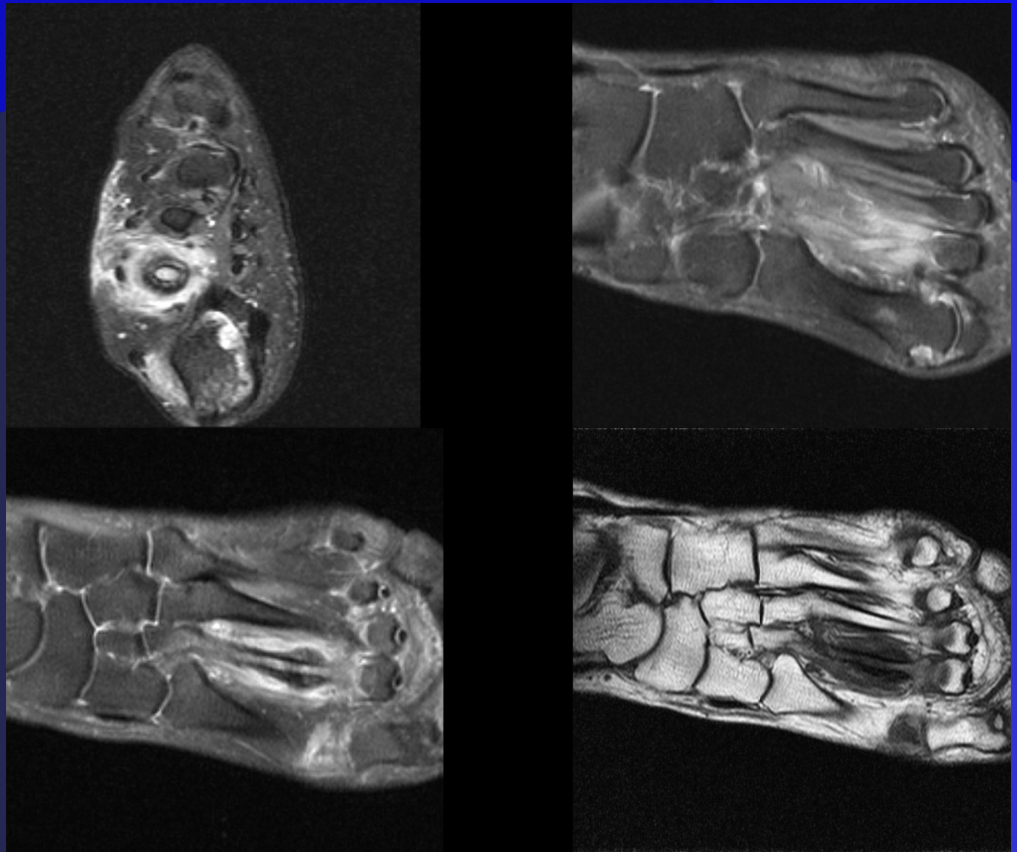
AVANT-PIED



Stress fractures

- Apposition lamellaire régulière parallèle au grand axe

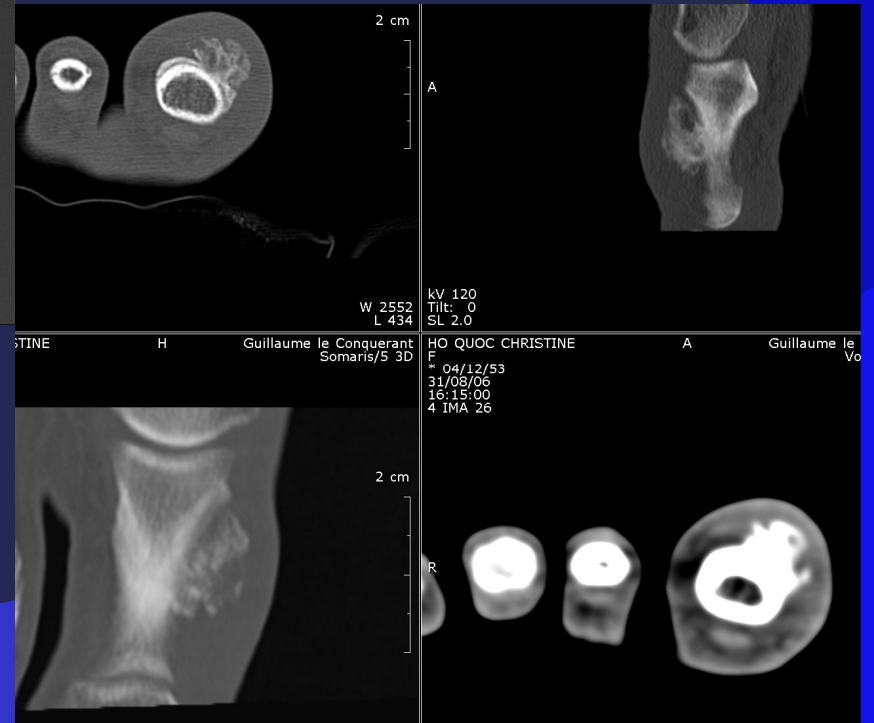
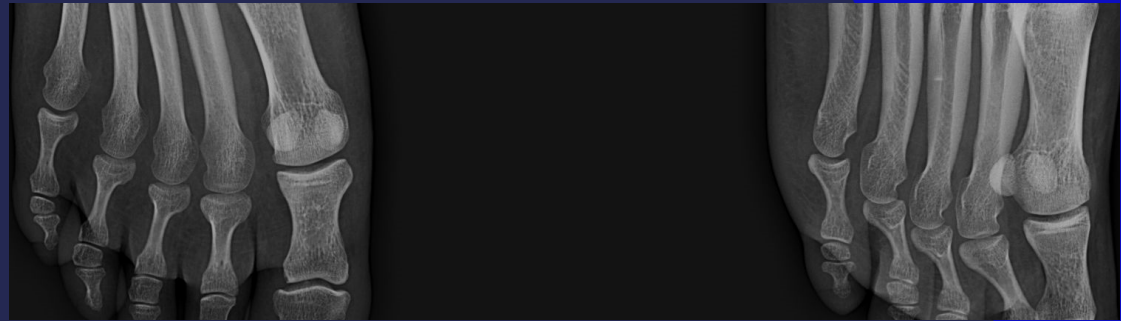




AVANT-PIED



Avant-pied



Avant pied évolution (op g)



Sésamoides : W-M et guntz



RHUMATISME INFLAMMATOIRE



Résultats

Articulations Les Plus Atteintes Au Niveau Des Pieds

Les articulations les plus atteintes au niveau des pieds sont par ordre décroissant (figure 5):

- La 1^e métatarsophalagienne avec un score de Sharp modifié par Van der Heijde moyen de 0,24
- La 5^e métatarsophalangienne avec un score moyen de 0,20
- La 1^e interphalangienne avec un score moyen de 0,17
- Enfin les 2^e, 3^e et 4^e MTP qui ont un score proche de 0,10



Figure 5: Score moyen par articulation.

PR



DROIT

GAUCHE

Ca ++

