

# COURS + TP 4

## Rachis lombaire



## 1. Intro

- Rappel anat
- Troubles de la Statique
- Disque et lombalgie

## 2. Causes de compression nerveuse

- Hernie discale : variétés : horizontale, foraminale, exclue
- Sténoses canalaire centrales, foraminales  
Spondylolisthésis: isthmique ou dégénératif
- Complications de la chirurgie canalaire  
Fibrose épidurale, Arachnoïdite

## 3. Lombo - sciatalgies secondaires

- Ostéoporose
- Infections : spondylodiscite
- Tumeurs : métastases

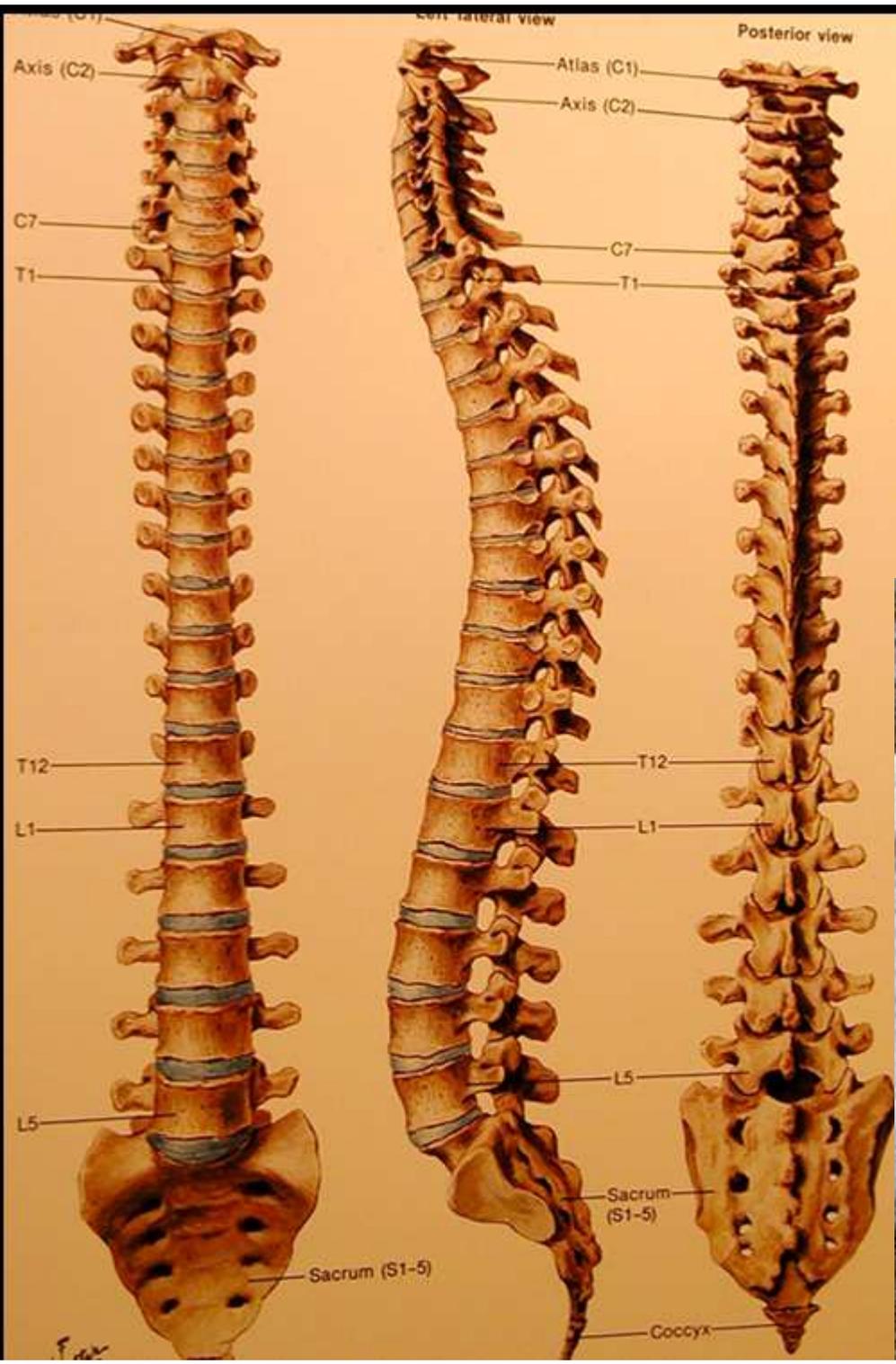
Diagnostic différentiel Tumeur >< Paget

Tassements vertébraux traumatiques : mineurs >< éclatement (Burst), instable

# Rachis :

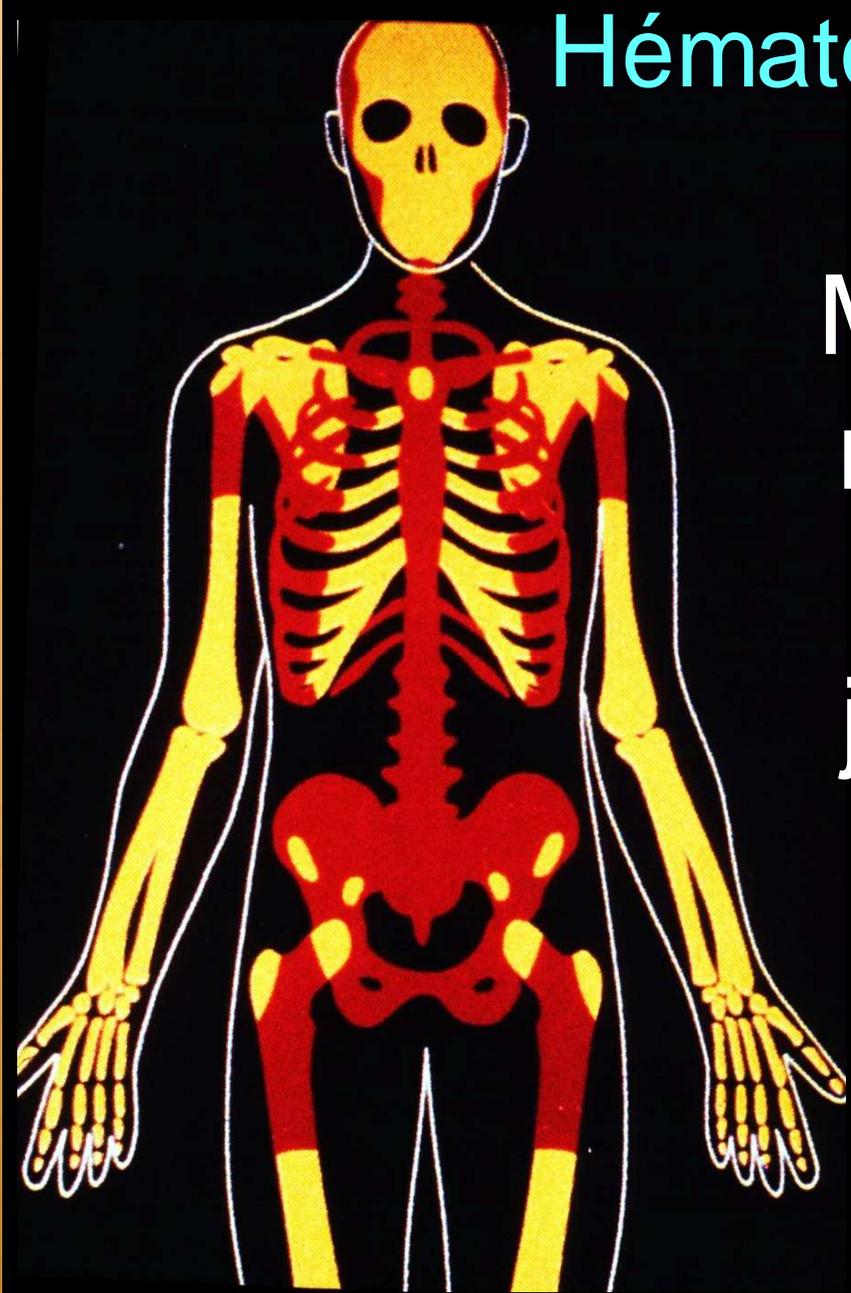
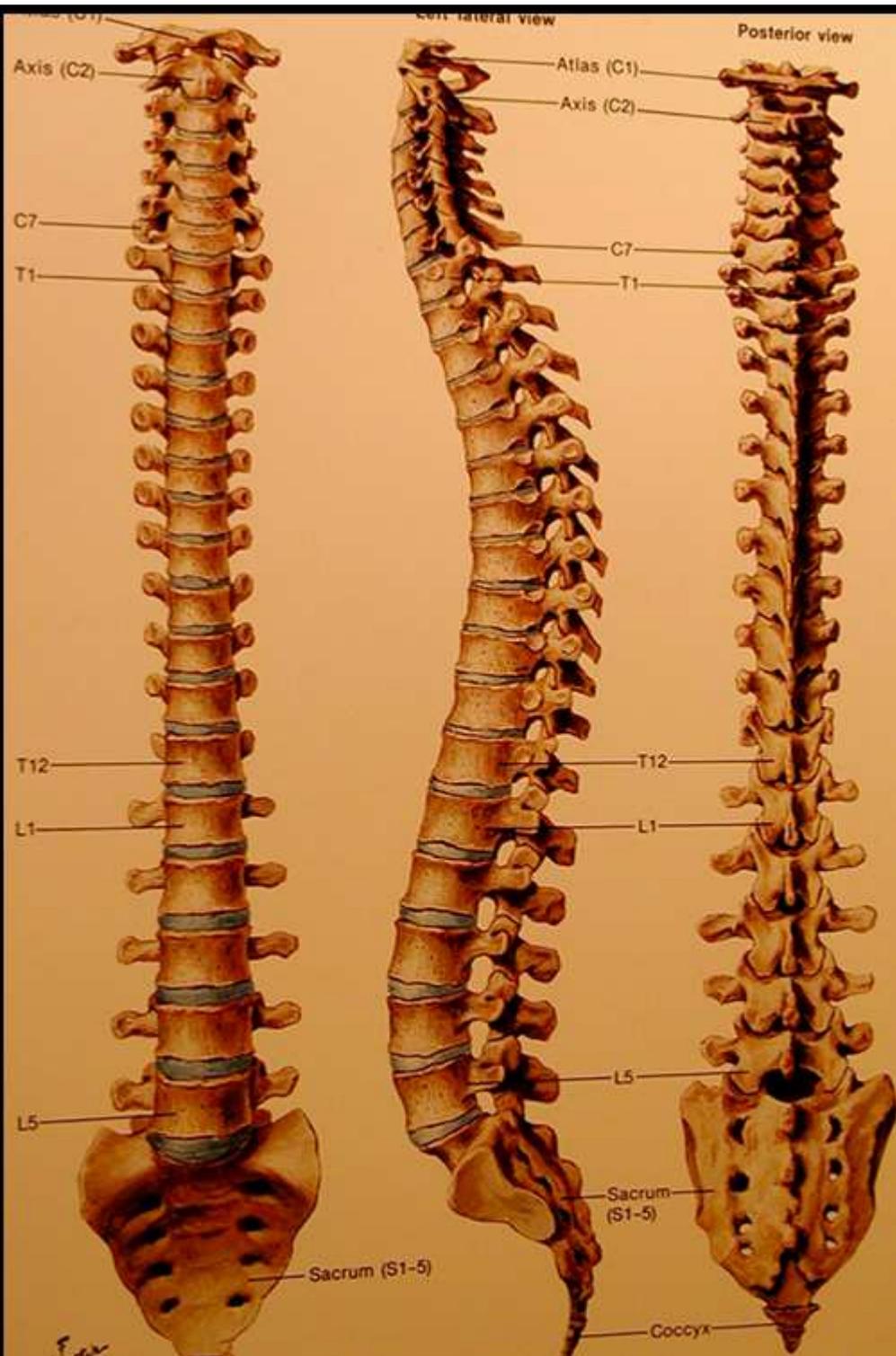
## 3 rôles essentiels

1. Statique
2. Hématopoïèse
3. Neuroprotection



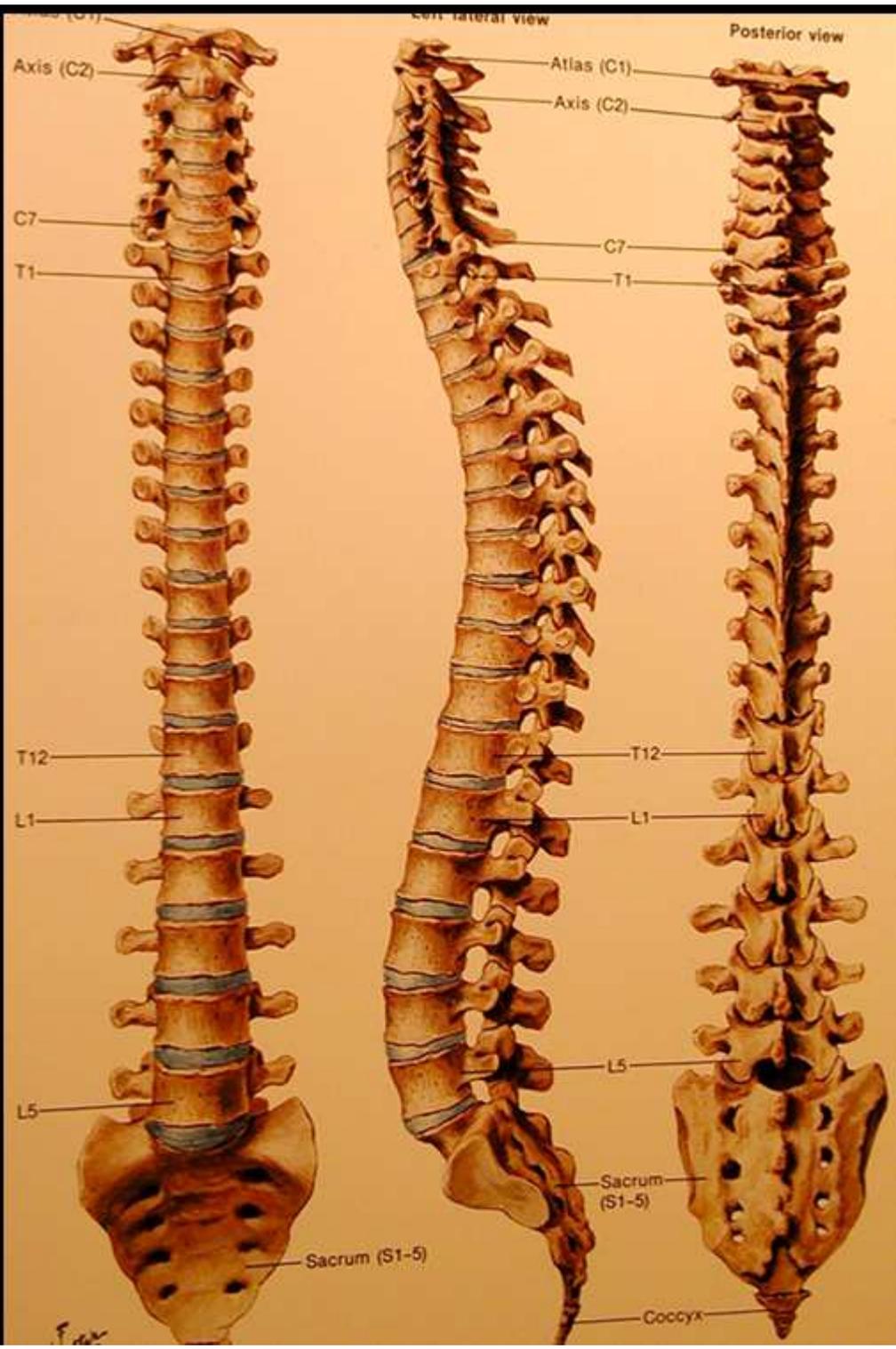
# Rôle statique





Hématopoïèse

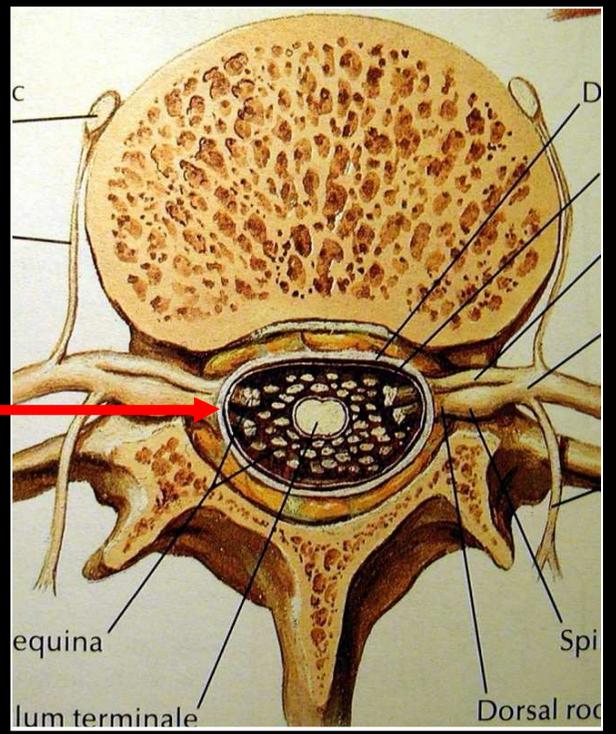
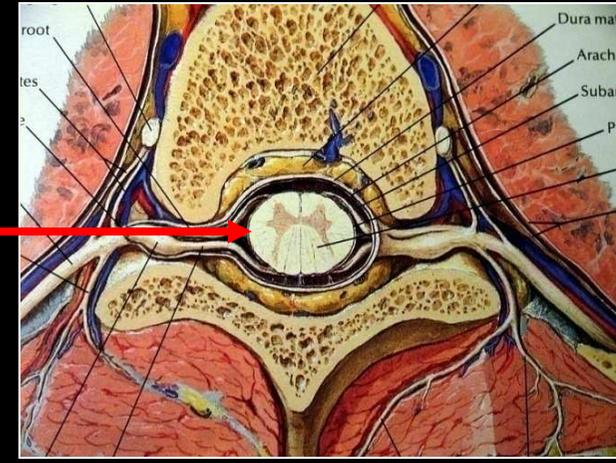
Moelle  
rouge  
et  
jaune



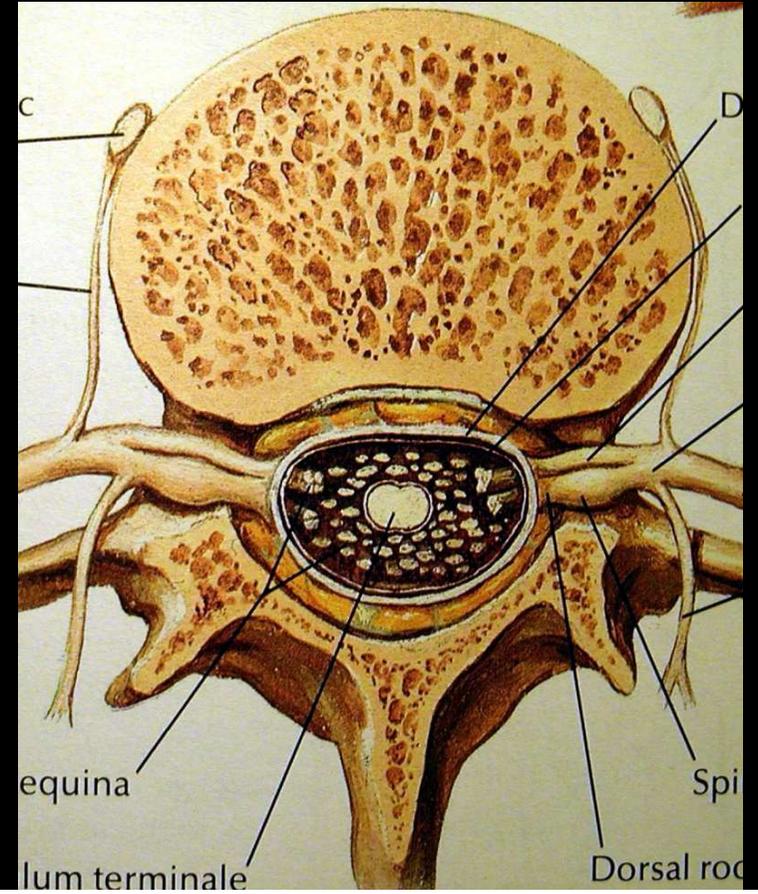
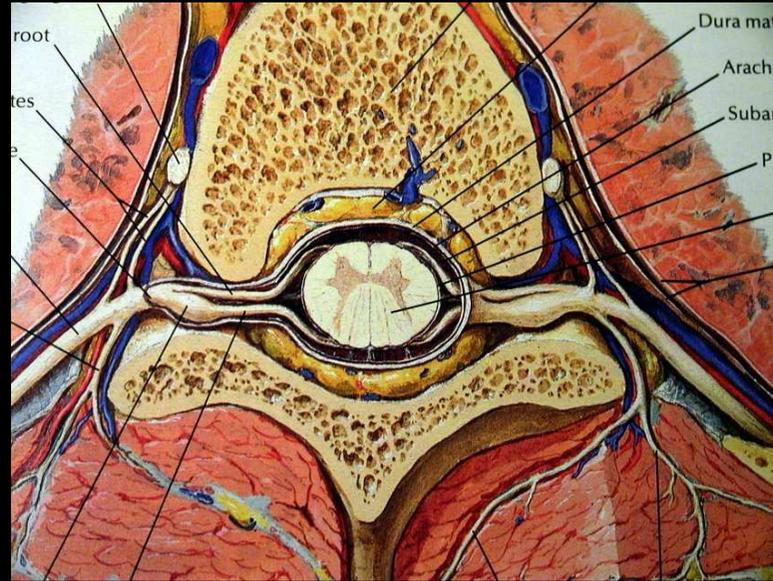
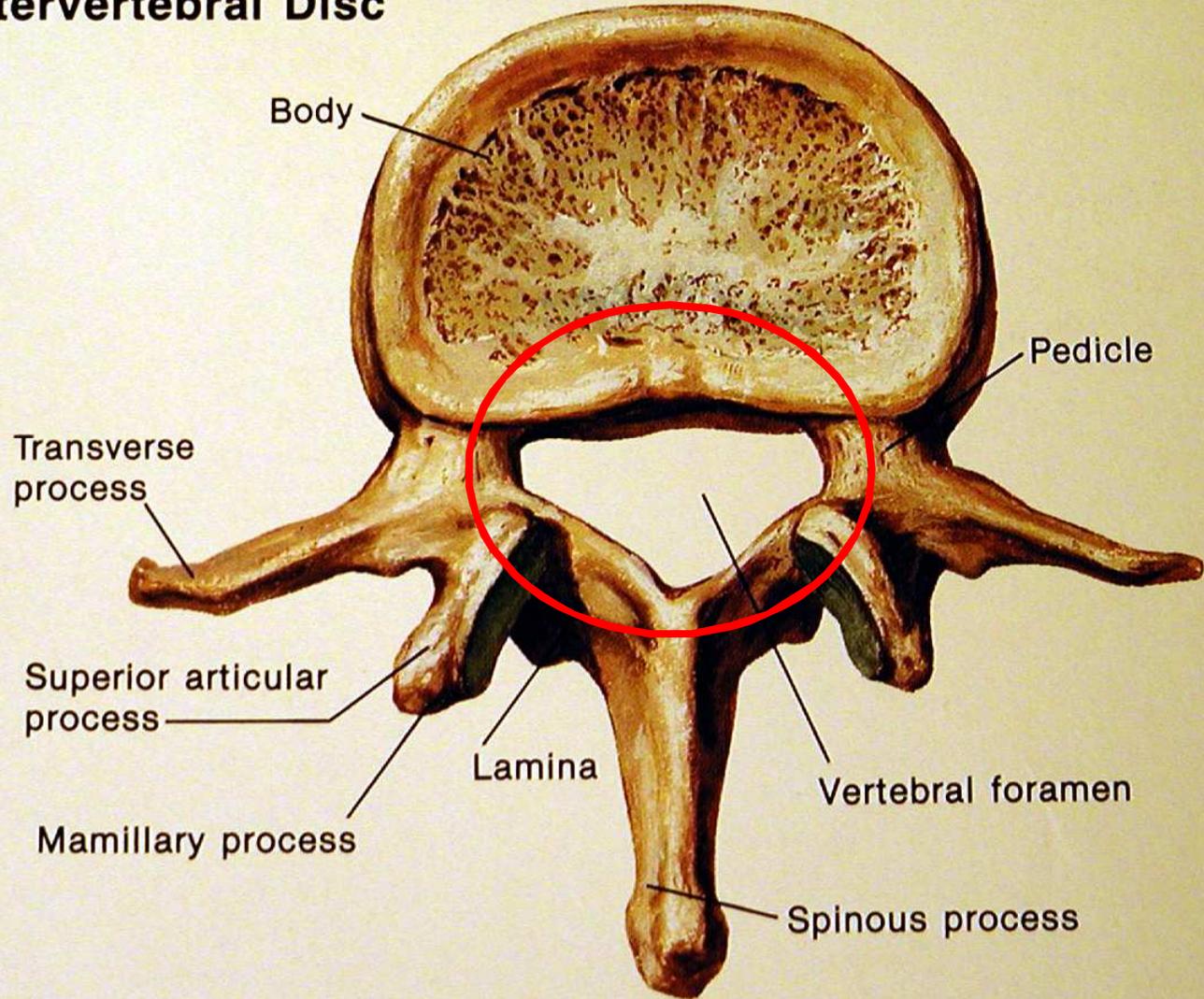
Cordon  
médullaire

Neuro  
Protection

Racines  
nerveuses



# Intervertebral Disc



Canal rachidien !

# Rachis : pathos

1. Statique
2. Hématopoïèse
3. Neuroprotection

Trauma  
Dégé  
Tum  
Infect  
Inflamm

Rachis = vulnérable !!!

3 modalités d'imagerie:

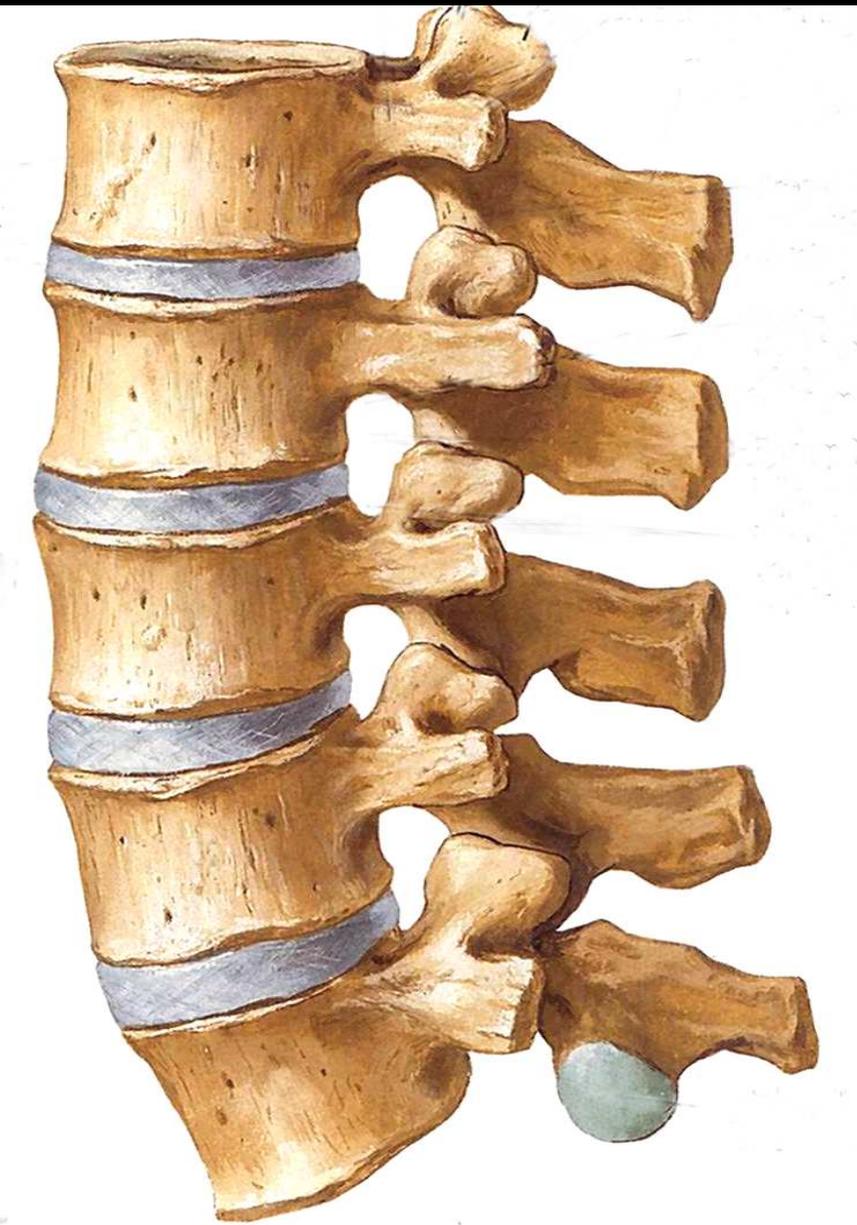
1. Radiographie

2. Scanner

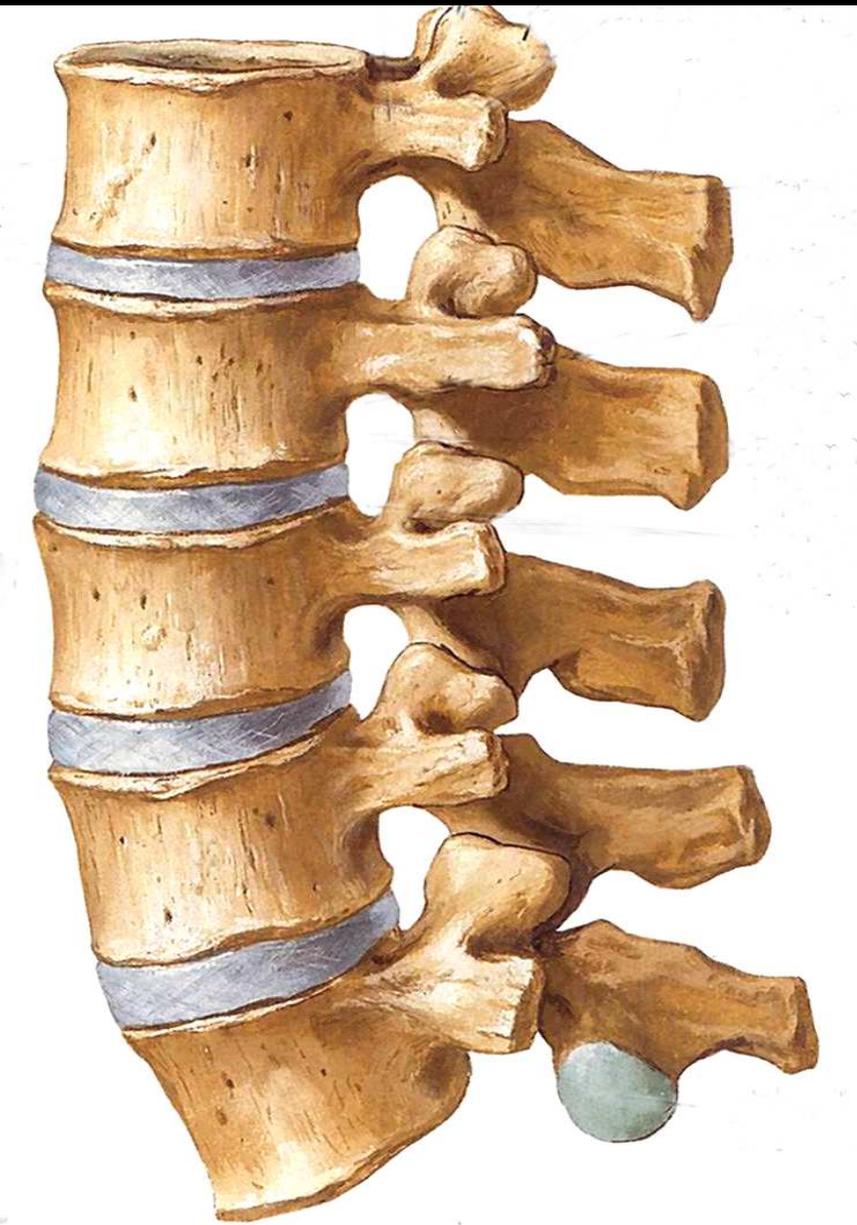
3. IRM

+ Méd. Nucl.

# Radiographie



# Tomodensitométrie (scanner)



# SCANNER RX

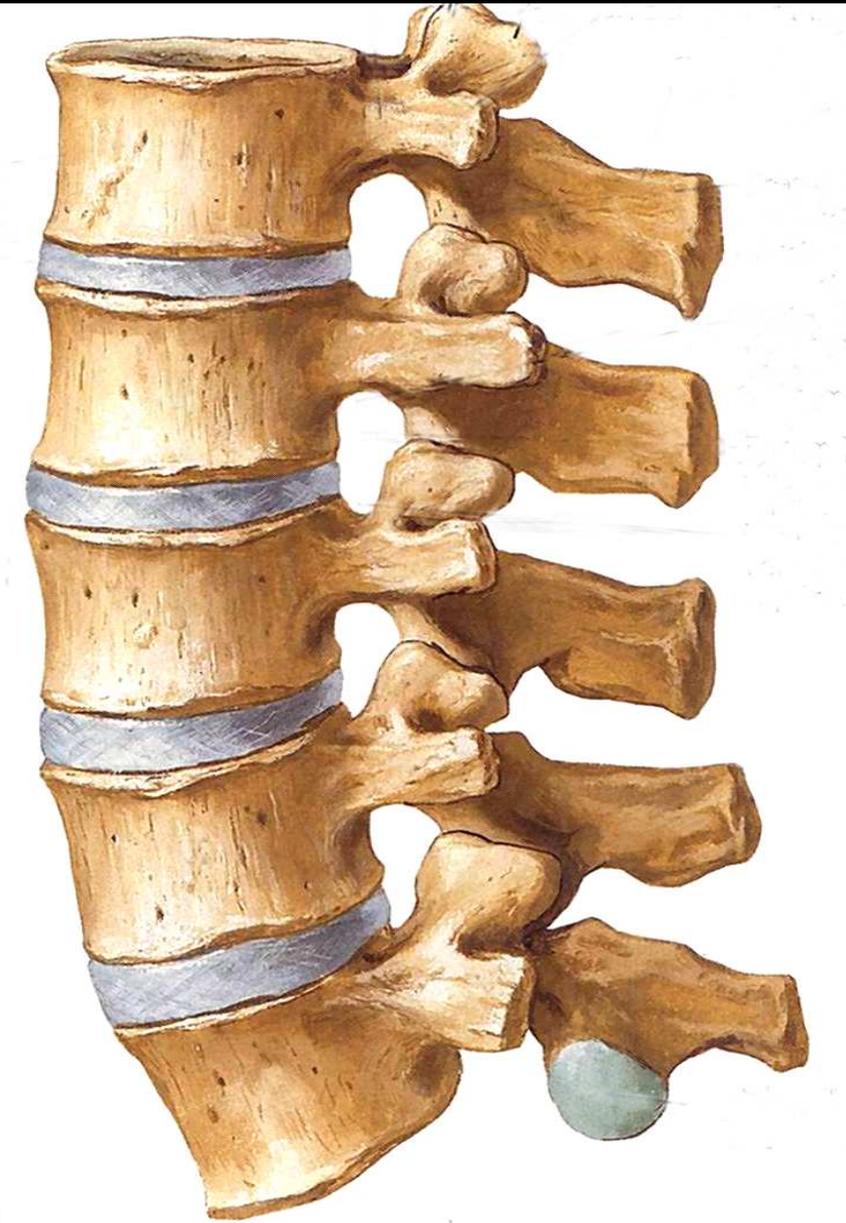
Synonymes : TDM et CT

TDM = Tomodensitométrie

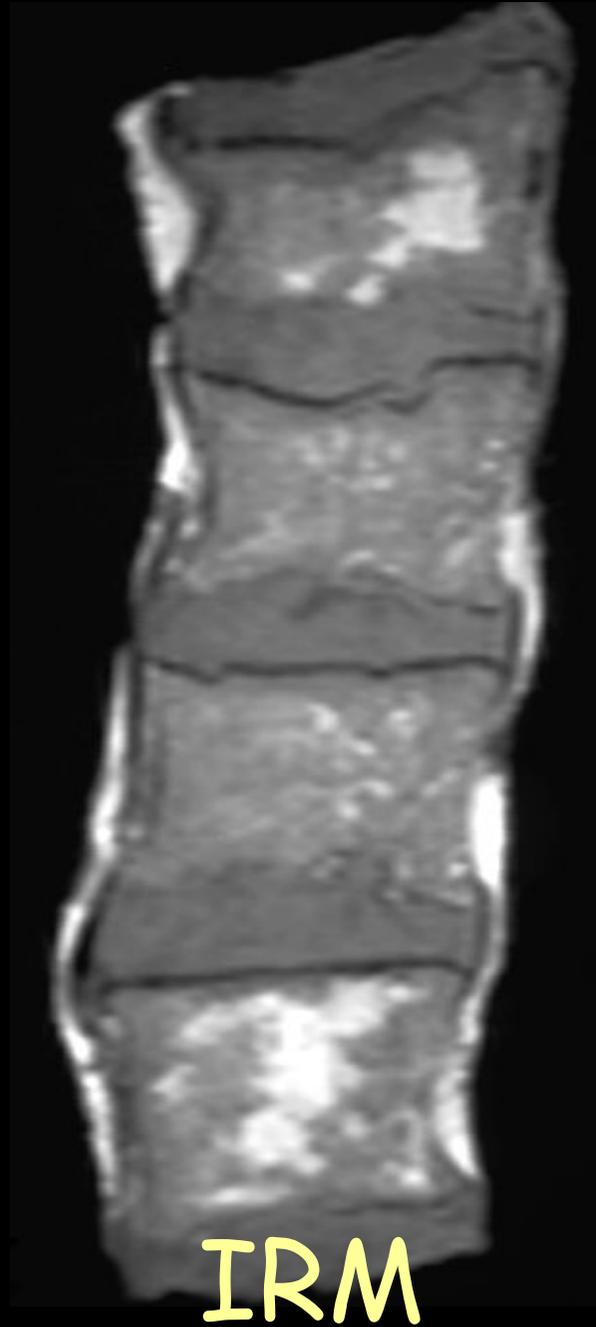
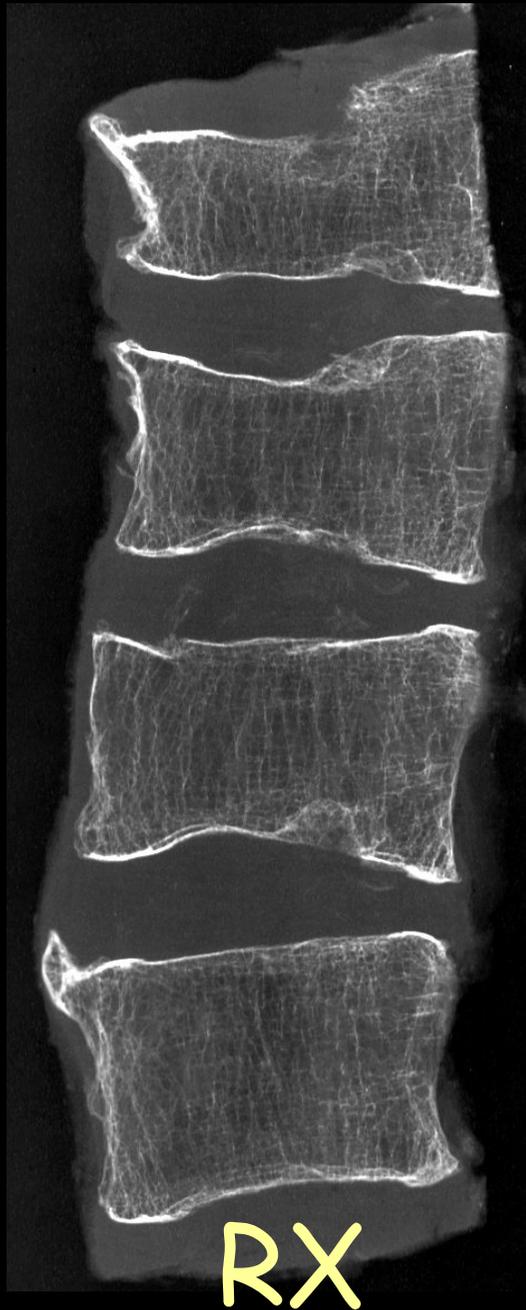
CT = Computed Tomography

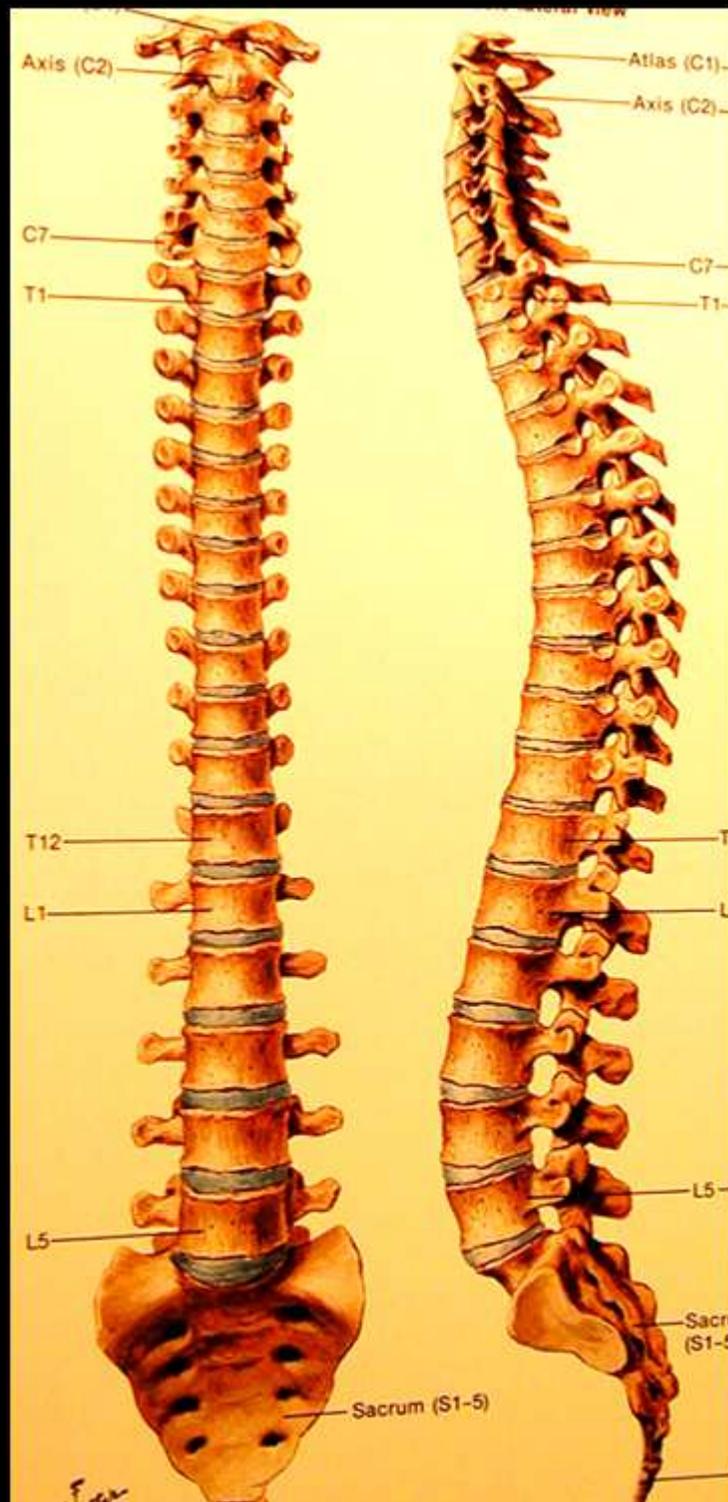
NB : « Bone scan » = scintigraphie  
Osseuse (et non scanner)

# Im. par Résonance Magnétique



# Im. par Résonance Magnétique



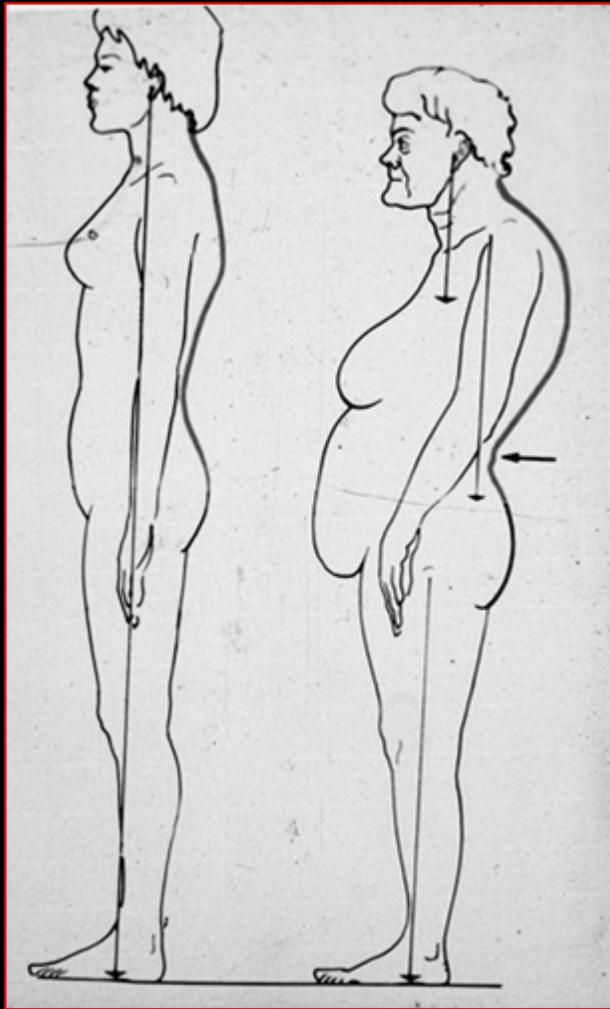


Lordose cervicale

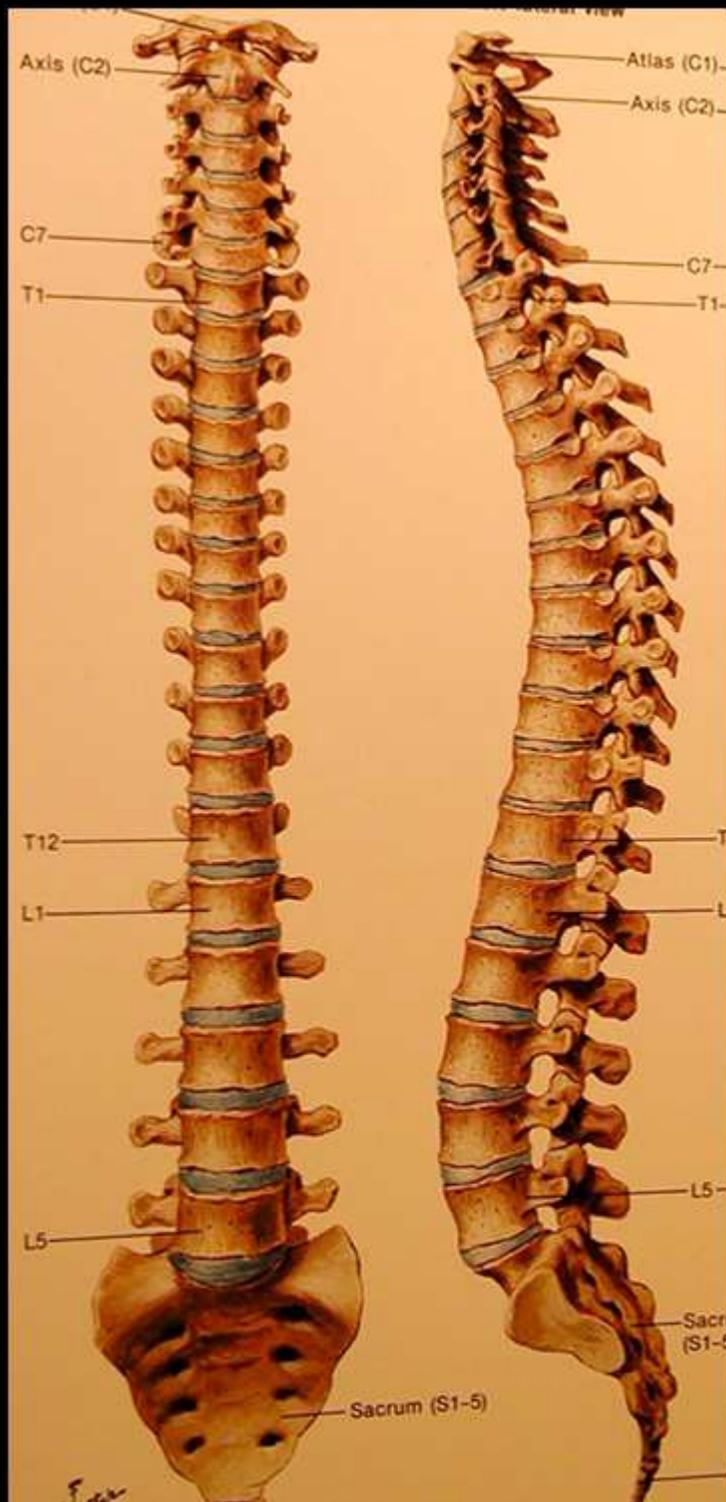
Cyphose dorsale

Lordose lombaire

Courbures  
physiologiques



**Hypercyphose**  
**Hyperlordose**

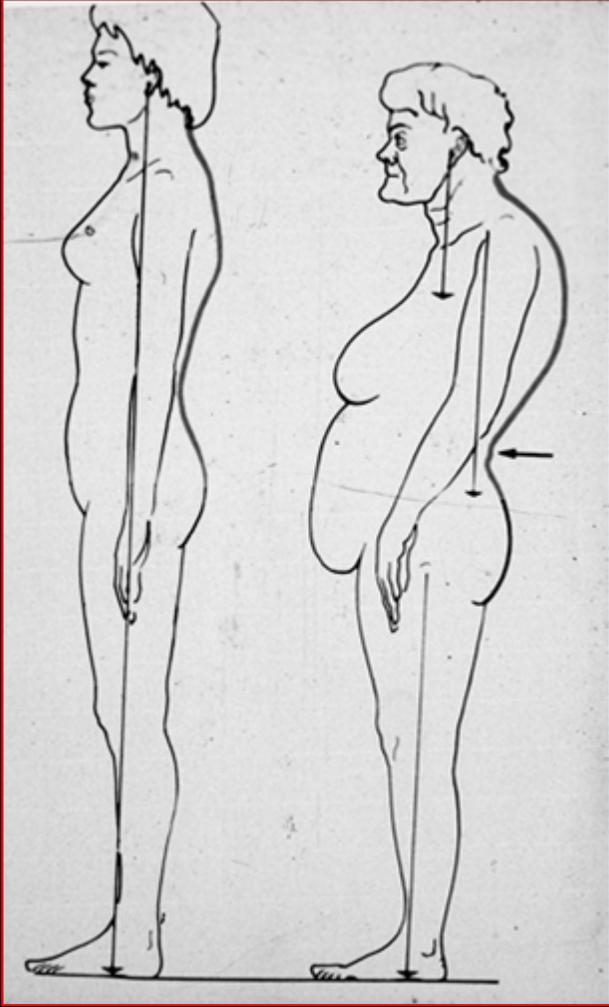


**Lordose cervicale**

**Cyphose dorsale**

**Lordose lombaire**

**Courbures  
excessives**



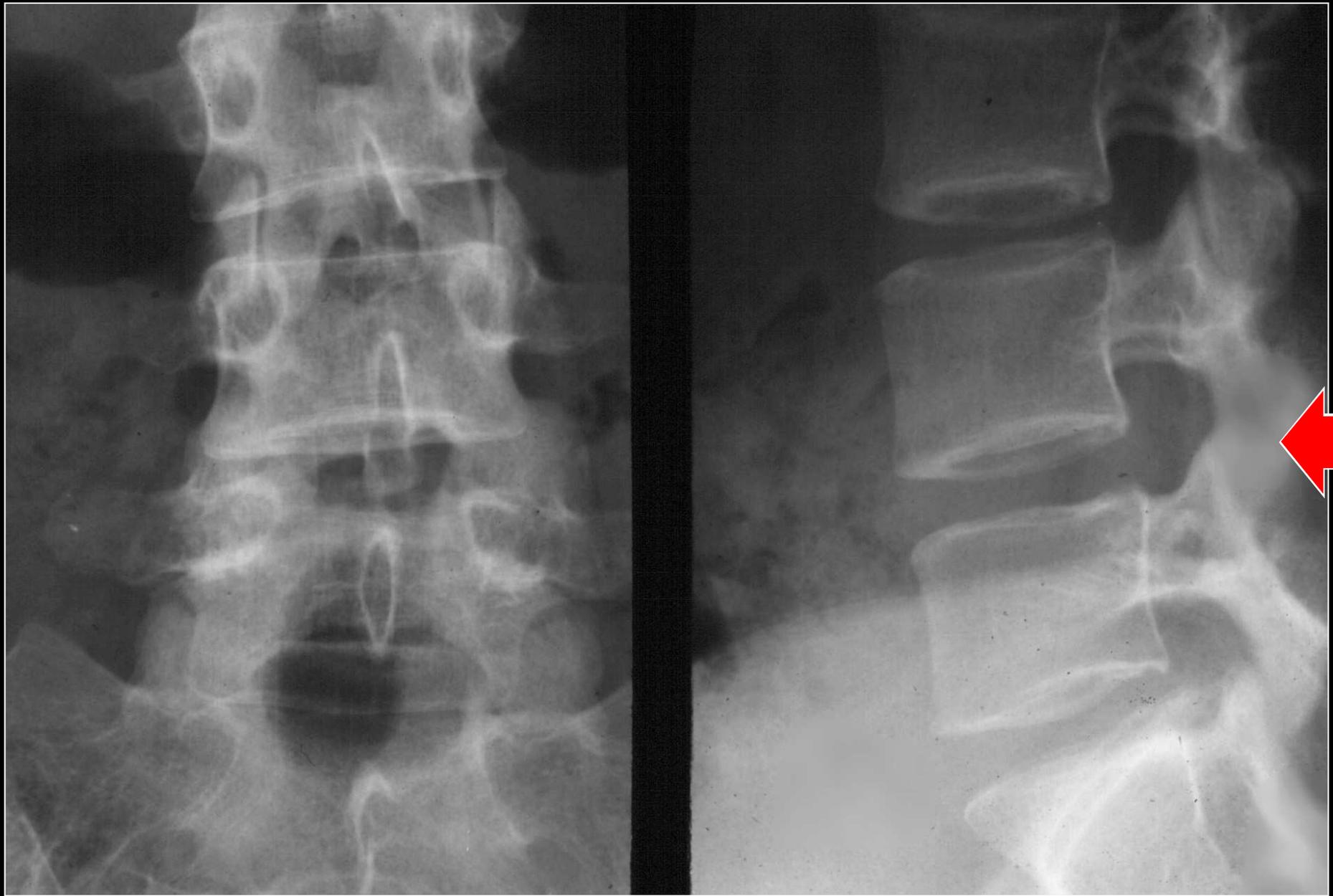
Hypercyphose  
Hyperlordose



Normal



Hyperlordose



Délordose antalgique



Normal



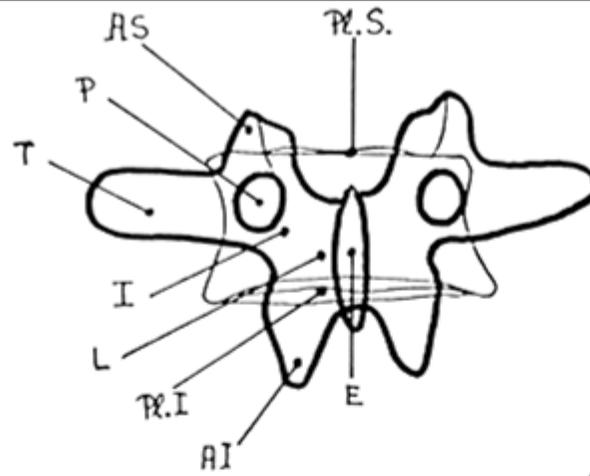
Scoliose

Rachis Lombaire  
+  
charnière lombosacrée

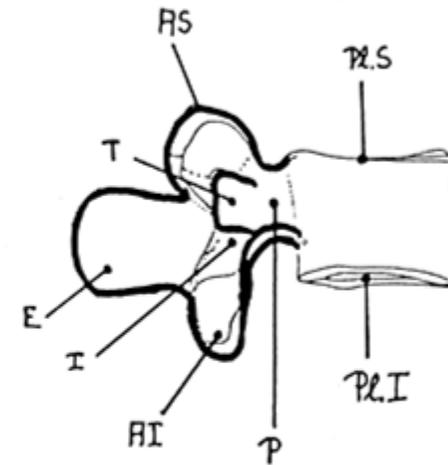
Radios : 3 projections  
(incidences) de base

1. Profil
2. Face
3. Obliques

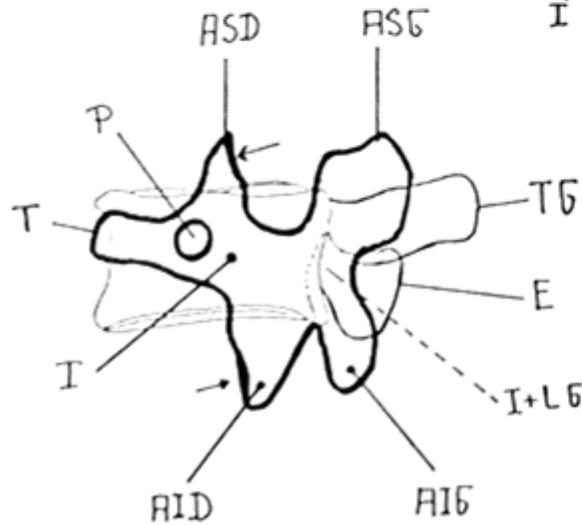
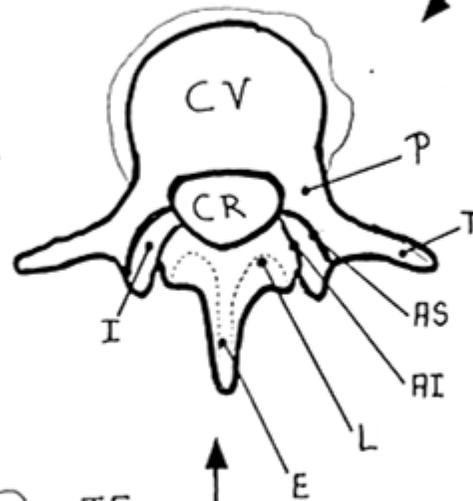
Côté Droit



OBLIQUE (ORF = OPD)



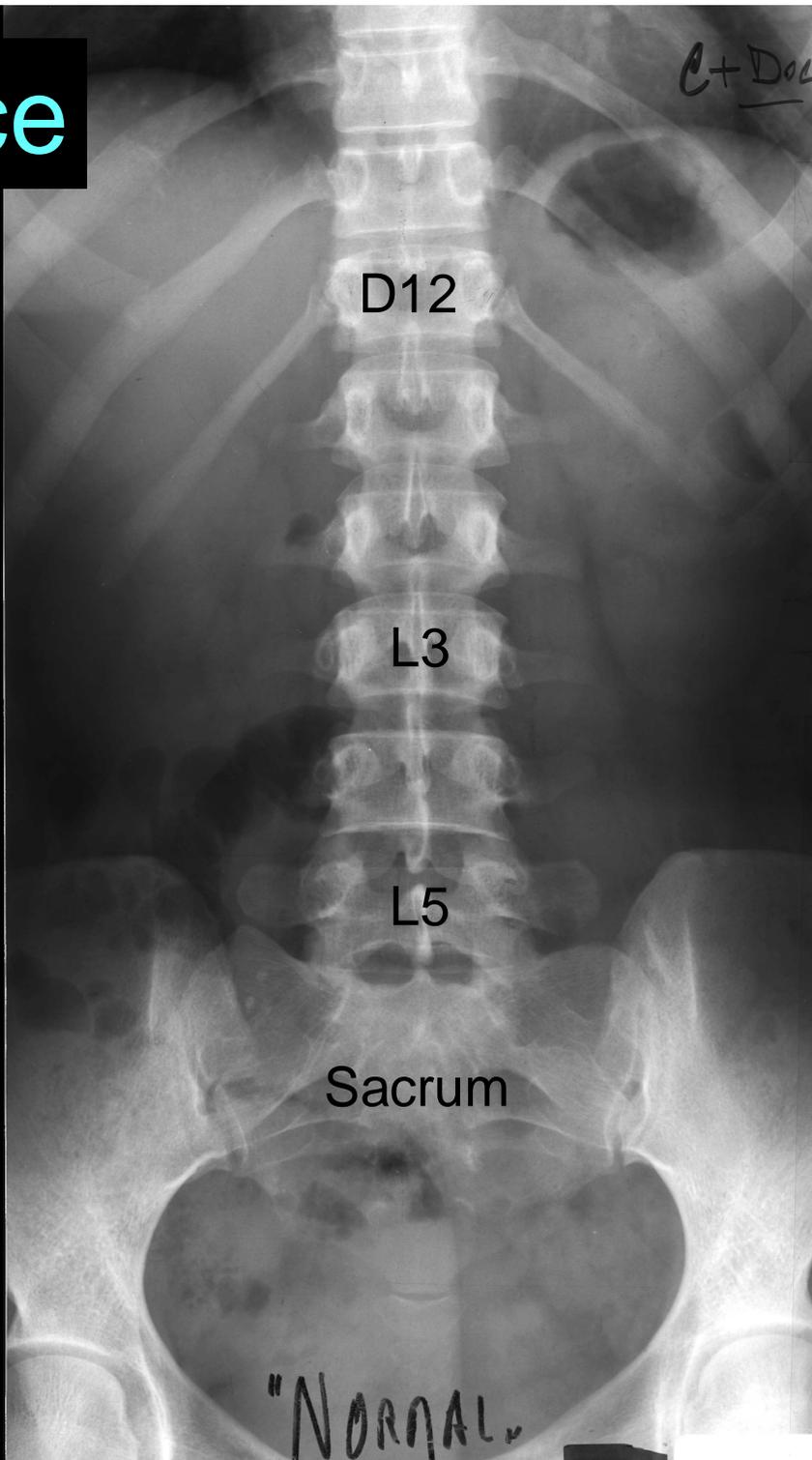
PROFIL



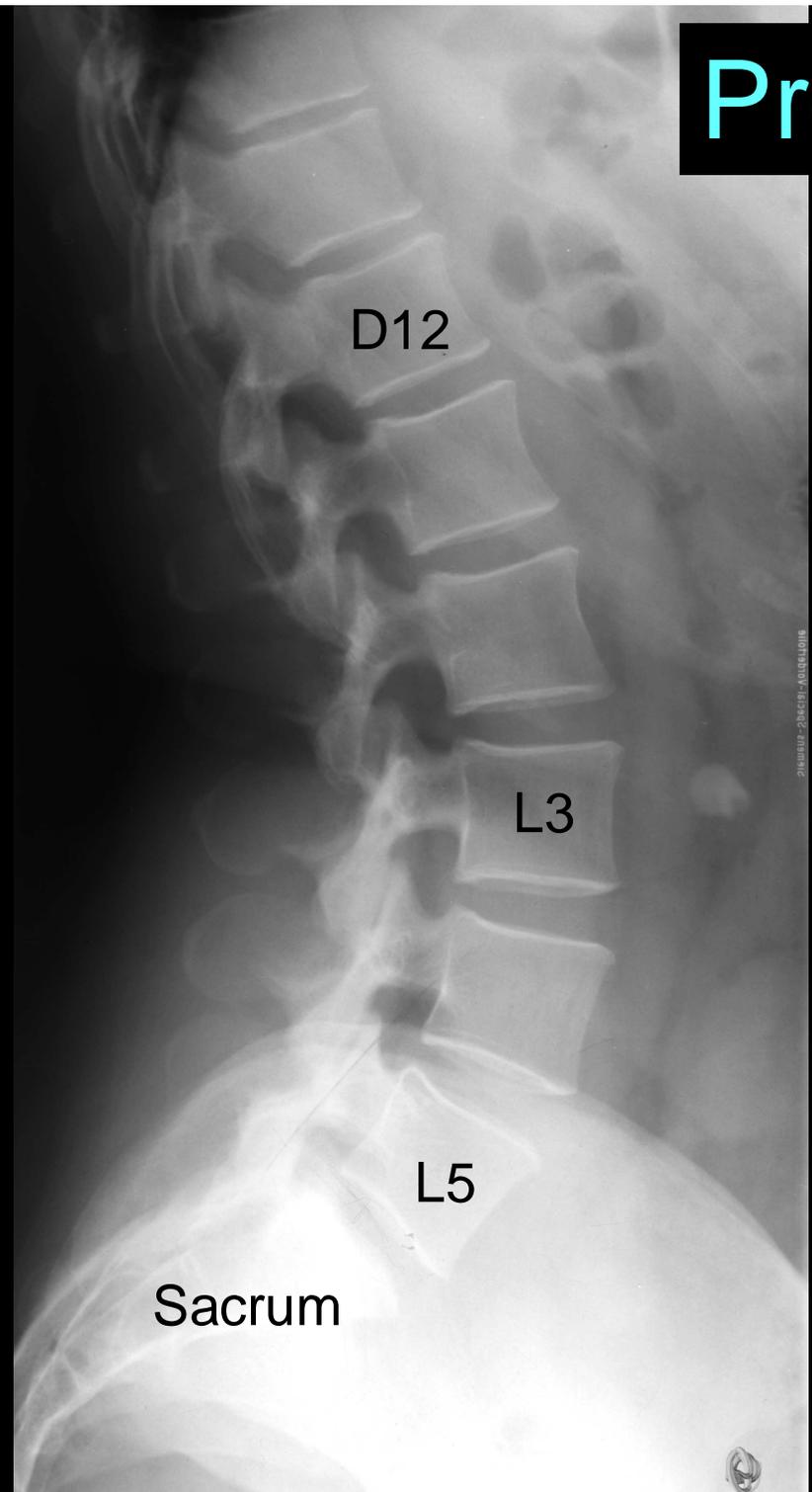
FACE

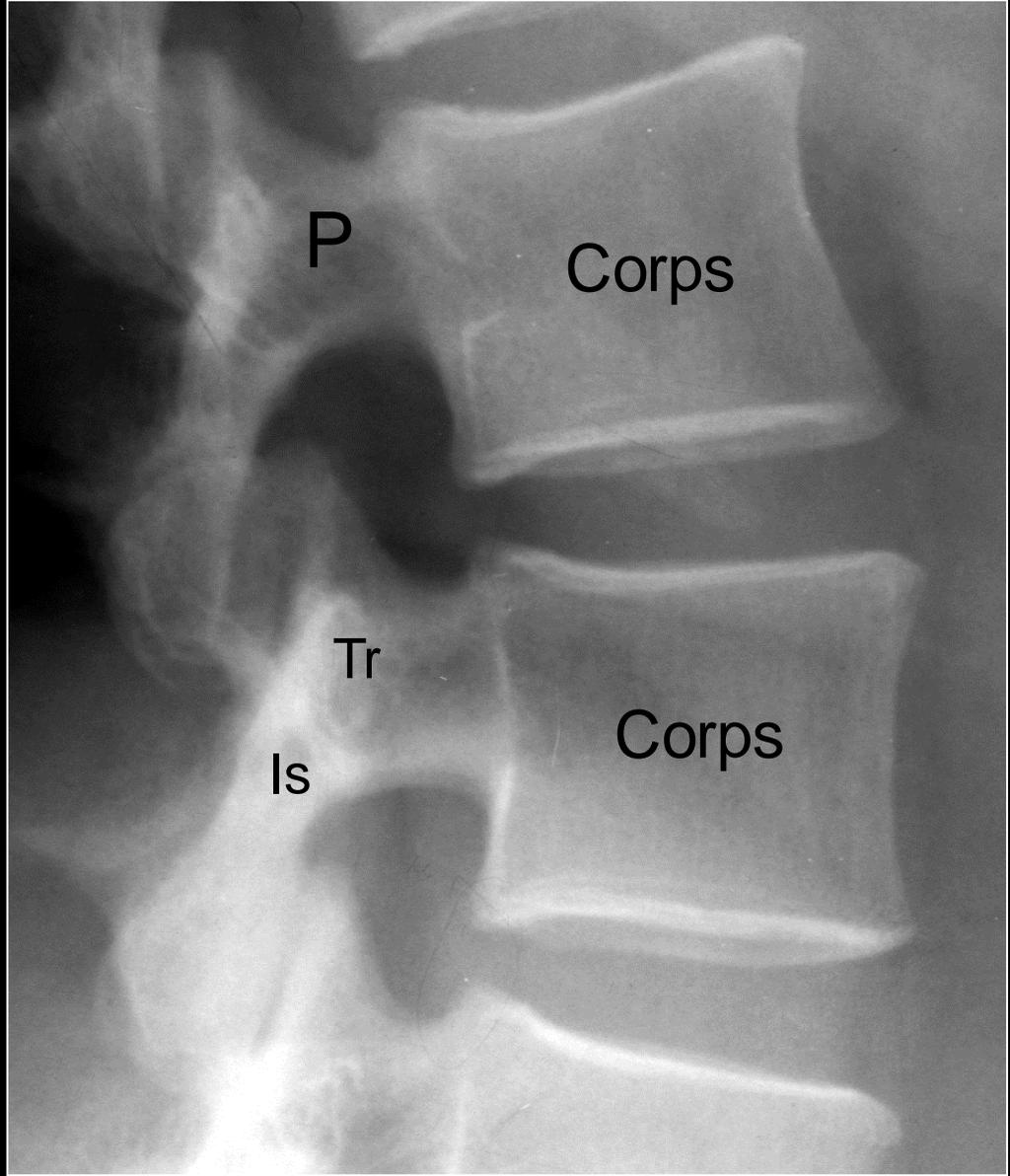
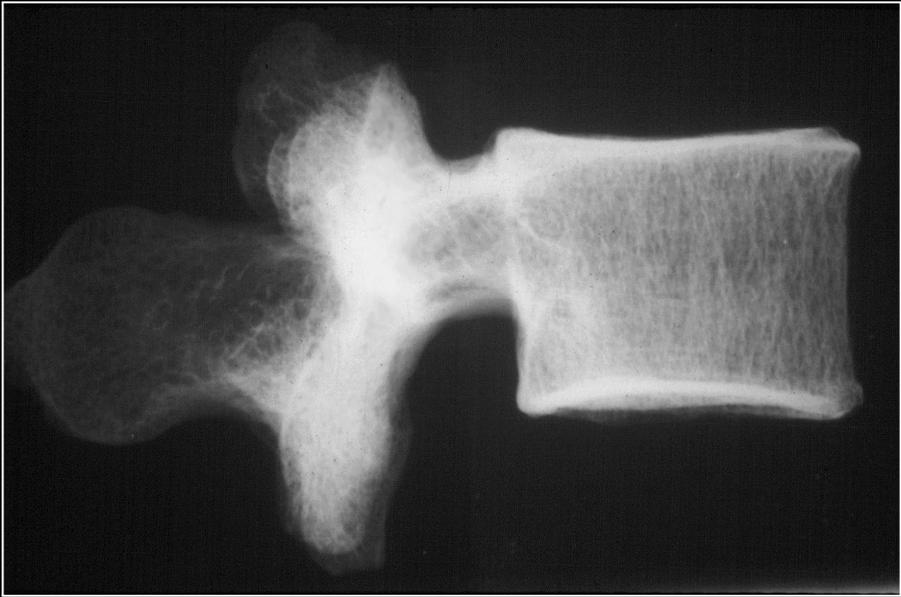
- A : Processus ou apophyse articulaire,
- S : Supérieur
- I : Inférieur
- CR : Canal rachidien
- CV : Corps vertébral
- E : Processus épineux
- F : Facettes articulaires
- I : Isthme interapophysaire, compris les facettes articulaires
- L : Lamina vertébrale, formant la paroi du canal rachidien. La jonction de

# Face

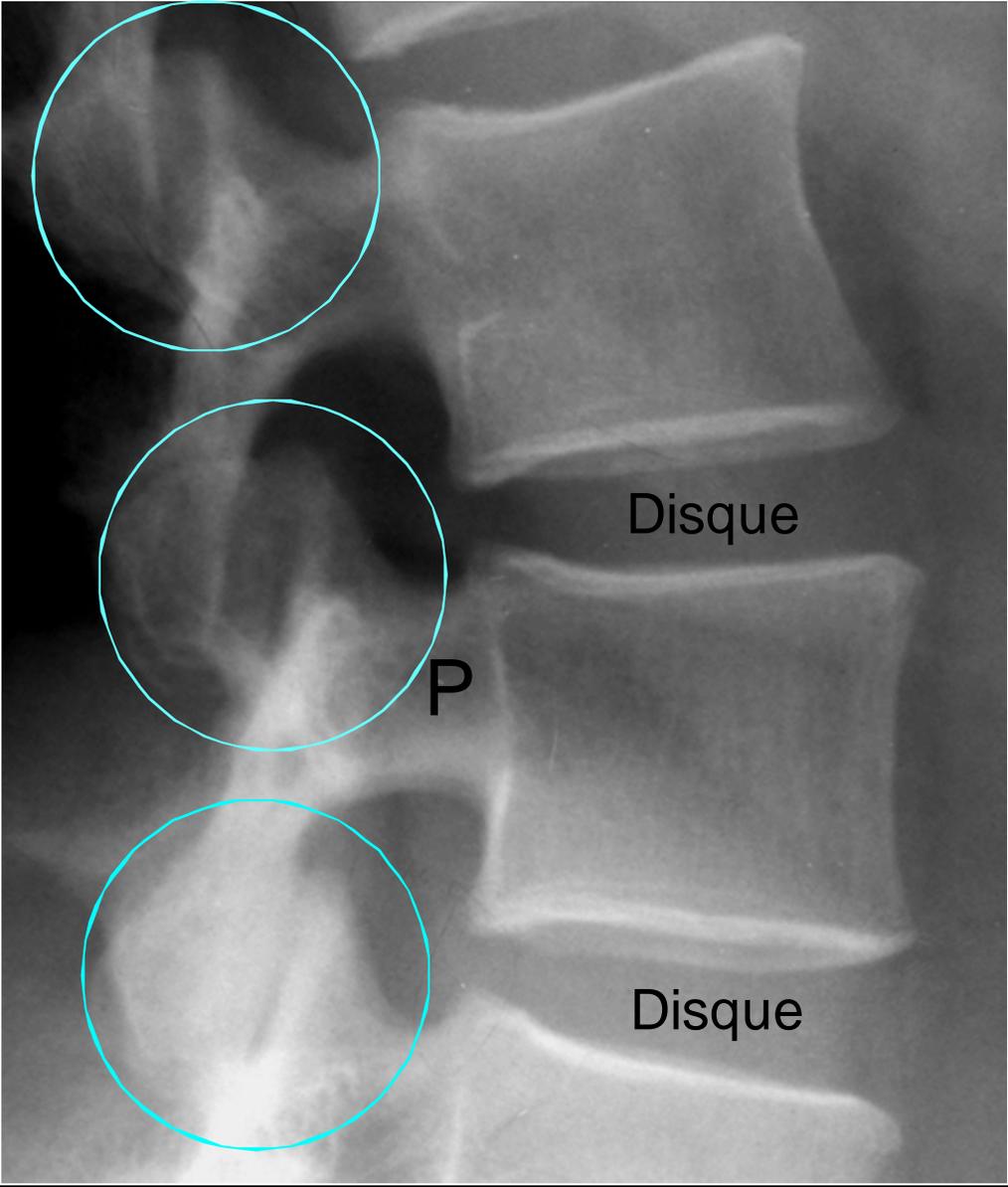
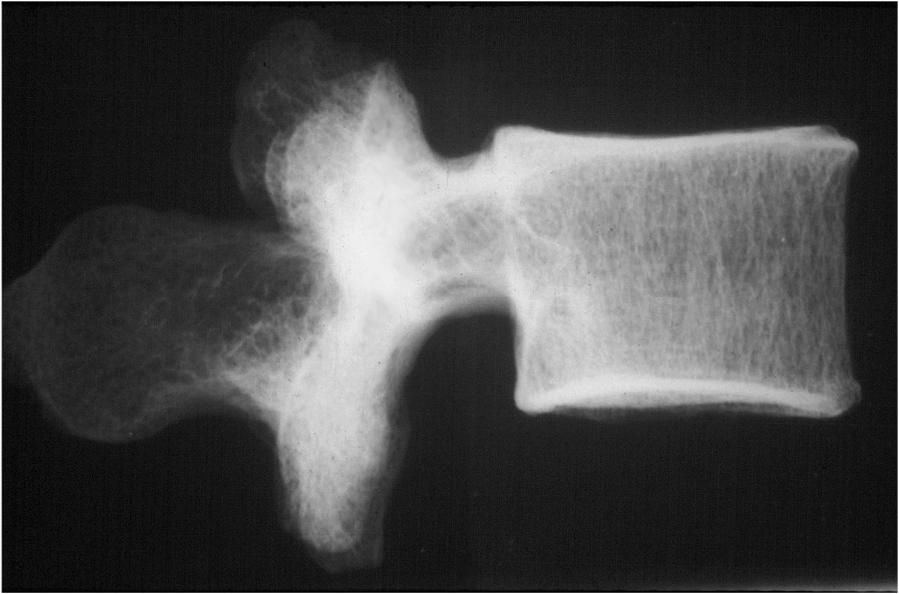


# Profil

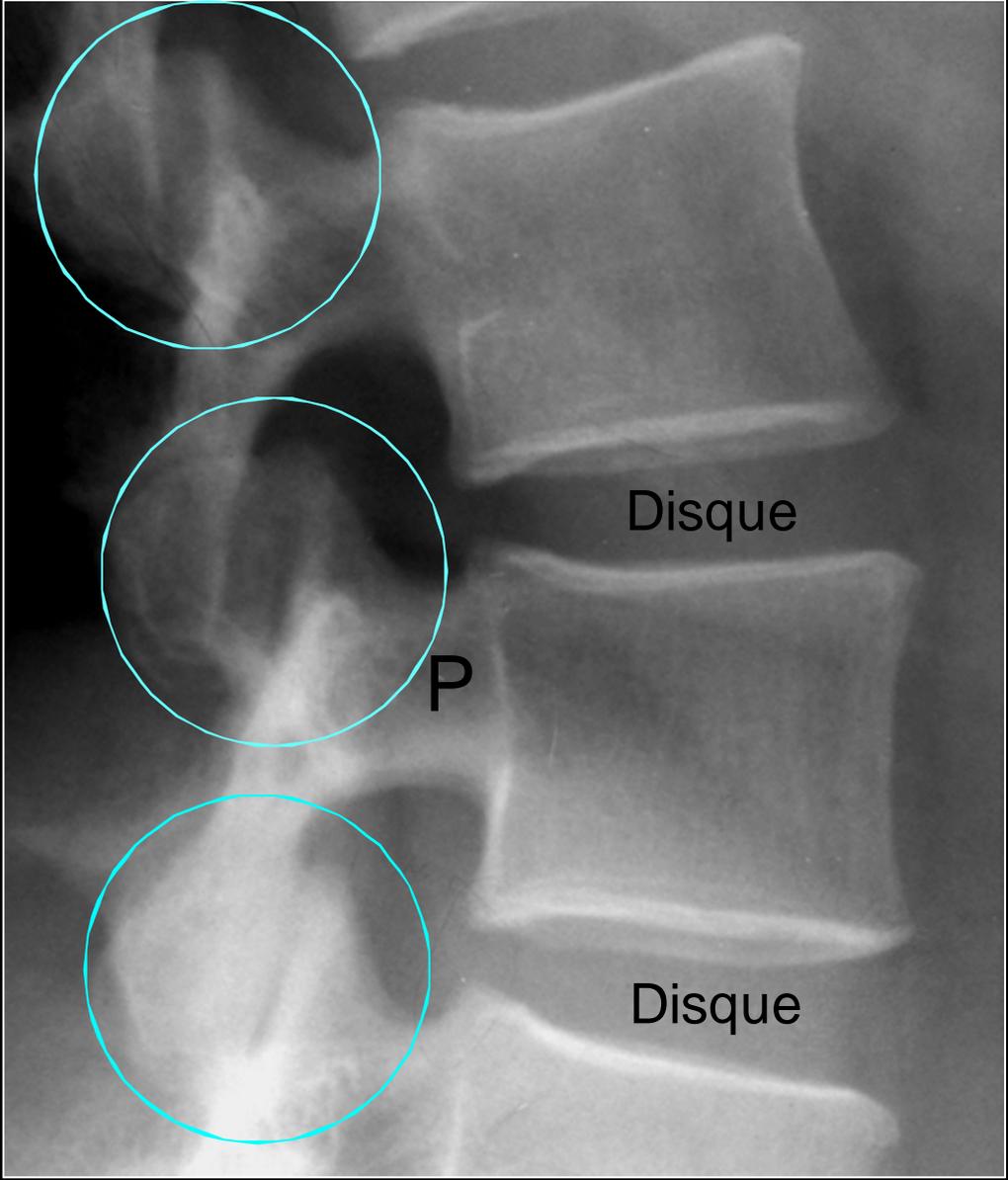
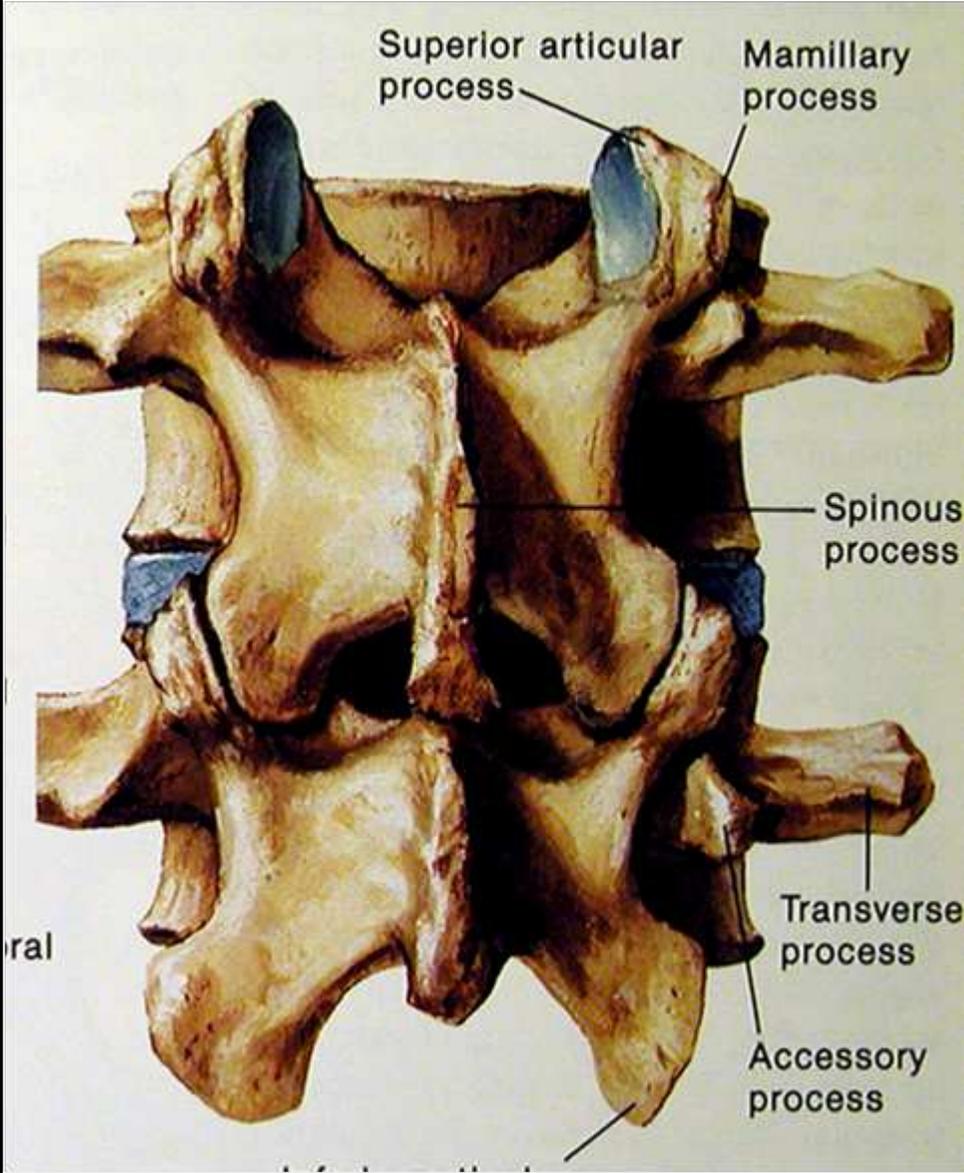


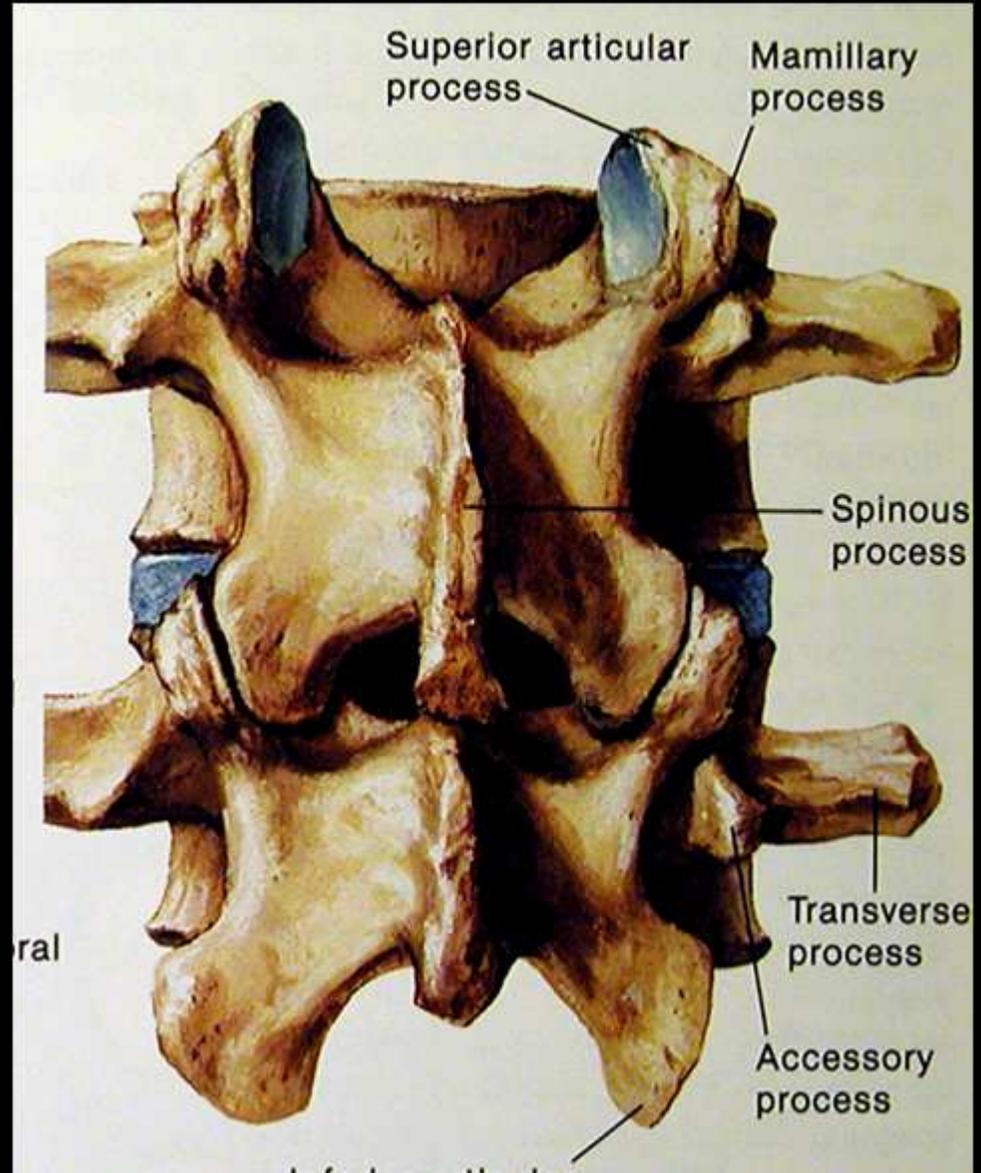
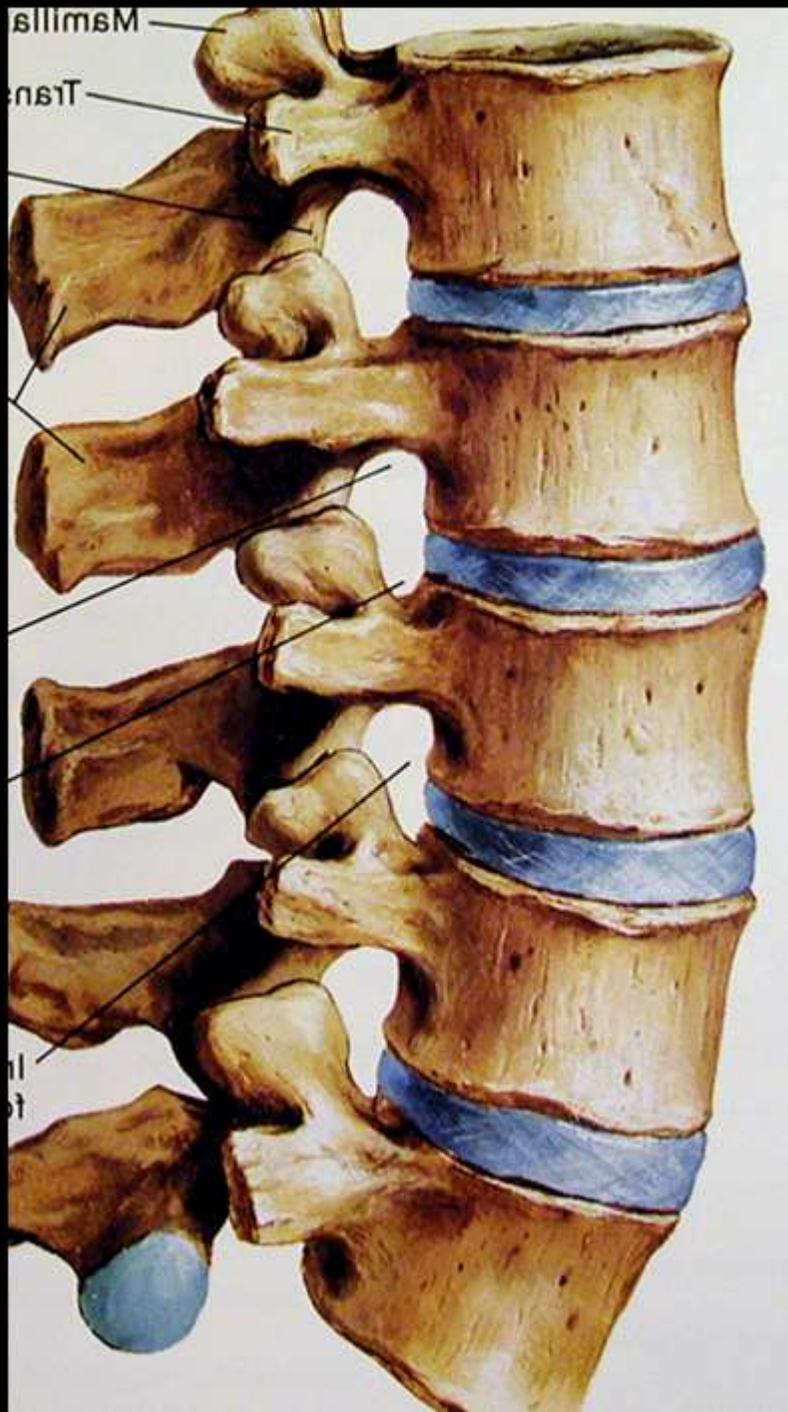


# Articulations interapophysaires



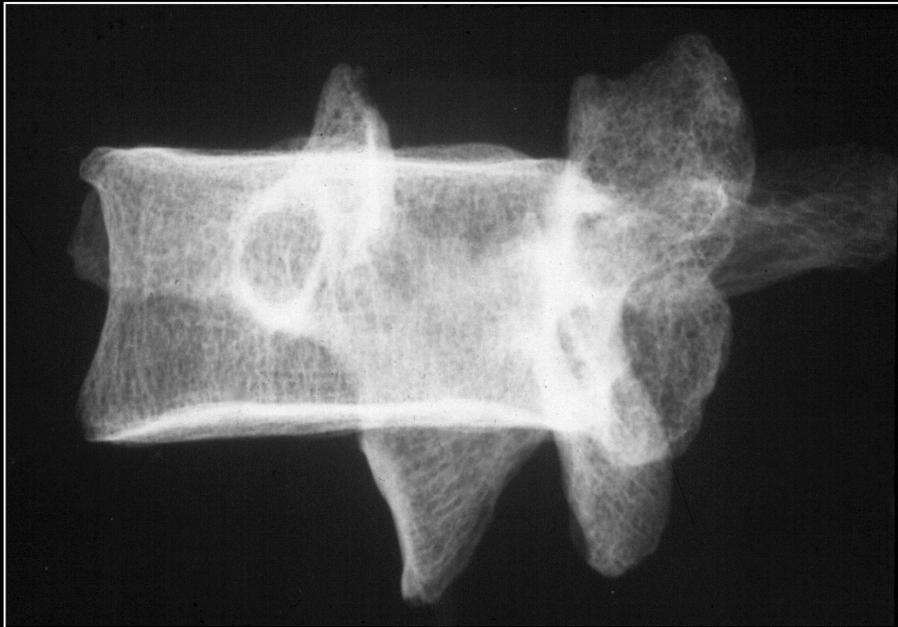
# Articulations interapophysaires

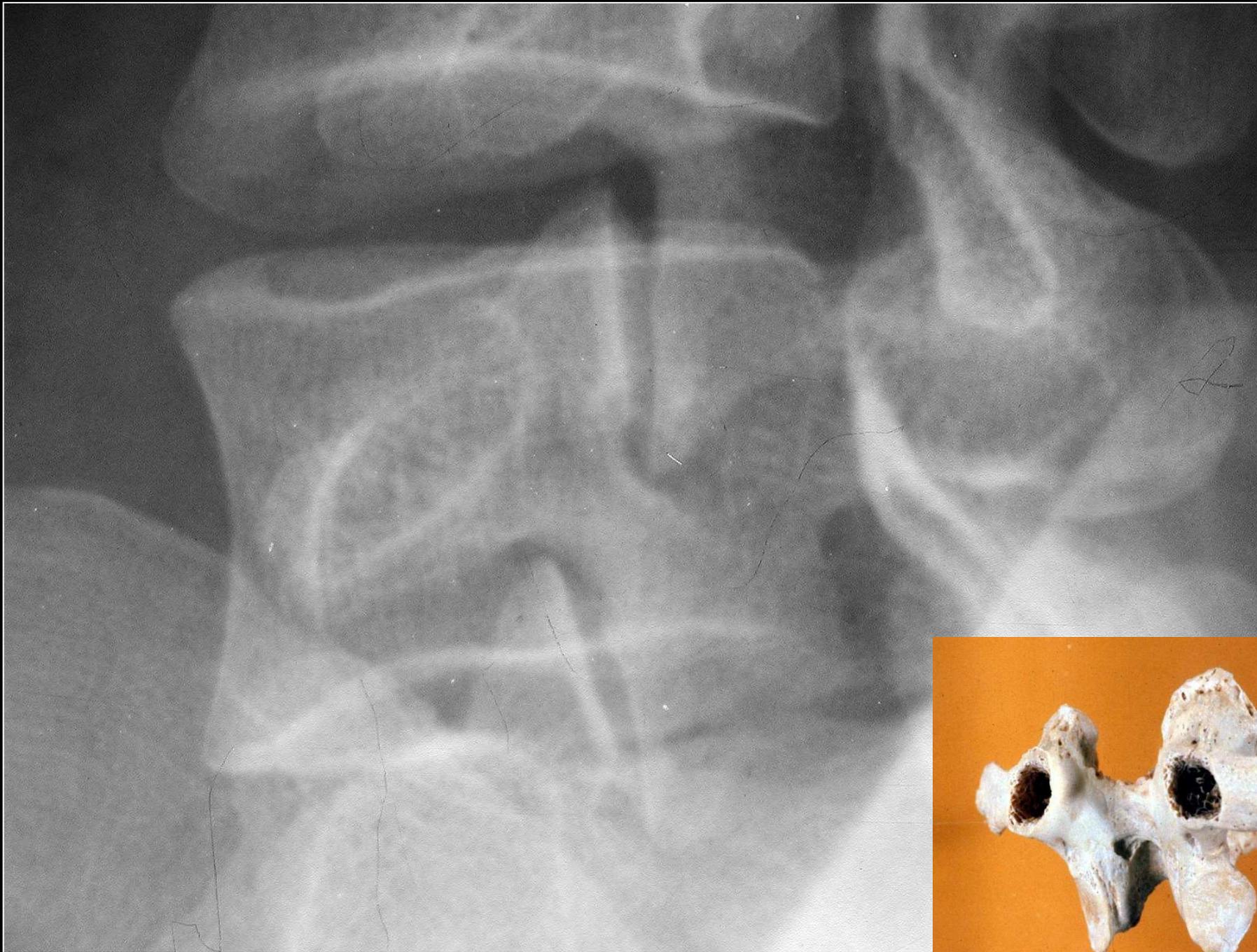


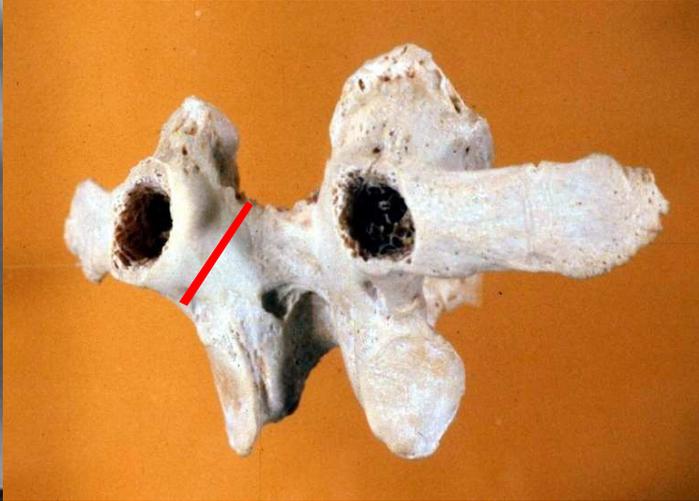
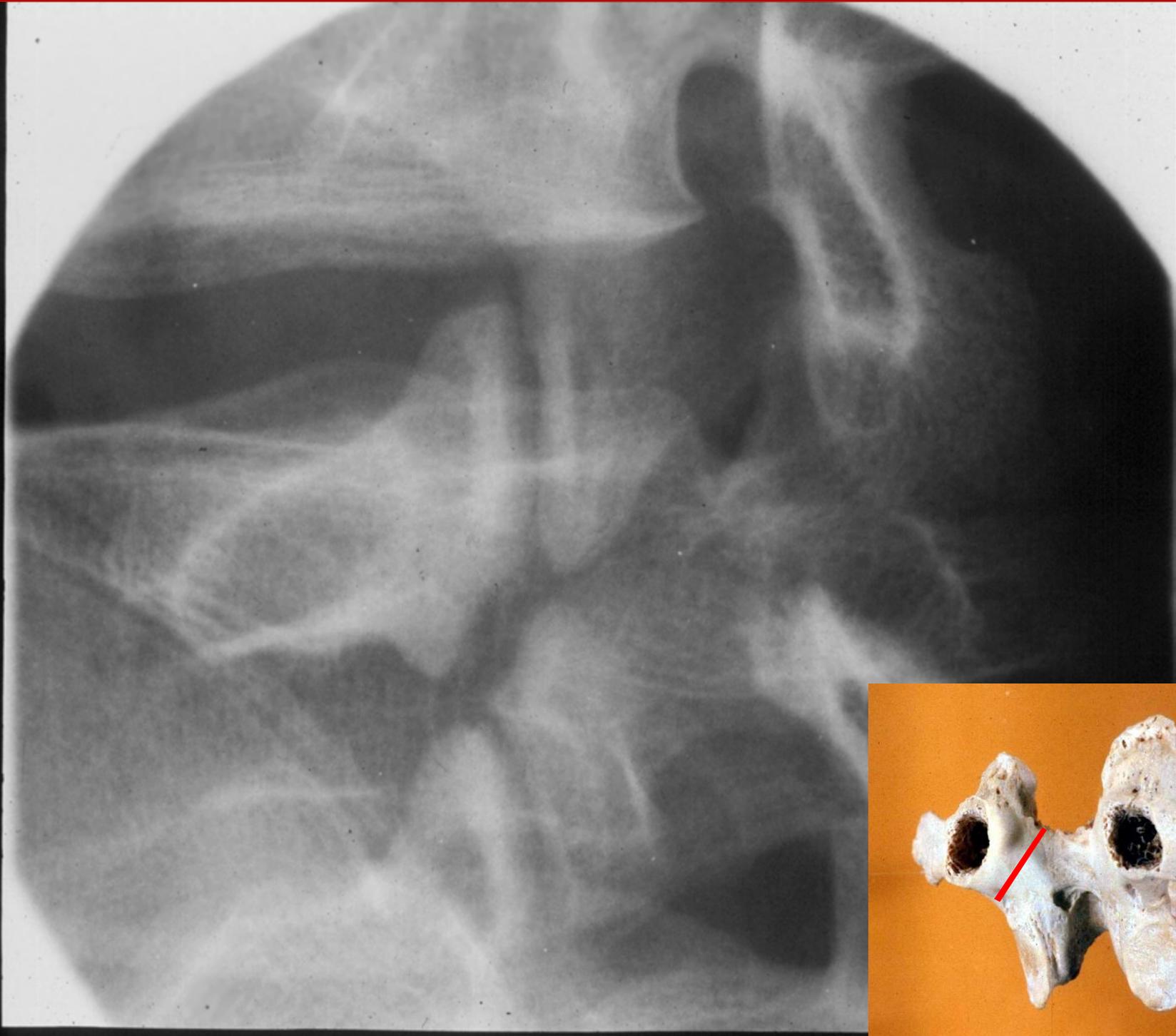




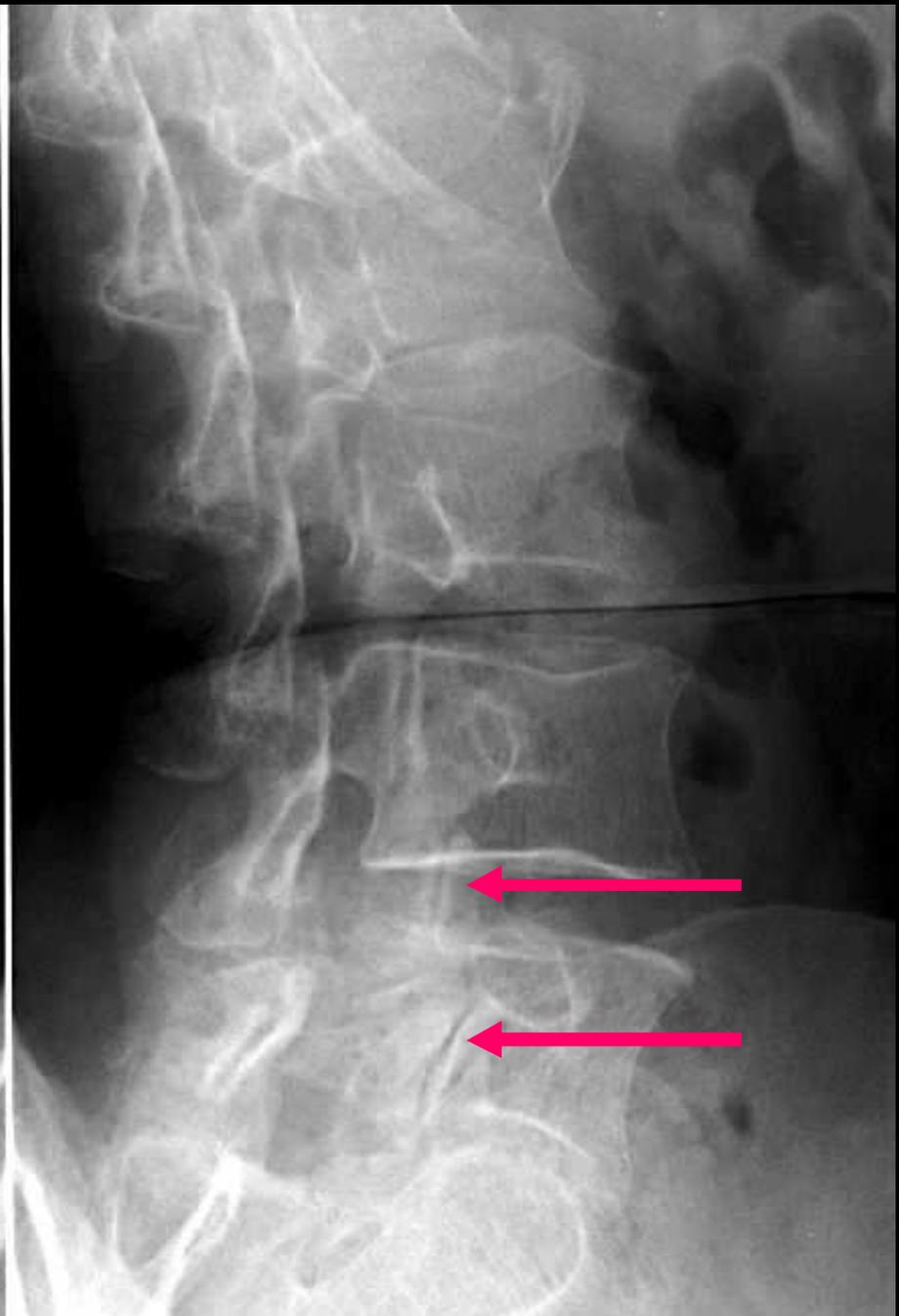
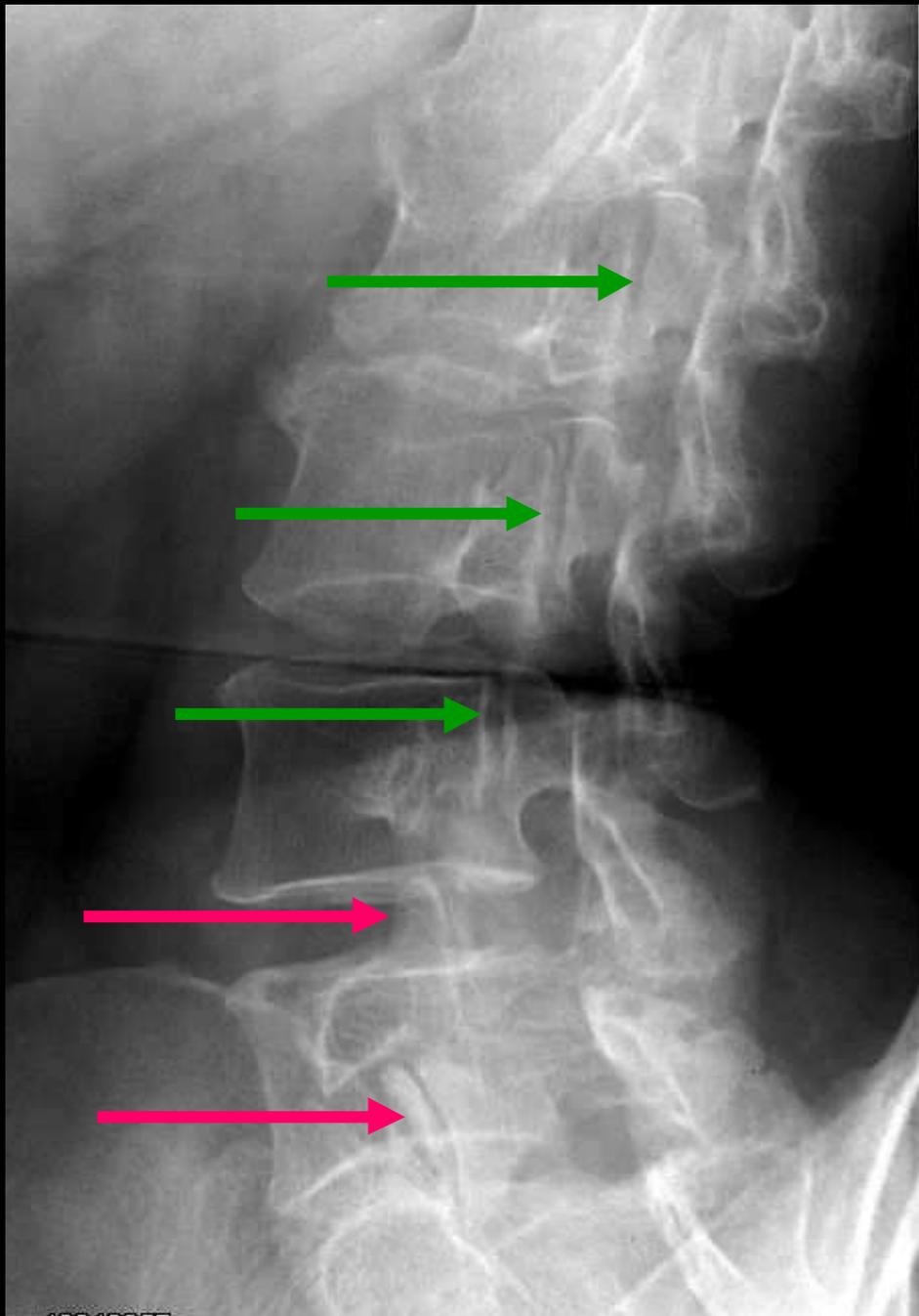
OAG











Le disque intervertébral

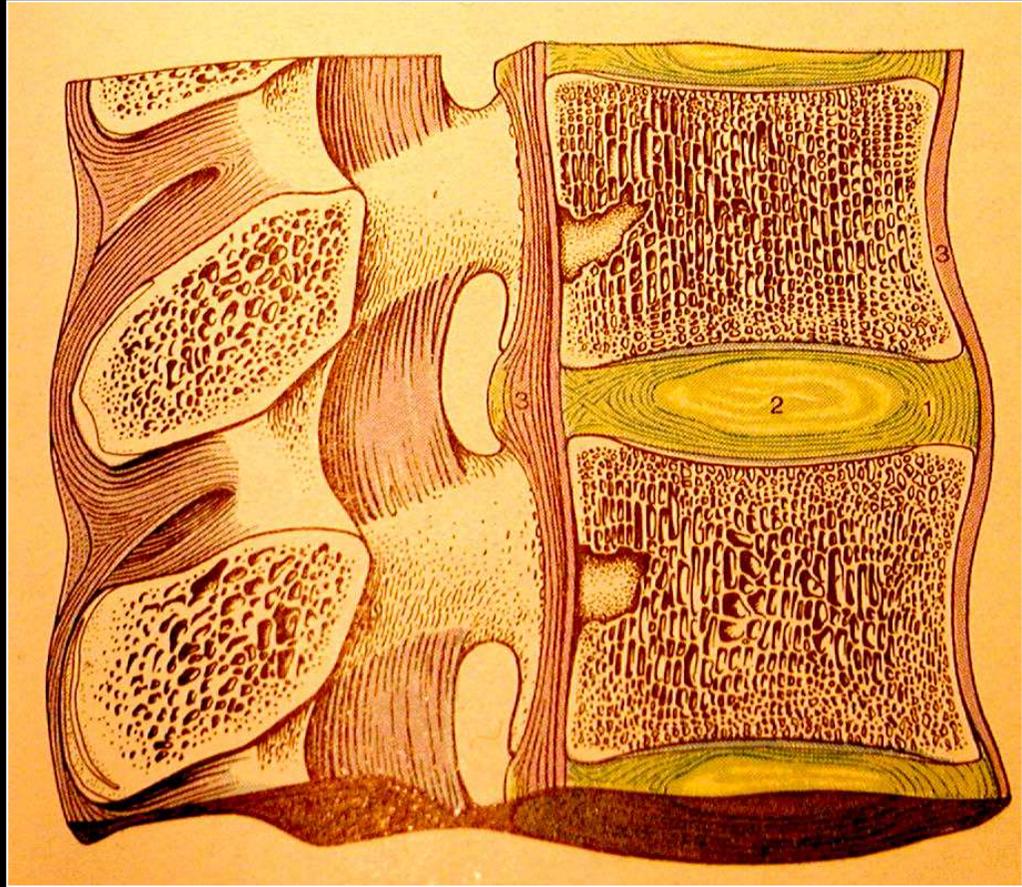
Un amortisseur  
hydraulique



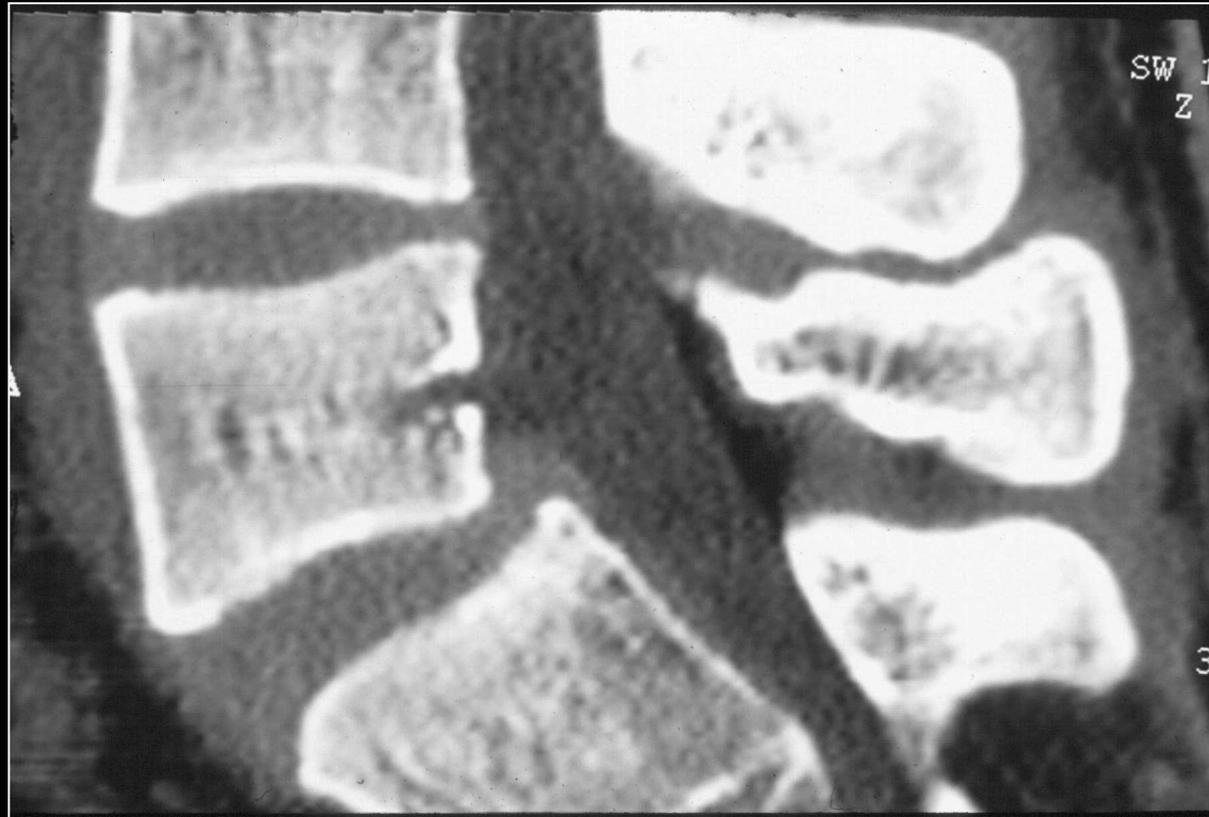
Après Décharge



Après Station



# Lombalgie isolée ?



Sciatique ?

**PRISE EN CHARGE DIAGNOSTIQUE  
ET THÉRAPEUTIQUE DES LOMBALGIES  
ET LOMBOSCIATIQUES COMMUNES  
DE MOINS DE TROIS MOIS D'ÉVOLUTION**



Texte des recommandations FÉVRIER 2000

**ANAES → HAS**

**Agence Nationale de l'Accréditation  
et de l'Évaluation Médicale  
Haute Autorité de la Santé**

# Lombalgie isolée

Soit

Commune,  
Mécanique

Guérit  
spontanément

Soit

Secondaire,  
symptomatique

S'aggrave  
progressivement

# Lombalgie isolée

Radiographie ?

Scanner ?

IRM ?

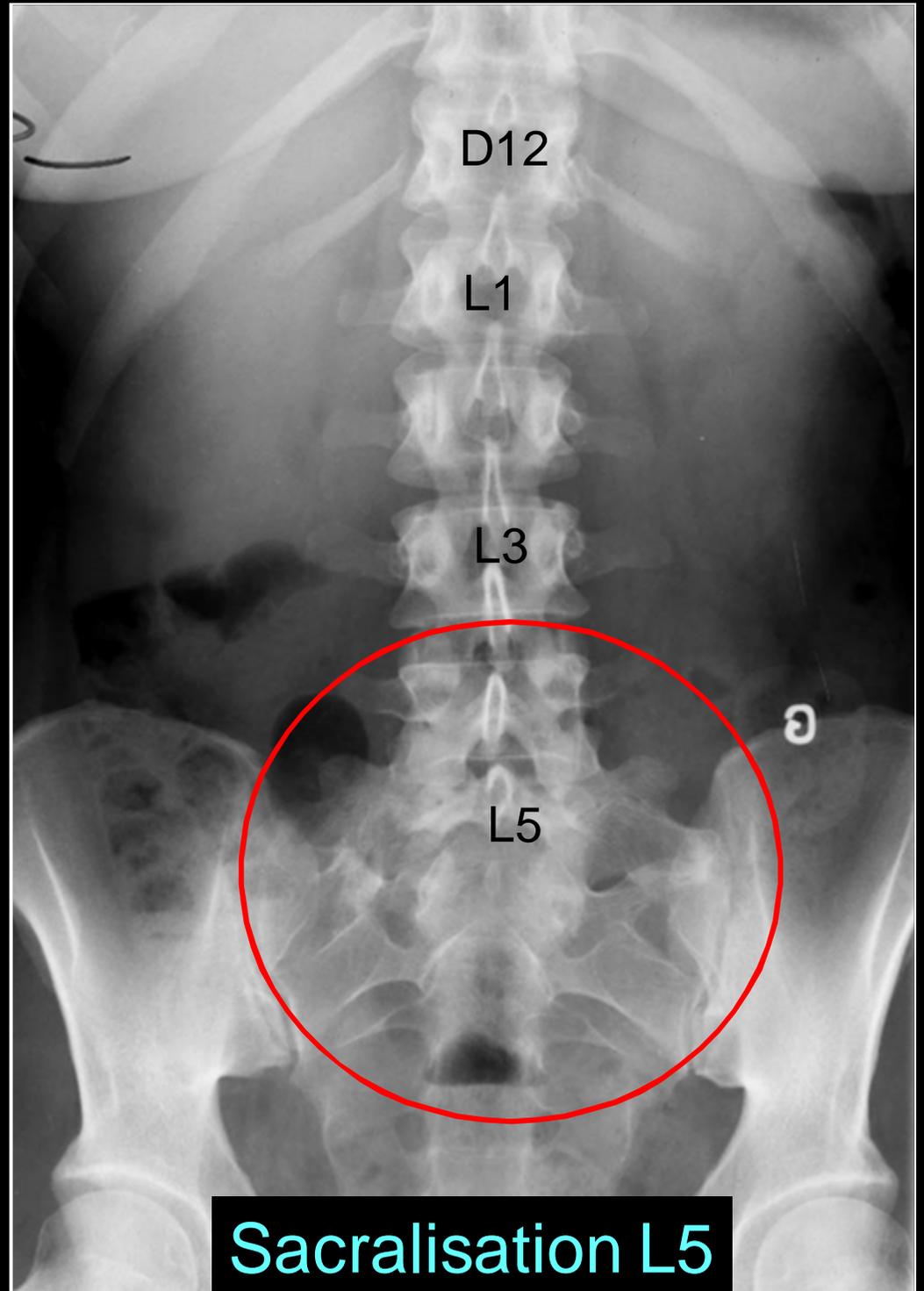
Rien avant essai de traitement MD !

Qu'apporte la Radio ?  
Une Vue Globale,  
en Charge !

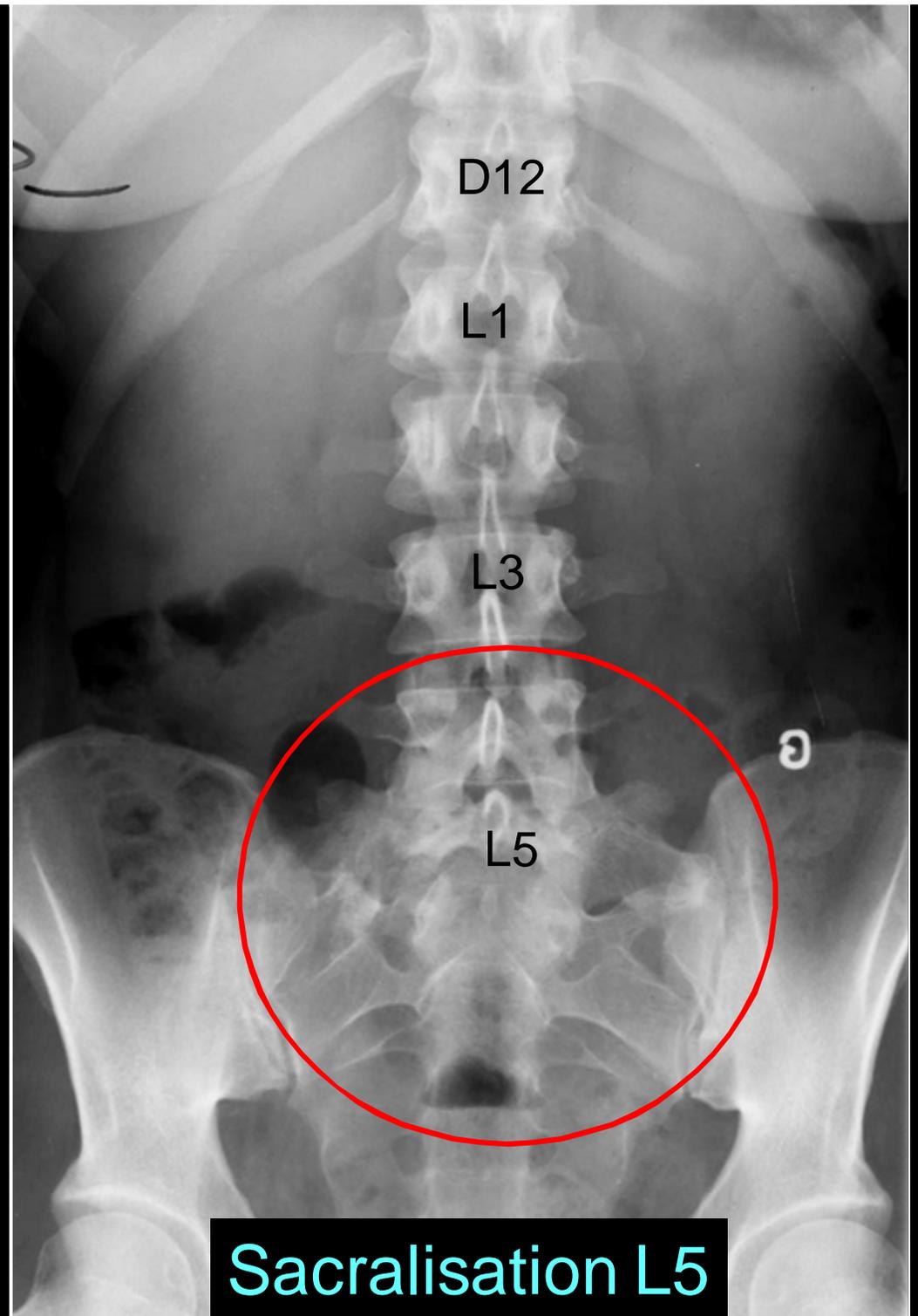
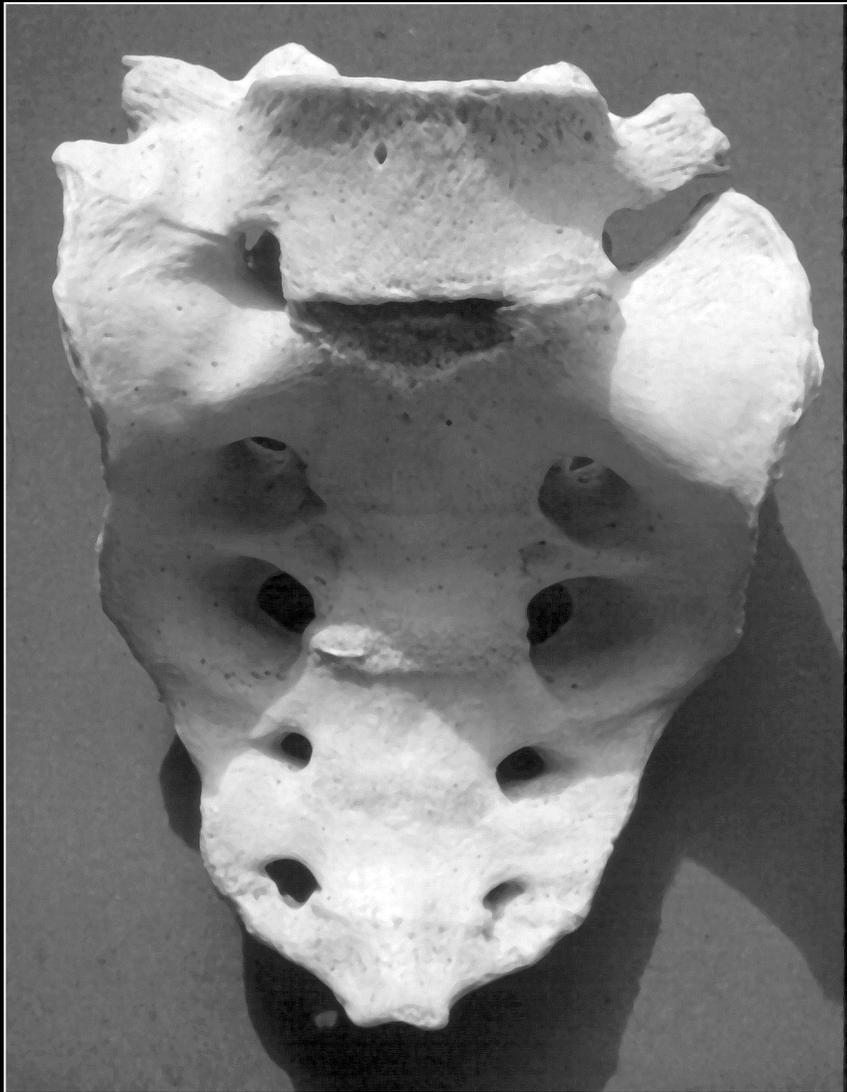




**Normal**

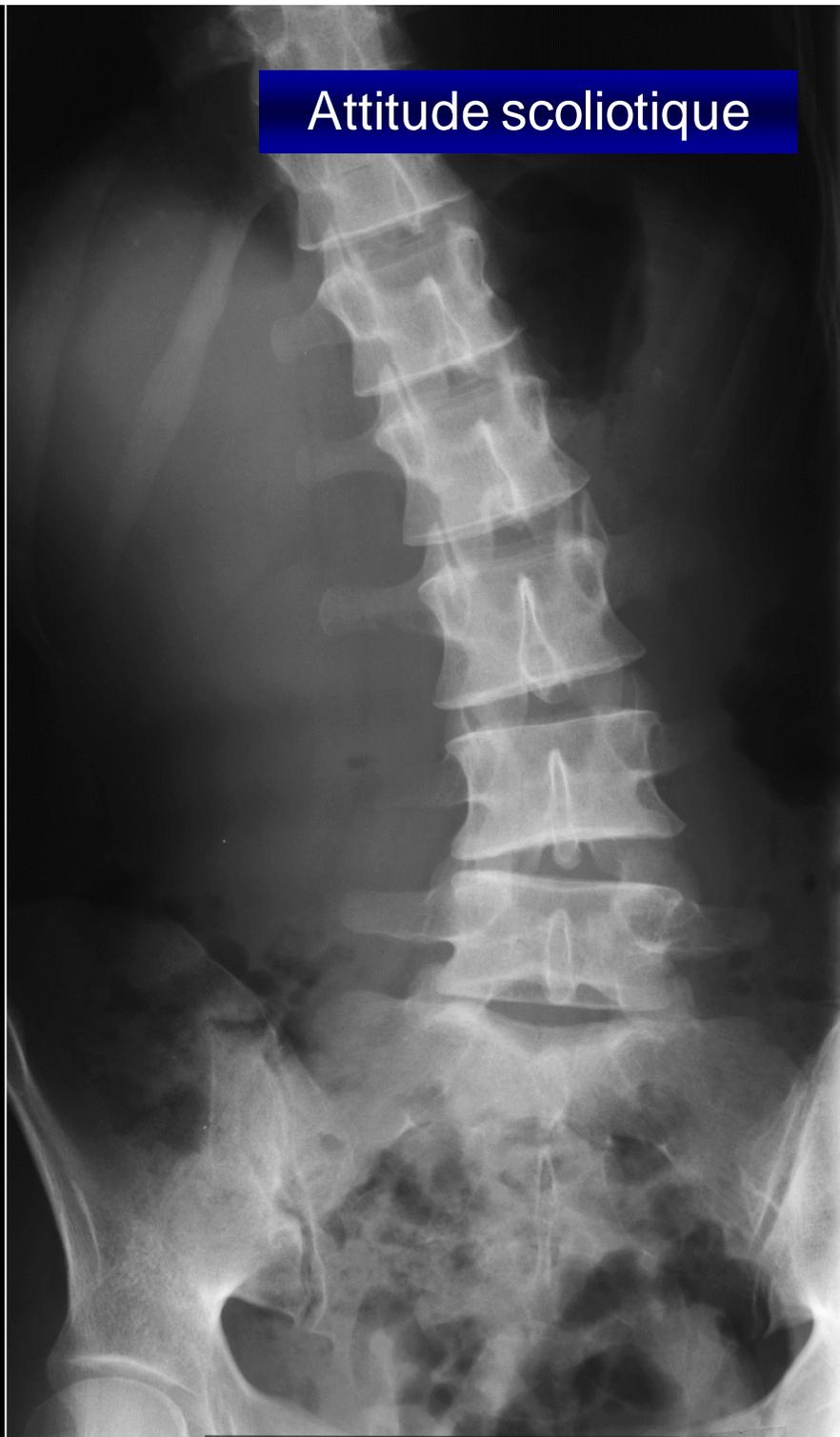


**Sacralisation L5**



Sacralisation L5

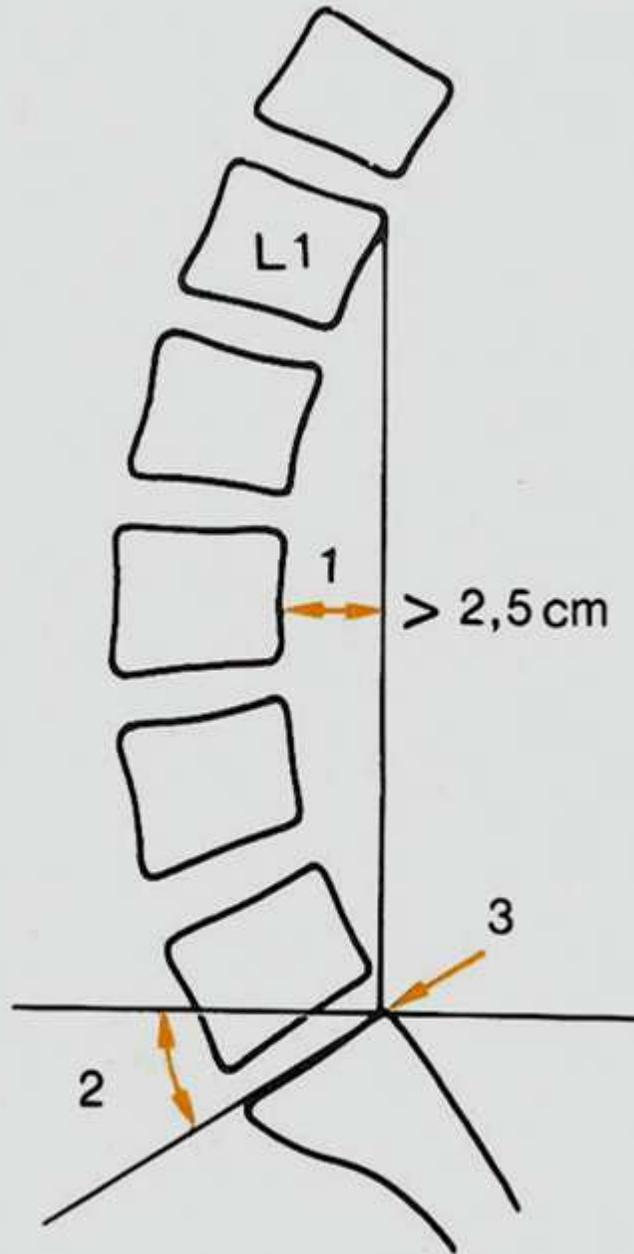
Attitude scoliotique

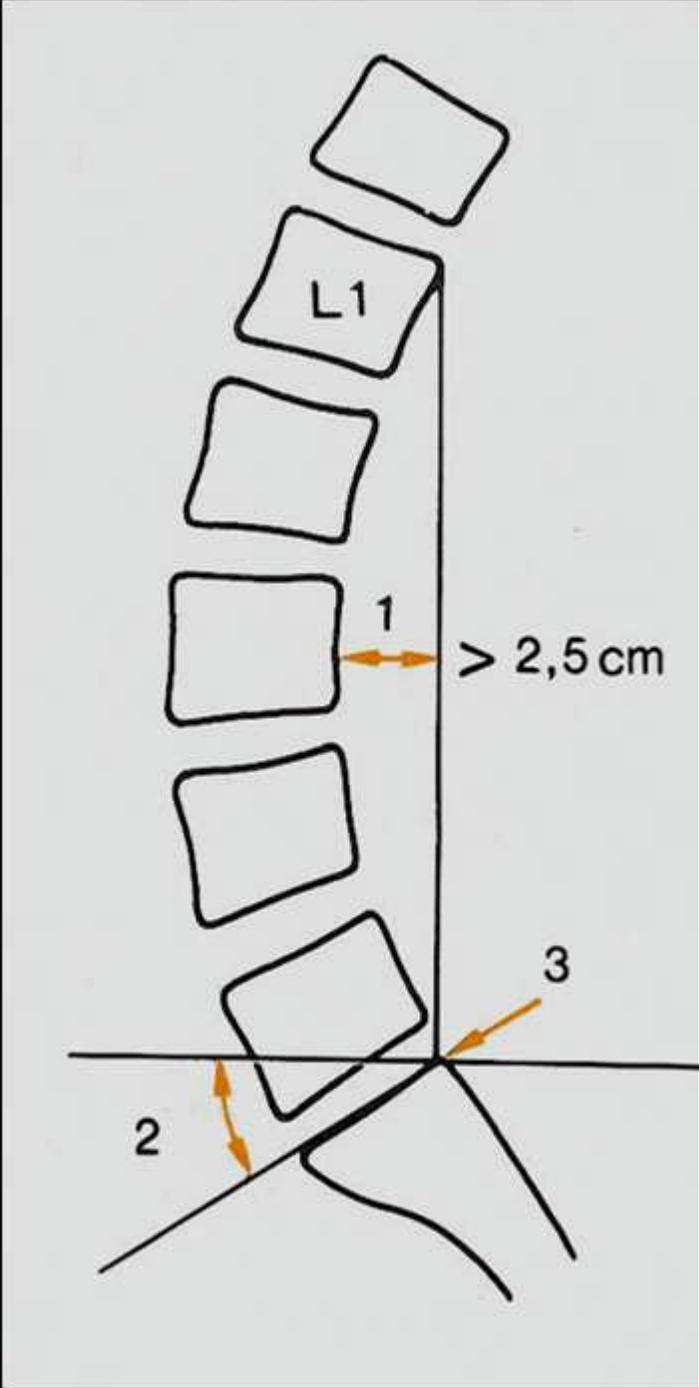


Scoliose

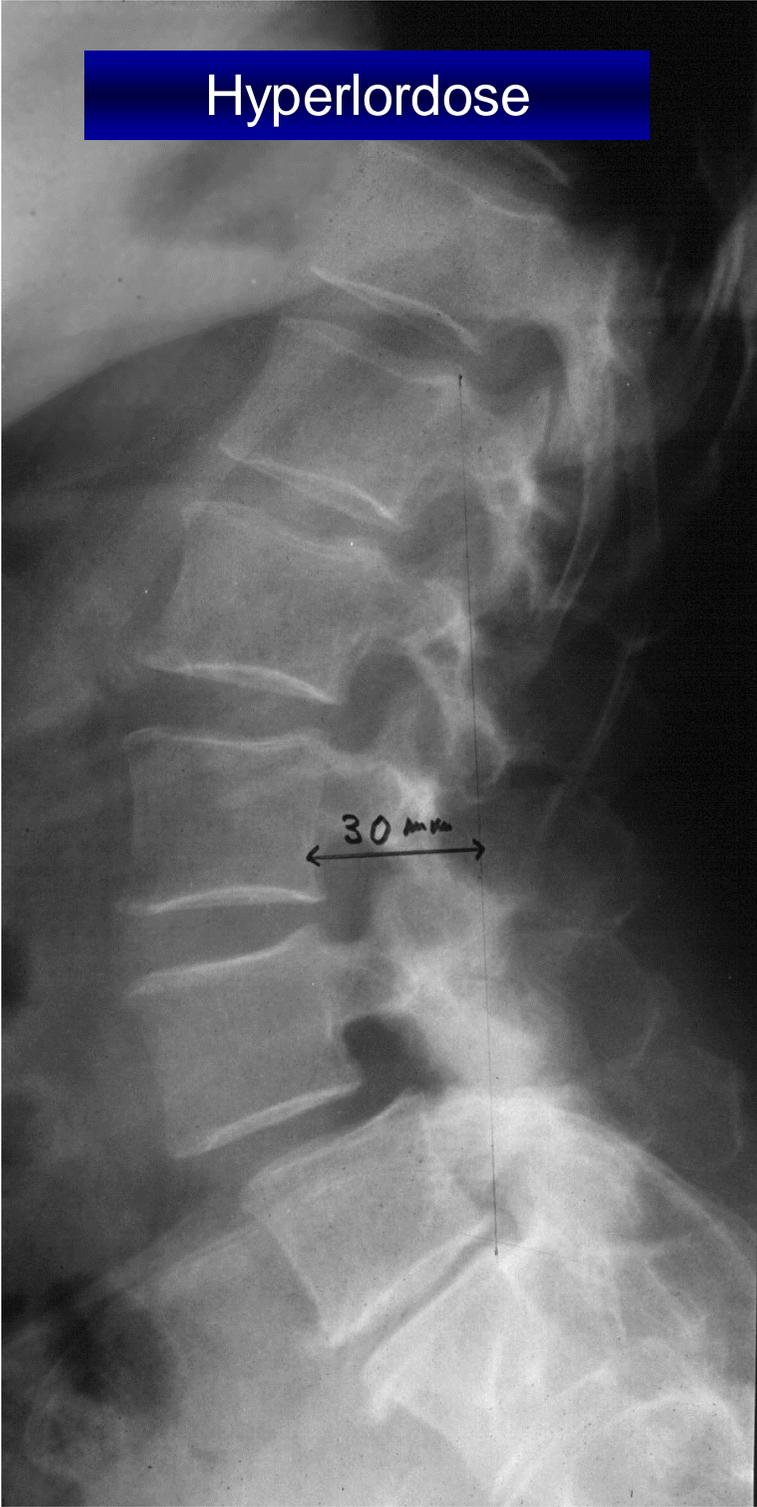


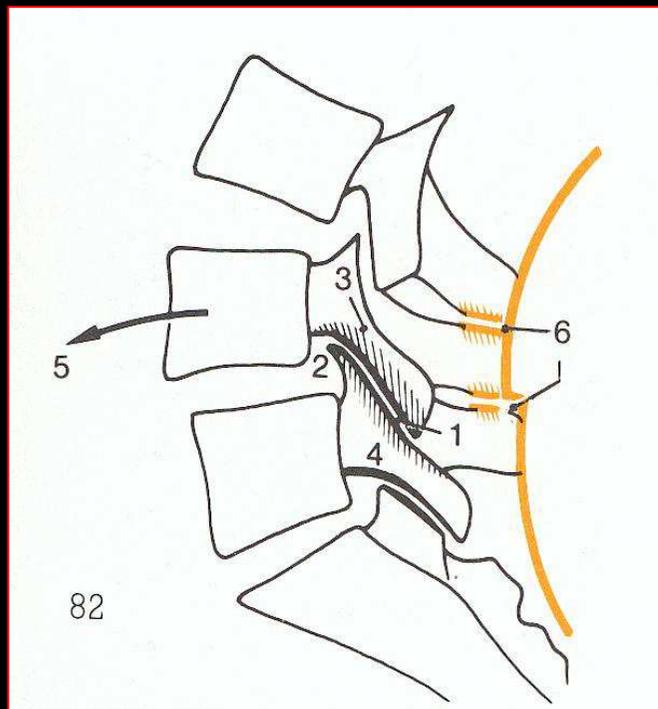
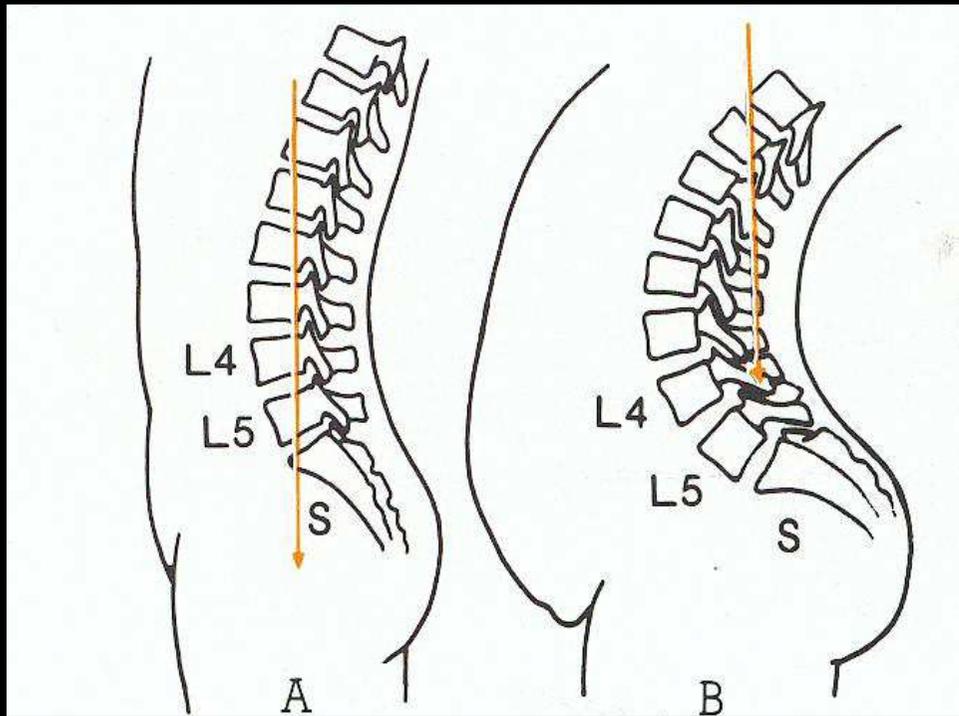
# Délordose



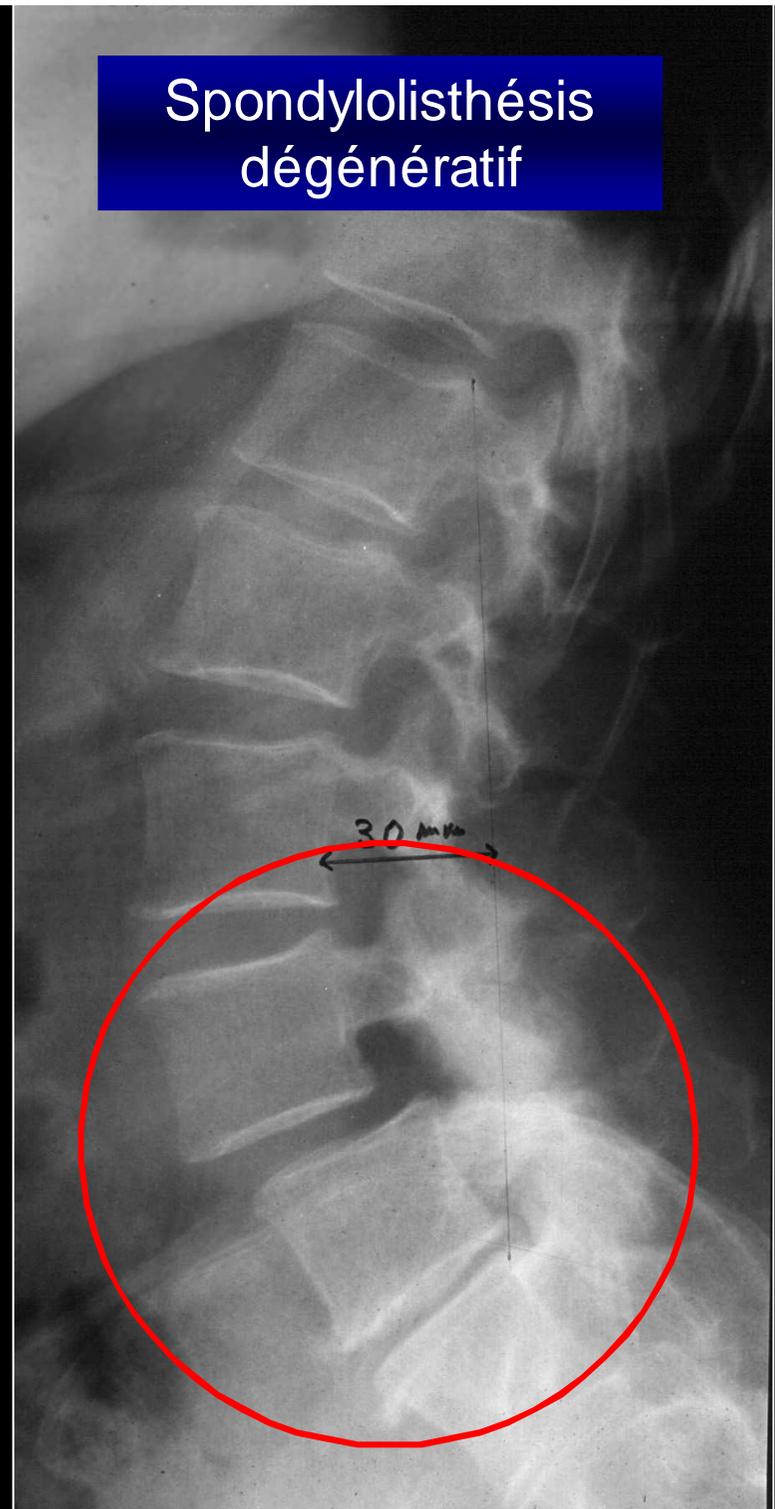


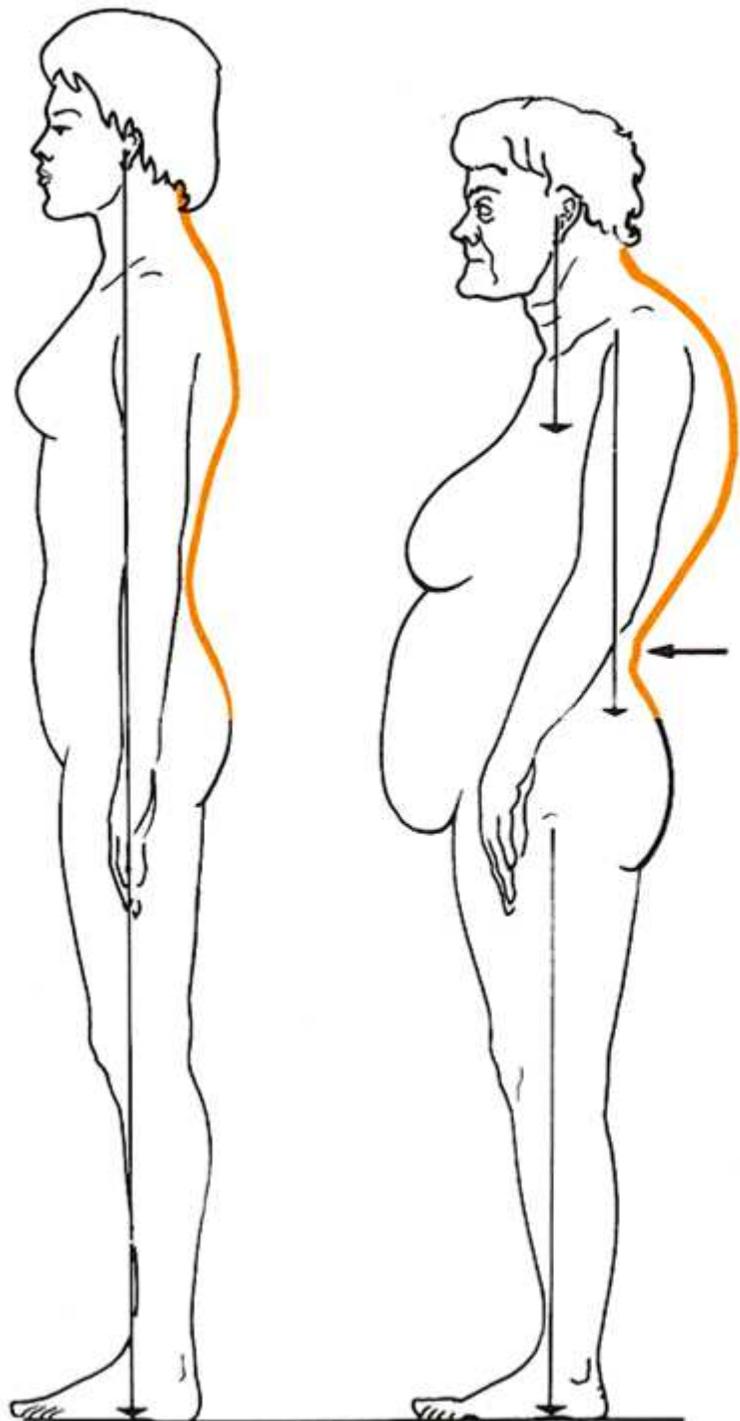
Hyperlordose





## Spondylolisthesis dégénératif





- 1- Arthrose interapophysaire postérieure
- 2- Glissement en avant de L4 (spondylolisthésis)
- 3- Arthrose interépineuse
- 4- Rétrolisthésis de L1

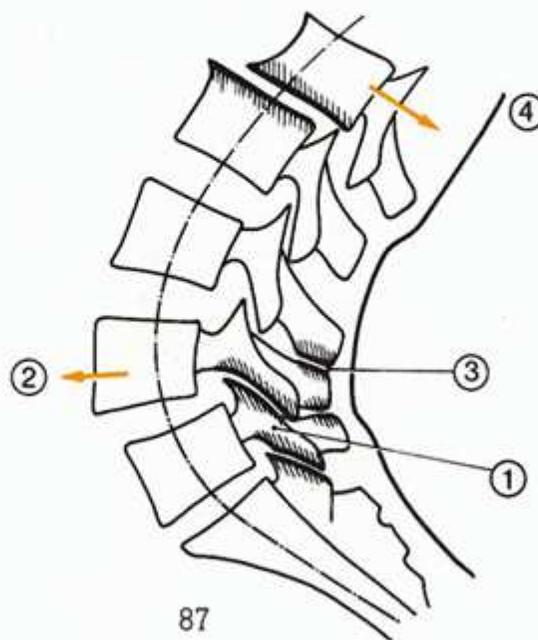
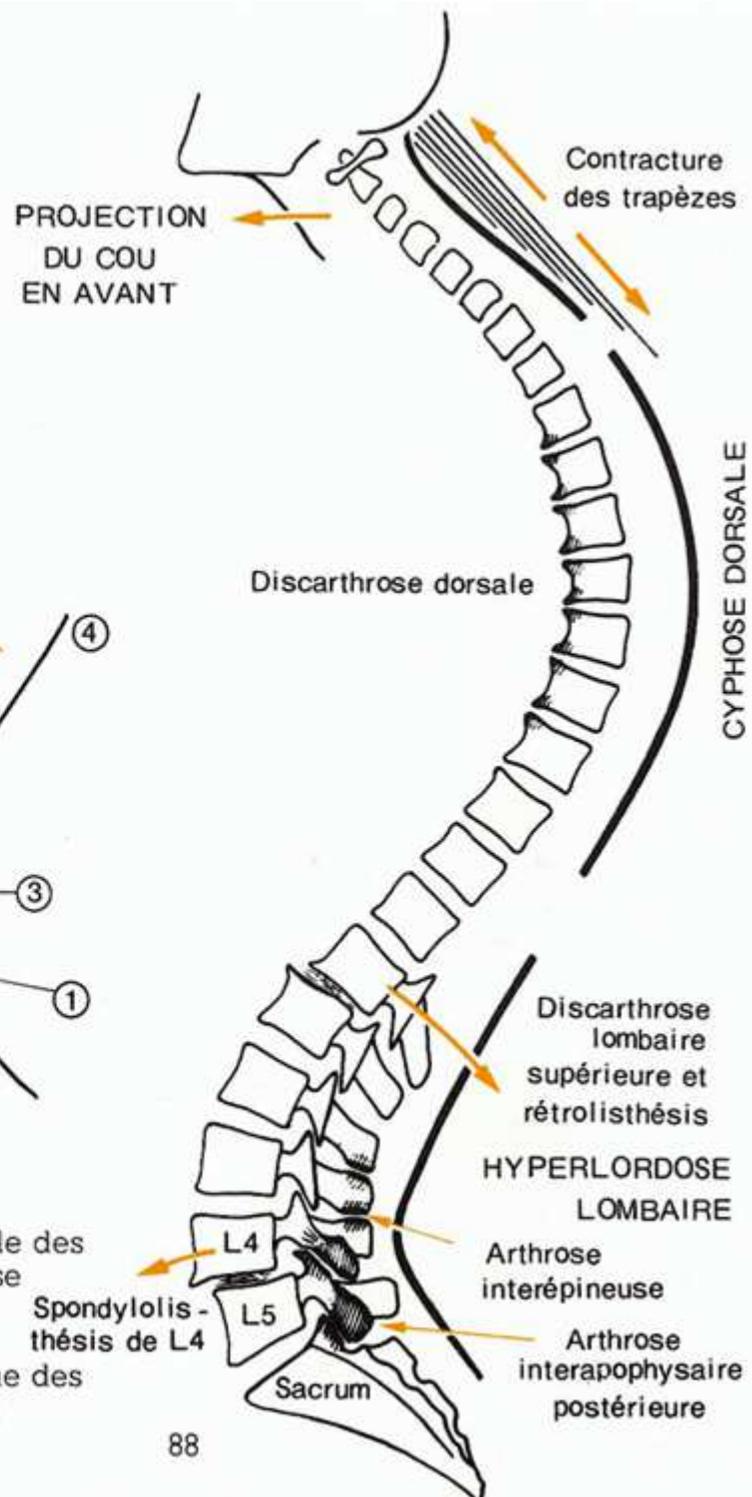


Fig. 87 - Schéma de l'ensemble des lésions accompagnant l'arthrose interapophysaire postérieure.

Fig. 88 - Aspect schématique des lésions radiologiques affectant l'ensemble du rachis.

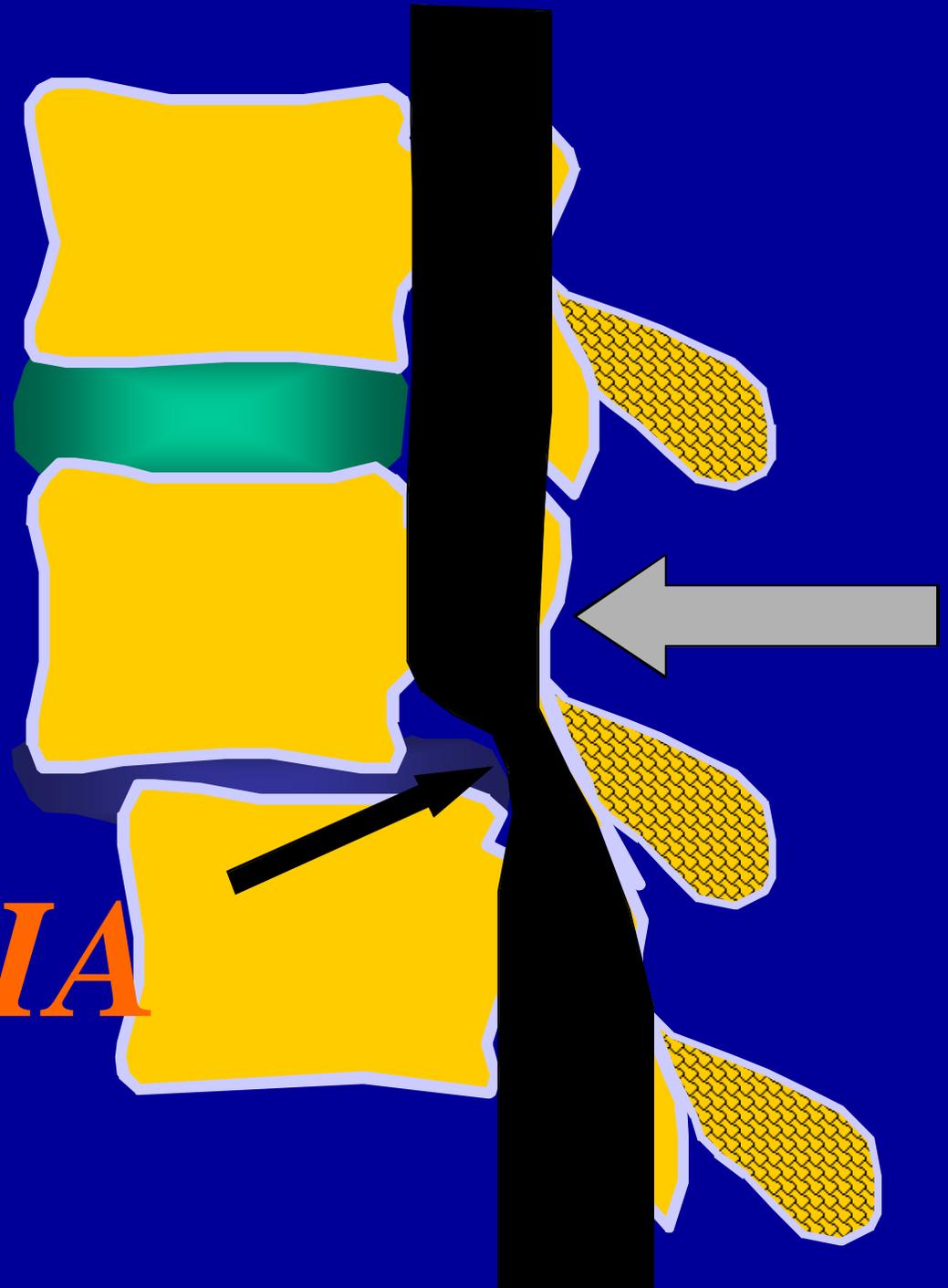


88

# SPONDYLOLISTHESIS

*dégénératif*

*= sur arthrose IA*



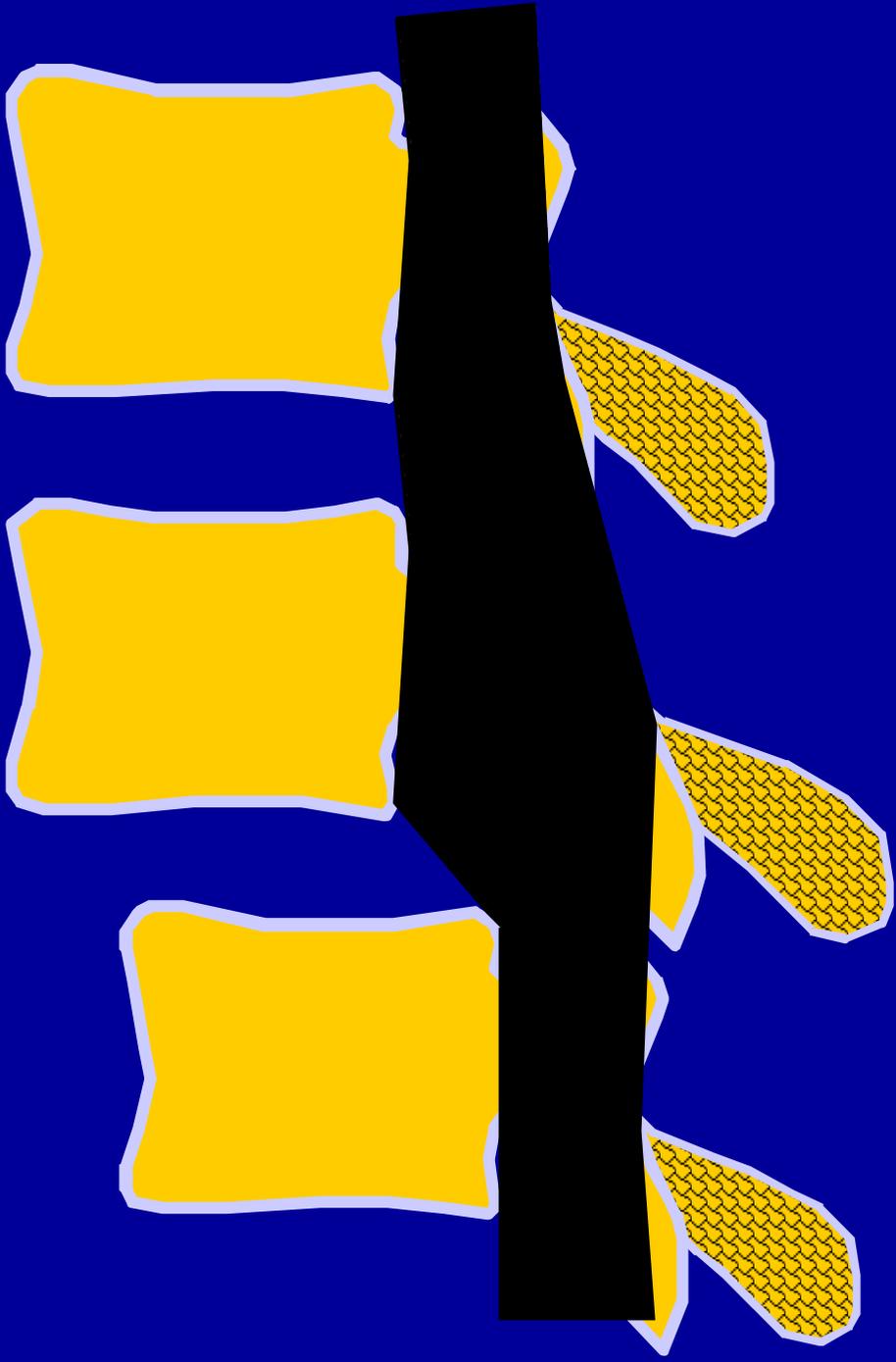
Antéro-listhésis sur

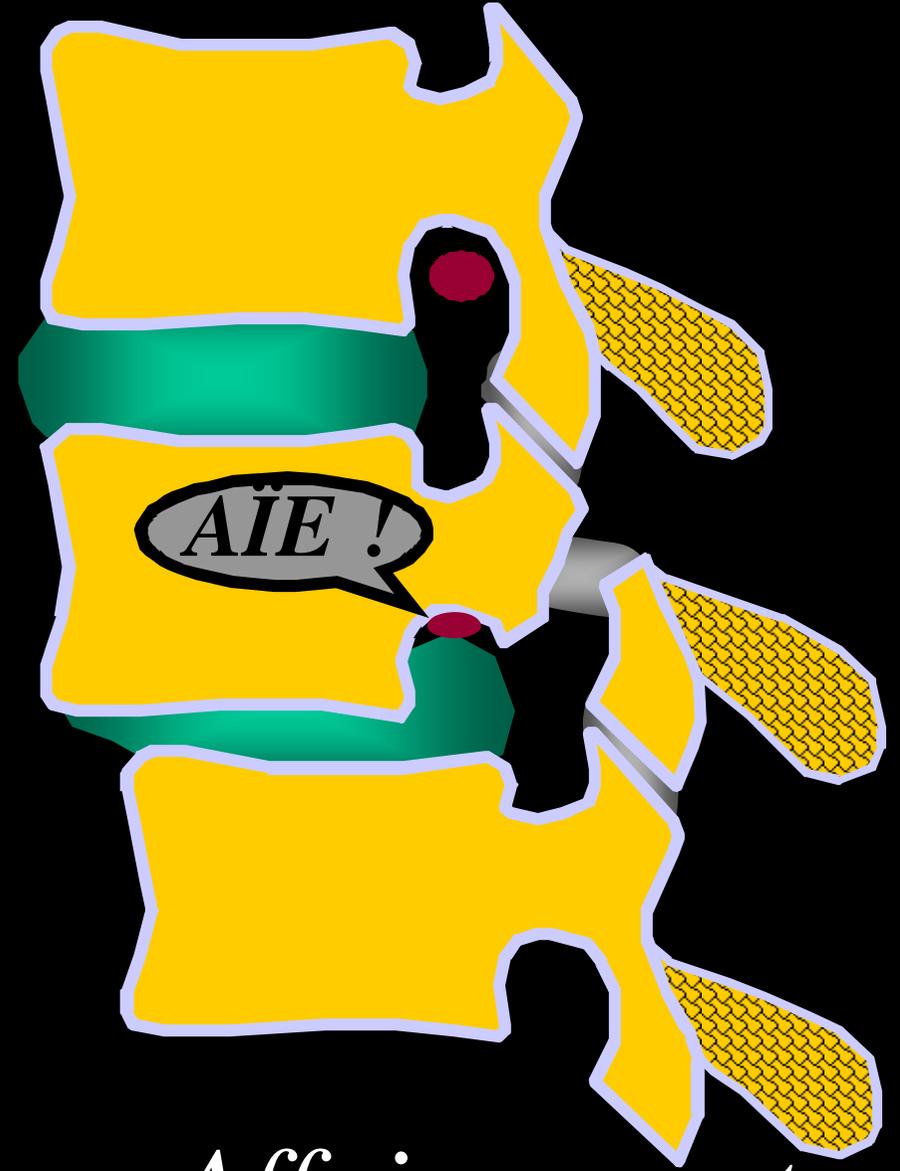
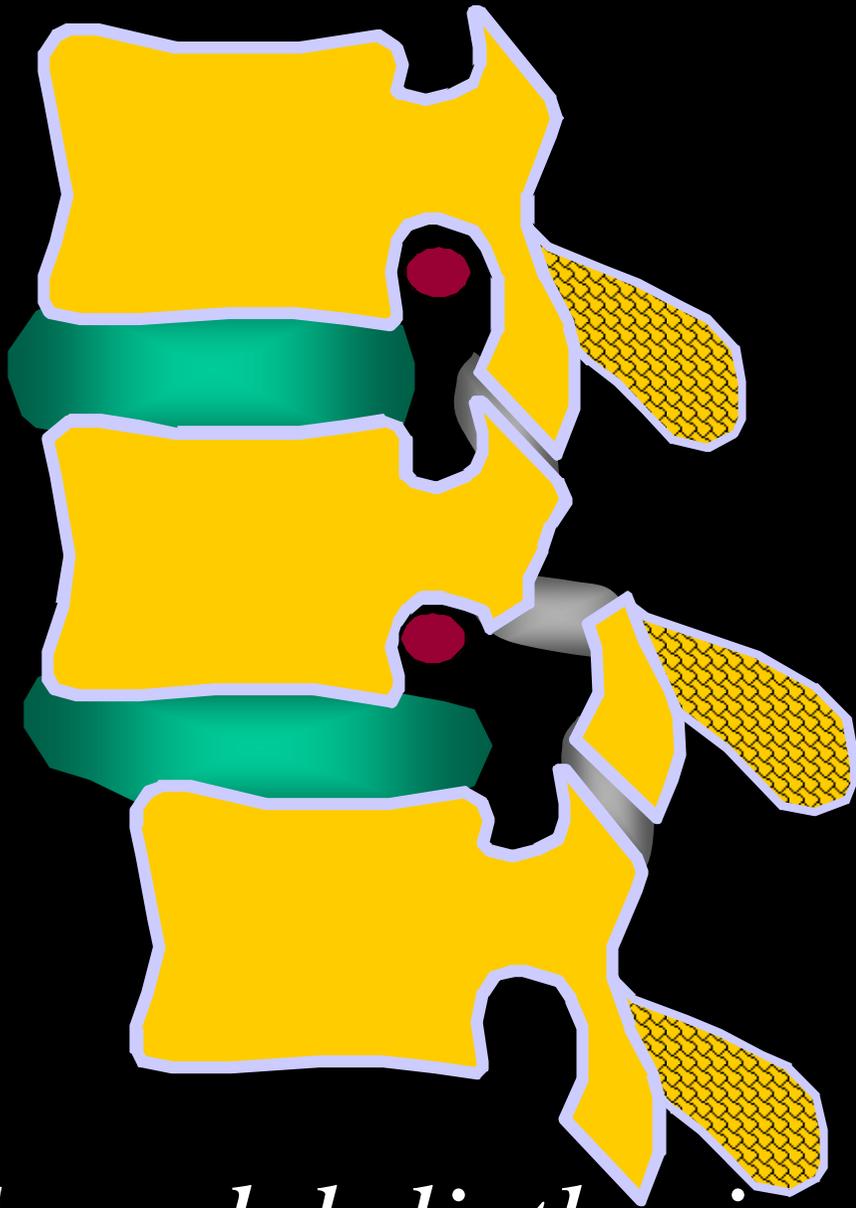
PAS LES MEMES CONSEQUENCES

Spondylolyse

Arthrose interapophysaire







*Spondylolisthesis*

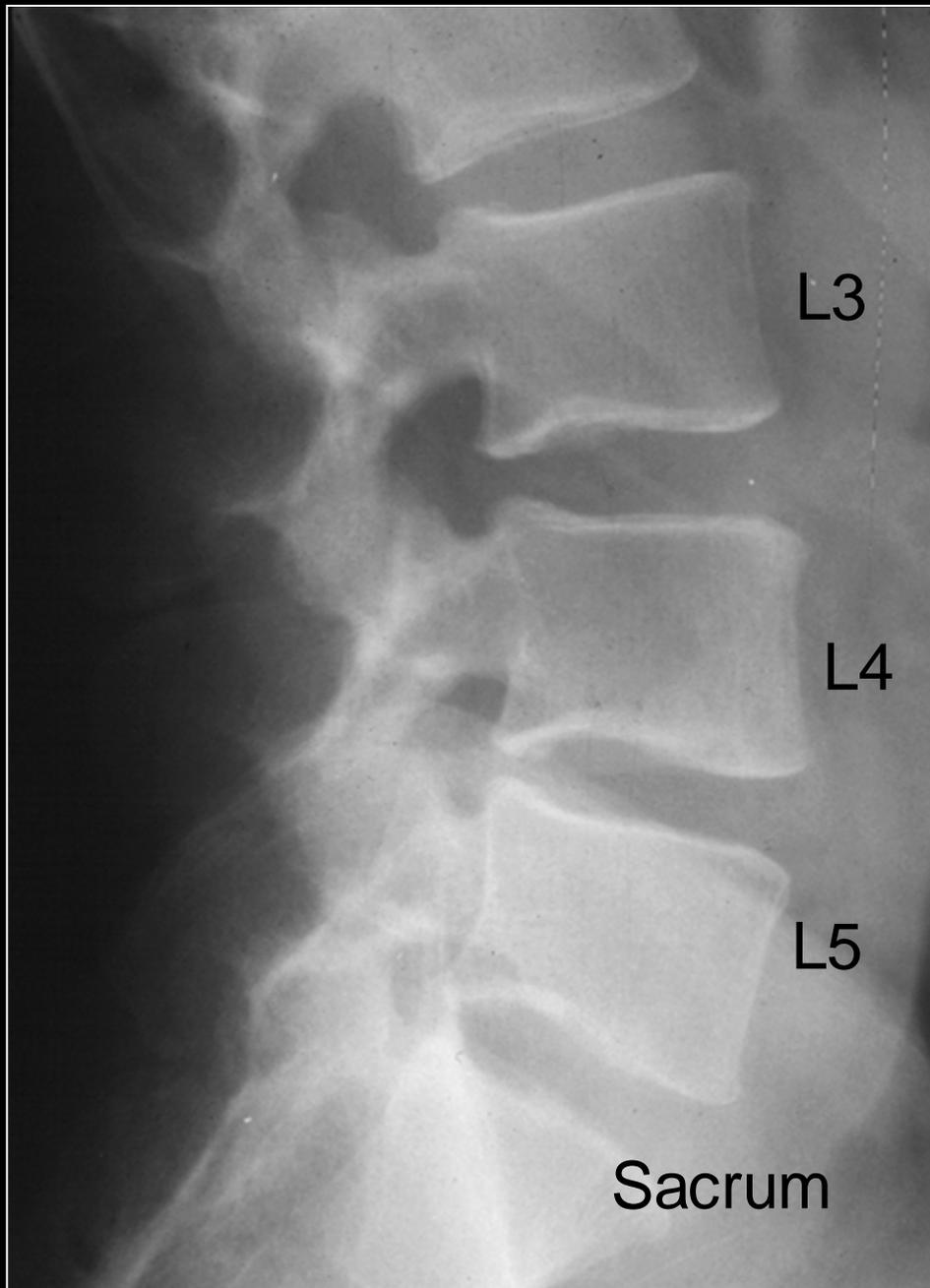
+

*Affaissement*

→ *rétrécissement foraminal*

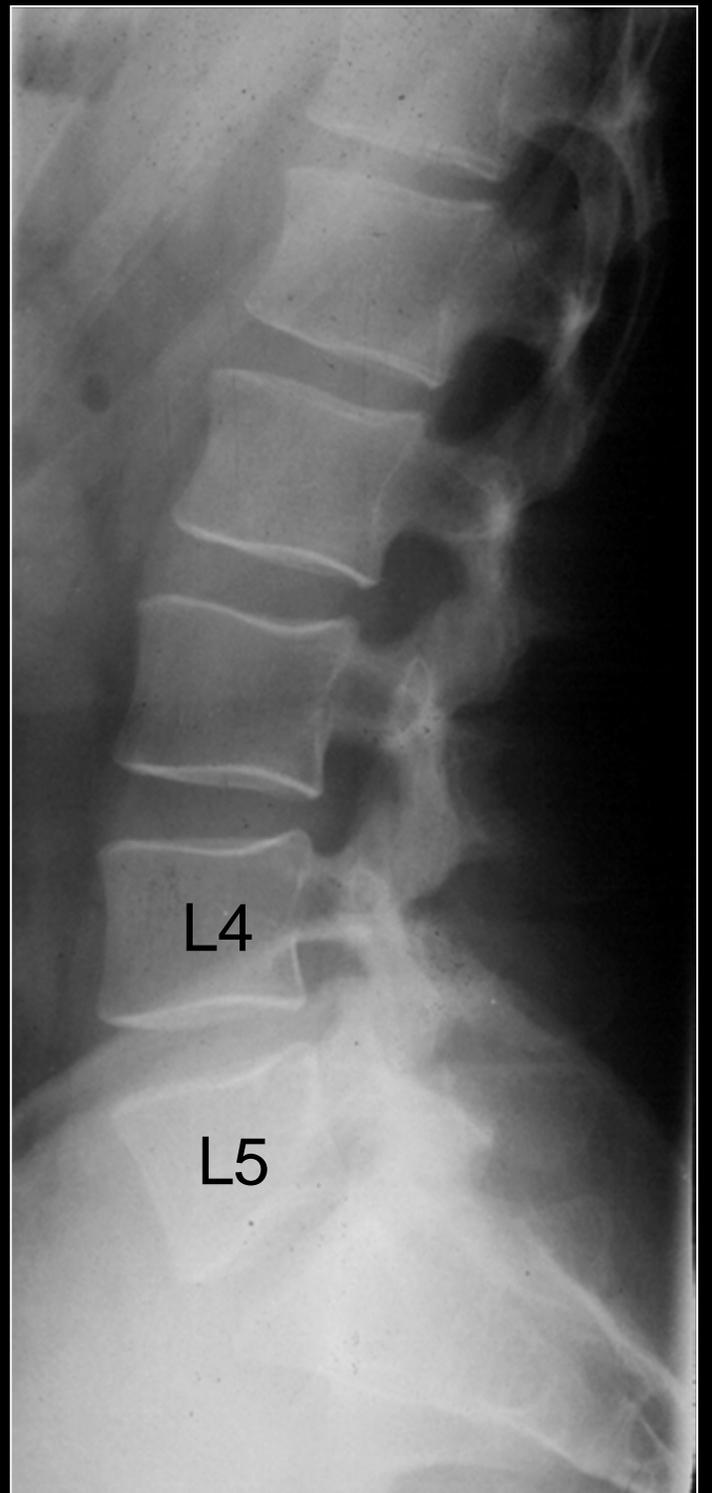
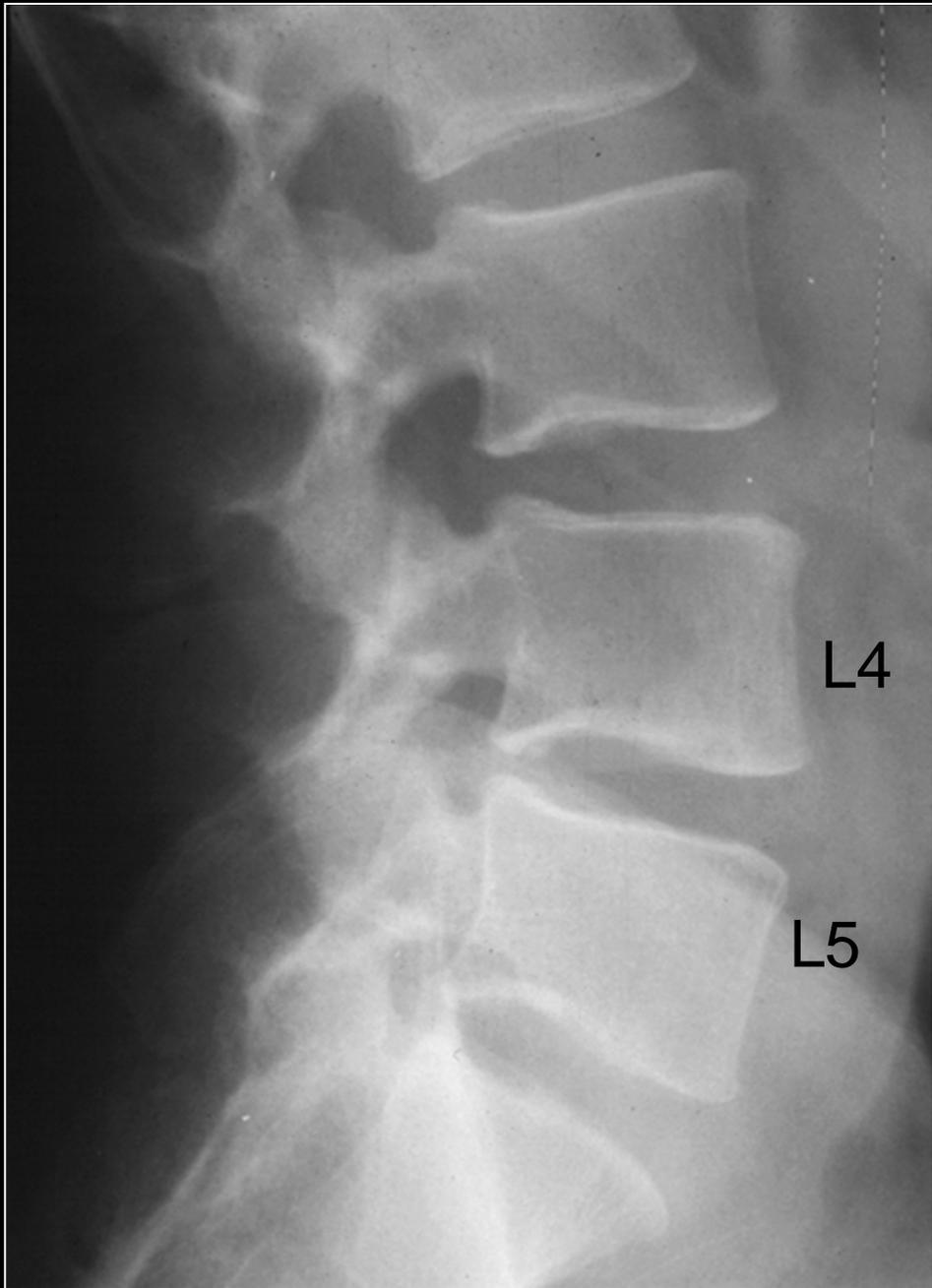
Le disque intervertébral

Un amortisseur  
hydraulique



Epaisseur discale

Normal ?





Pincement discal

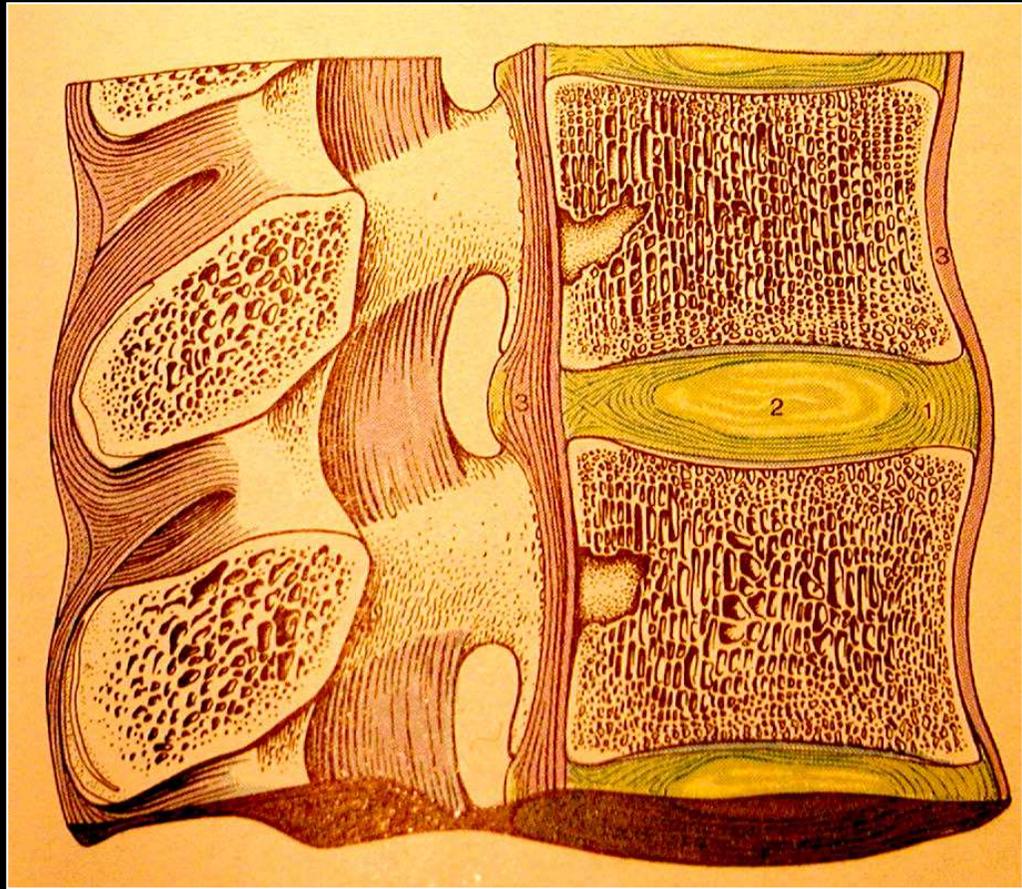


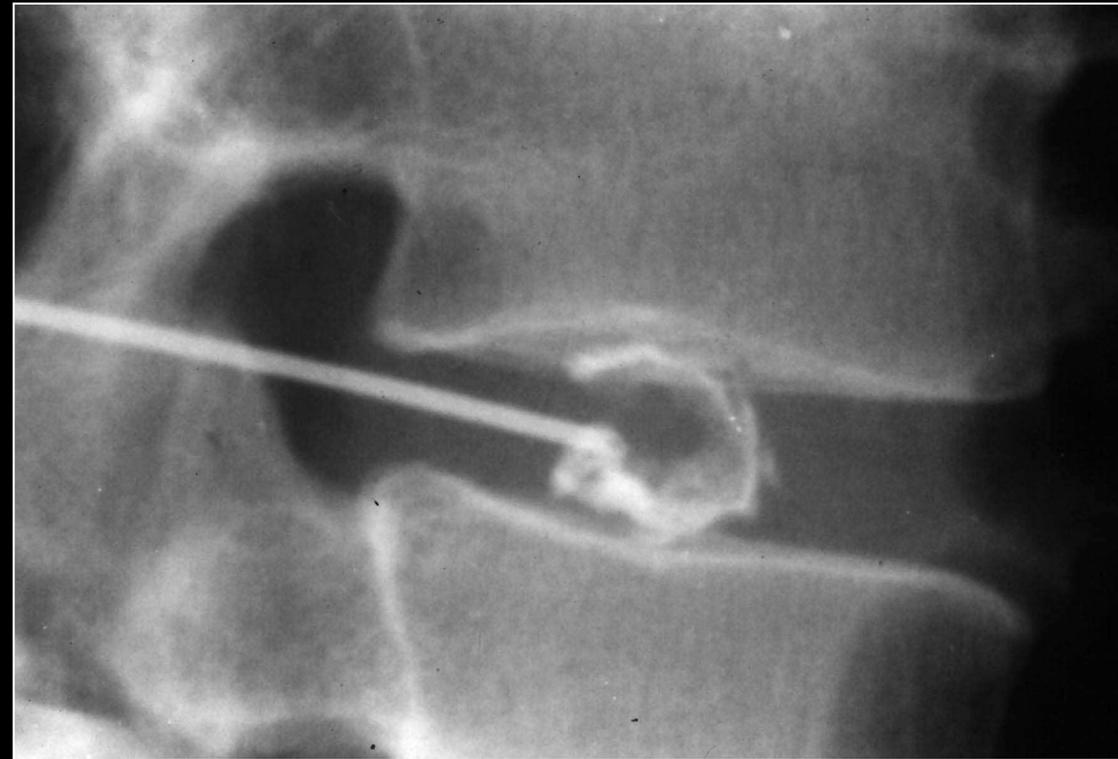
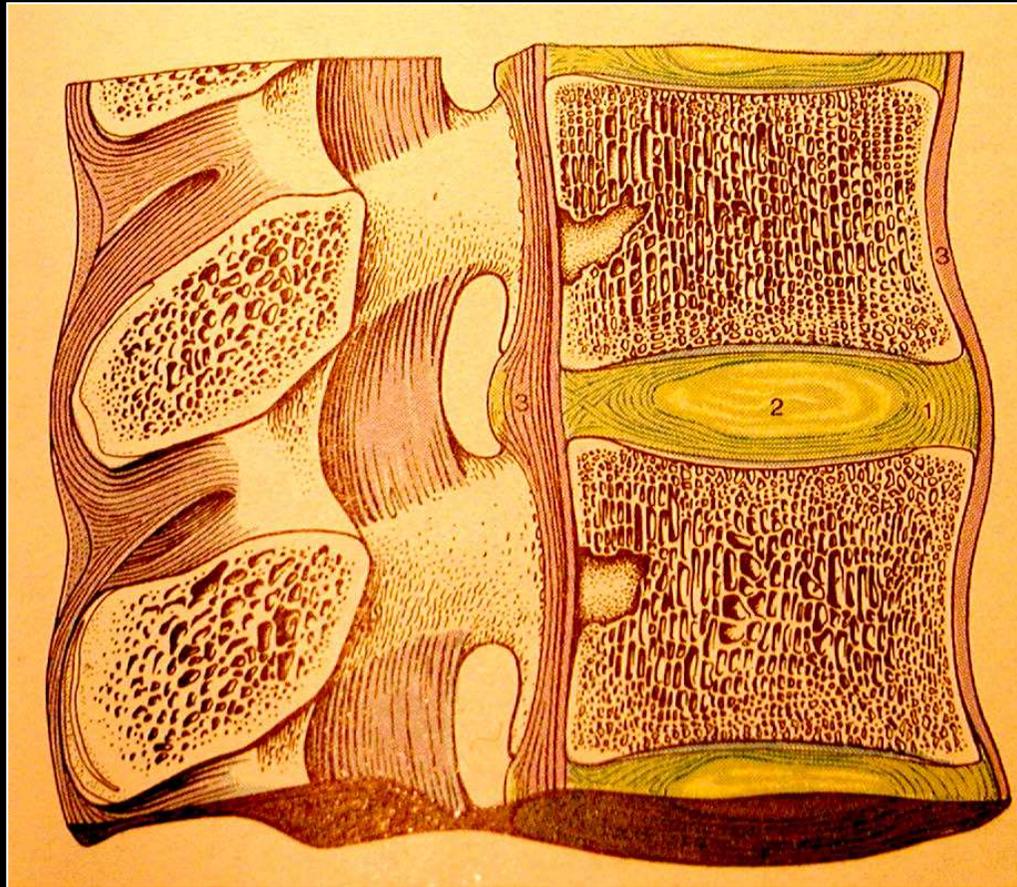




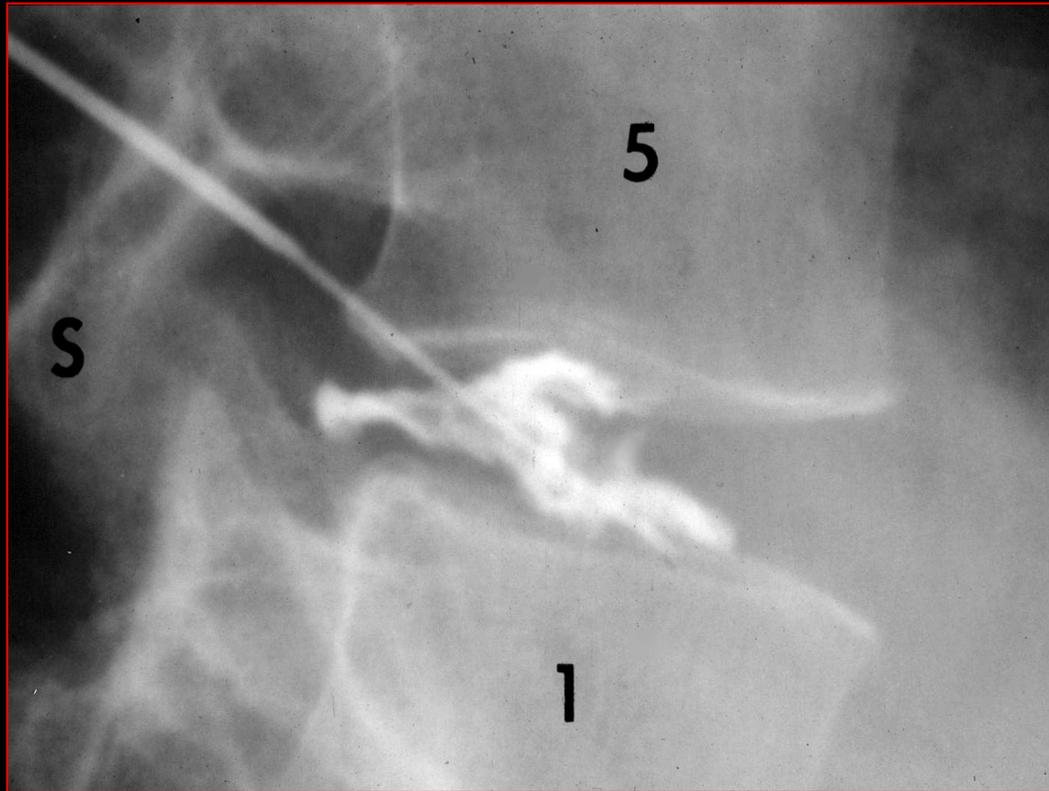
S  
Y  
M  
P  
T  
Ô  
M  
E  
S  
?



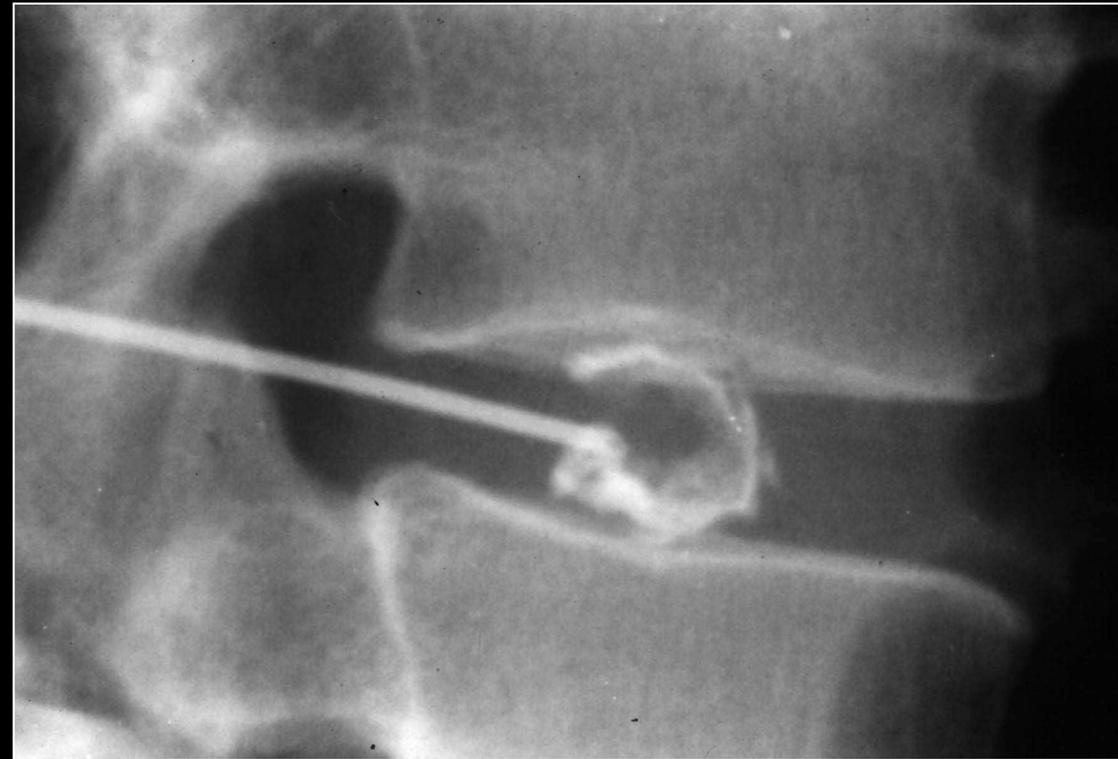




Discographie normale



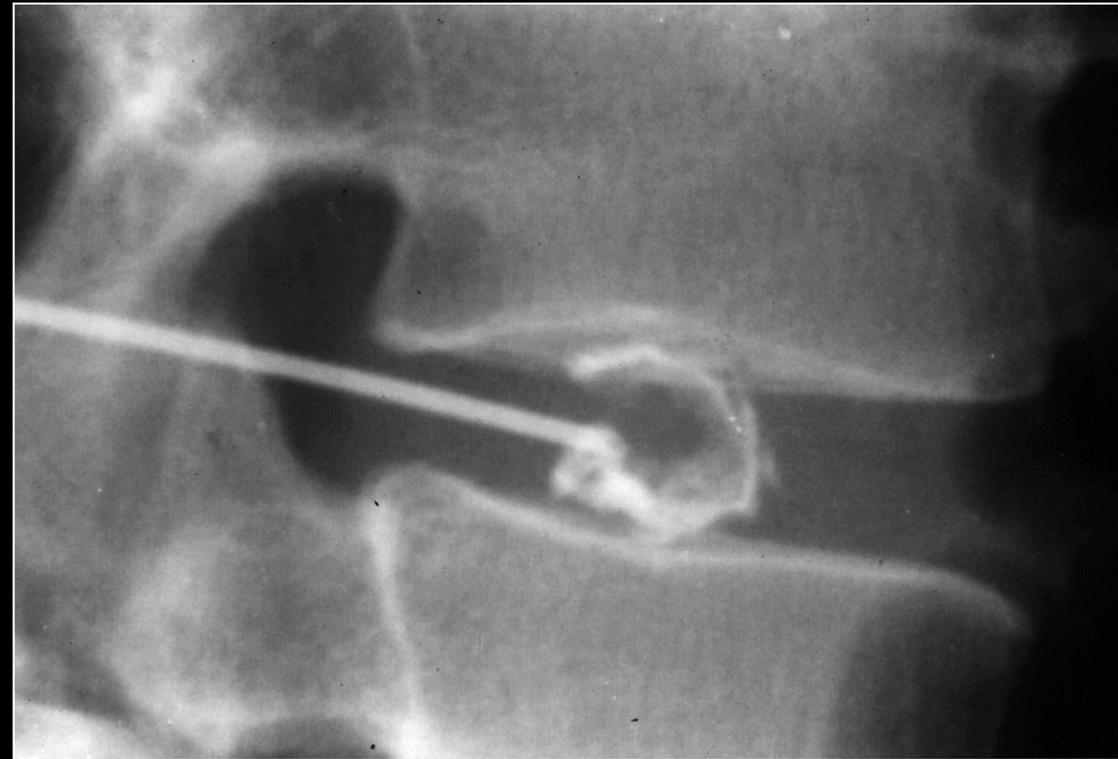
Annulus fissuré



Annulus continent



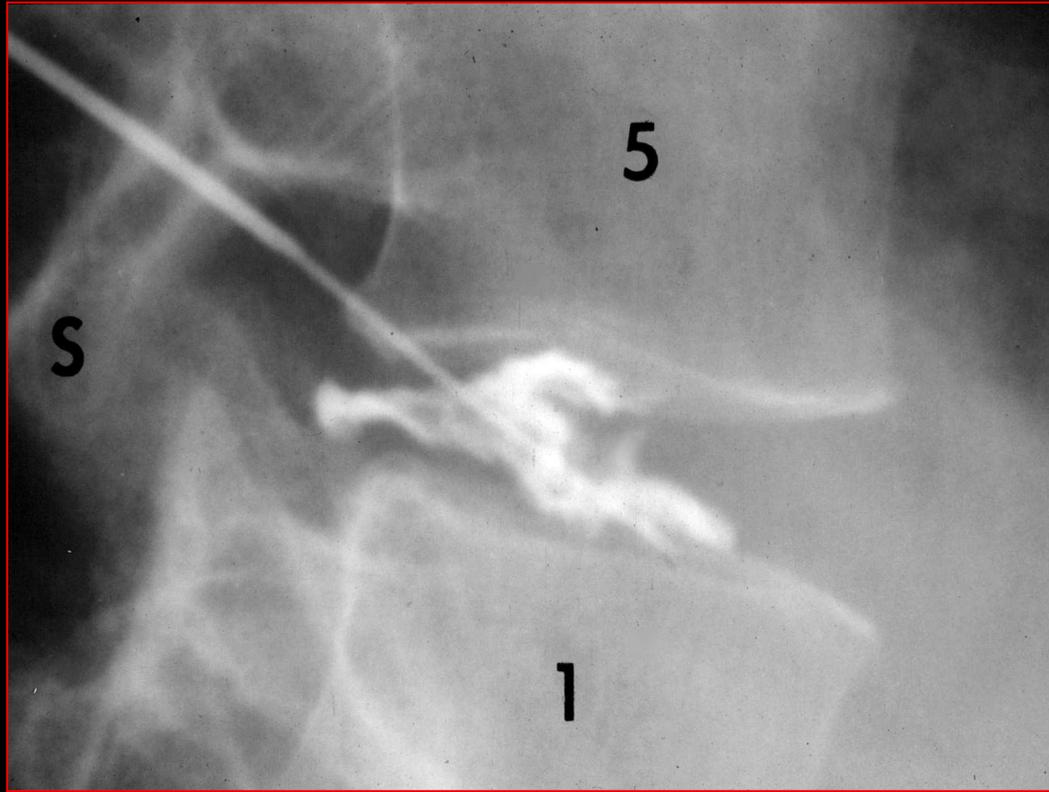
Scanner



Annulus continent



Scanner

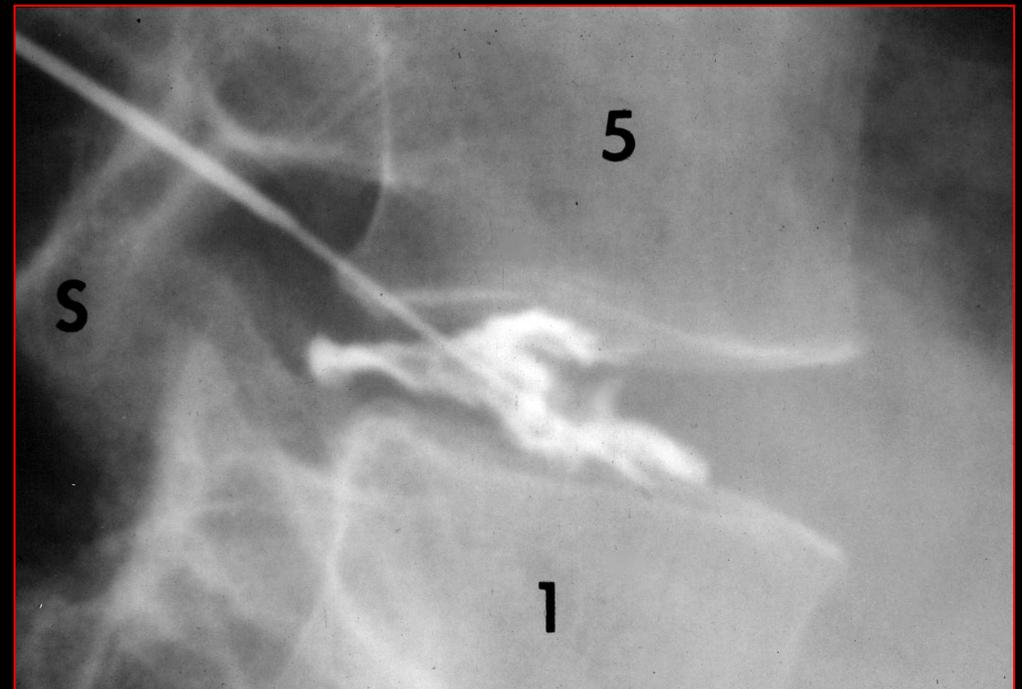


Annulus fissuré



Scanner

Fissuration de  
l'annulus  
non visible  
en scanner !!!



RX ?



CT ?

D  
O  
U  
B  
L  
E  
F  
R  
A  
C  
T  
U  
R  
E  
?

IRM ?



# 1. Lombalgie isolée

Soit Commune,  
Mécanique

Guérit spontanément  
→ Pas d'imagerie !

Soit Secondaire,  
symptomatique

S'aggrave  
→ Imagerie indiquée :  
Pathologie active ?  
Tumeur ? Inflammation ?

## 2. Lombalgie + Sciatalgies ou autres signes Neurologiques

# “Radiculalgies communes”

- Pas d'imagerie précoce  
(essai thérapeutique 6-8 semaines)
- Imagerie conflit disco-radiculaire (TDM, IRM)

*si*

*Résistance au traitement médical*

*Traitement invasif envisagé*

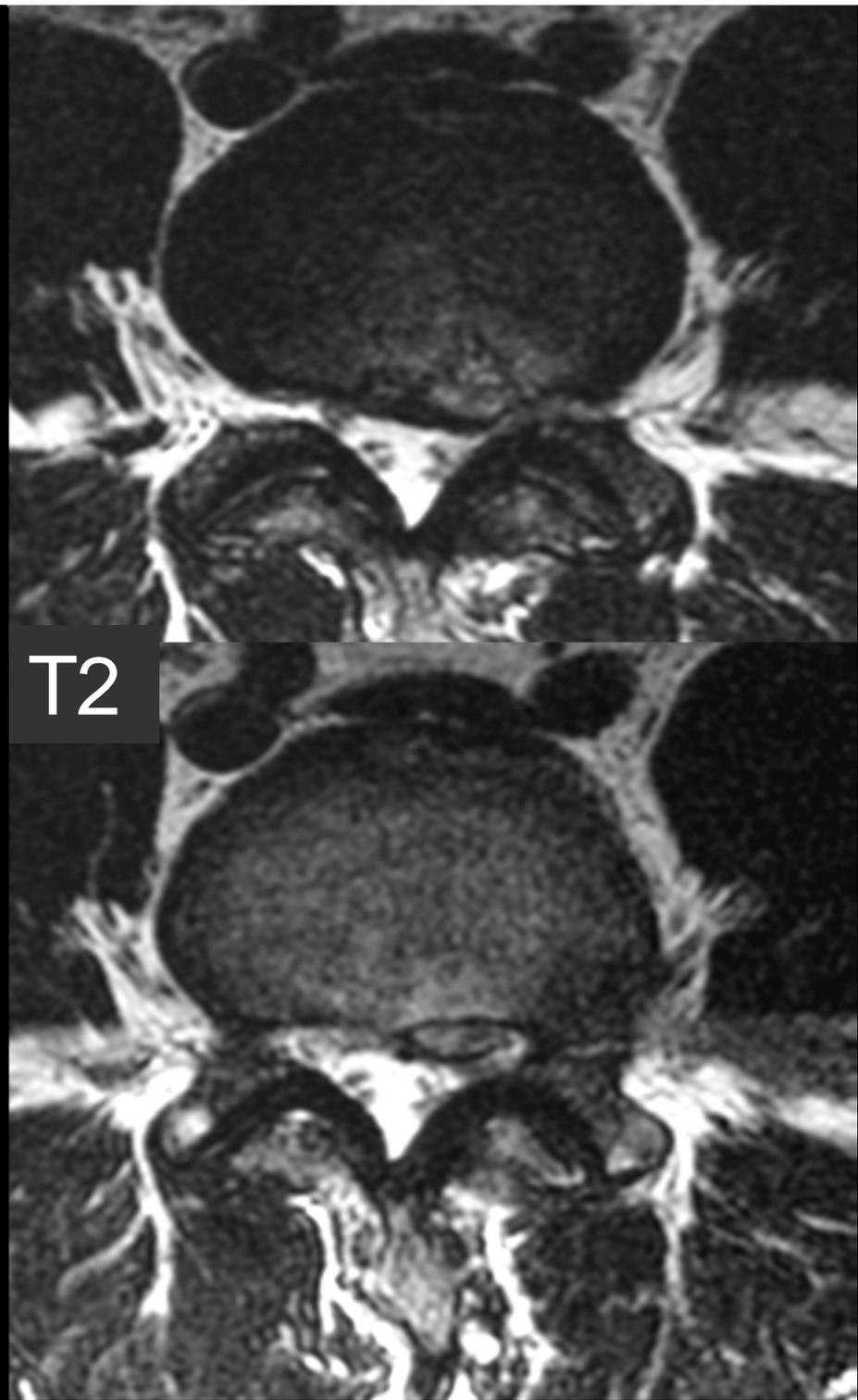
# Imagerie précoce si

- Urgence thérapeutique  
(donc diagnostique)

- “Radiculalgie symptomatique”

# Urgence thérapeutique (donc diagnostique)

- Hyperalgique non contrôlable
- Paralysante
- Syndrome médullaire
- Syndrome de la queue de cheval





# “Radiculalgie symptomatique”

- Tumeur (antcdts, > 50 ans, AEG, SI ...)
- Infection (t°, immunosuppression,...)
- Fracture (corticoïdes, trauma, âge)

# CONFLIT DISCO-RADIC.

IRM

TDM (CT scanner)

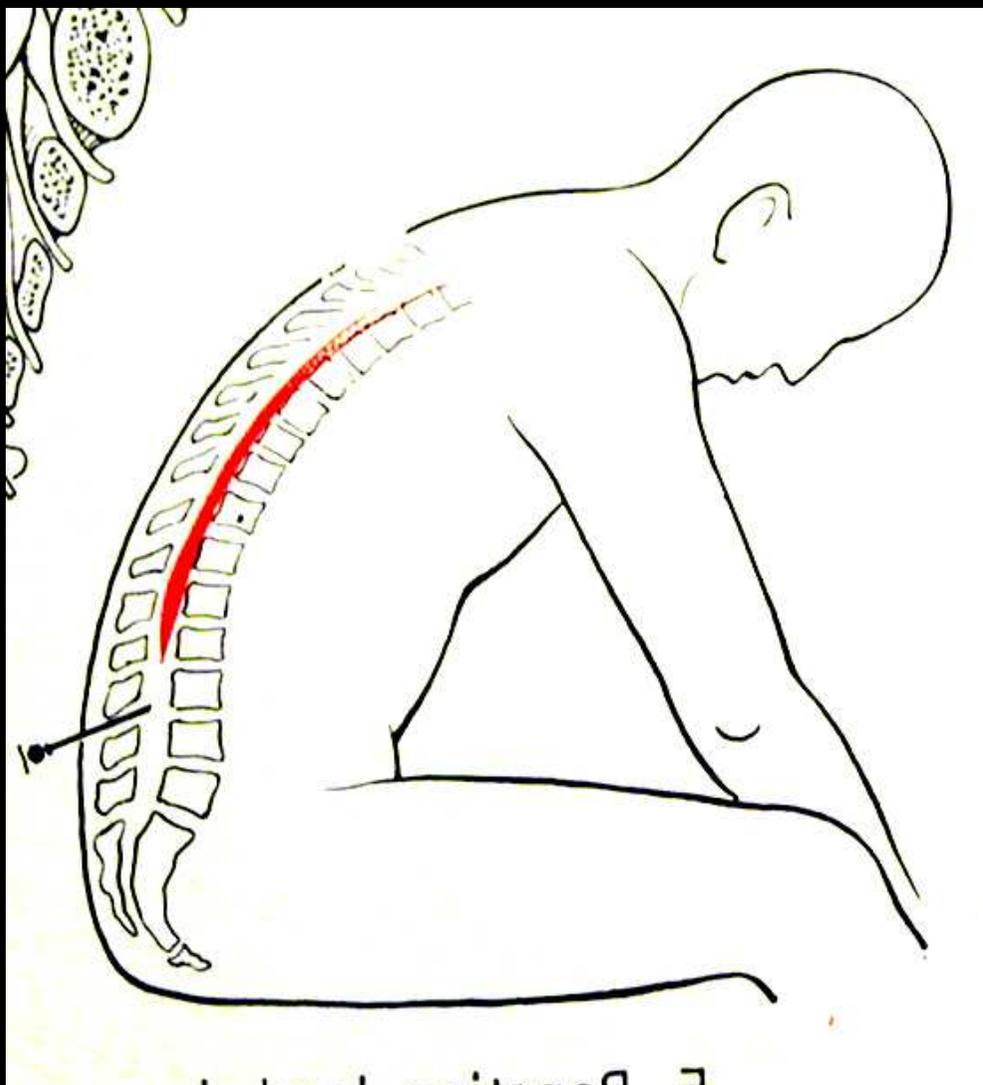
**Plateau Inf L5**



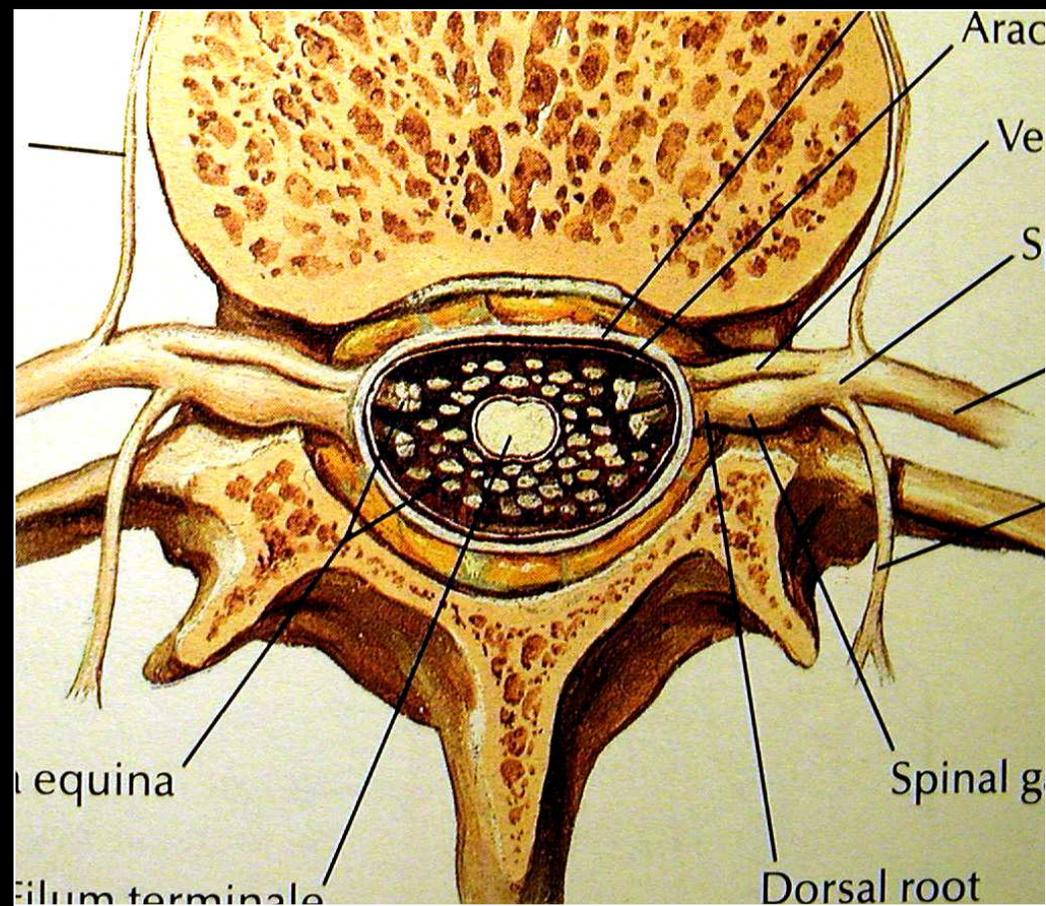
**Disque L5 - S1**



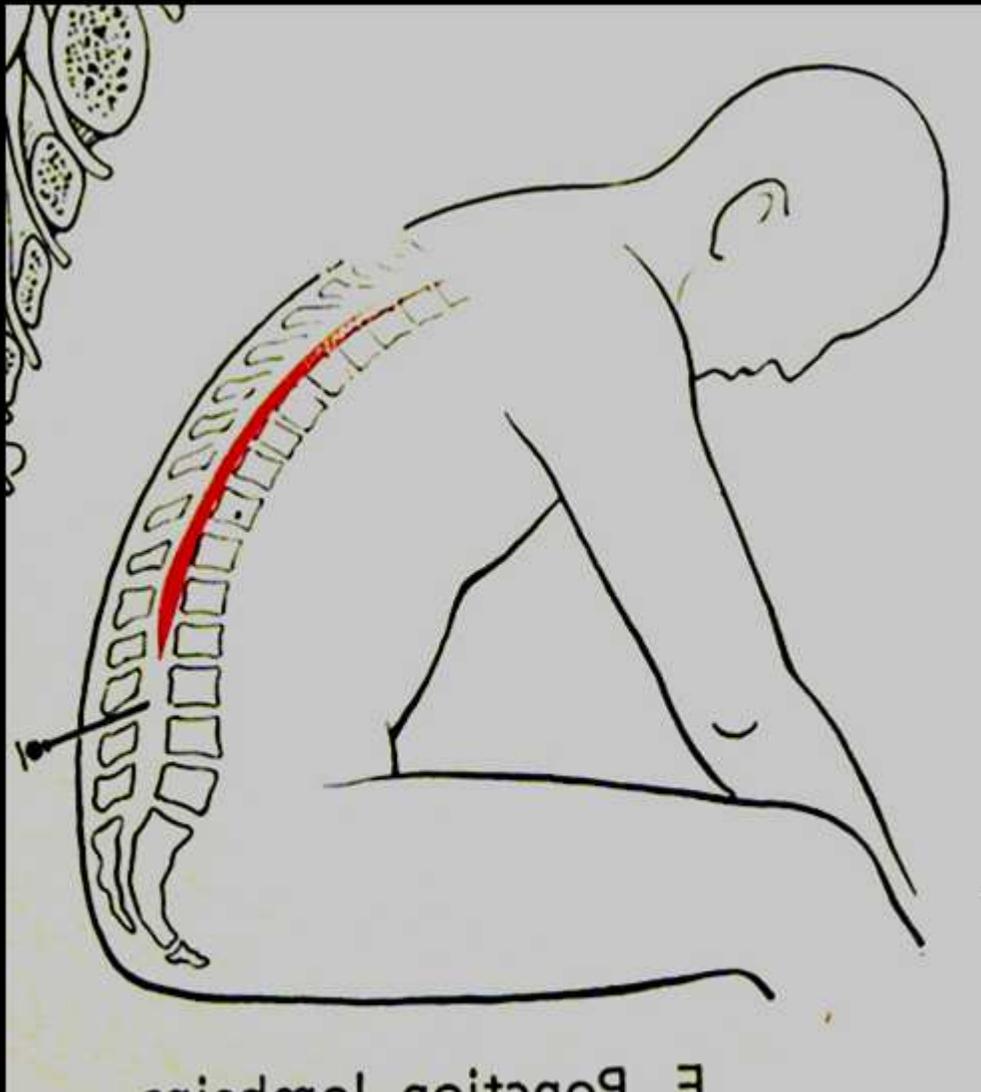
# Myélographie (Sacco-radiculographie)



Ponction lombaire en L3-L4



# Myélographie



Ponction lombaire en L3-L4



L2

L3

L4

L5

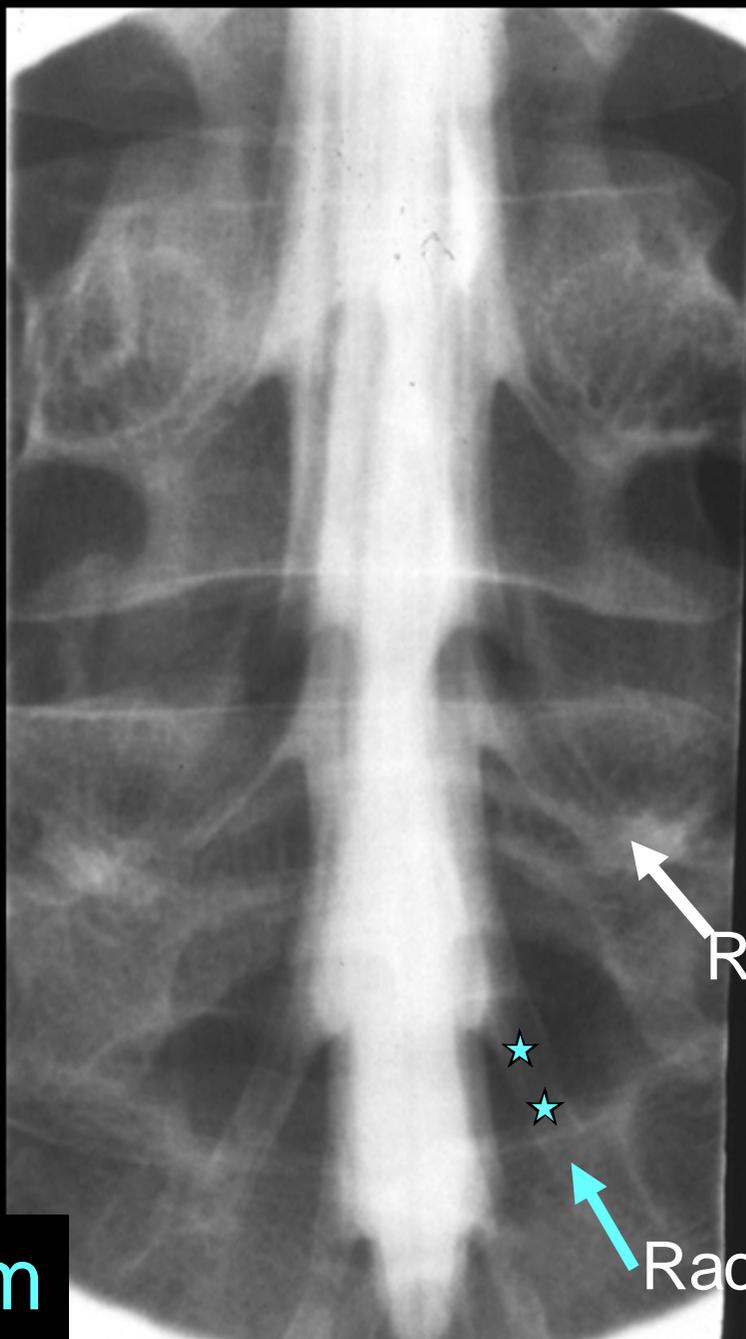
Sacrum

Face

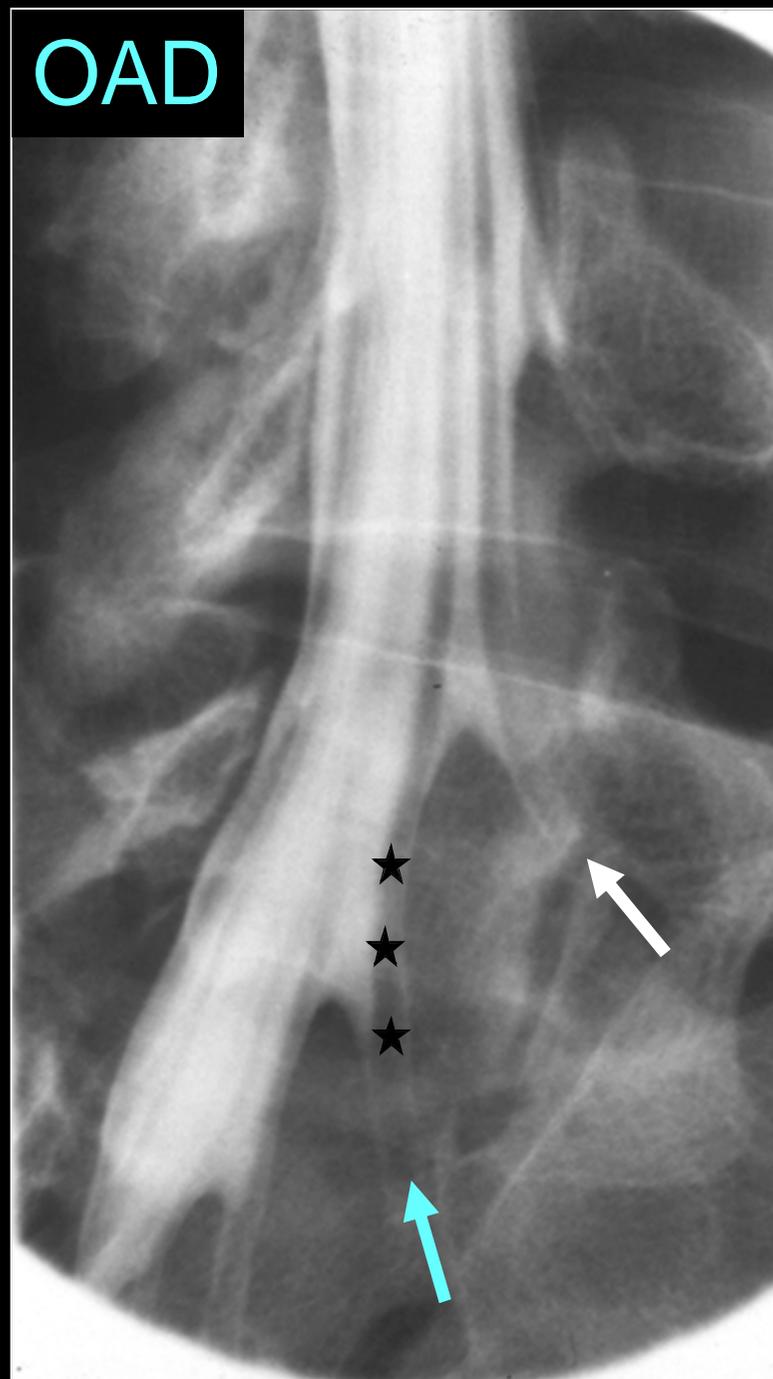
L4

L5

Sacrum



OAD



# Myélographie (Sacco-radiculographie)

L4



L5

L4



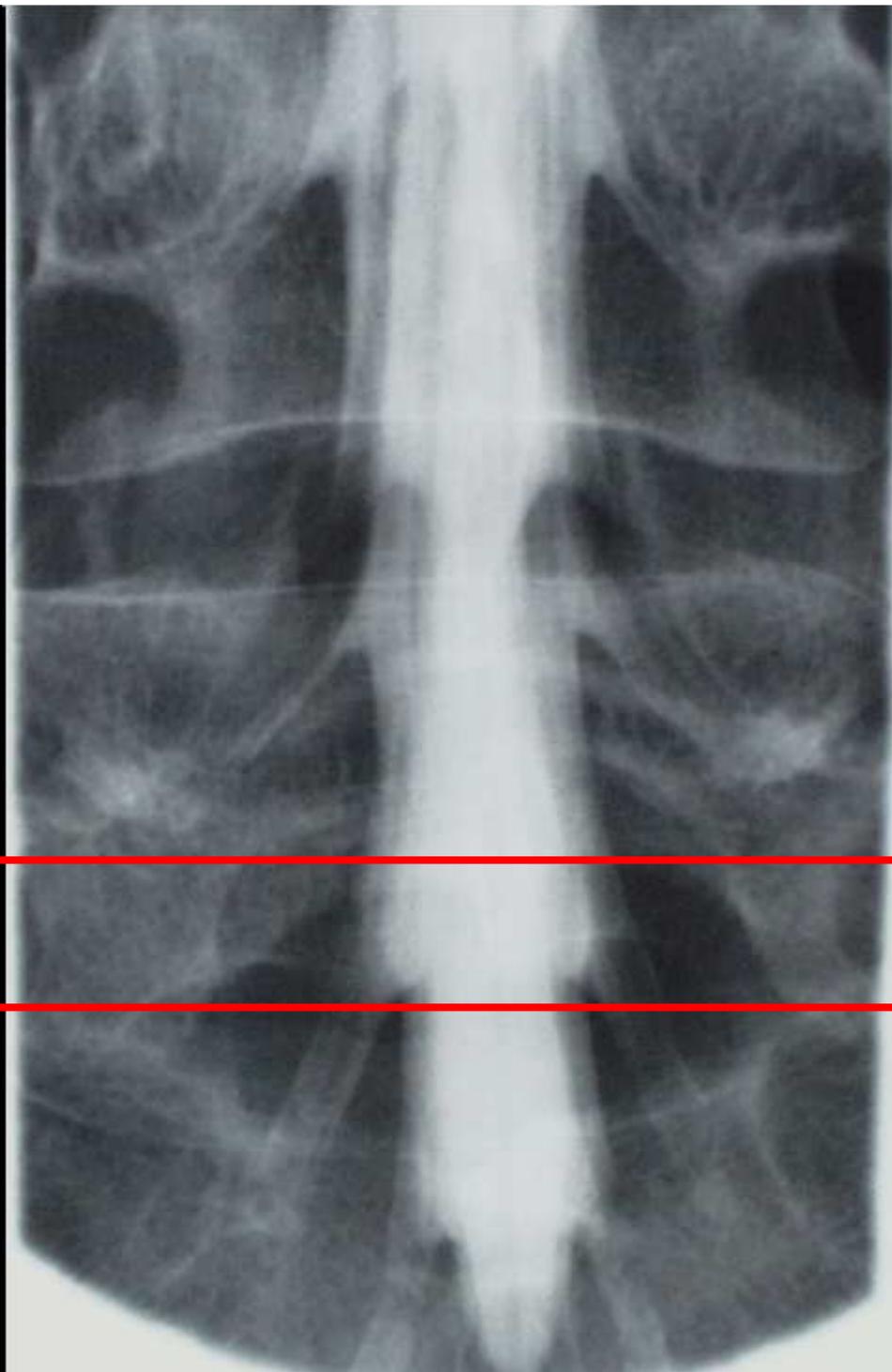
L5

**Dr**

**L4**

**L5**

**Sacrum**

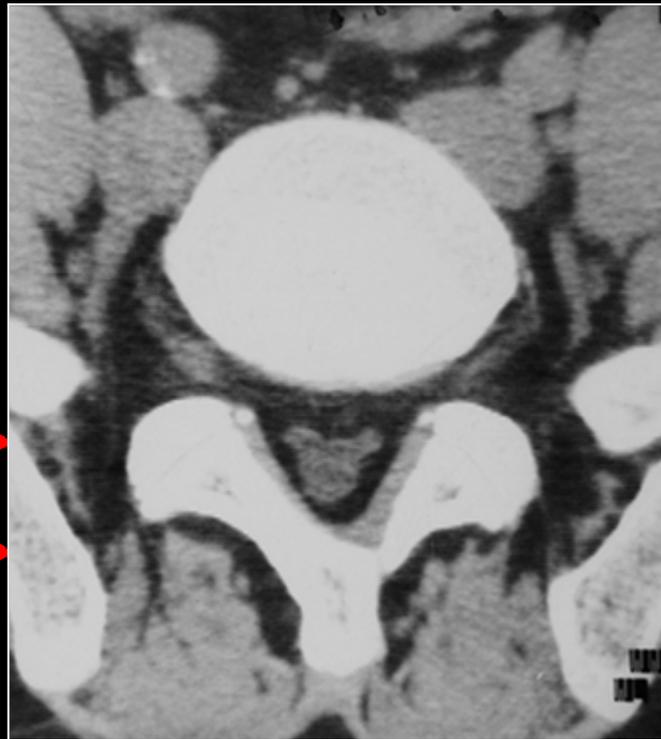


**Face**

**Plateau Inf L5**

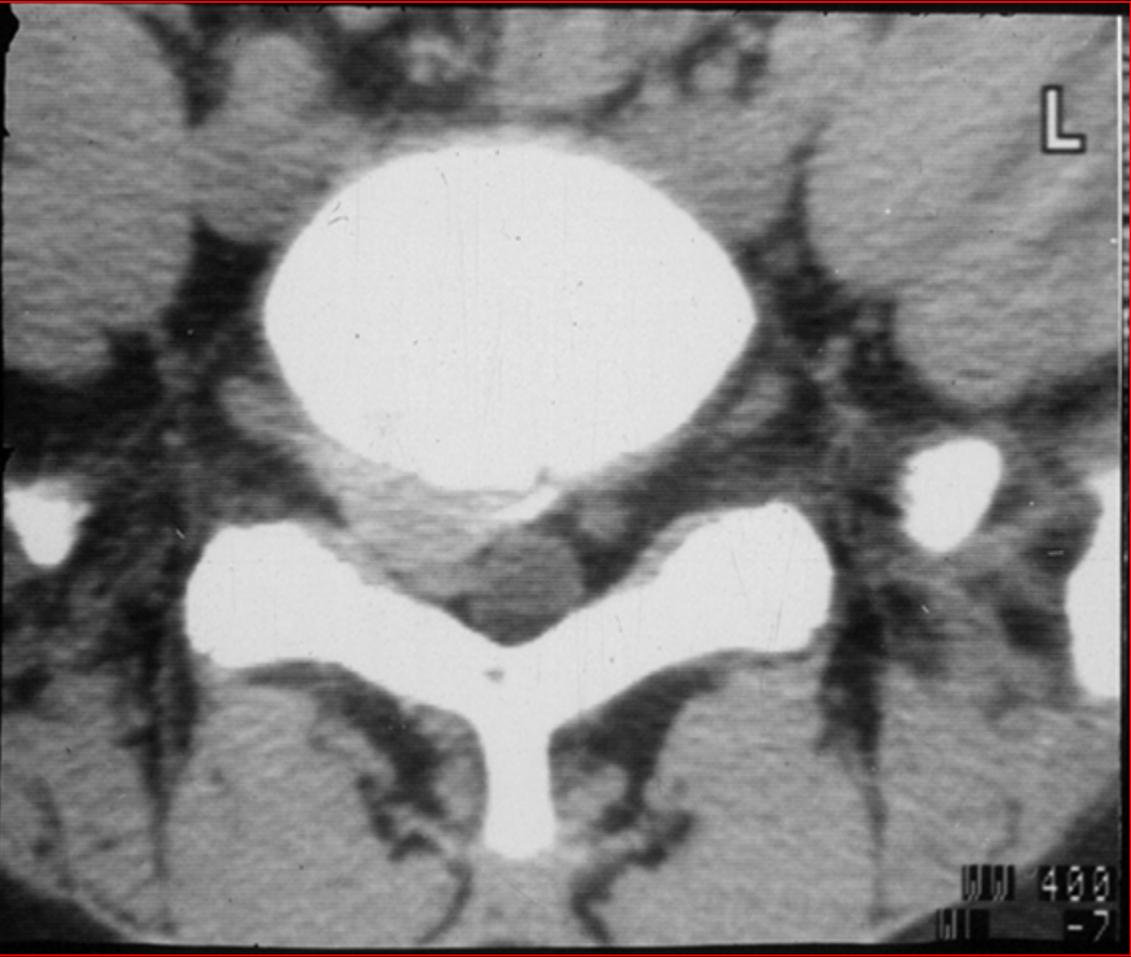


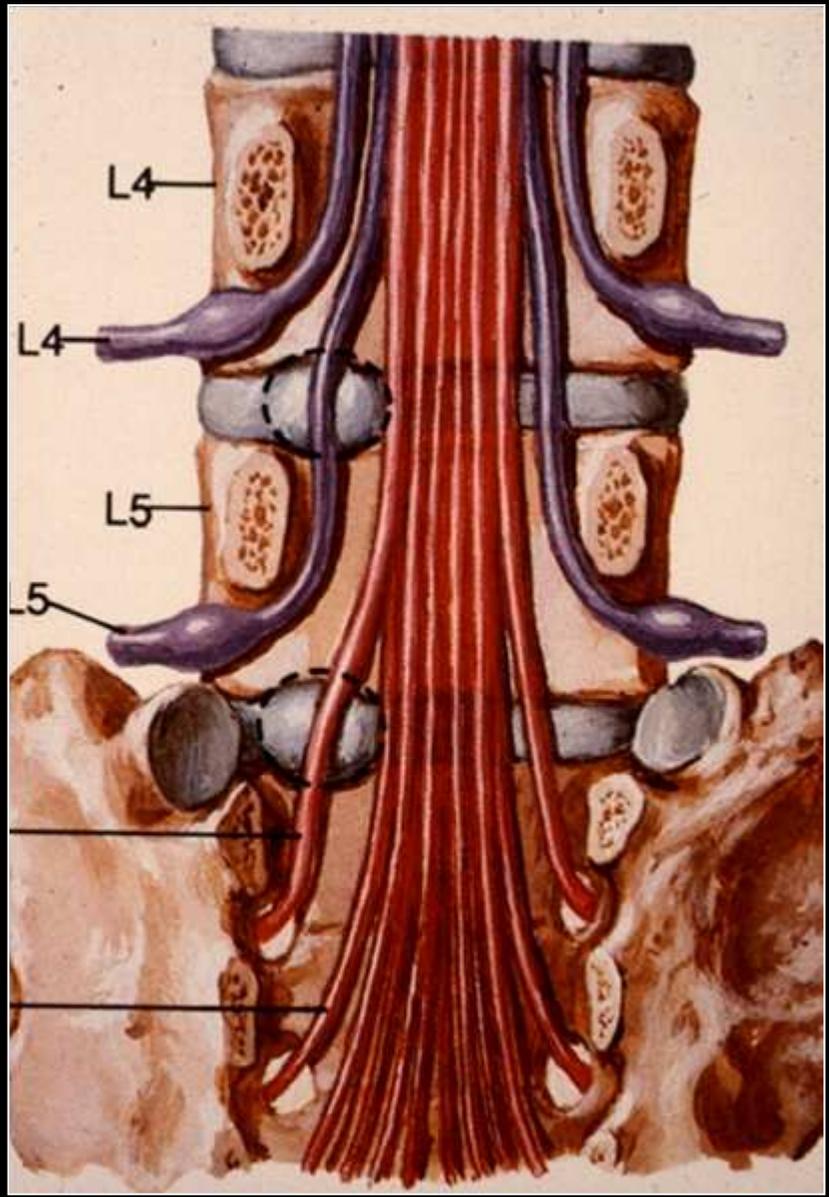
**Disque L5 - S1**



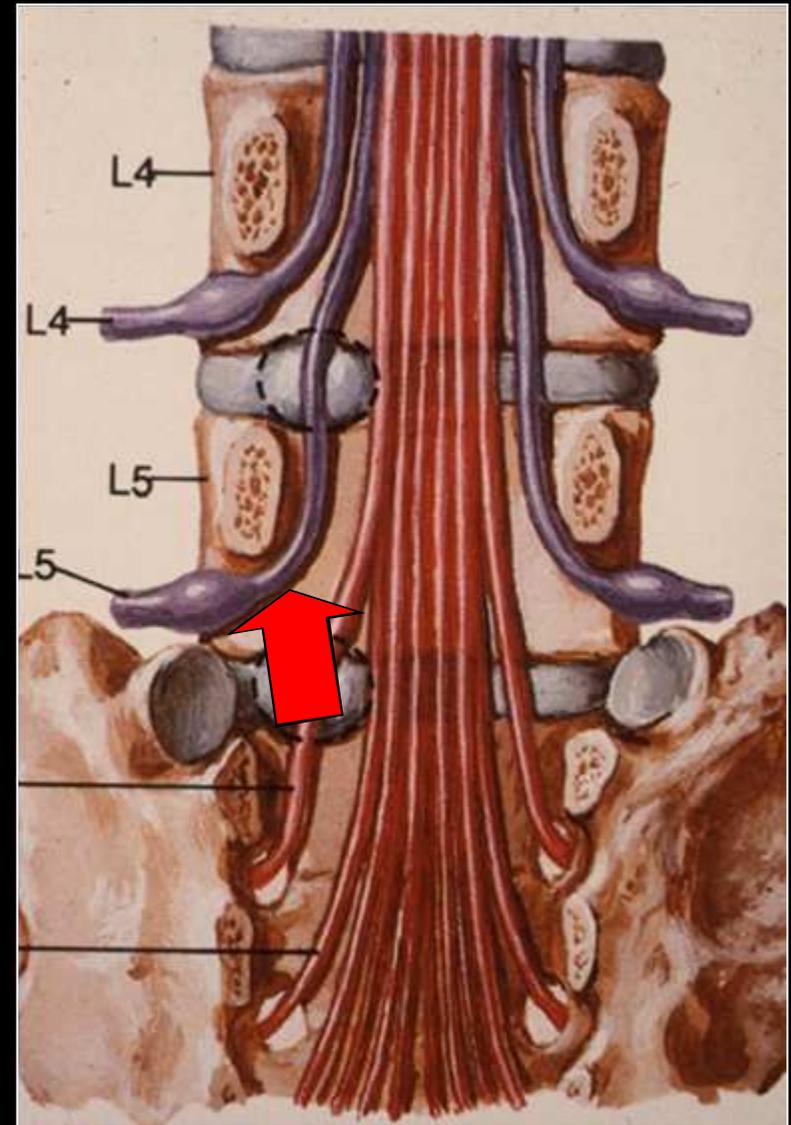
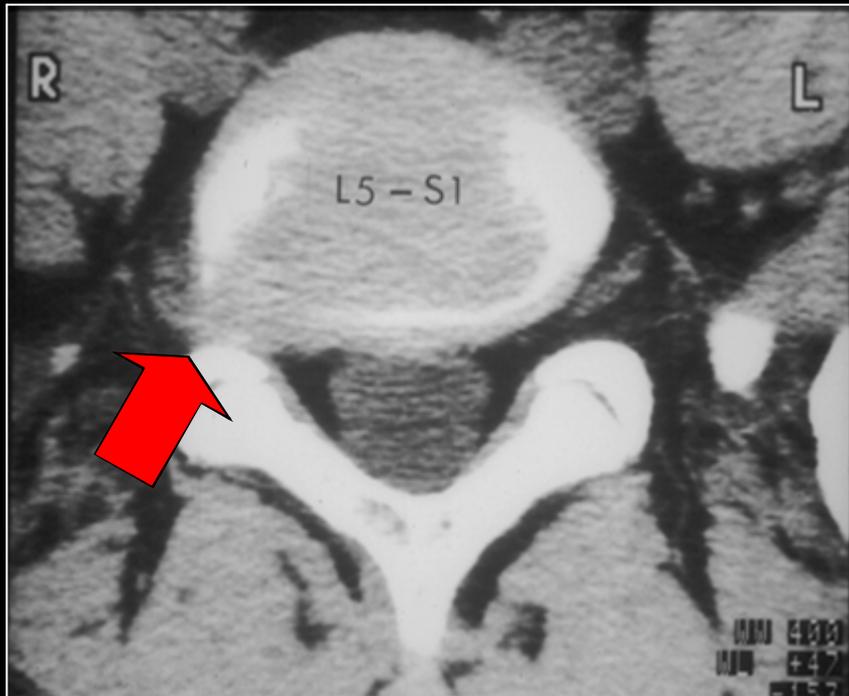
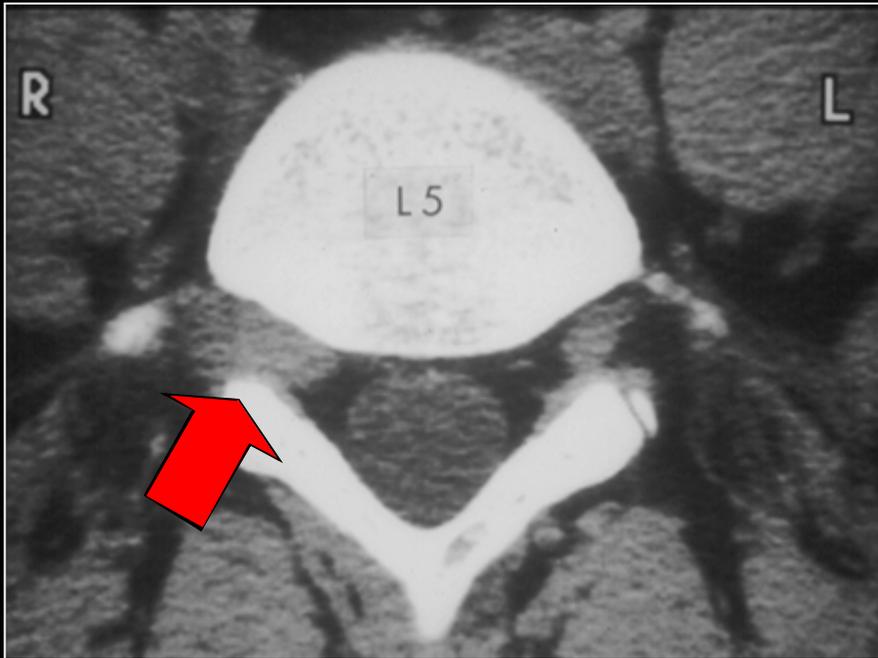


?

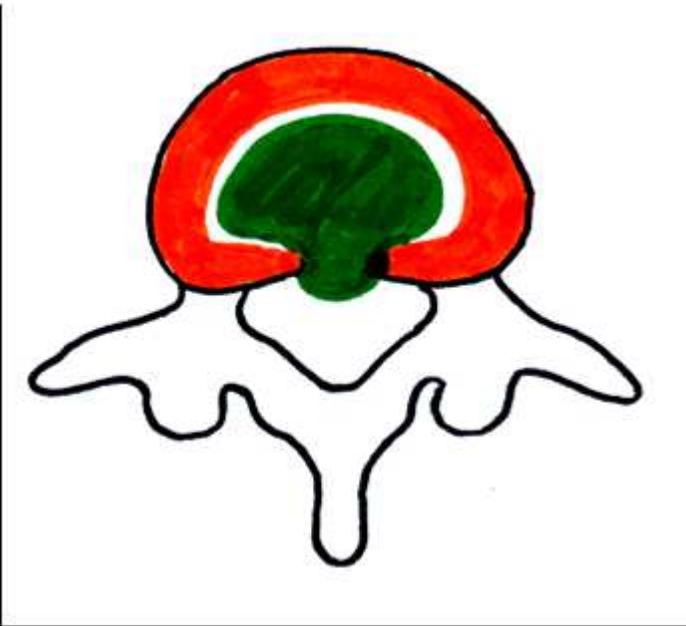




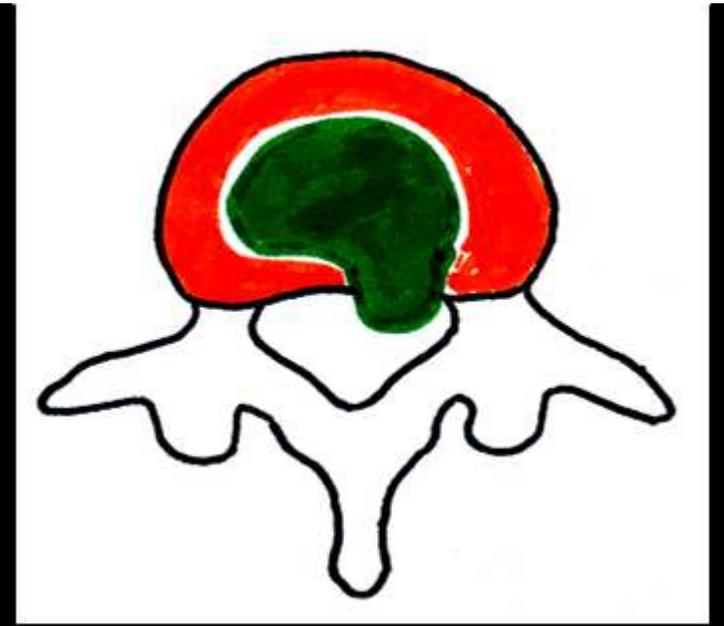
# Hernie ascendante



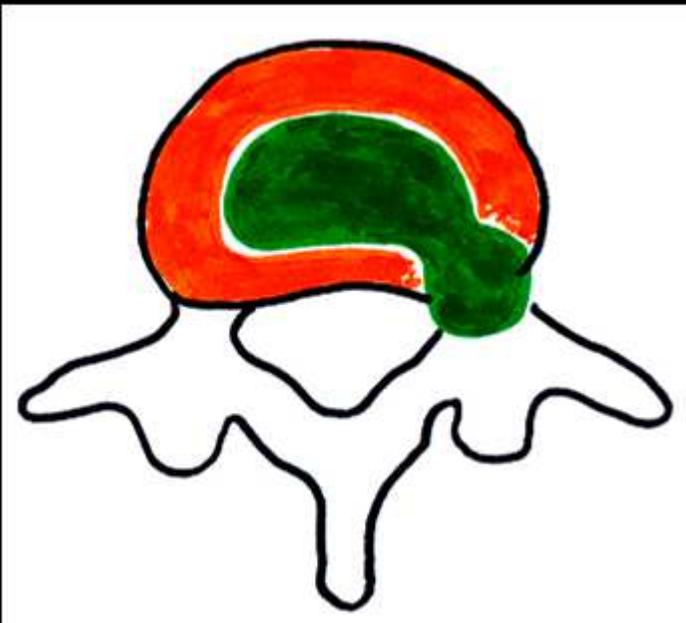
F  
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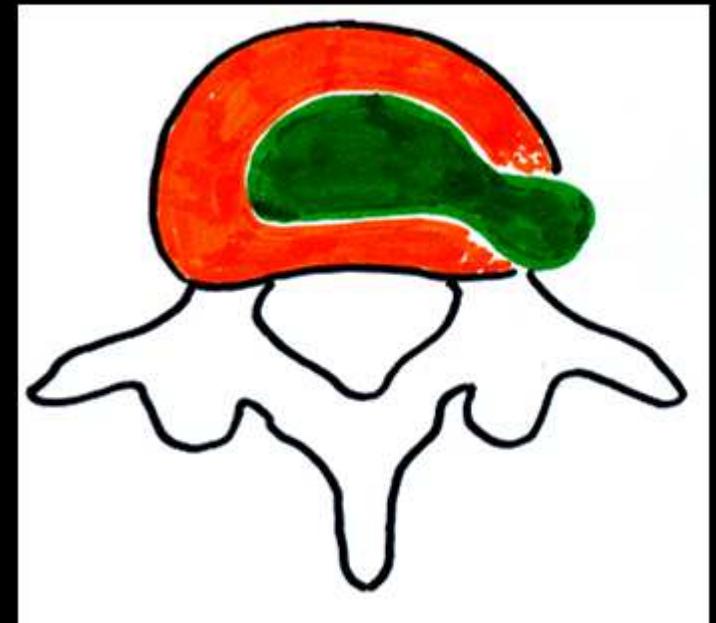
Médian



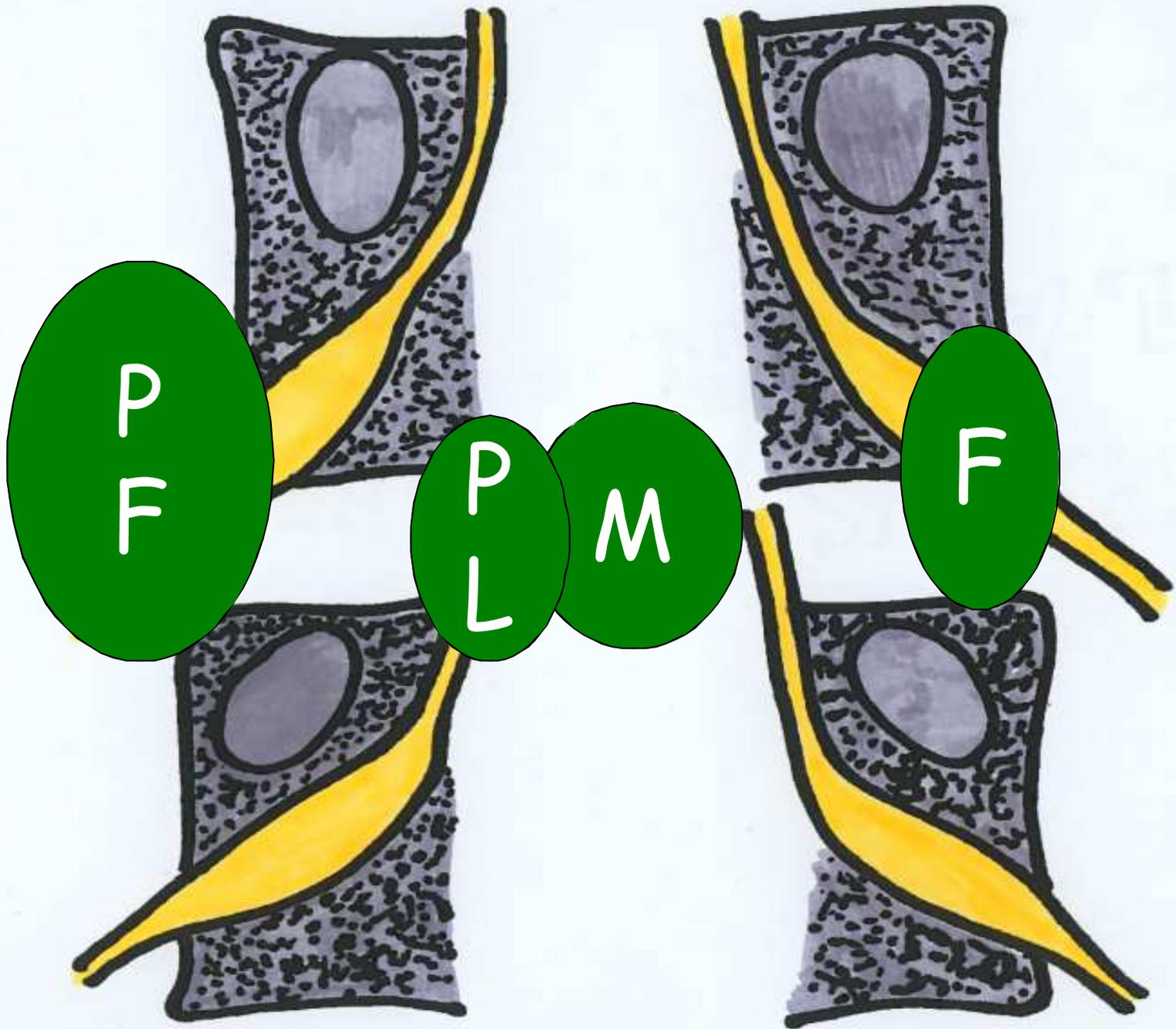
Postéro-latéral



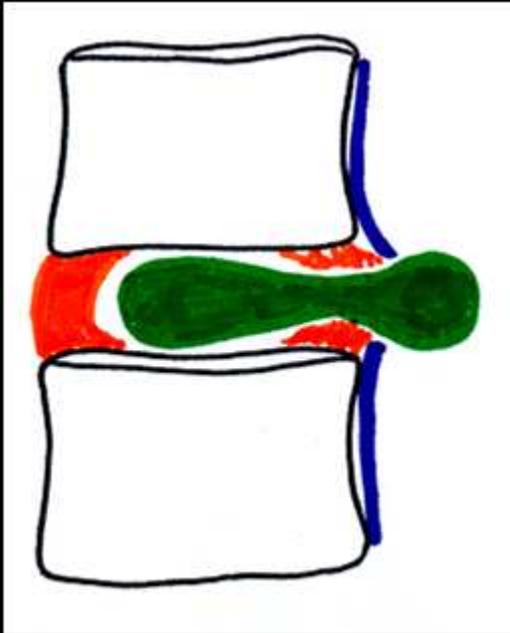
Foraminal



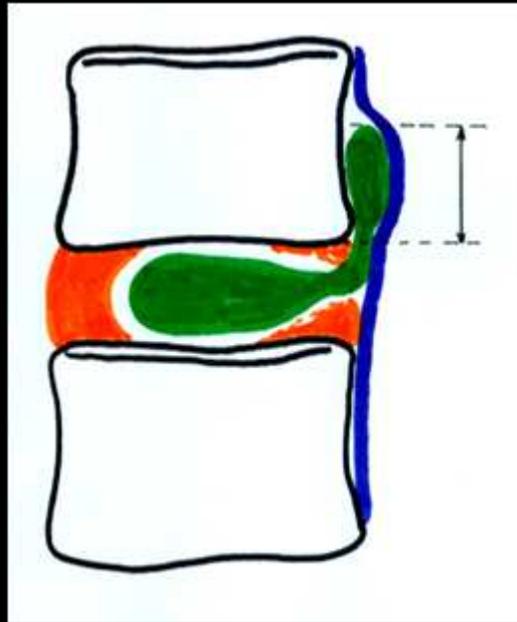
Post-foraminal



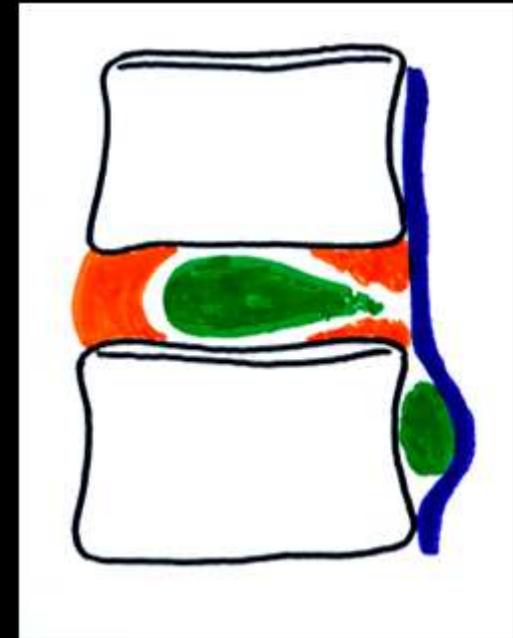
# Hernies discales



Horizontale

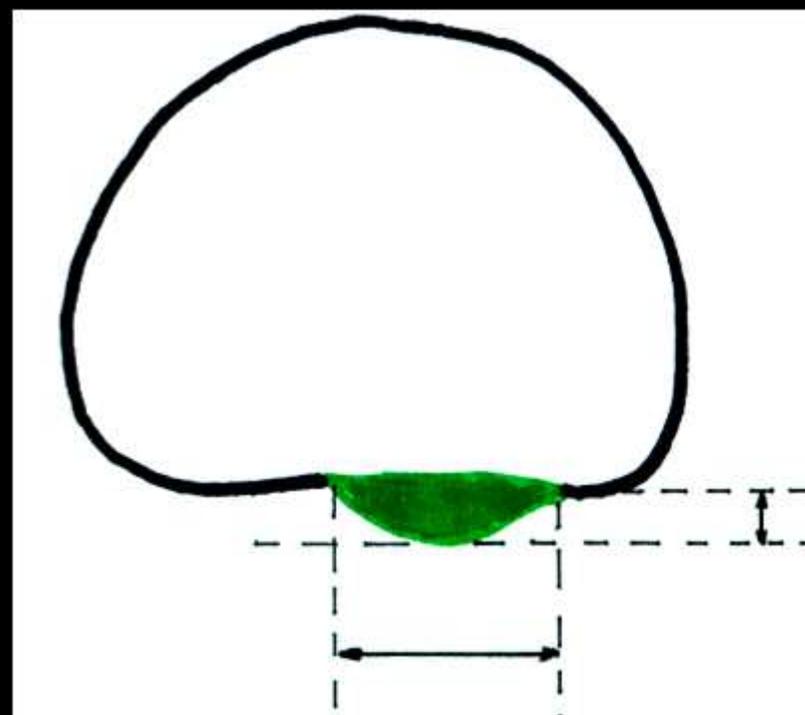
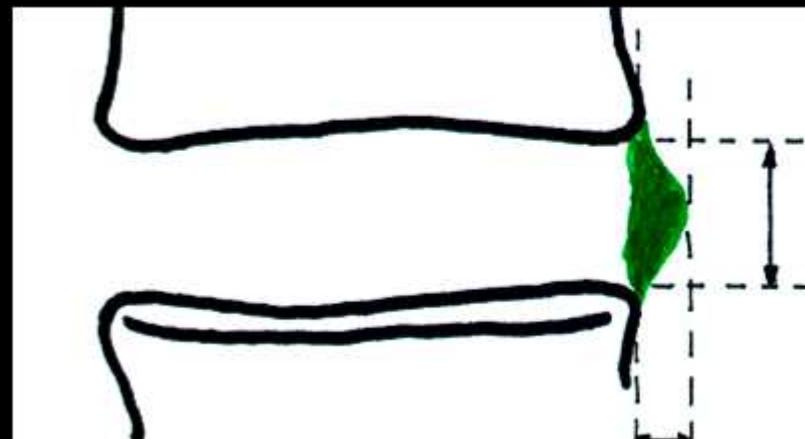


Ascendante

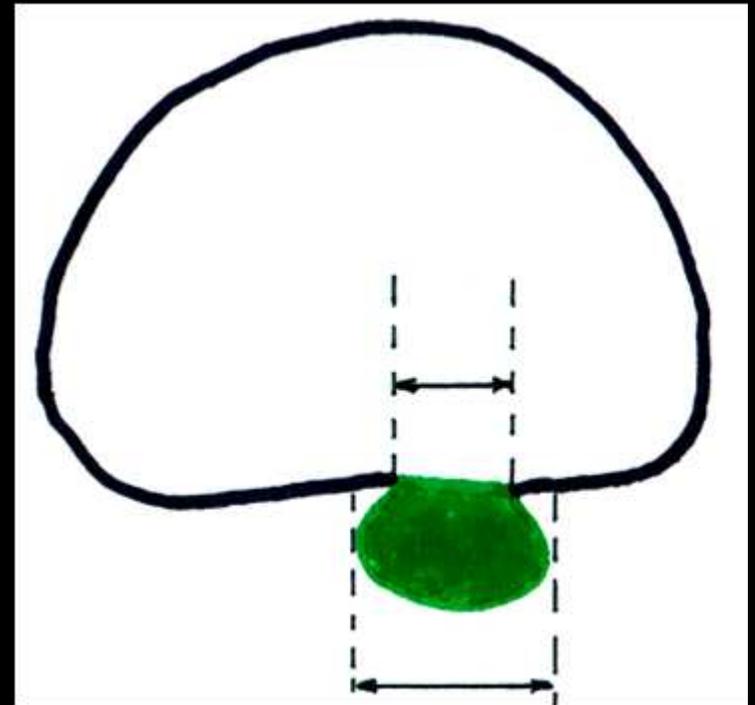
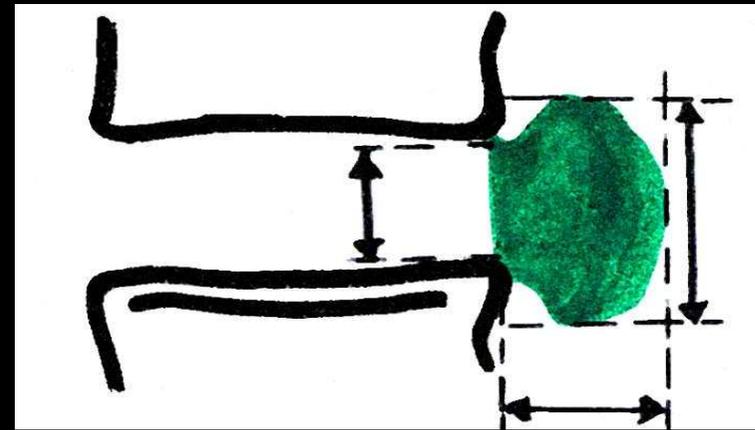


Exclue

# Protrusion



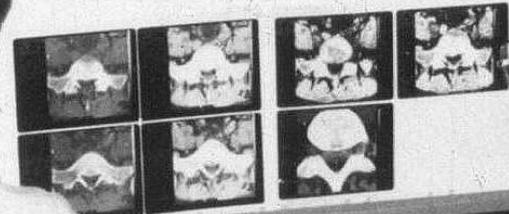
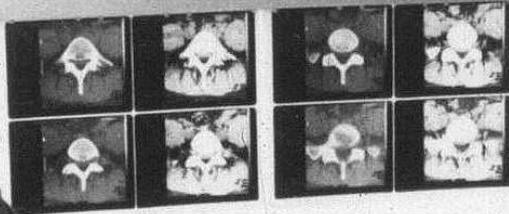
# Extrusion (hernie)



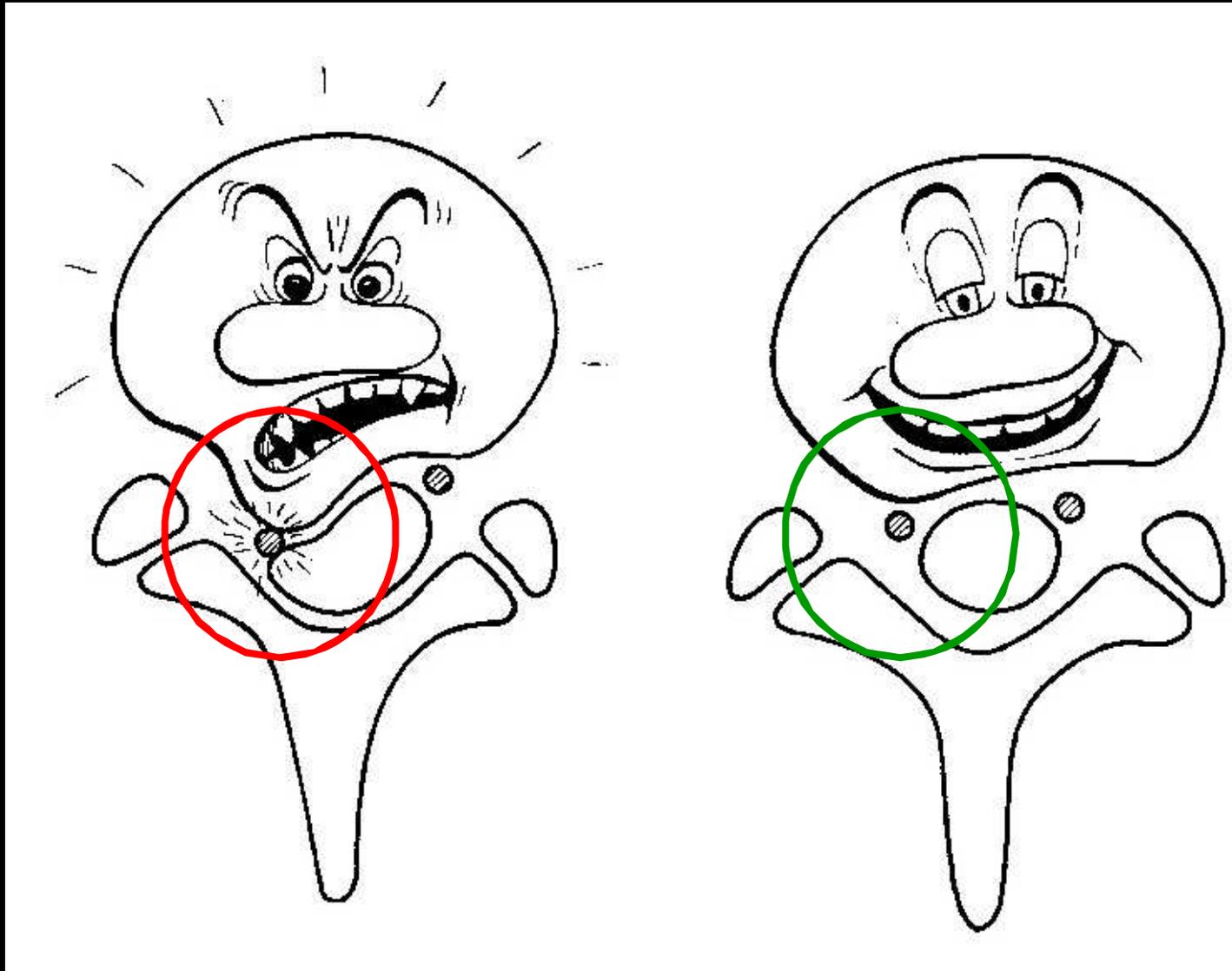
PROTRUSION

HERNIATION

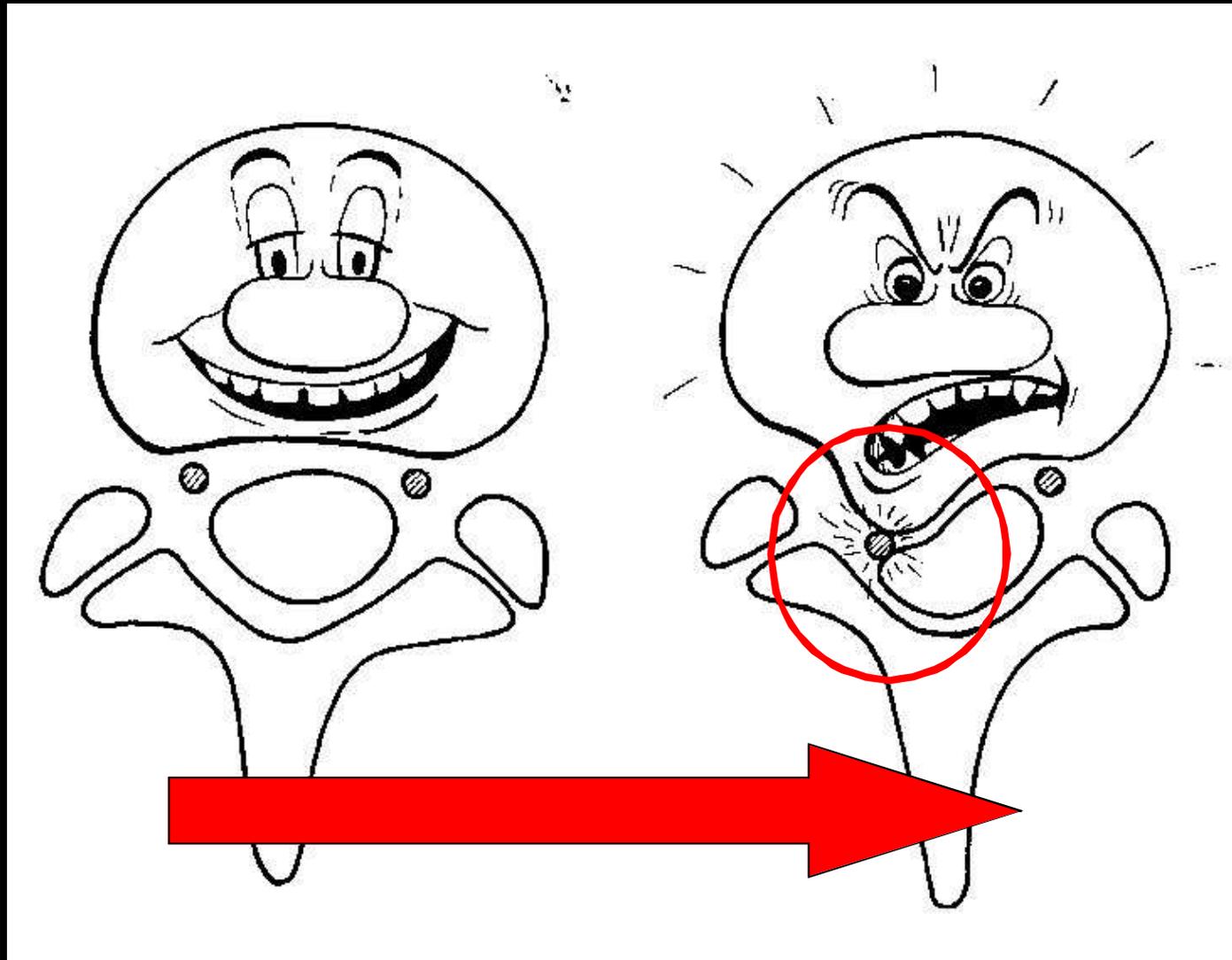
BULGING



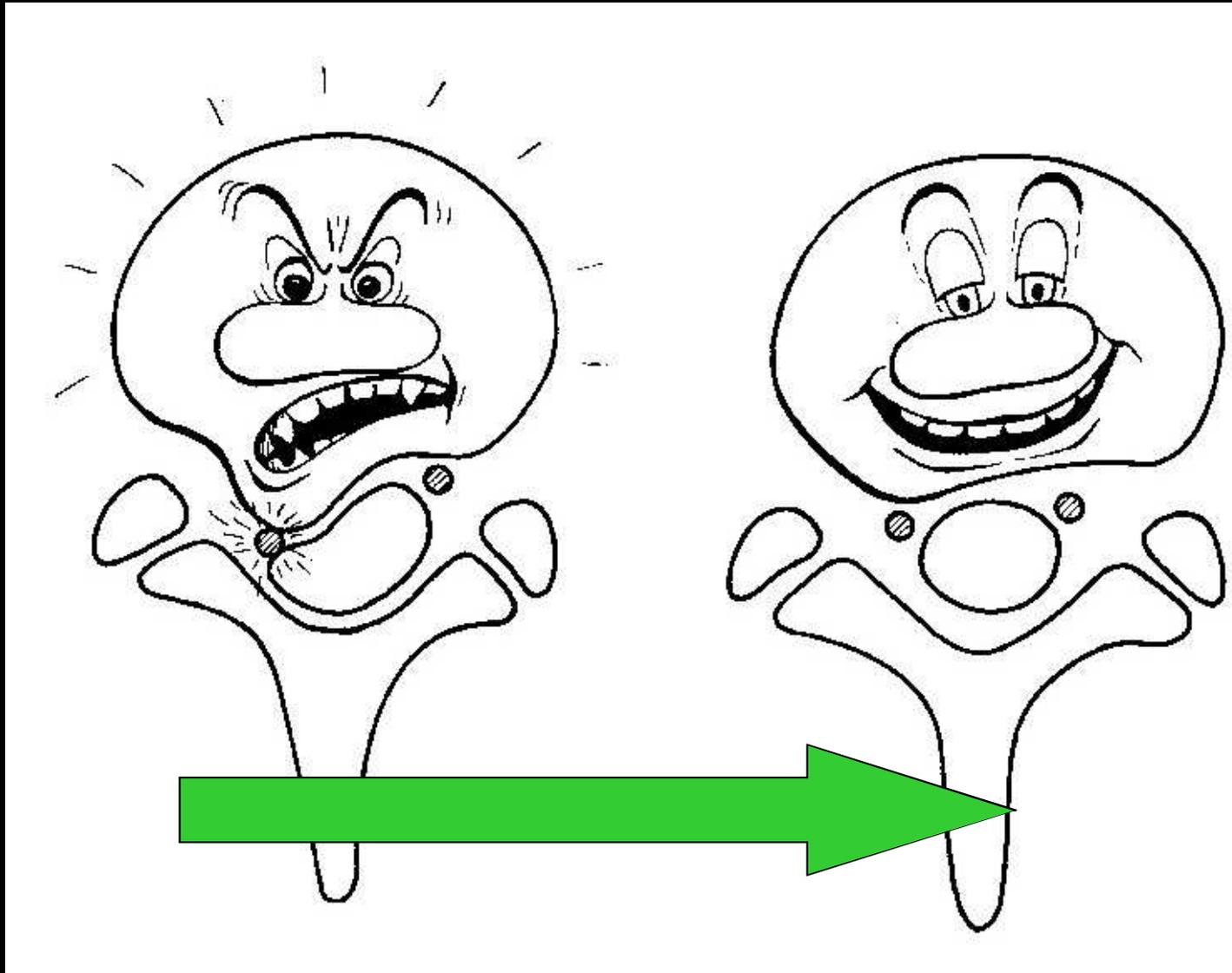
?



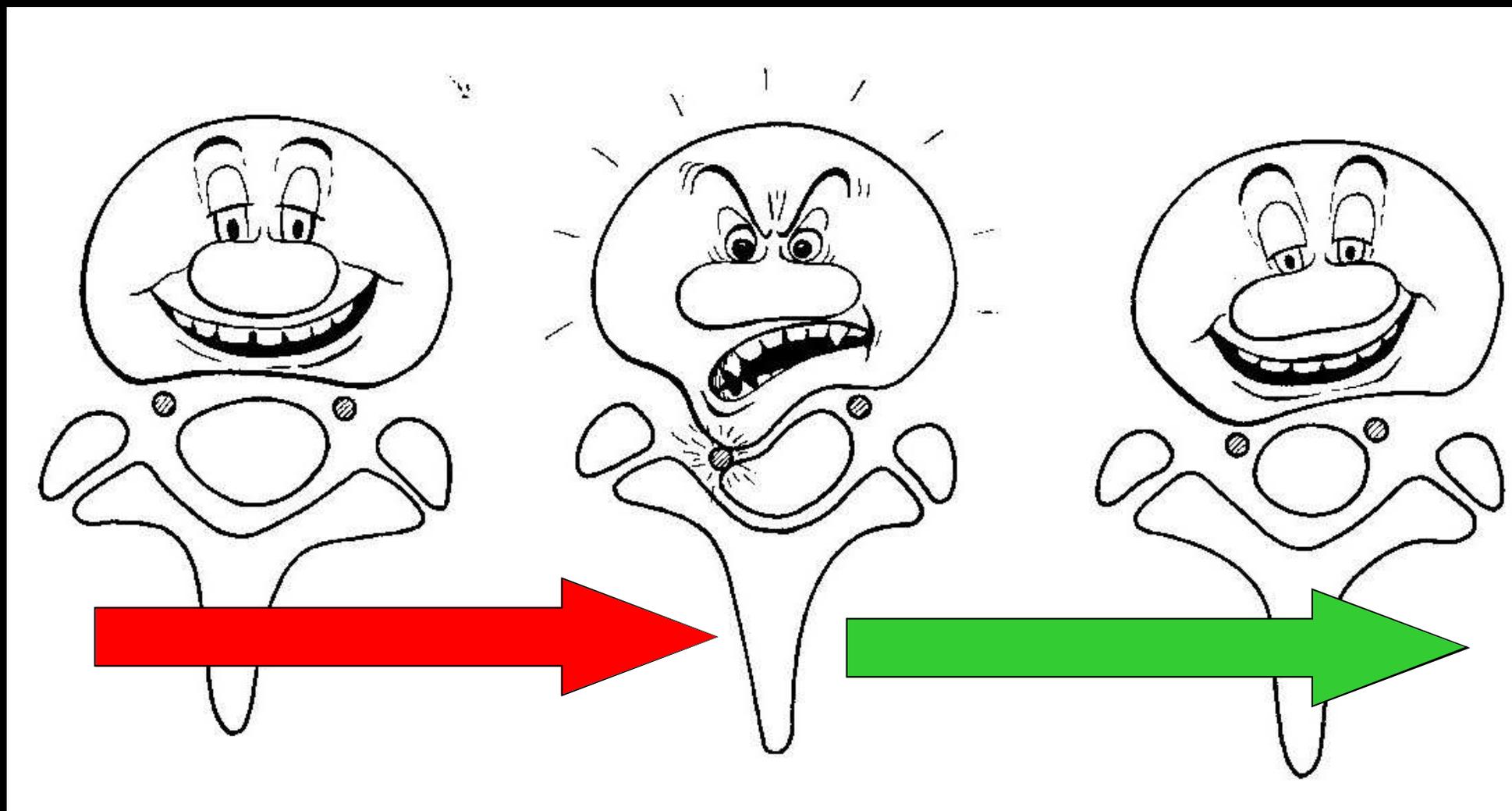
L'important ? ?? C'est la compression nerveuse



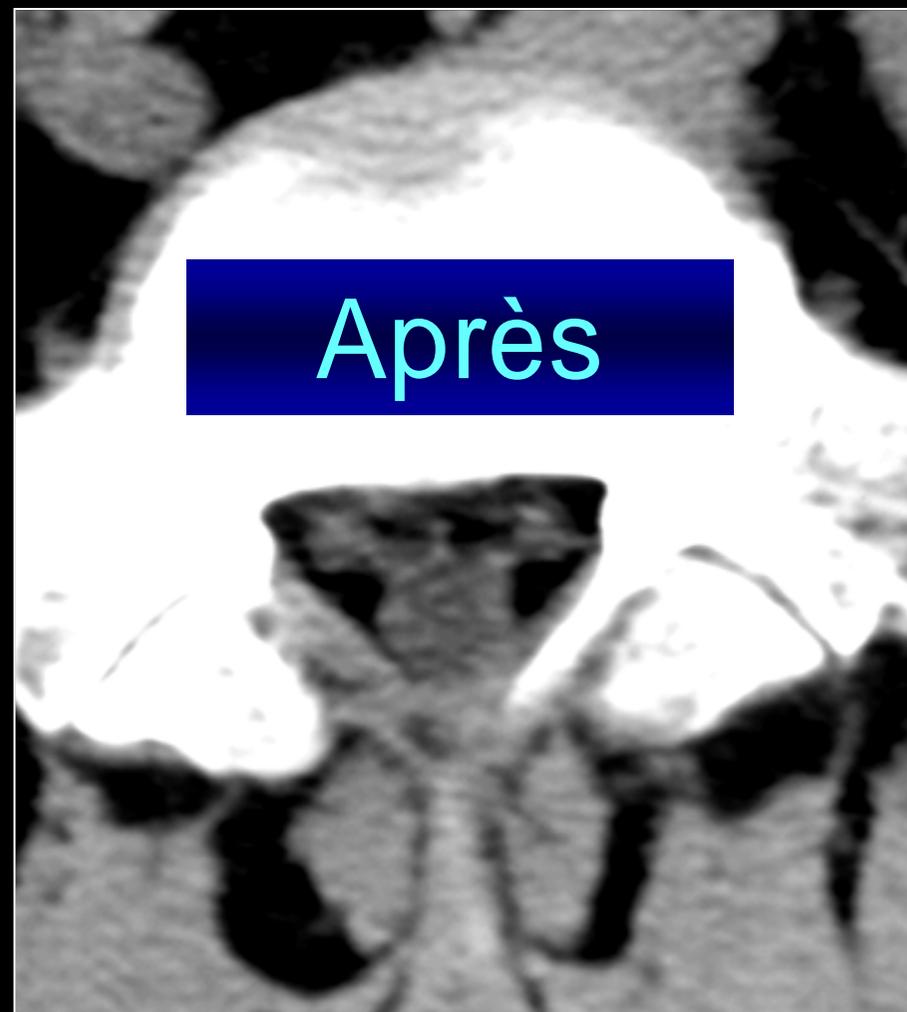
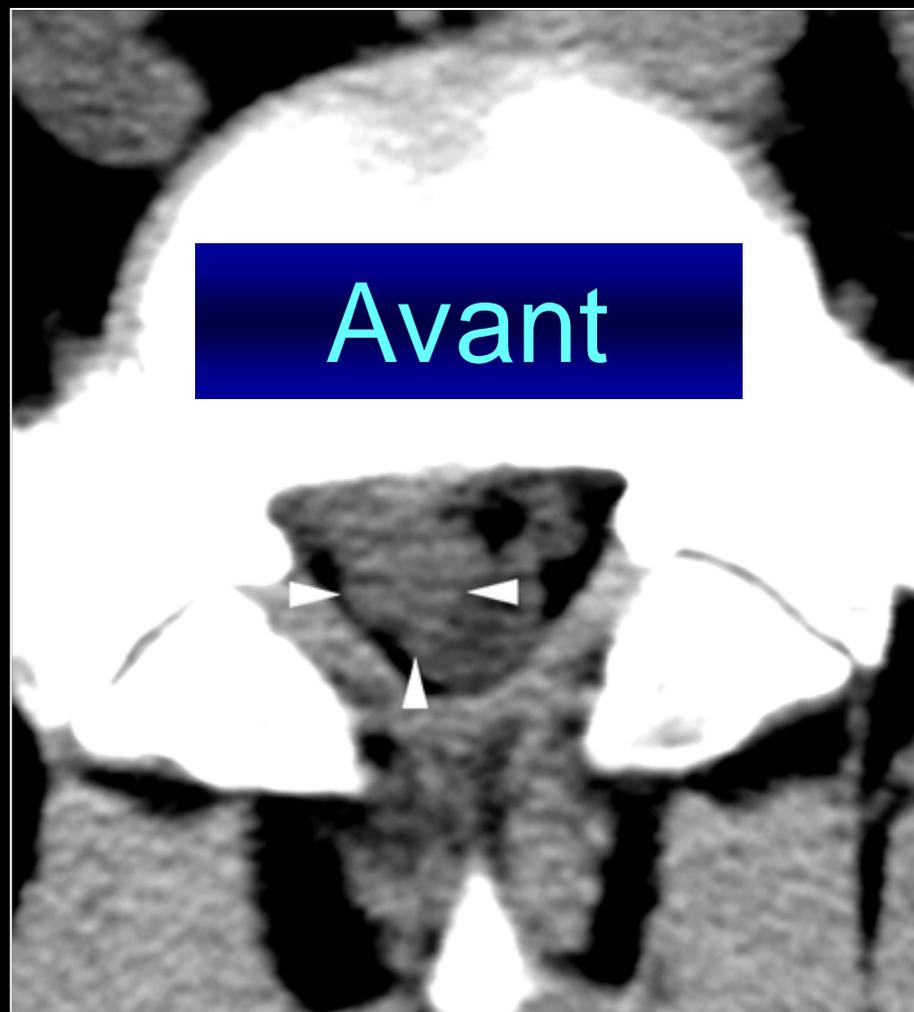
Evolution bien connue



Evolution moins connue

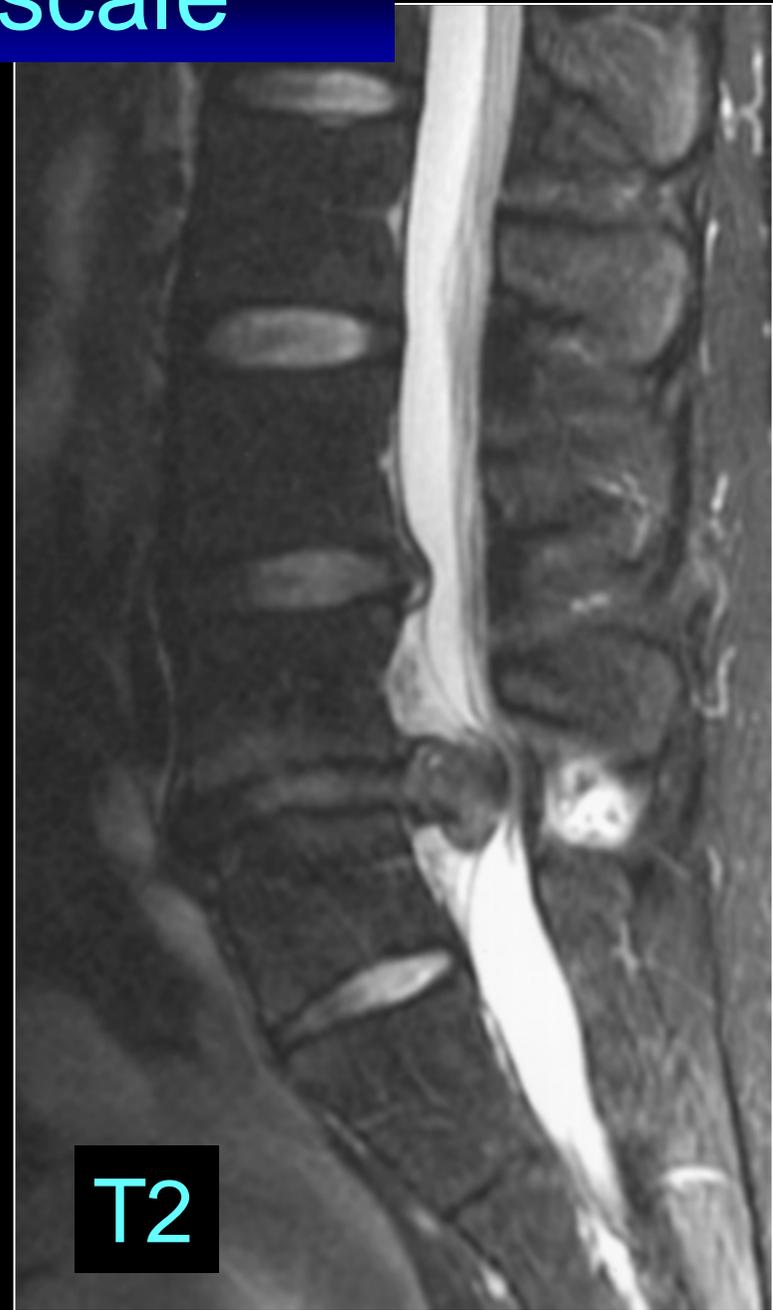


Evolution de la Hernie discale

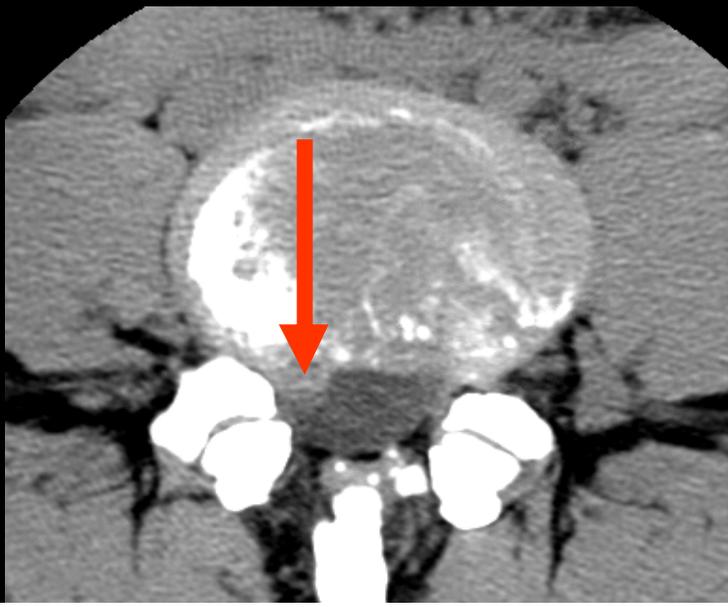
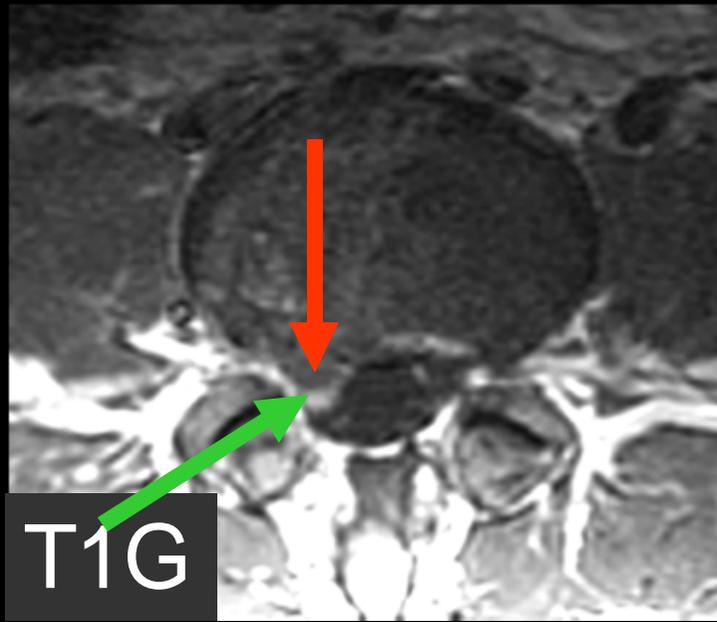
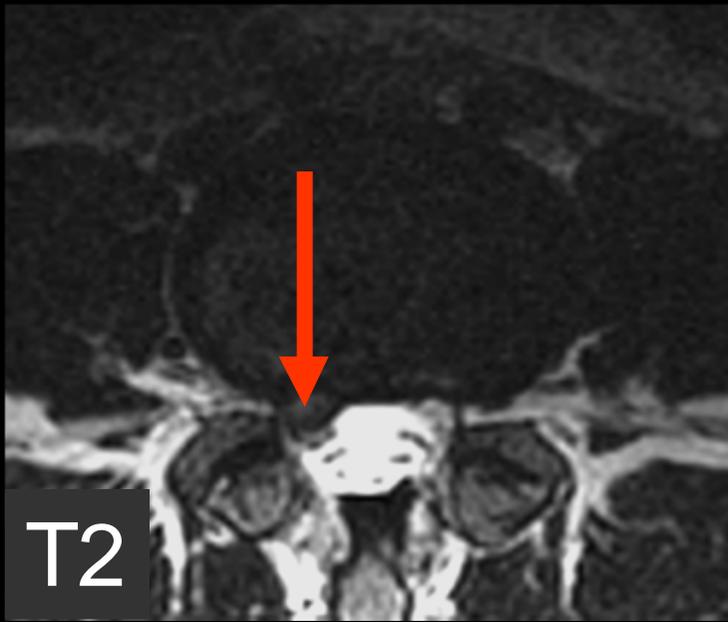


Traitement médical !

# Hernie discale

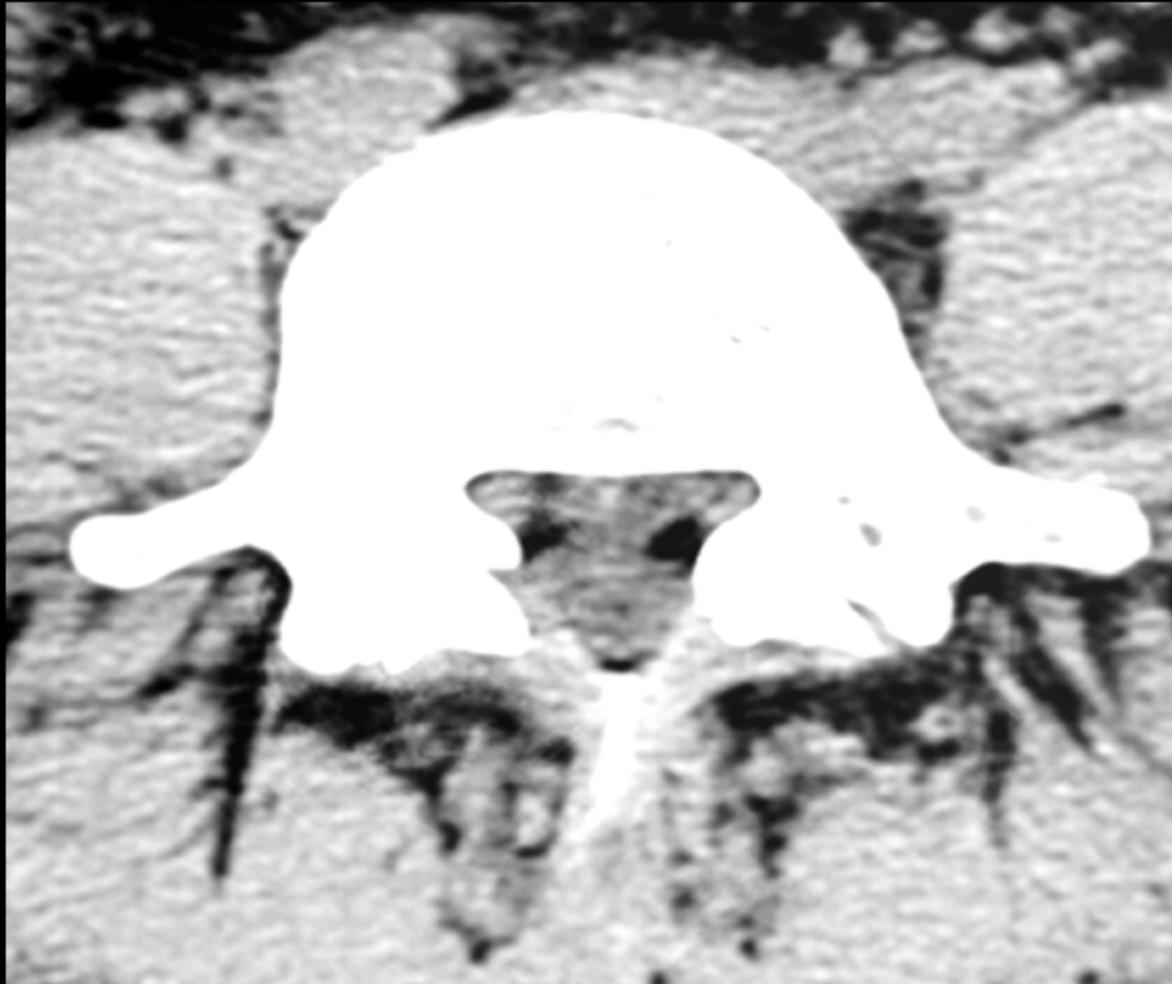


# Conflit radriculaire?

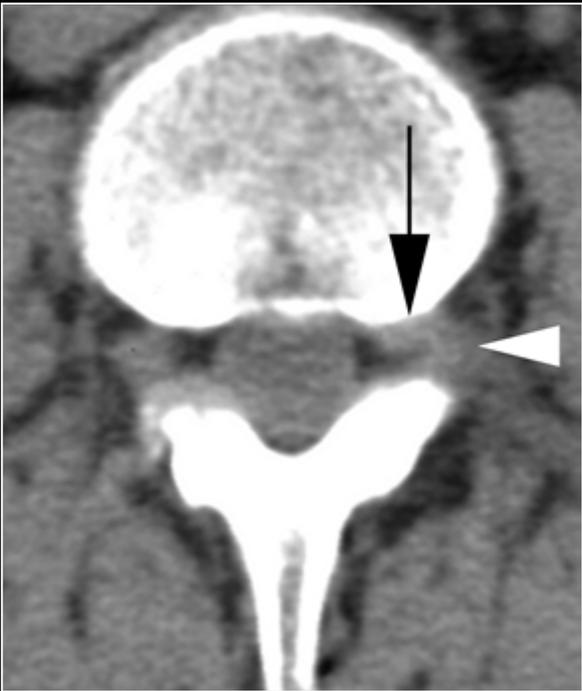
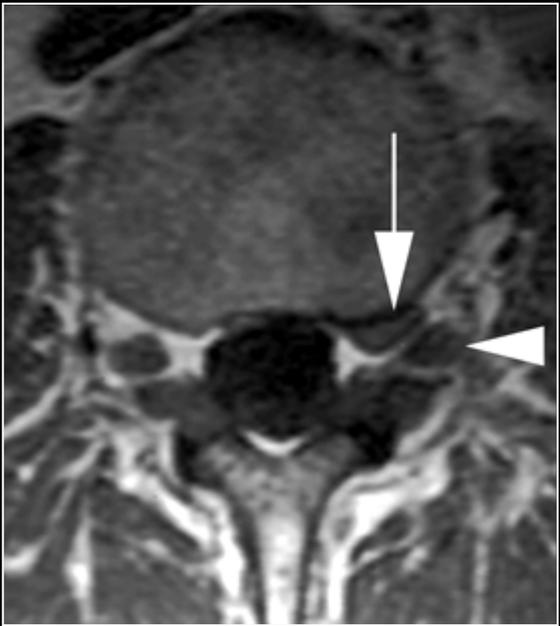


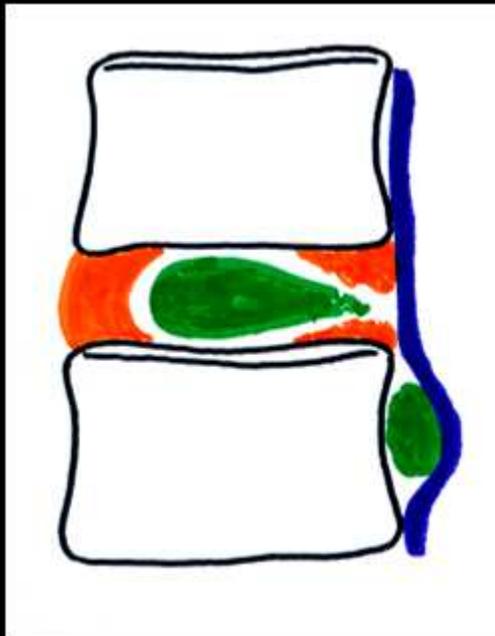
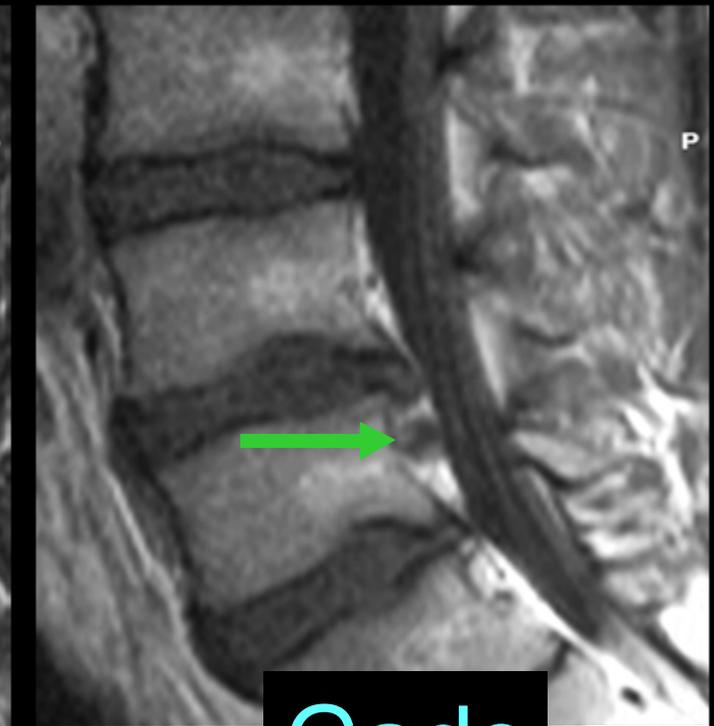
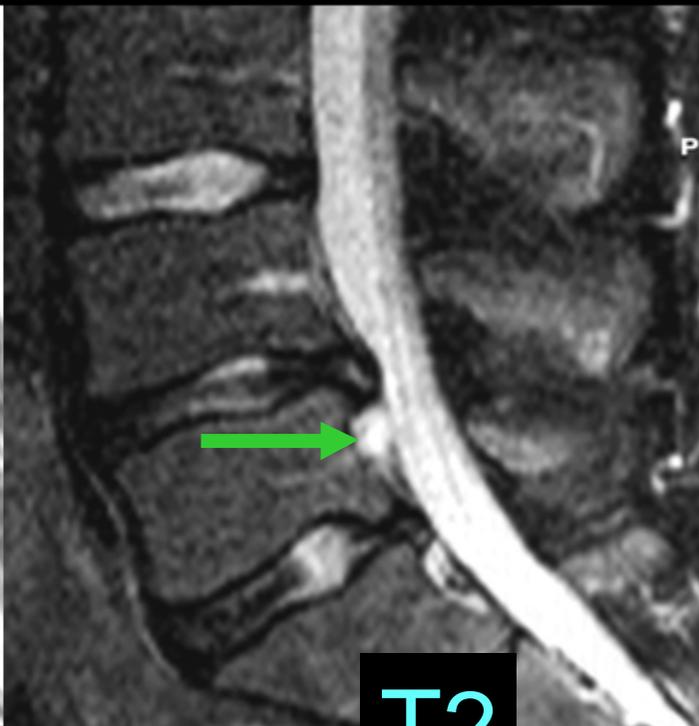
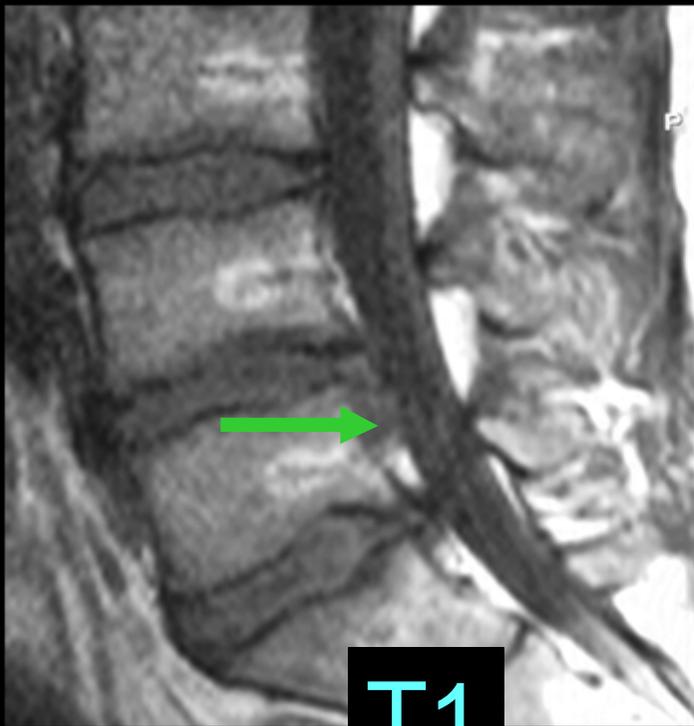
TDM (CT)

# Répercussions?

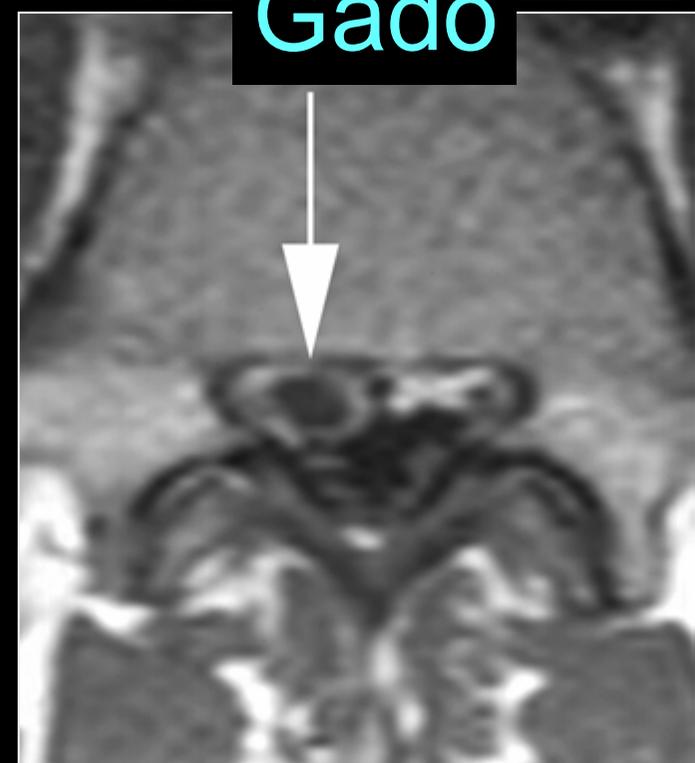
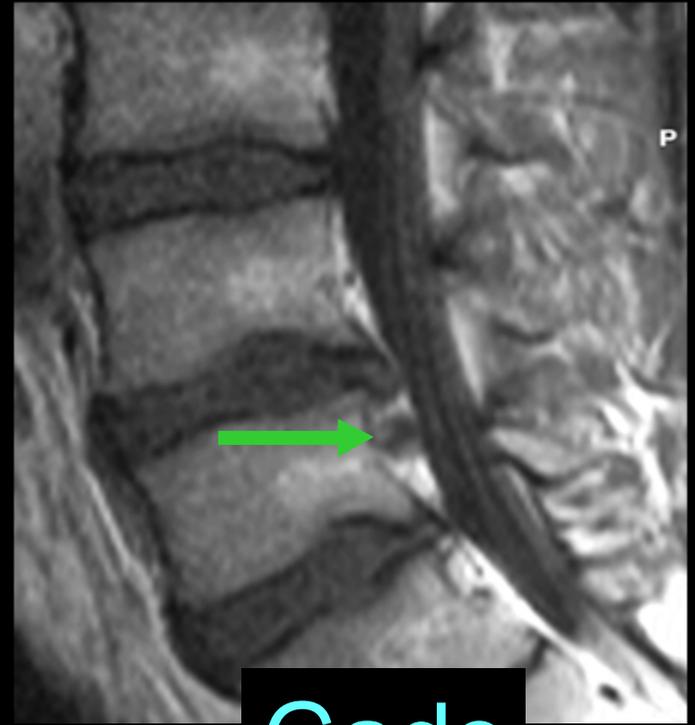
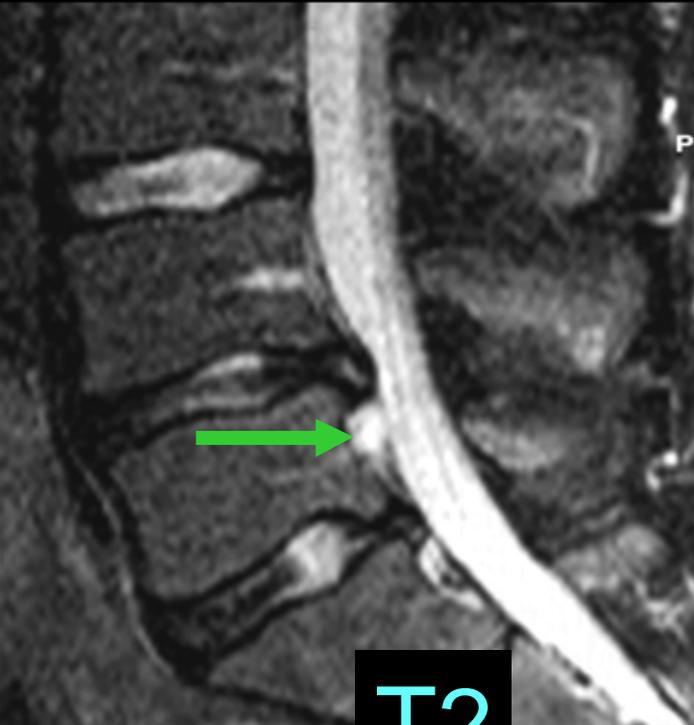
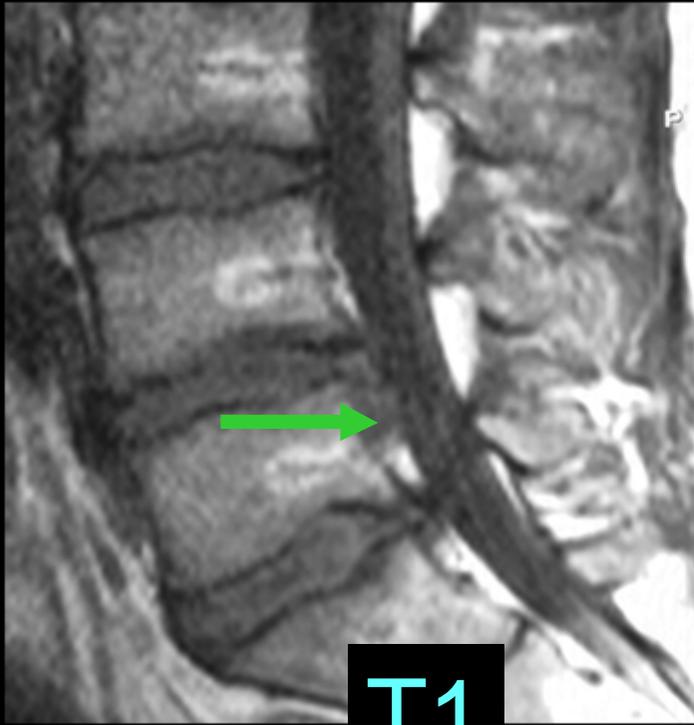


? →





Hernie exclue  
ou séquestrée



# IRM du Rachis lombaire

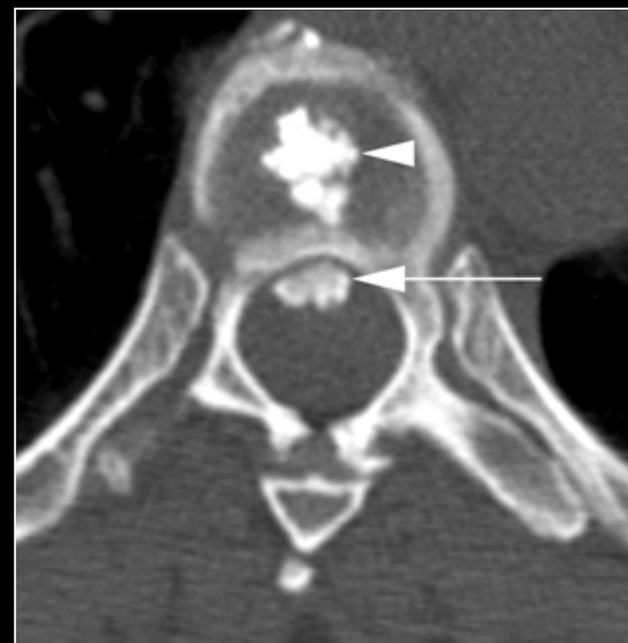
## Limites actuelles

Décubitus (>< charge)

Collections gazeuses

Structures minérales

# HD calcifiée





?

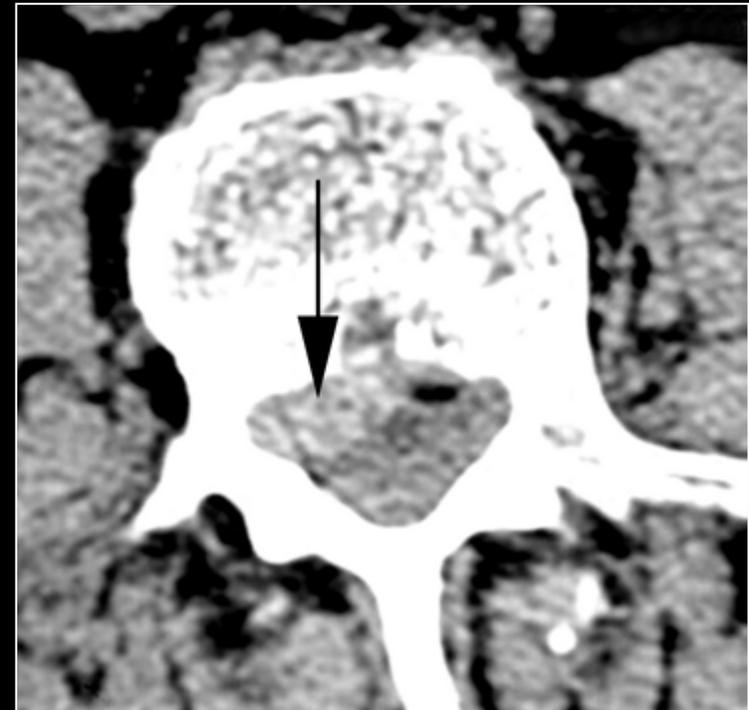
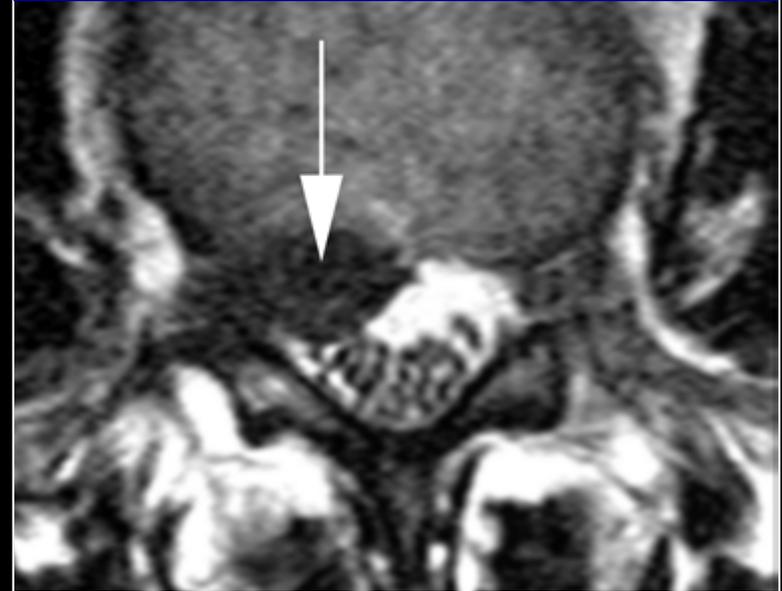


?

# Gaz épidual



# Hernie



## Contrindications IRM?

- Pace maker
- CE métall intraoculaire
- « Vieux » clips cérébraux
- Claustro sévère

# Normal de référence

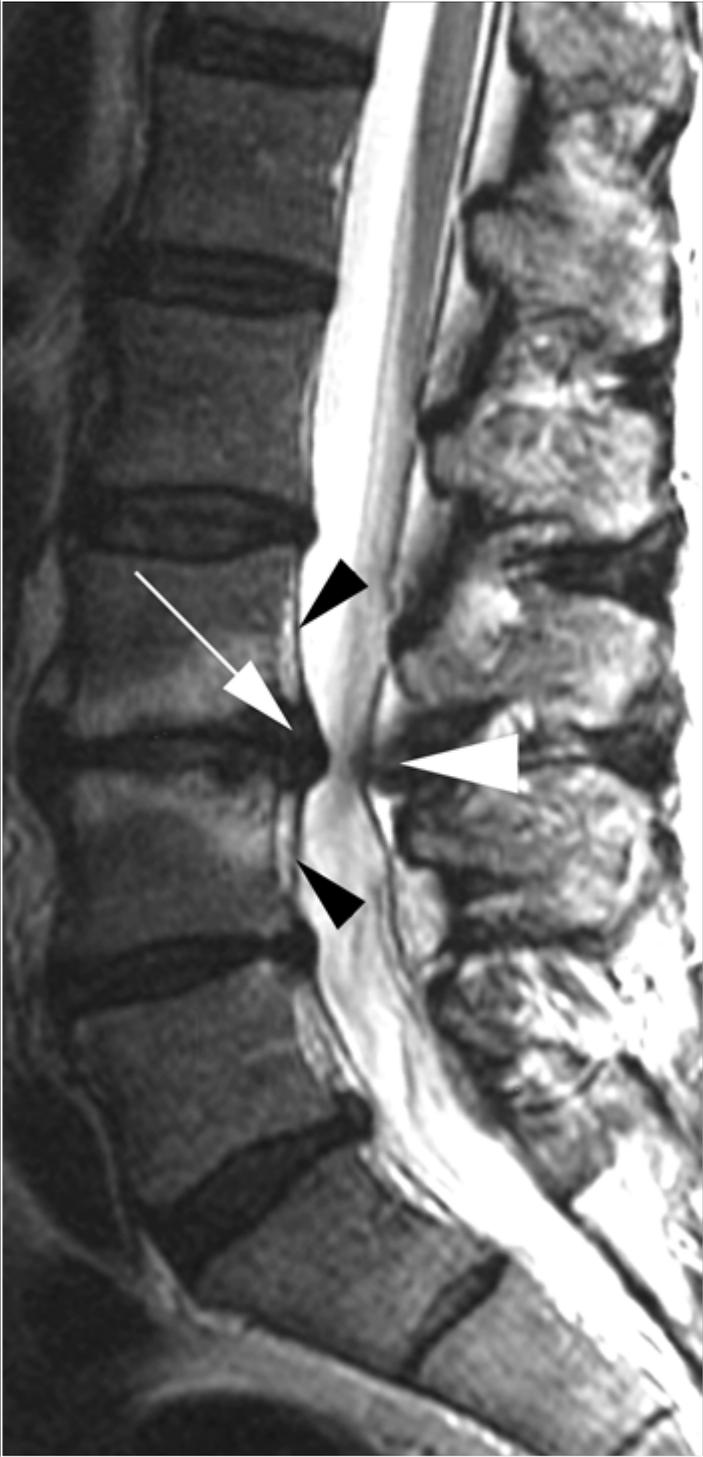


T1



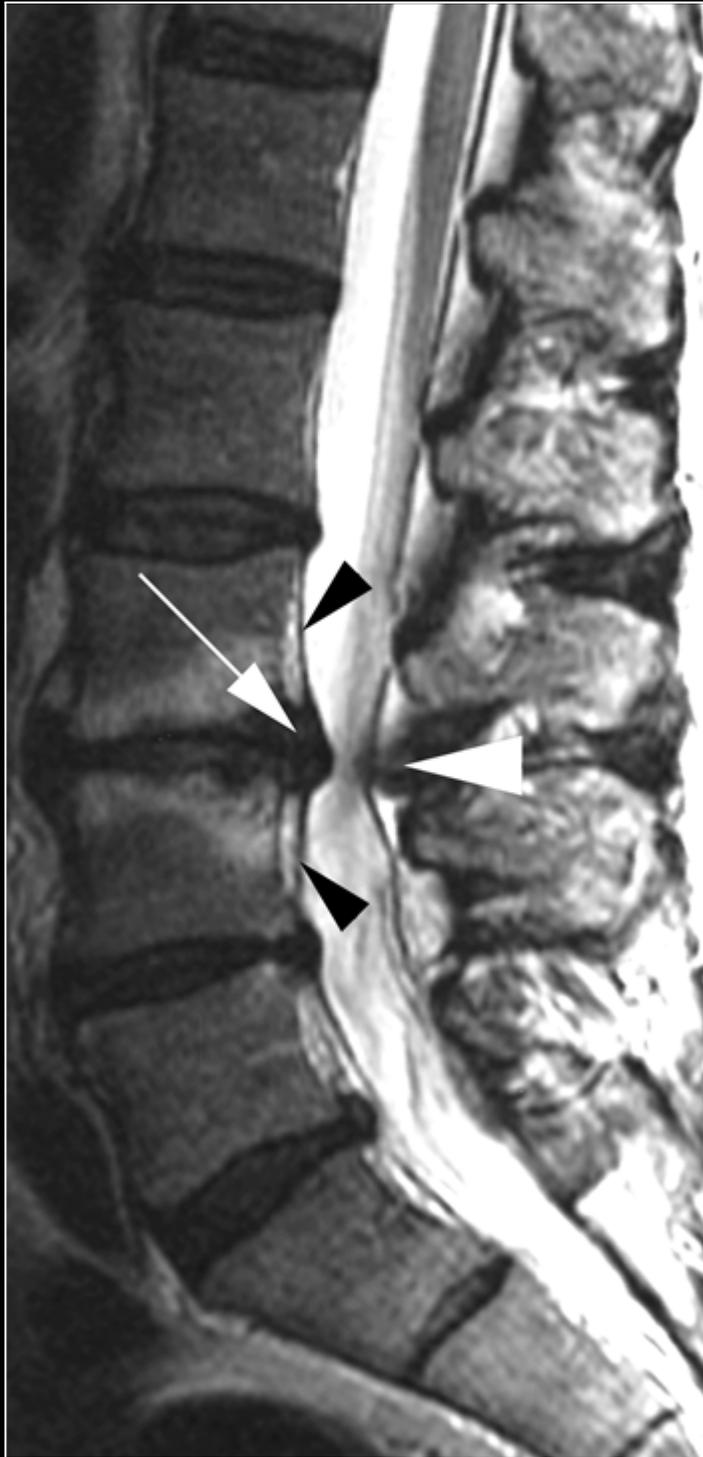
T2

?



Normal

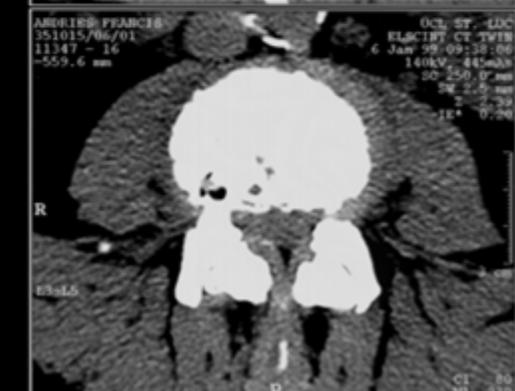




Sténose canalaire d'origine mixte :  
antérieure (disco vertébrale) et  
postérieure (ligaments jaunes)



# Scanner → ?



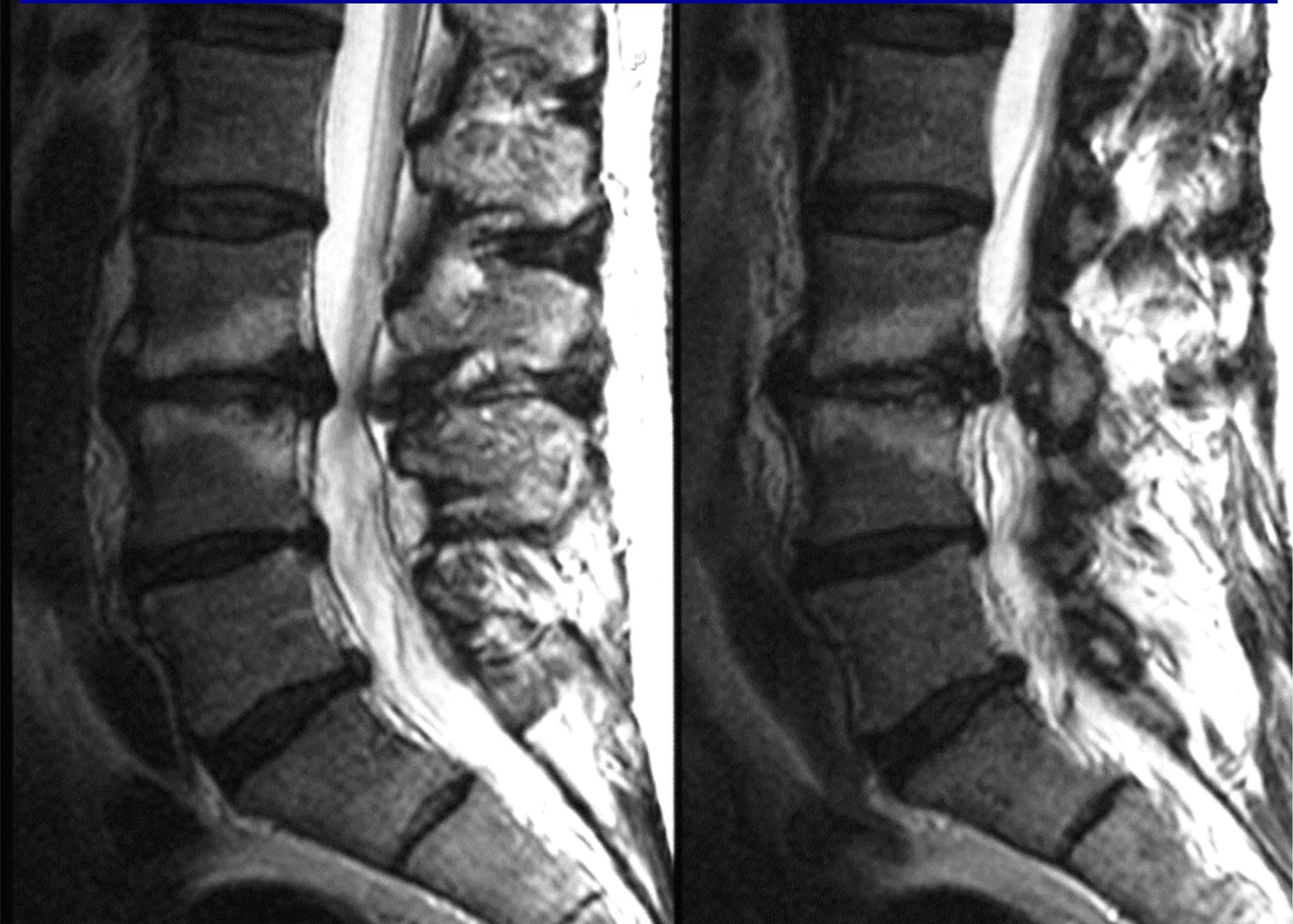
nm

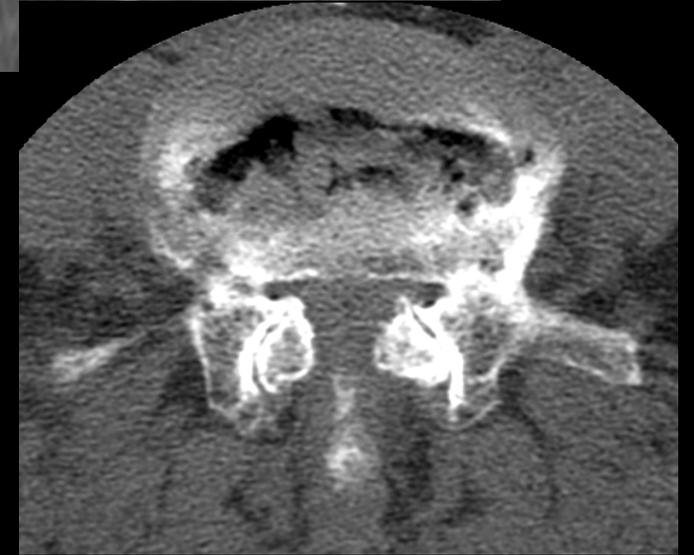
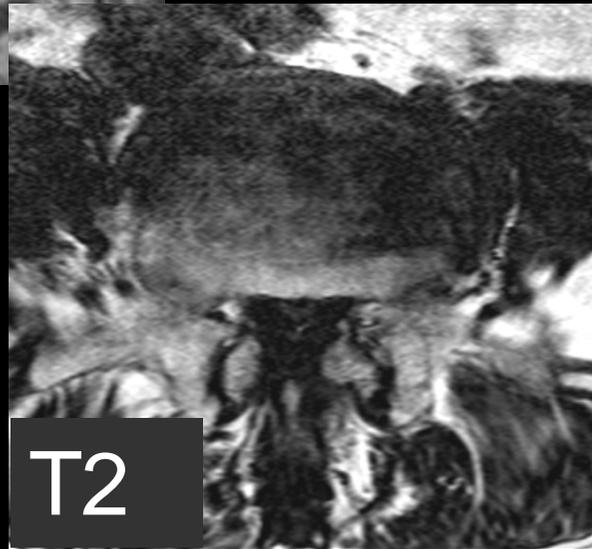
140kV  
SC 2  
SW  
IE



6.8 mm

# Sténose centrale combinée

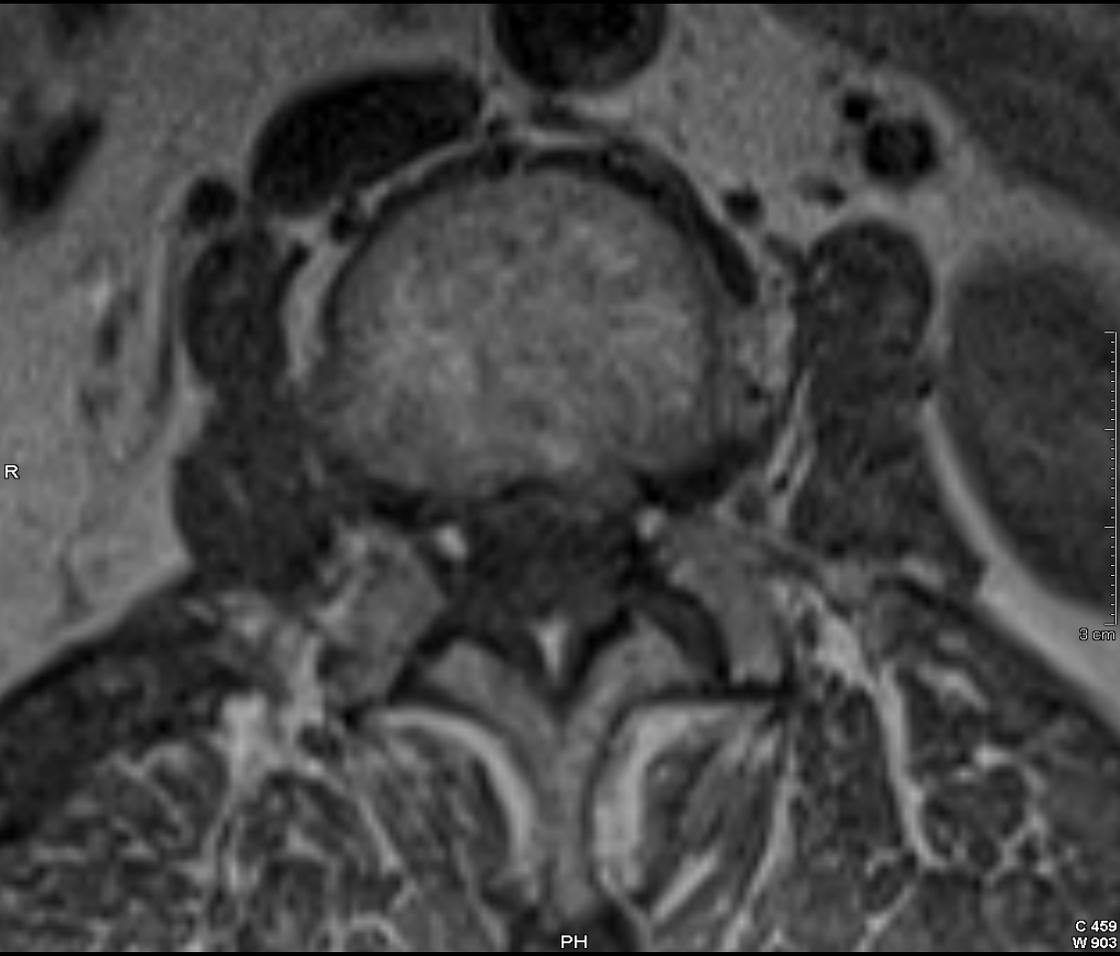


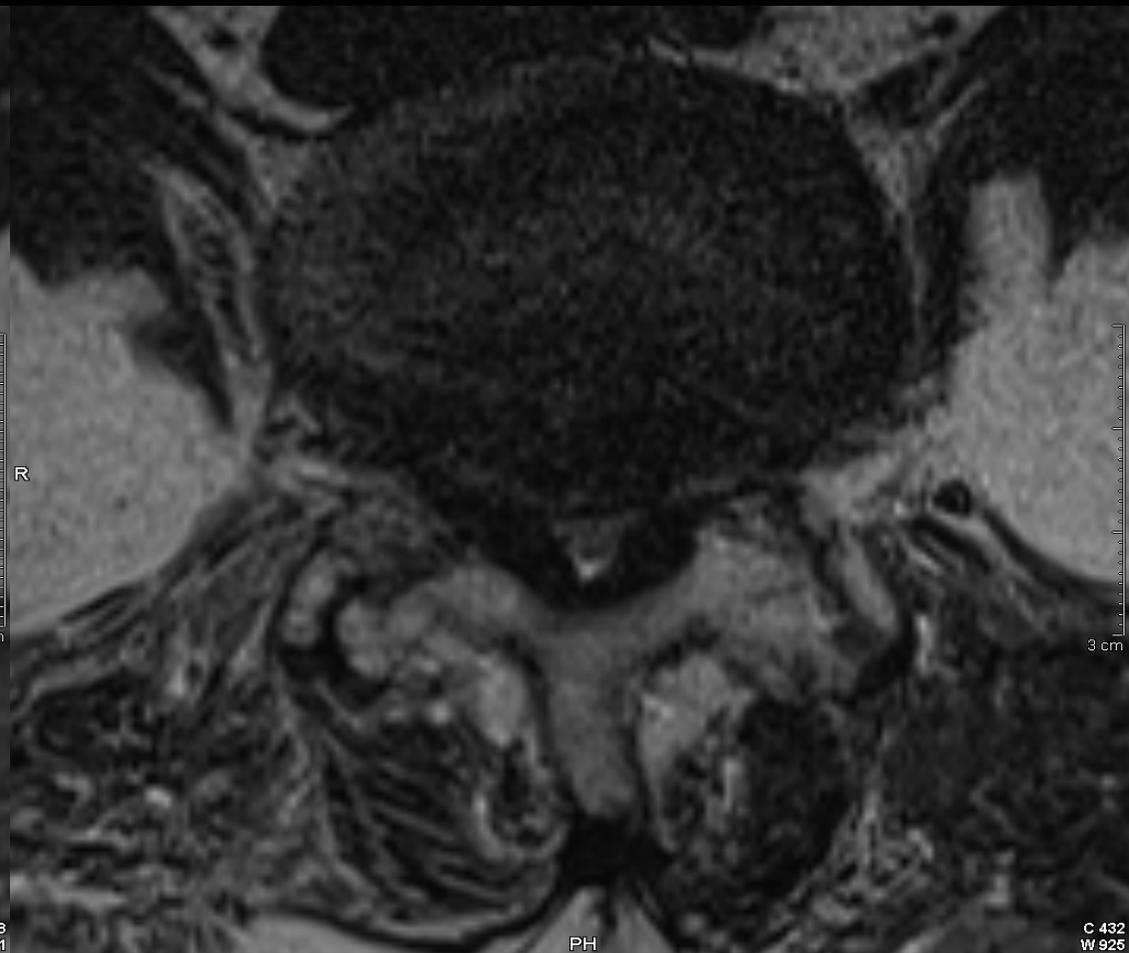
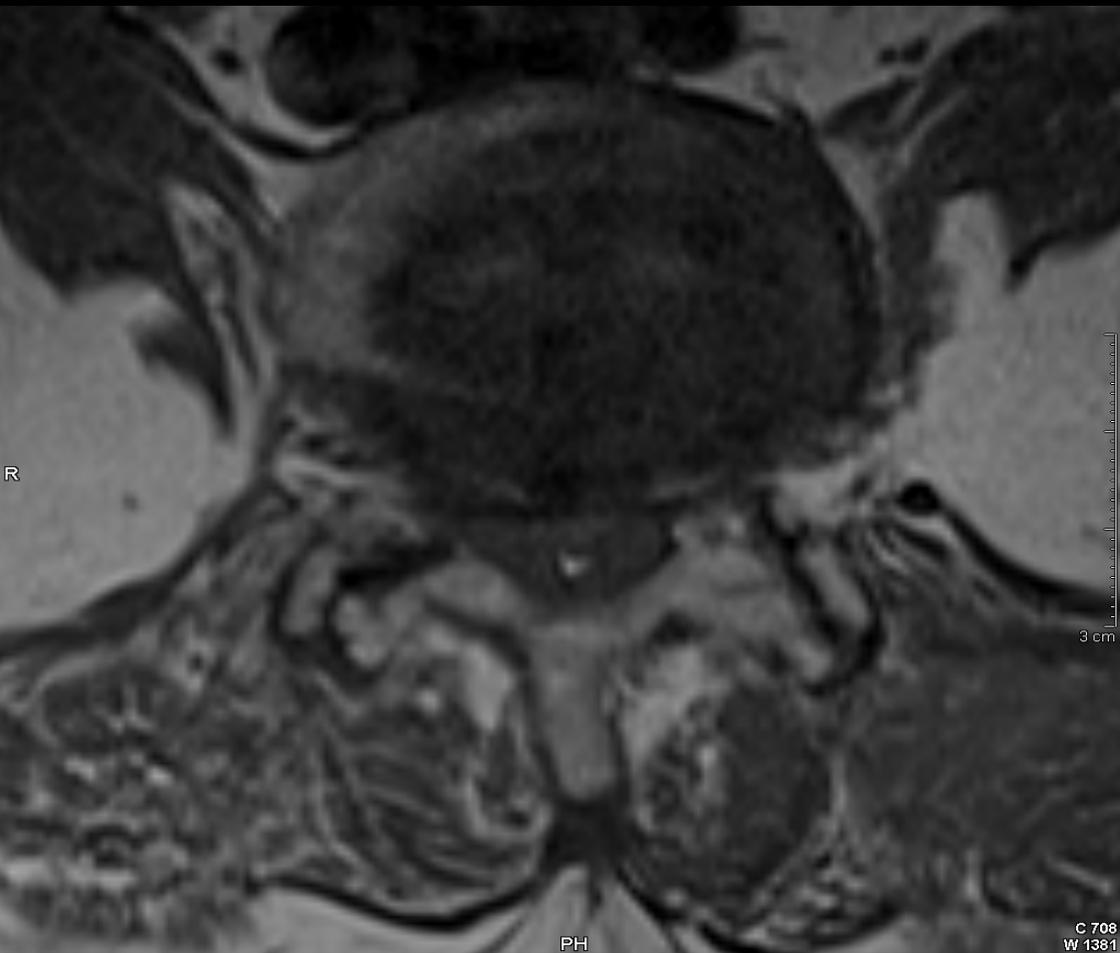


Spondylosithesis sur arthrose IAP

Fe 66ans claudication









T1

Radiculalgies  
droites L 4



T2



Droit



Gauche

Sténose foraminale droite L4-L5 sur  
Arthrose interapophysaire avec  
spondylolisthesis plus  
important à droite



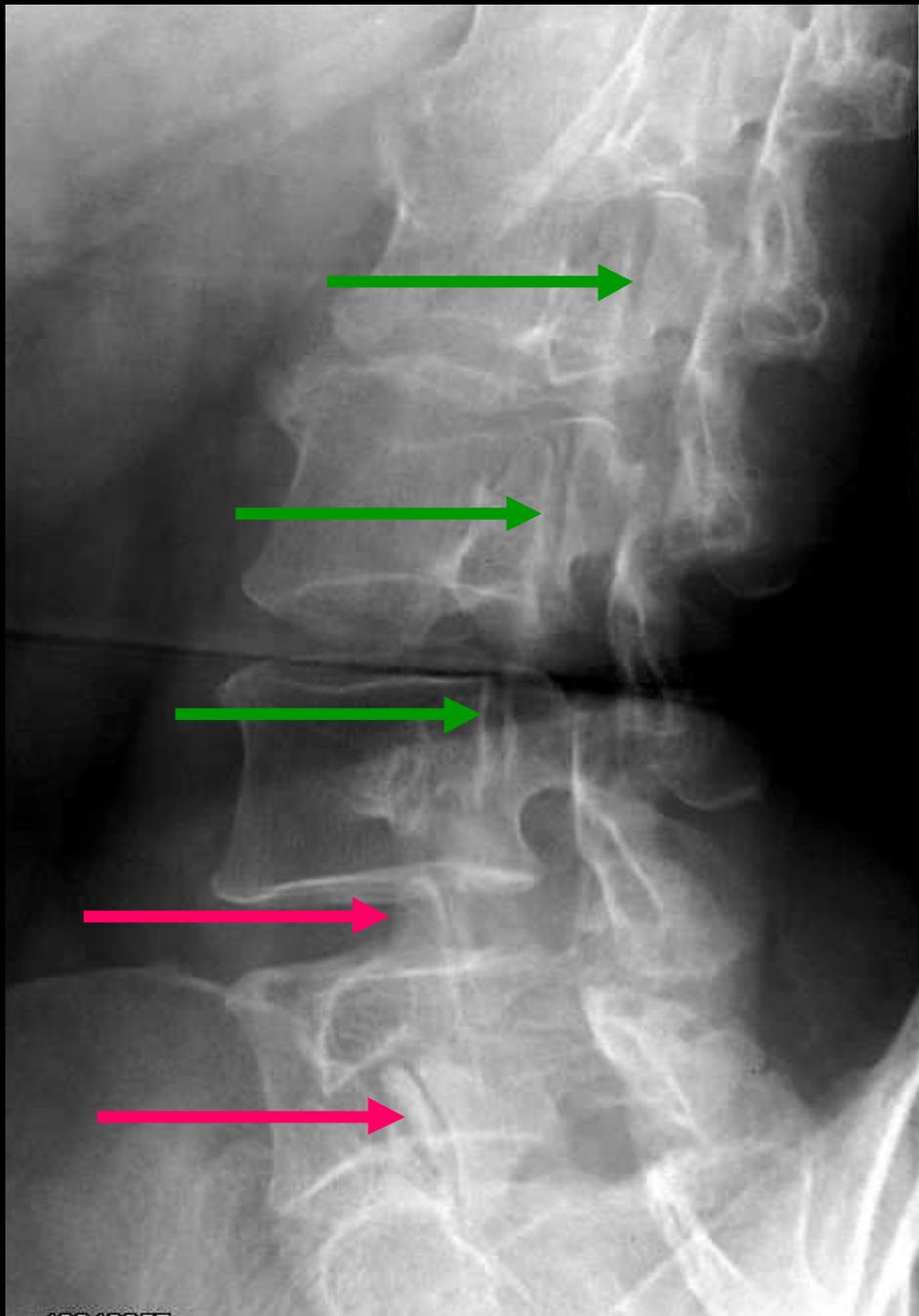
Radiculalgies  
droites L 4



Droit



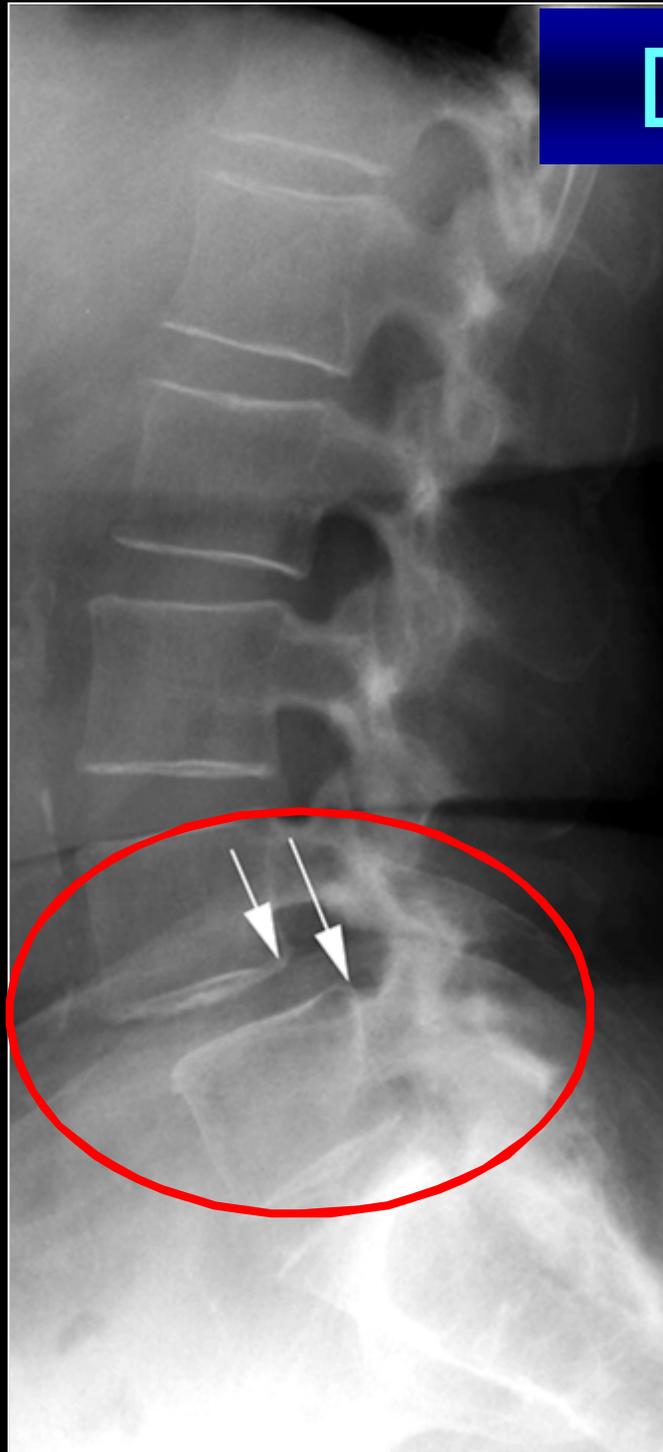
Gauche



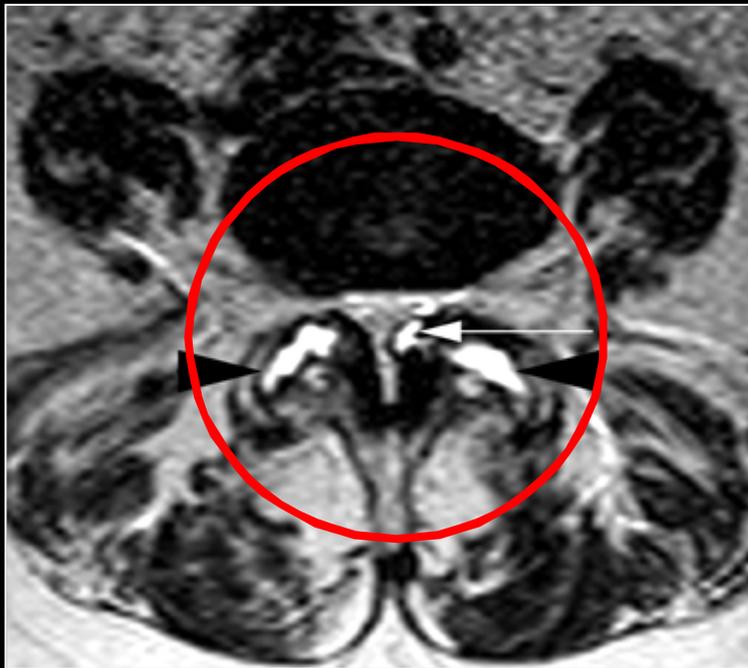
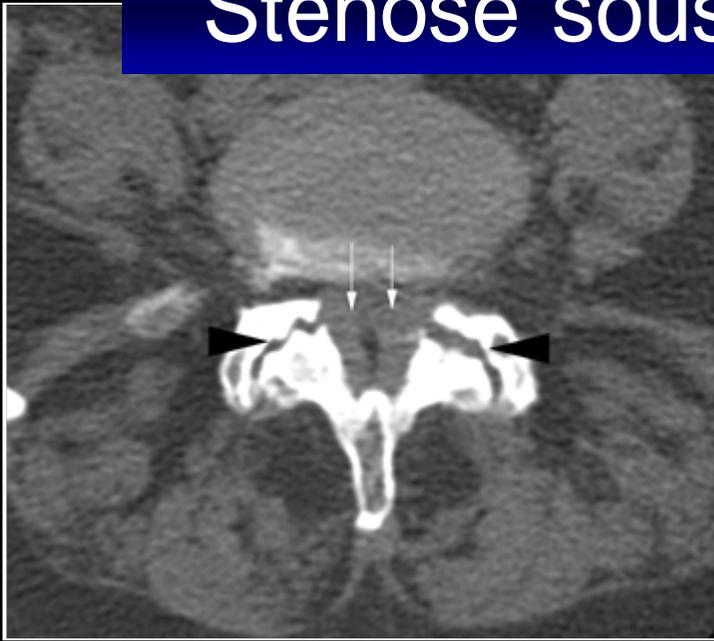
Couché

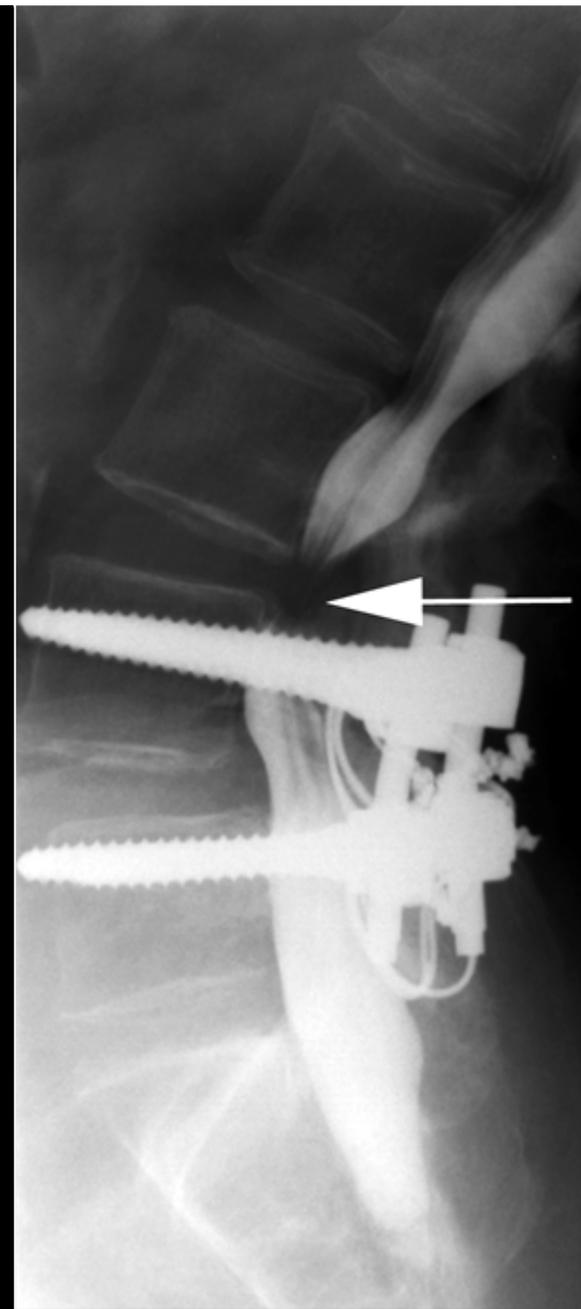
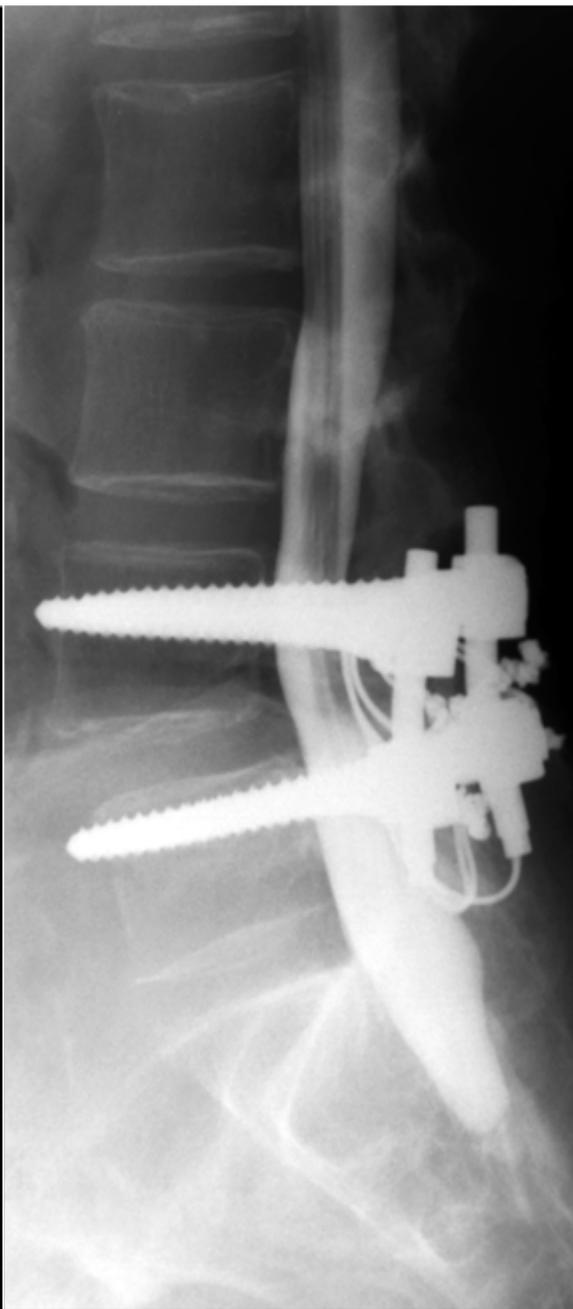


Debout



# Sténose sous-estimée en décubitus





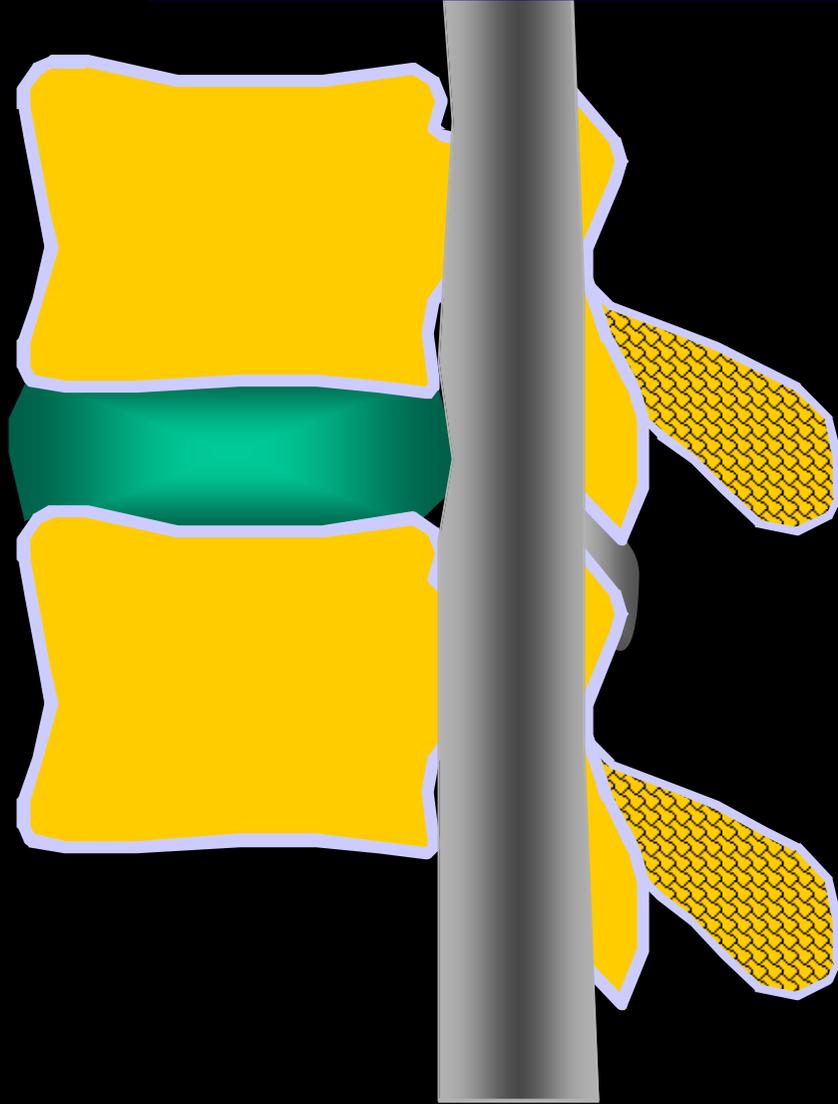
La Lordose rétrécit le canal !

# Scanner et IRM du Rachis lombaire

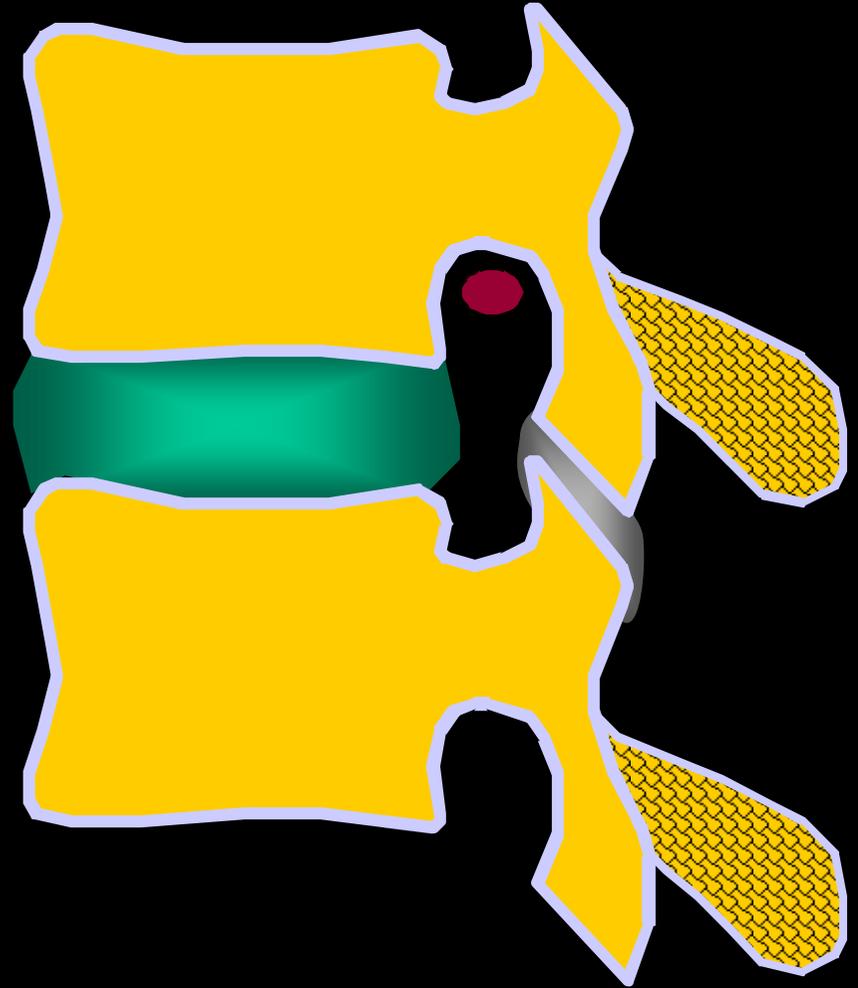
Une Limite commune !

Décubitus  
Versus Station

# Sténoses

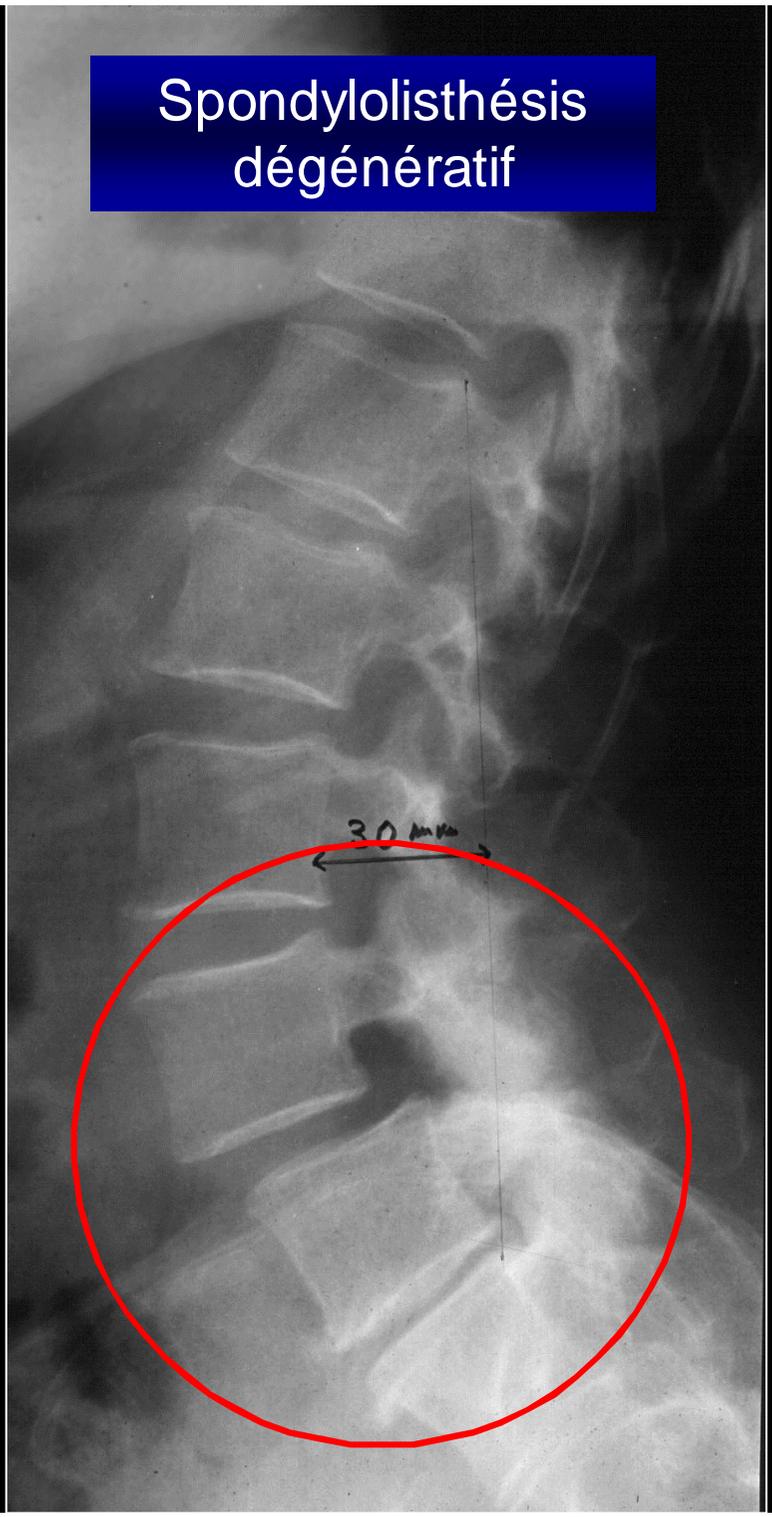
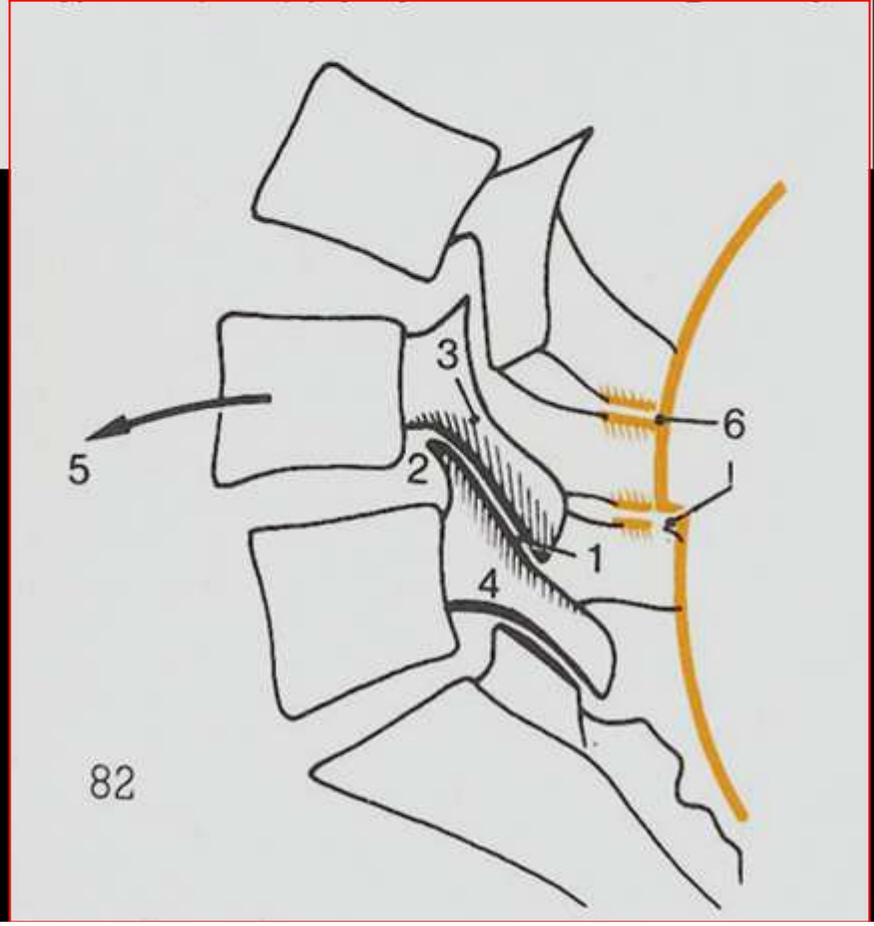
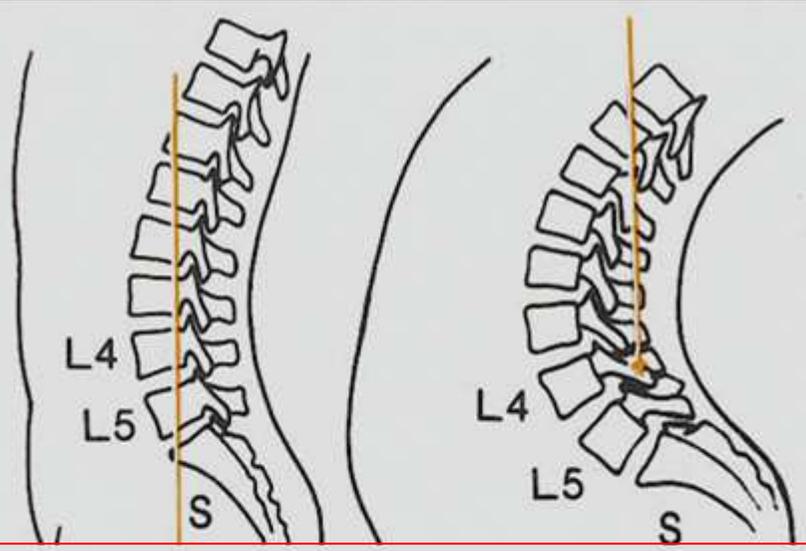


*Canal rachidien*



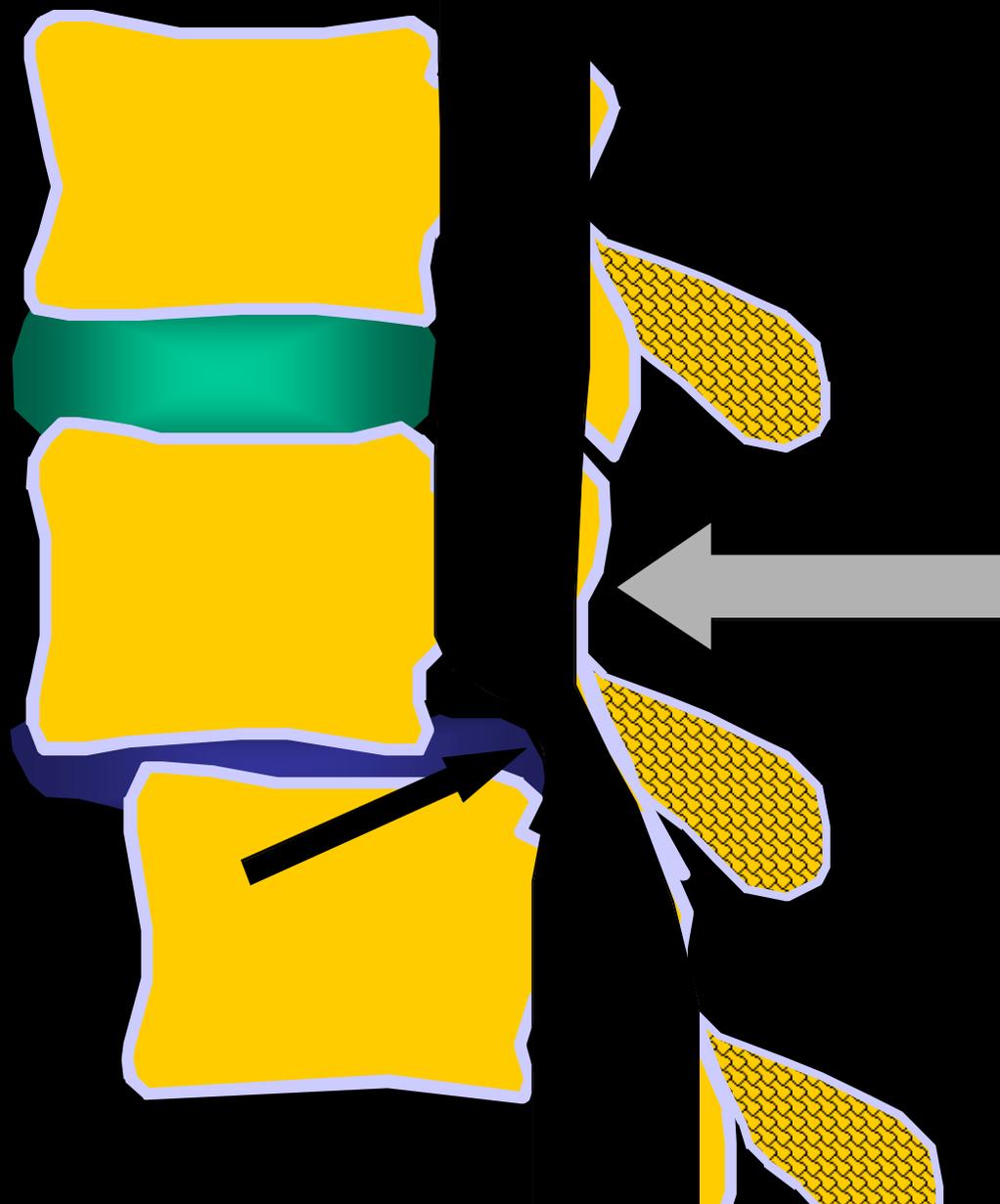
*Foramen*

# Spondylolisthésis dégénératif





*Spondylolyse*



*Arthrose postérieure*

Spondylolisthesis  
sur Arthrose ou  
Spondylolyse ?





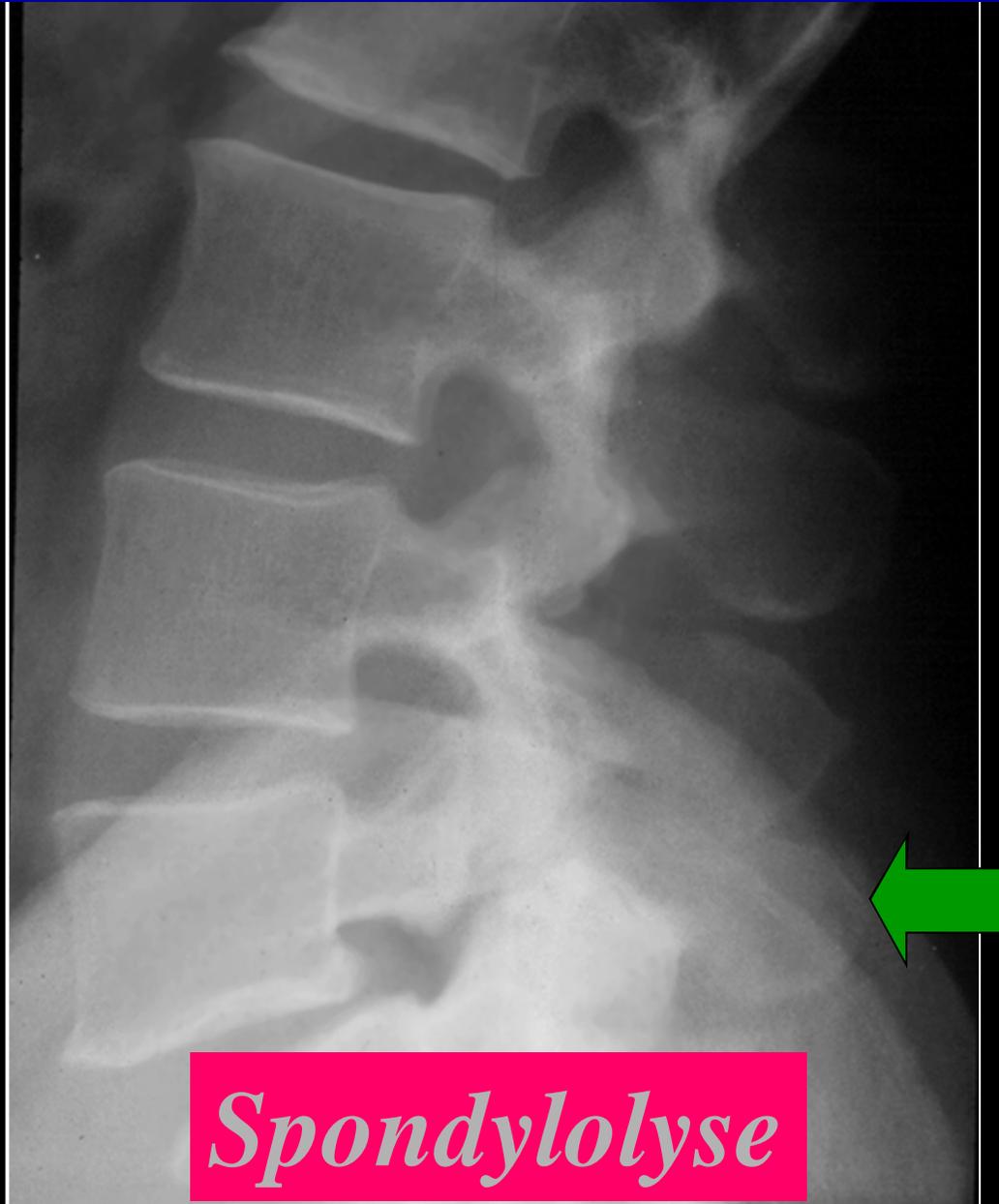
*Spondylolyse*



# Spondylolisthésis sur Arthrose ou Spondylolyse ?

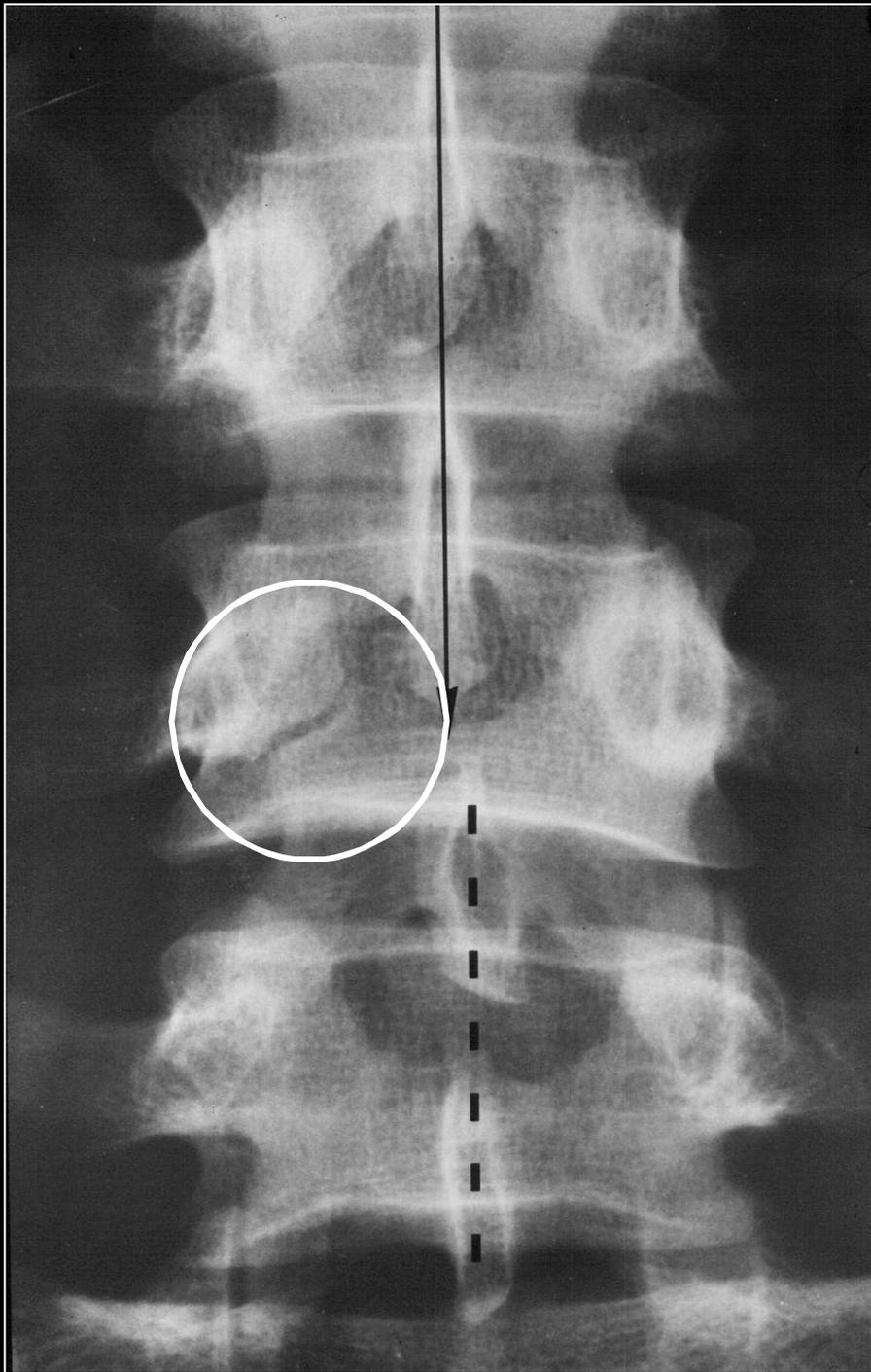


*Arthrose postérieure*



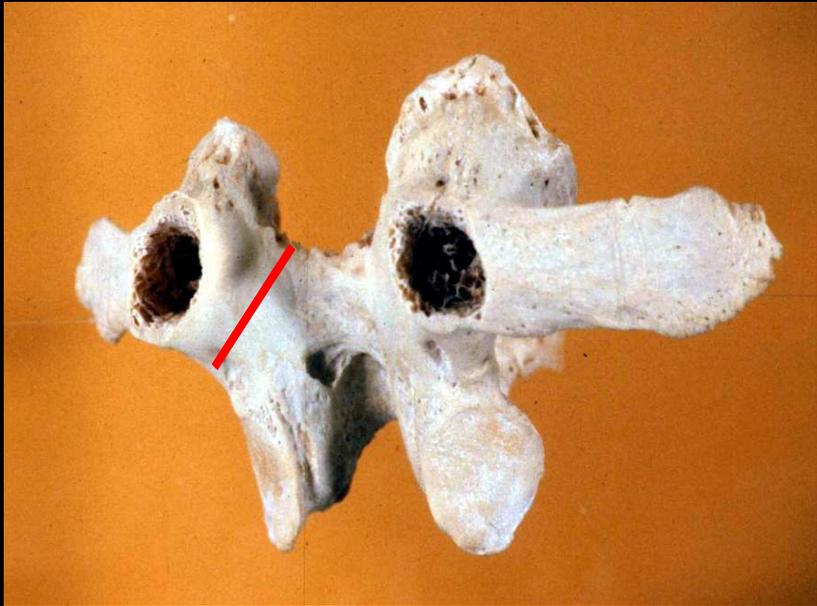
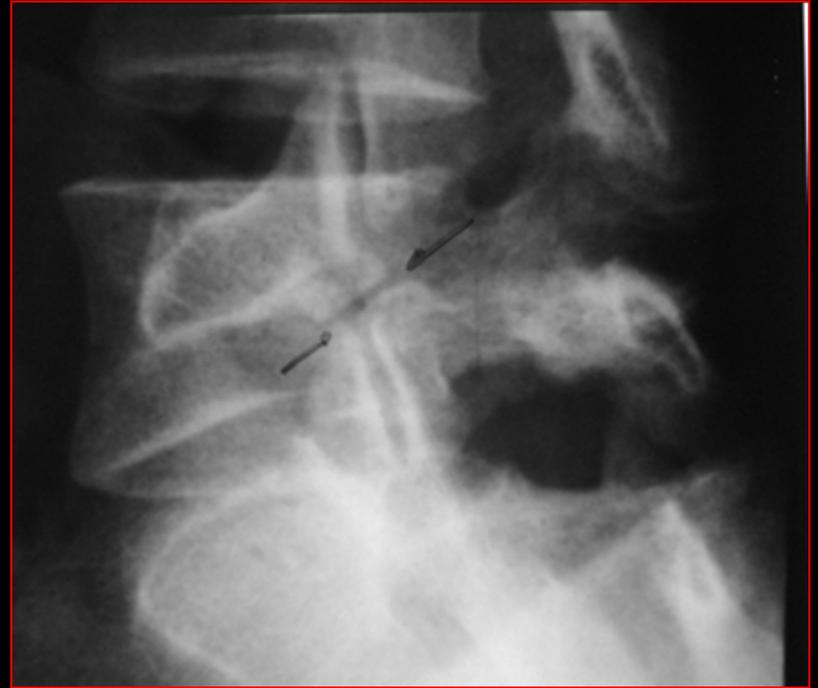
*Spondylolyse*

Regardez l'épineuse !



# La Spondylolyse : Une fracture de stress







Apparition  
lyse

Guérison lyse

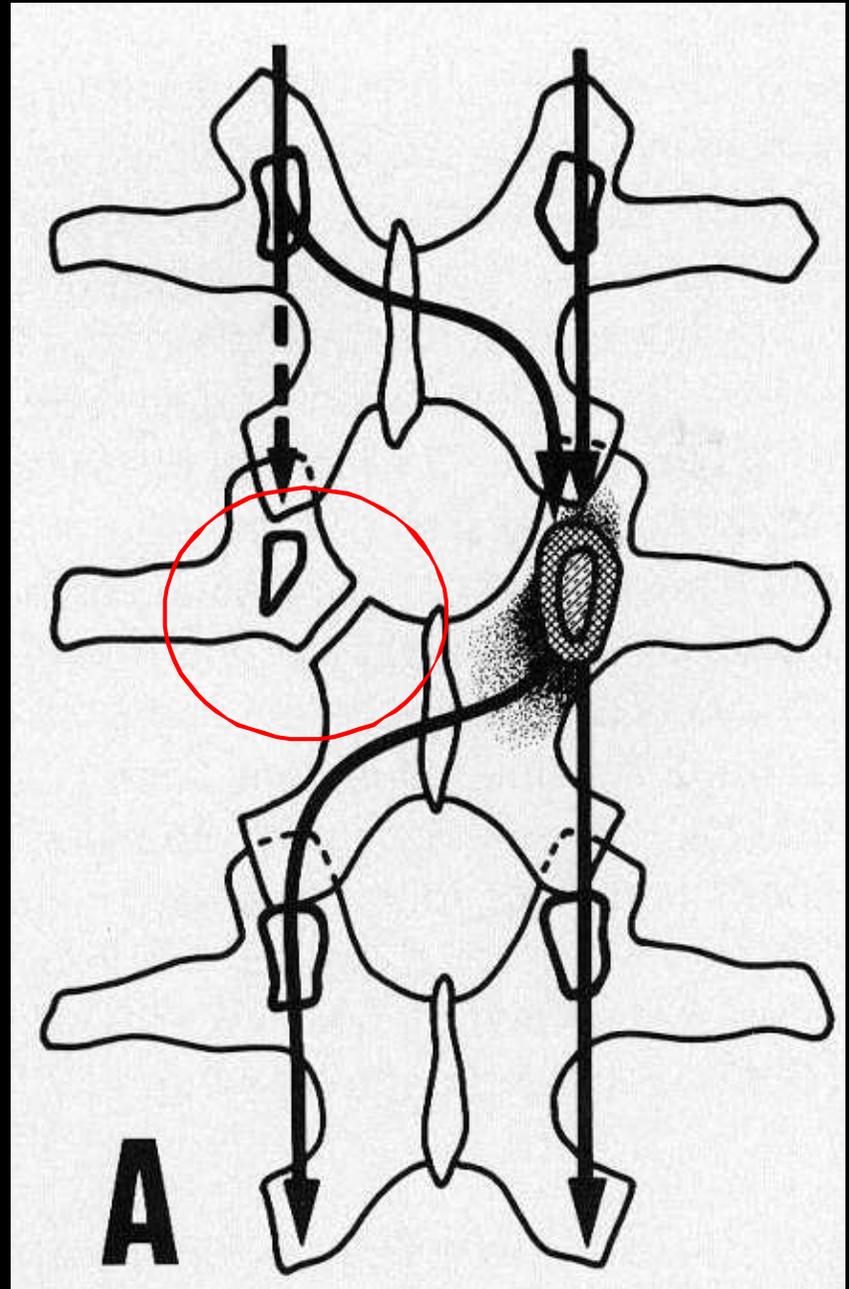
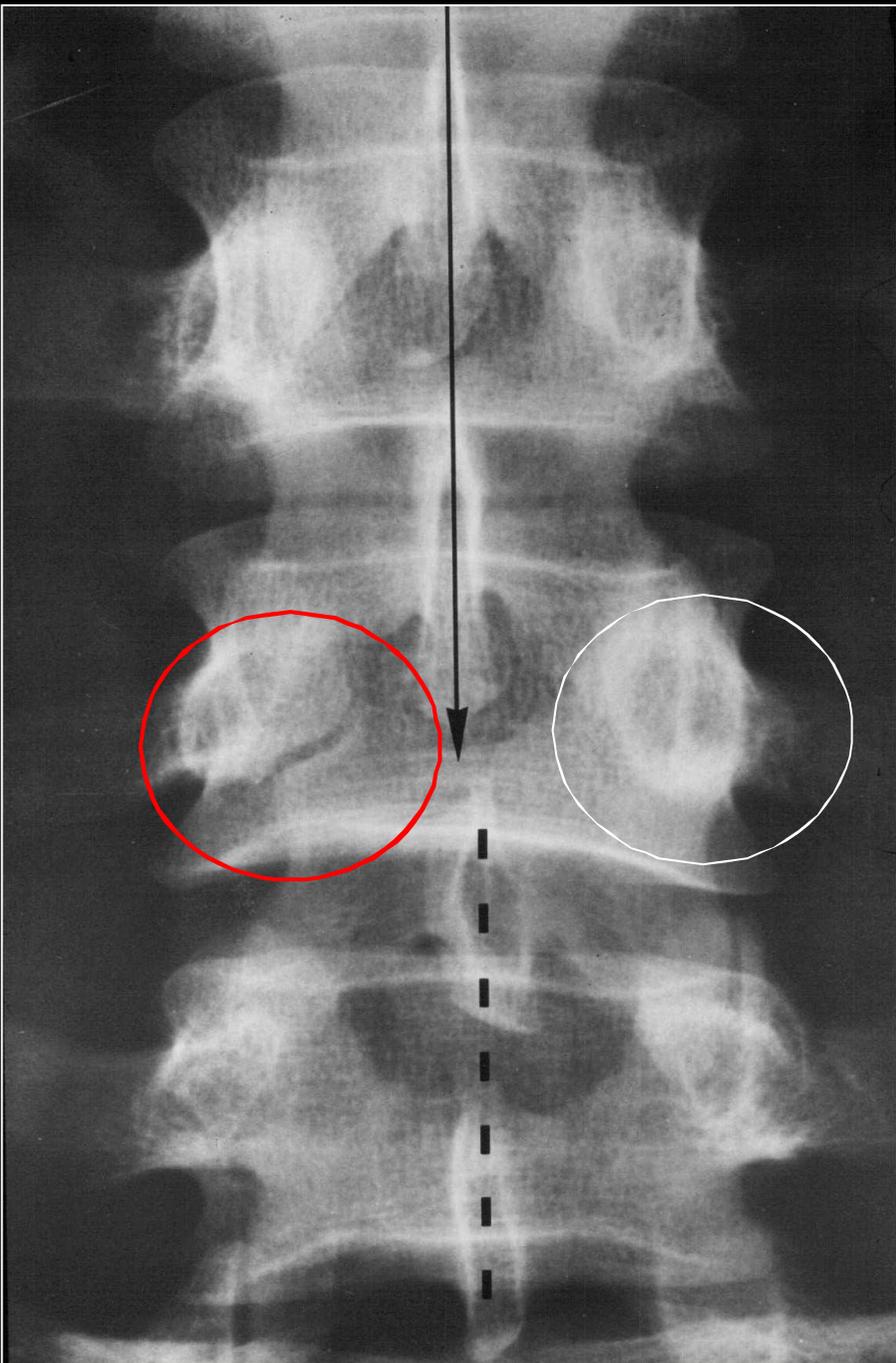


Apparition  
lyse



Guérison



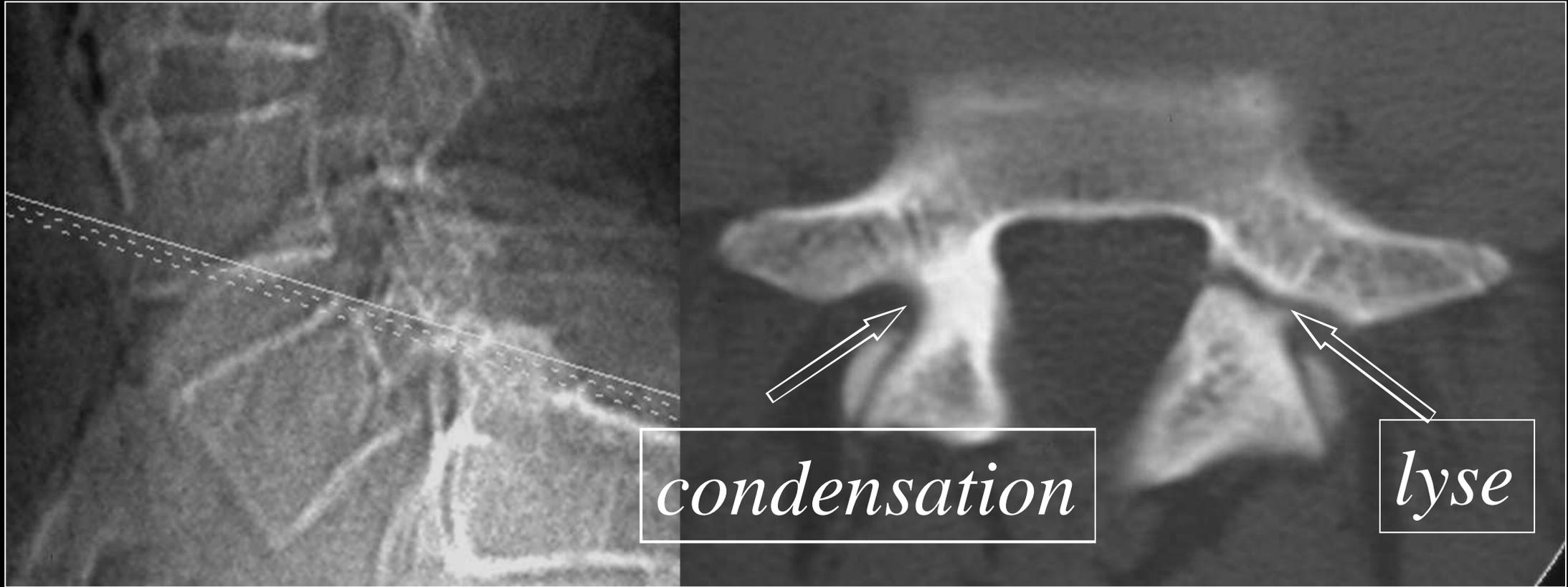


« Anisocorie » vertébrale sur Spondylolyse unilatérale



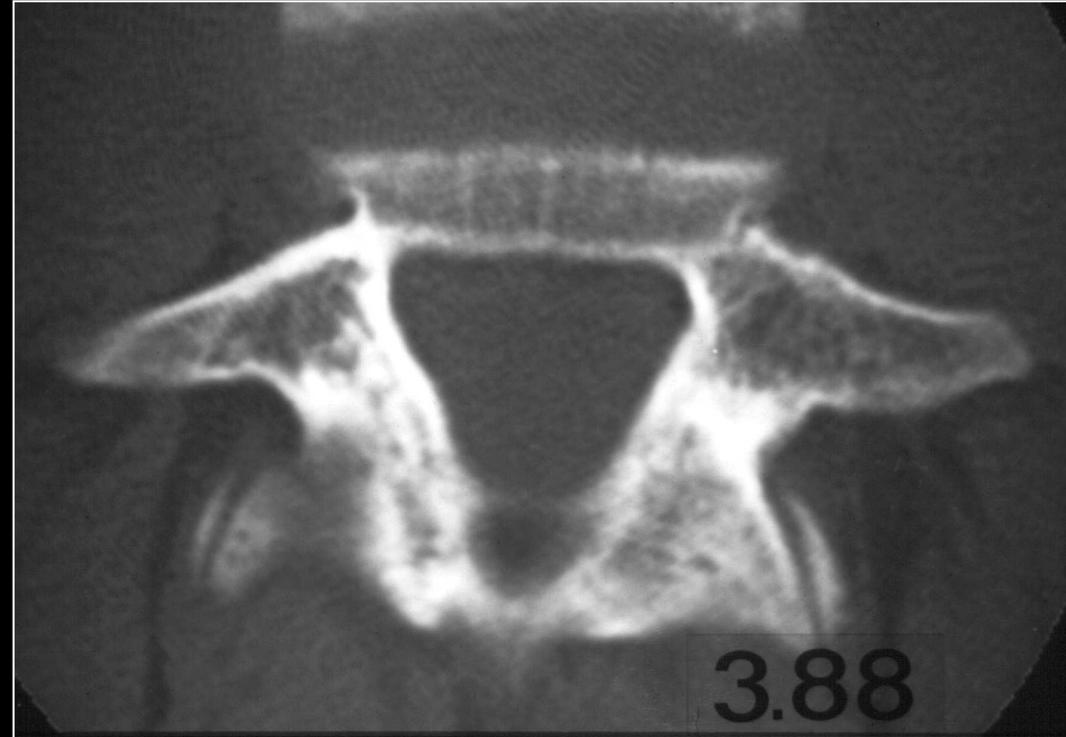
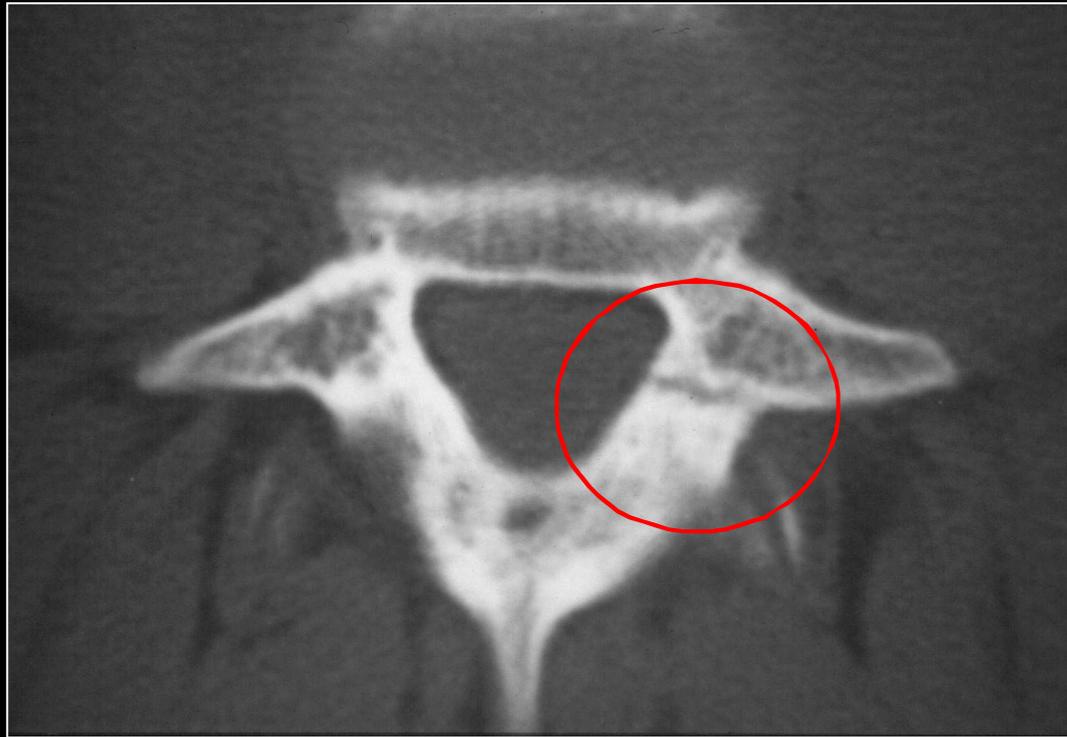


« Anisocorie » vertébrale



*condensation*

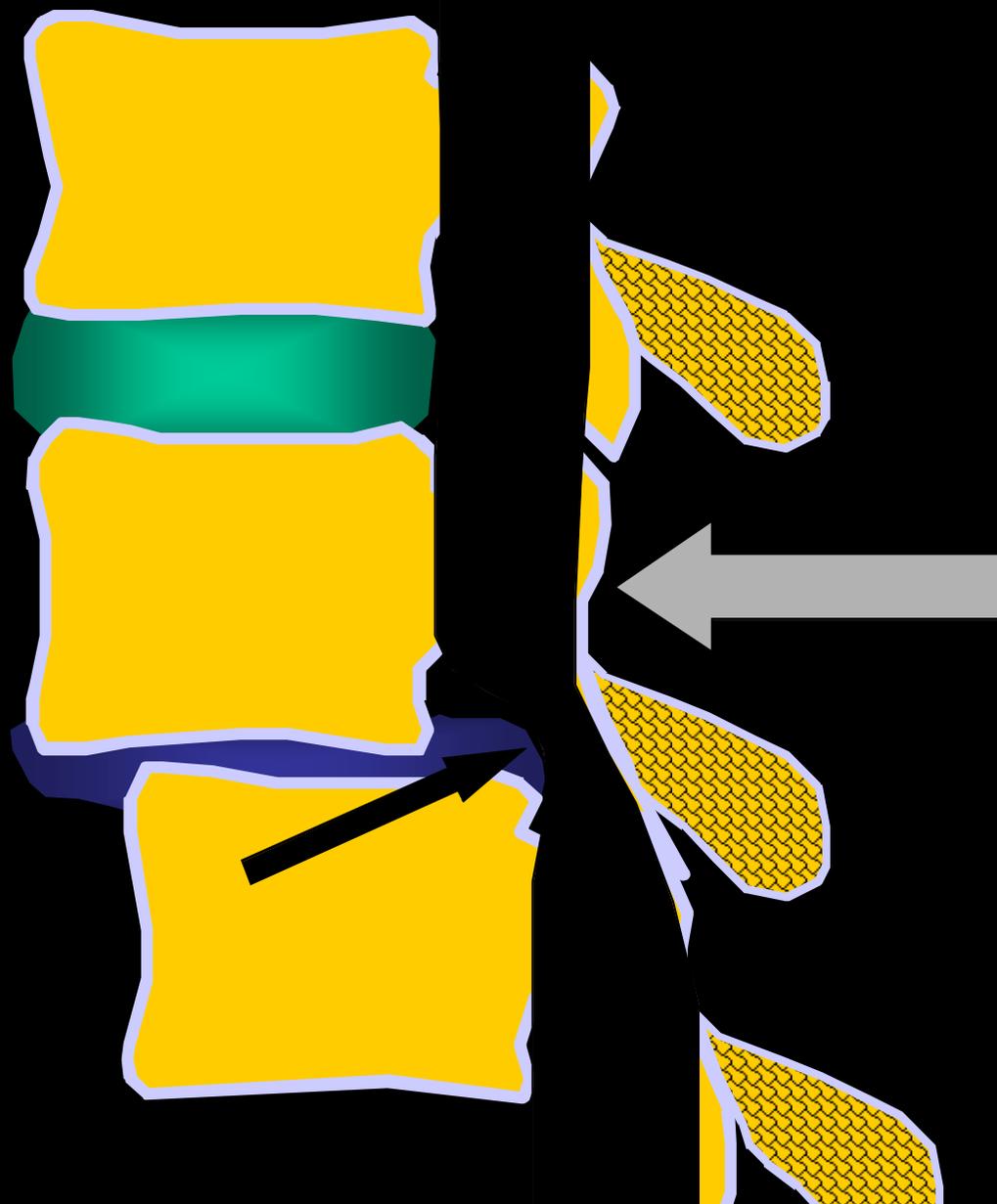
*lyse*



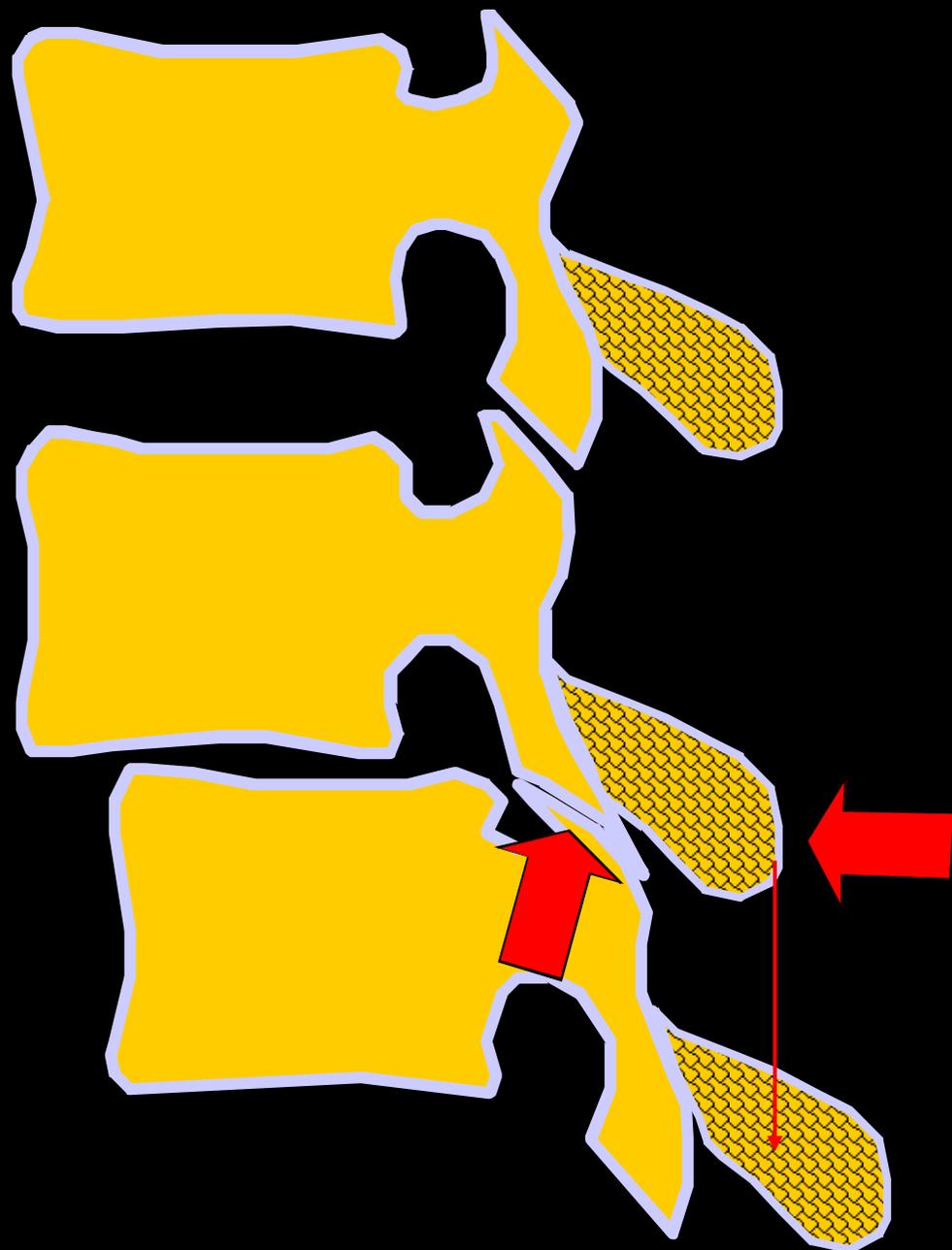
Guérison

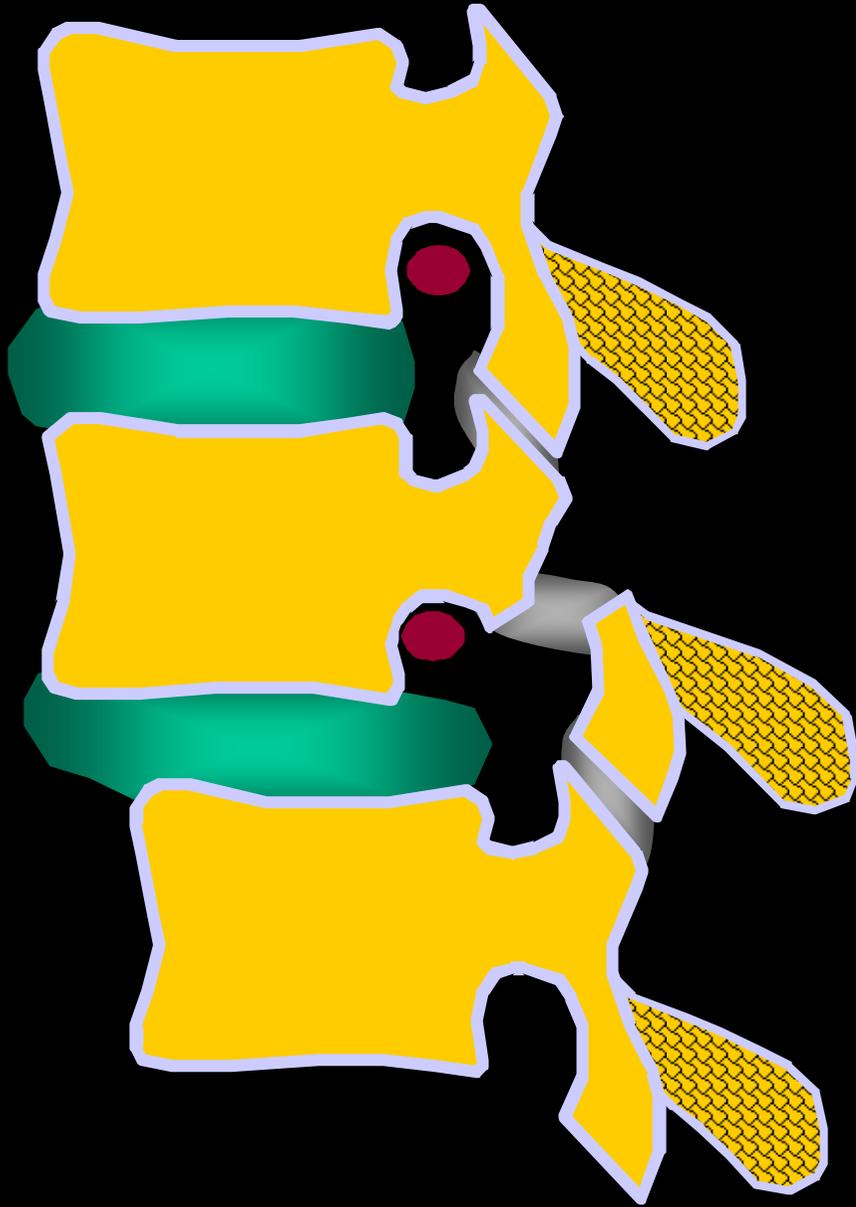


*Spondylolyse*



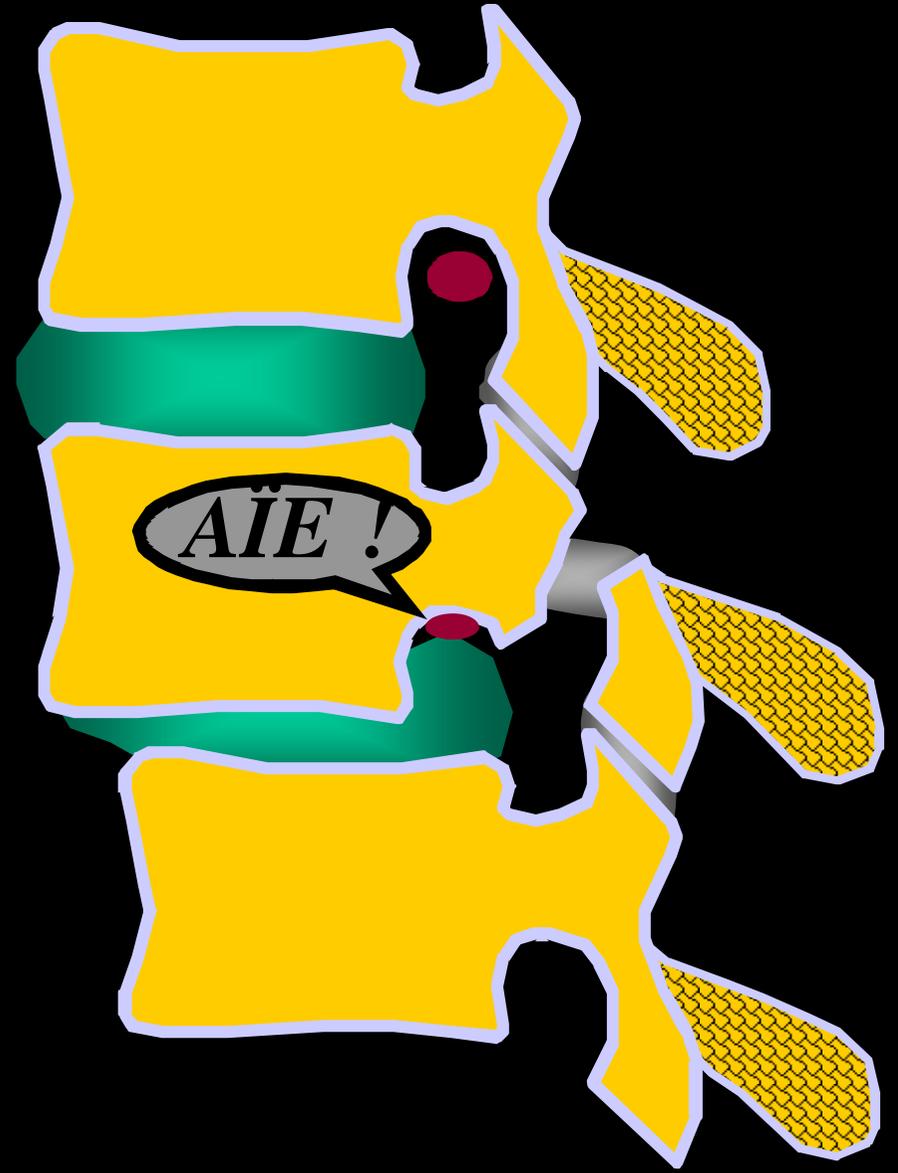
*Arthrose postérieure*





*Spondylolisthesis*

+



*Affaissement*



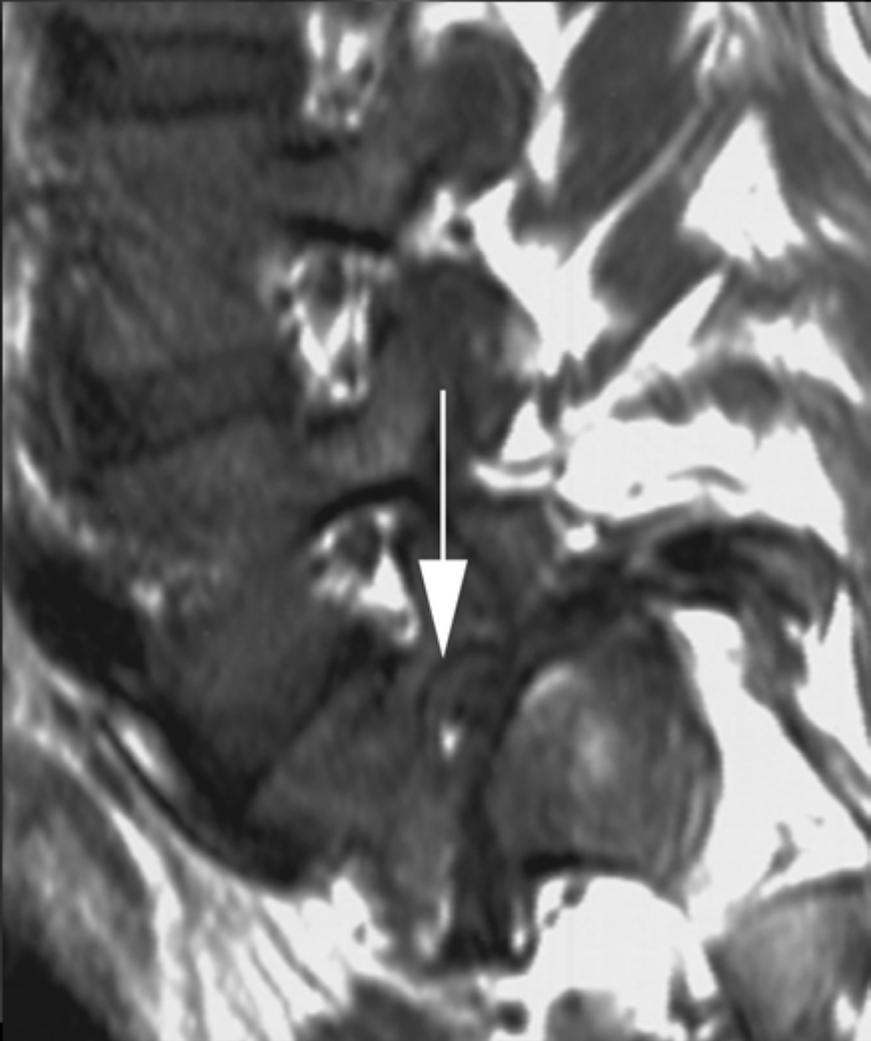
*Spondylolyse*

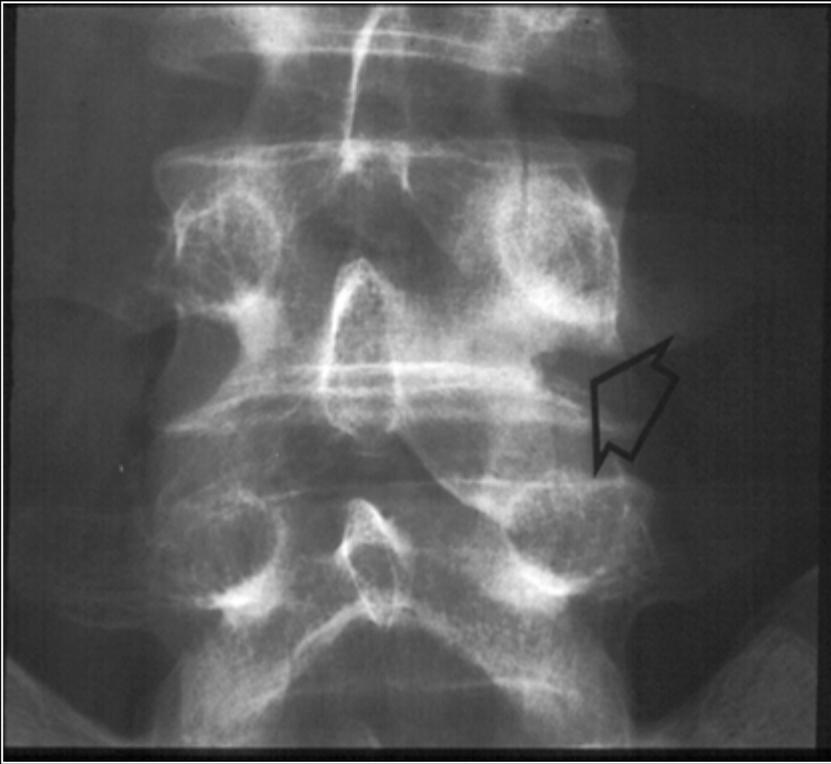


*Spondylolyse « classique »: rétr. foram. et pas canalaire*

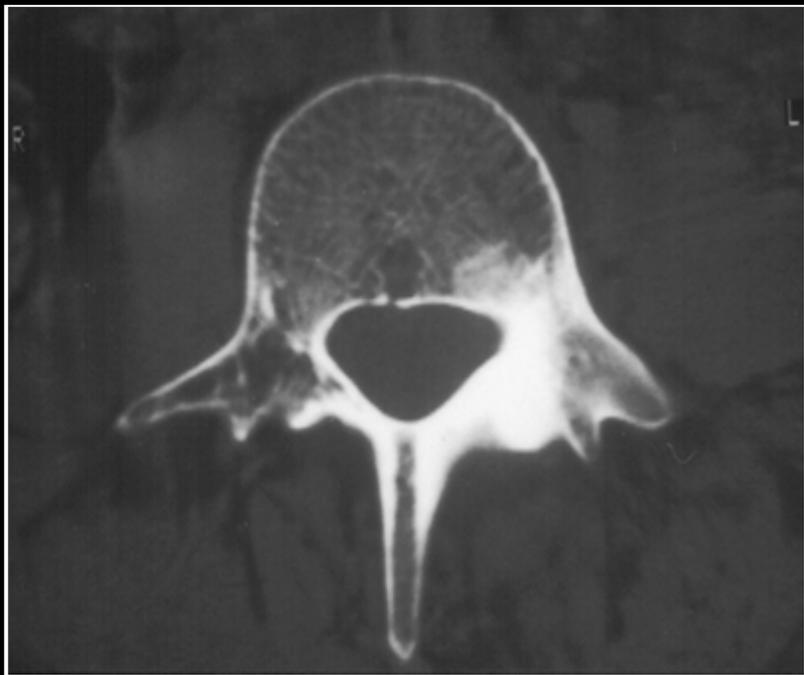


*Rare cas de spondylolyse avec rétr. canalaire*





Lombalgies  
de type  
inflammatoire

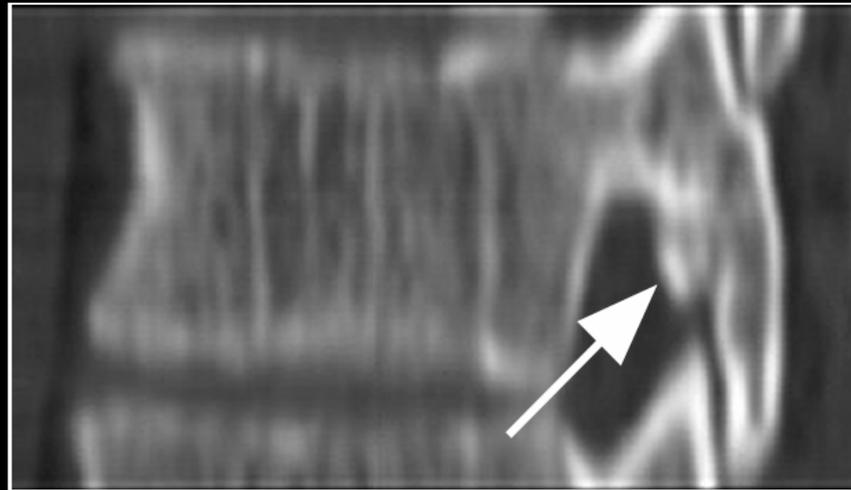
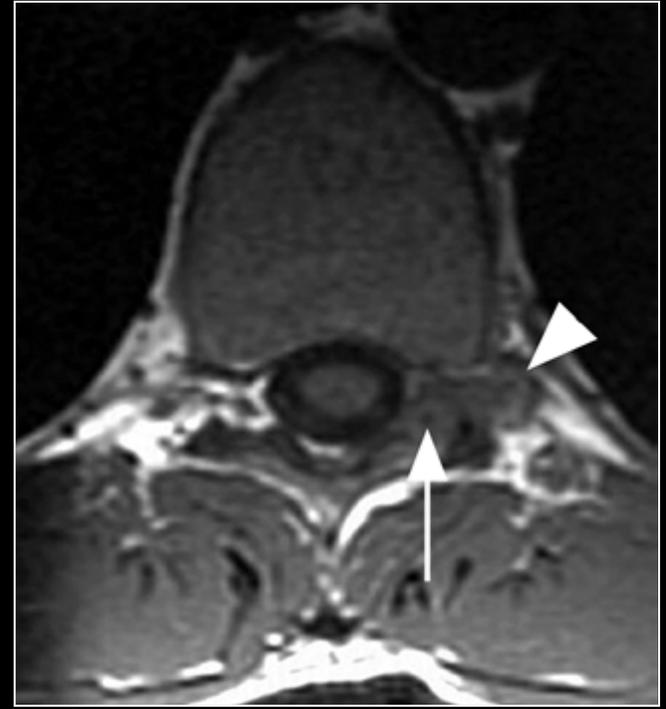
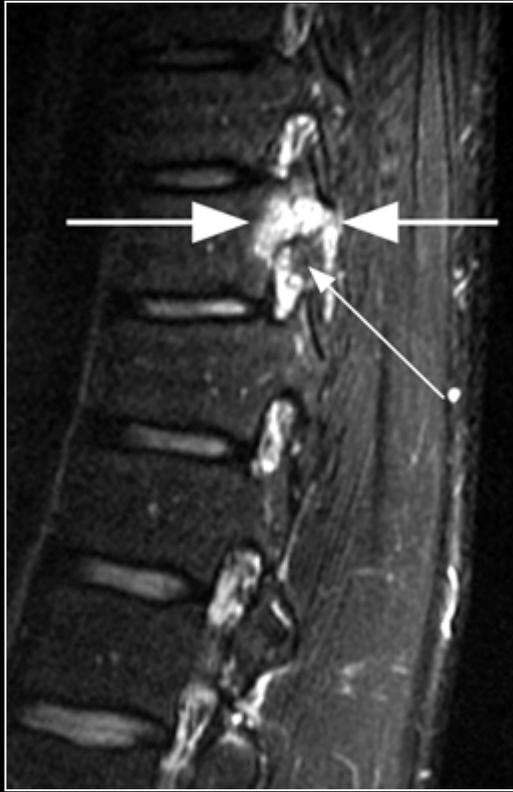


Ostéome  
Ostéoïde  
+ hyperostose  
réactionnelle

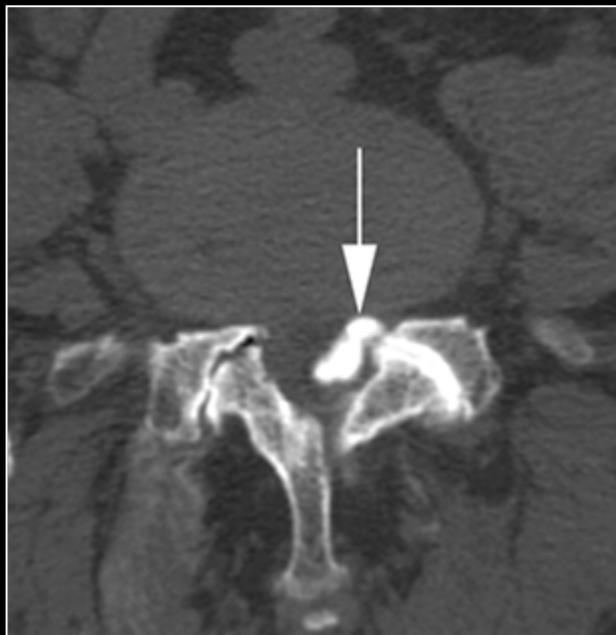
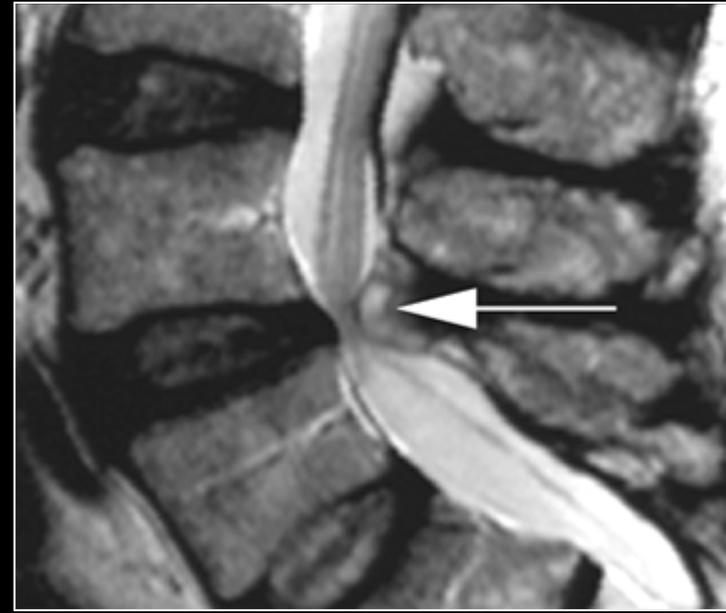
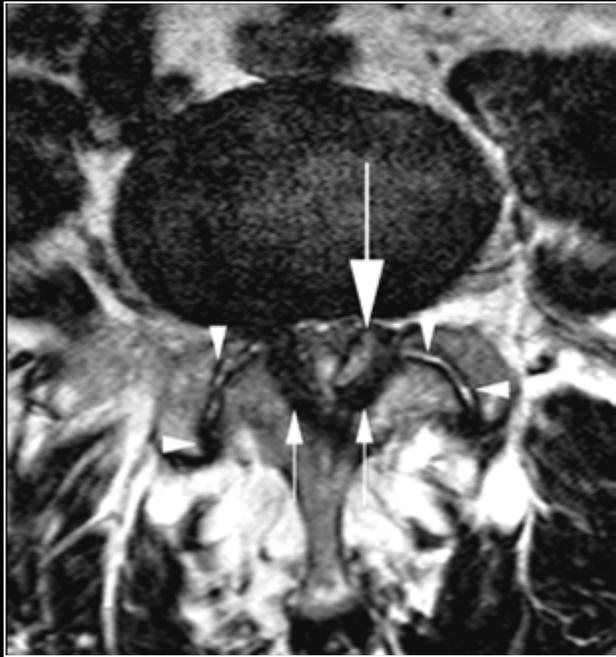


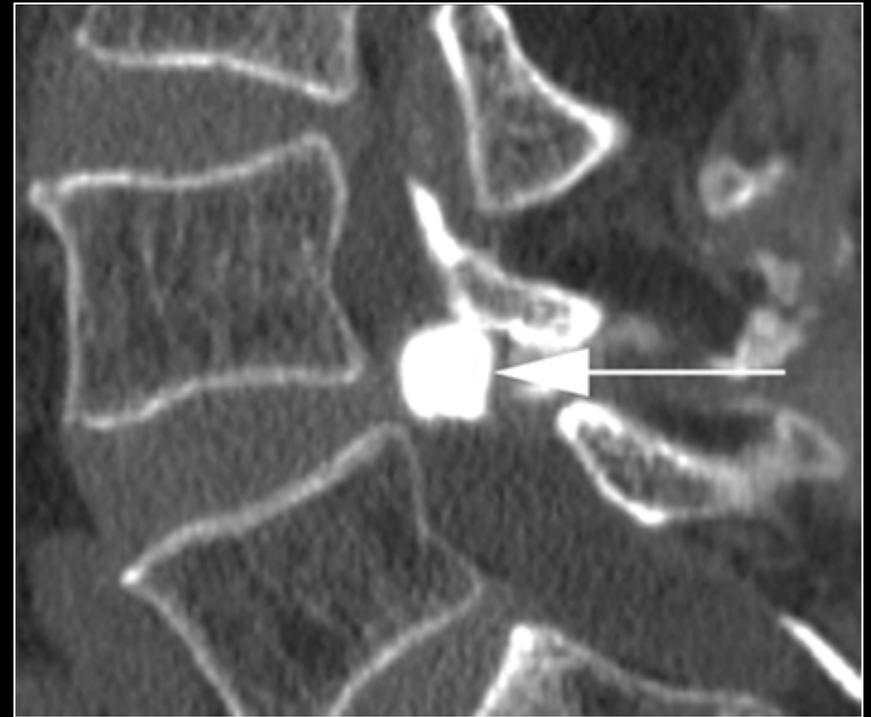
Devant une Scoliose  
douloureuse, penser à  
Faire une scintigraphie  
osseuse !





# Cas particulier





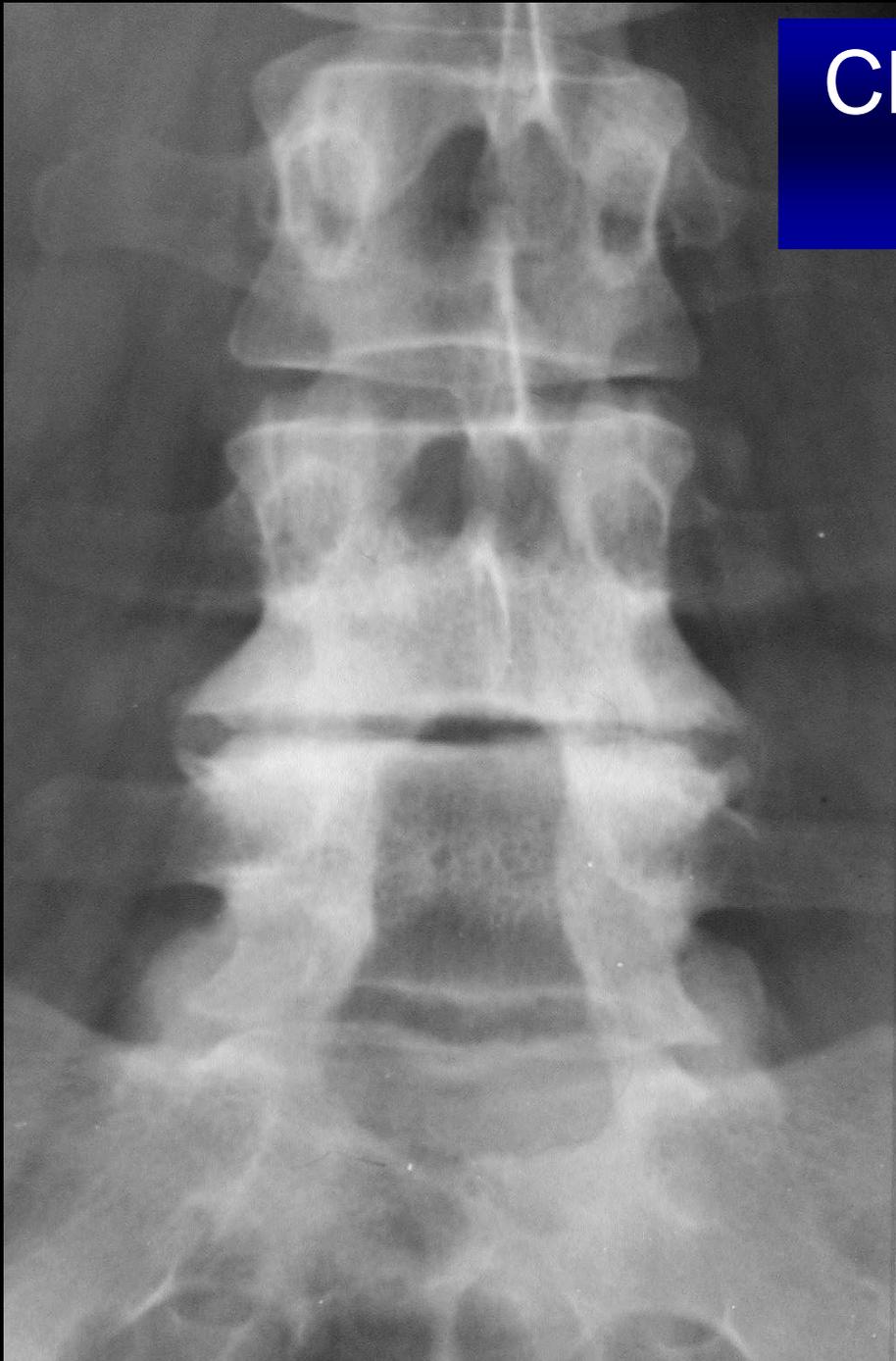
**Kyste arthrosynovial opacifié par  
Arthrographie interapophysaire**



# Complications de la chirurgie rachidienne

- Infection
- Fibrose épidurale
- Arachnoïdite

Chirurgie  
???

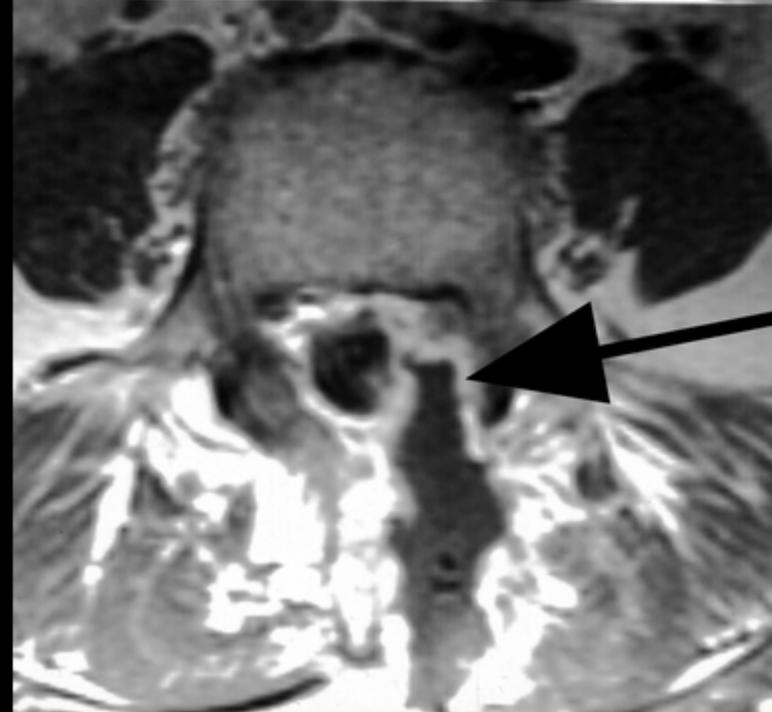


# ATCD chirurgie

?

T1

Gado

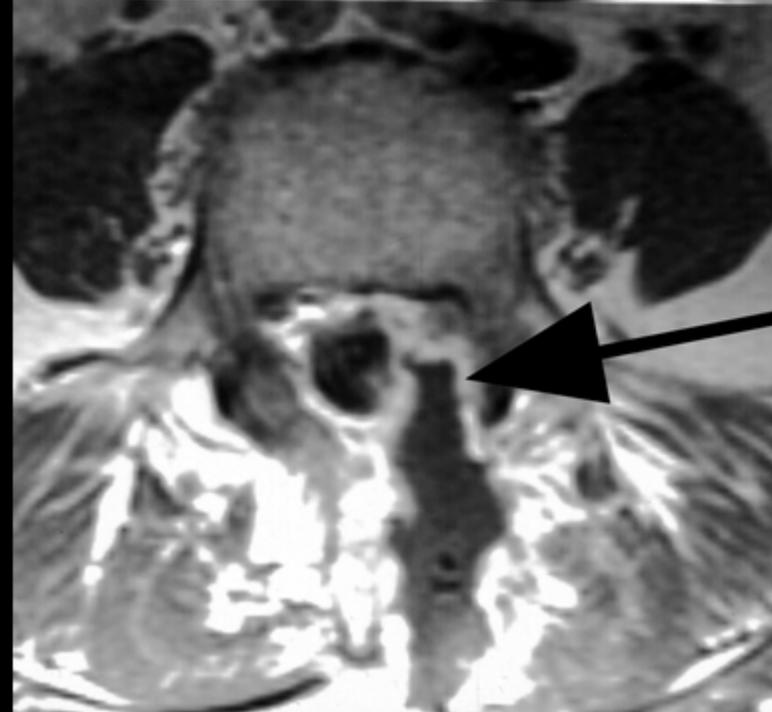


Abcès  
épidural

T1

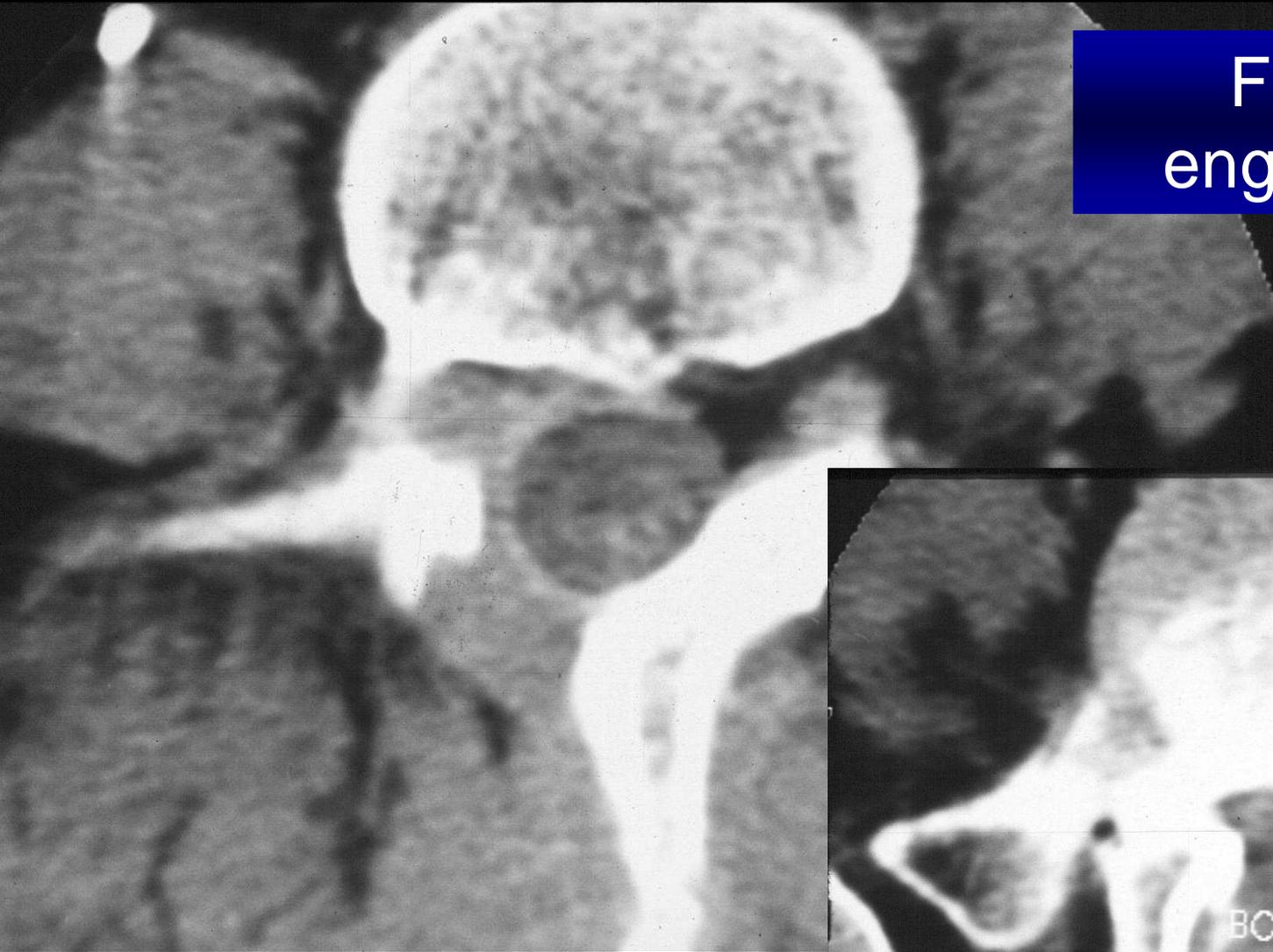


Gado

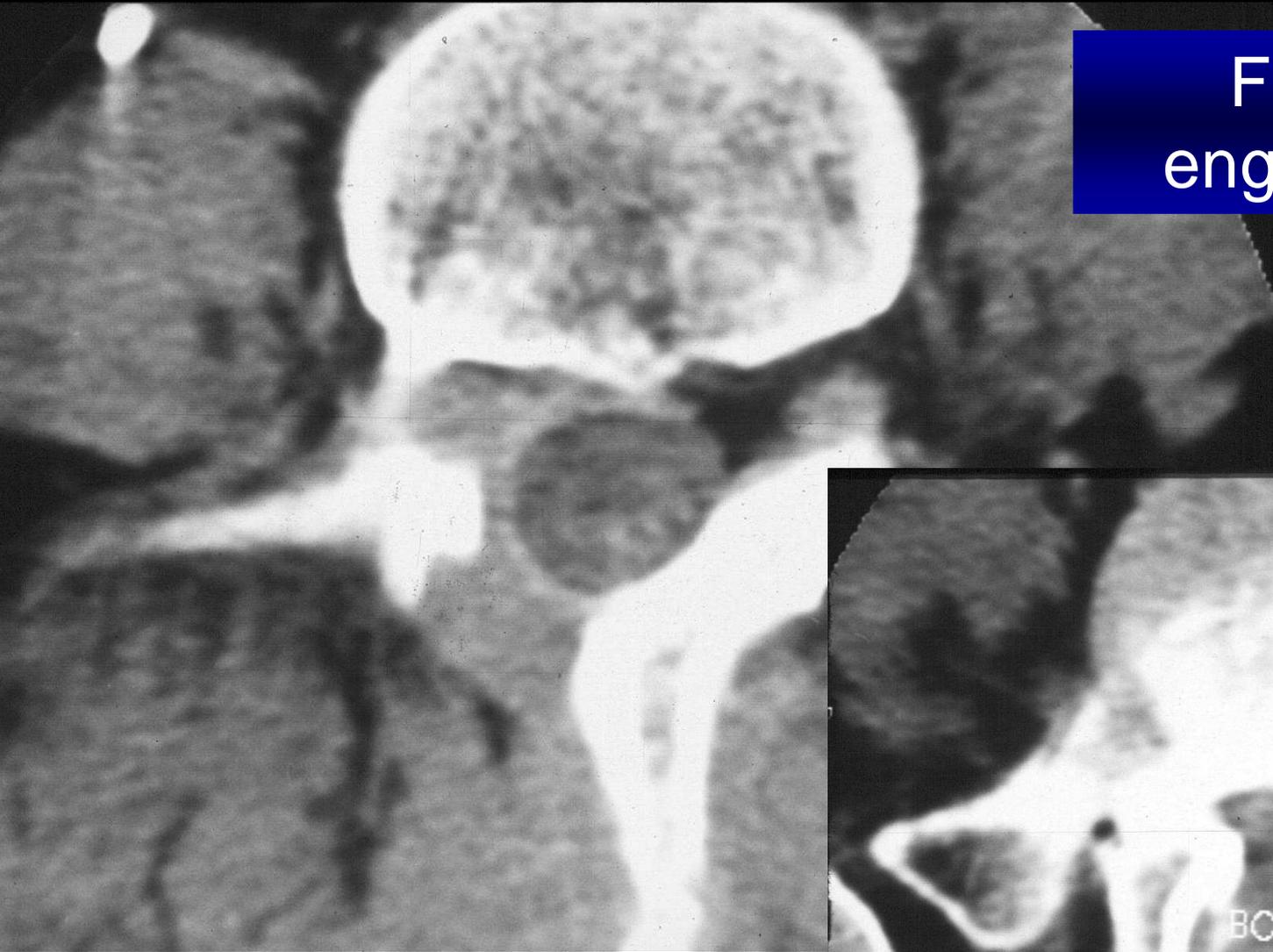




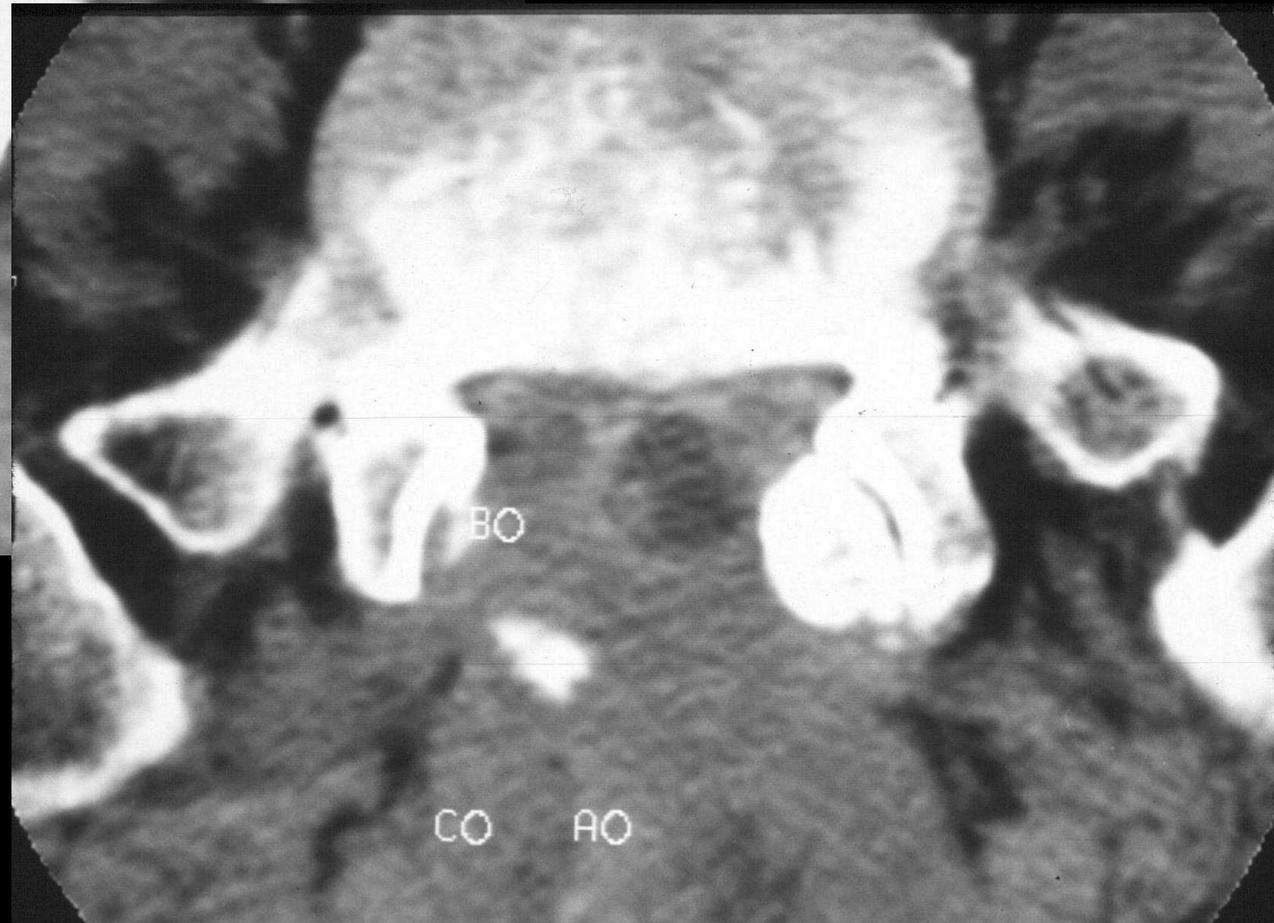
Séquelles chirurgie



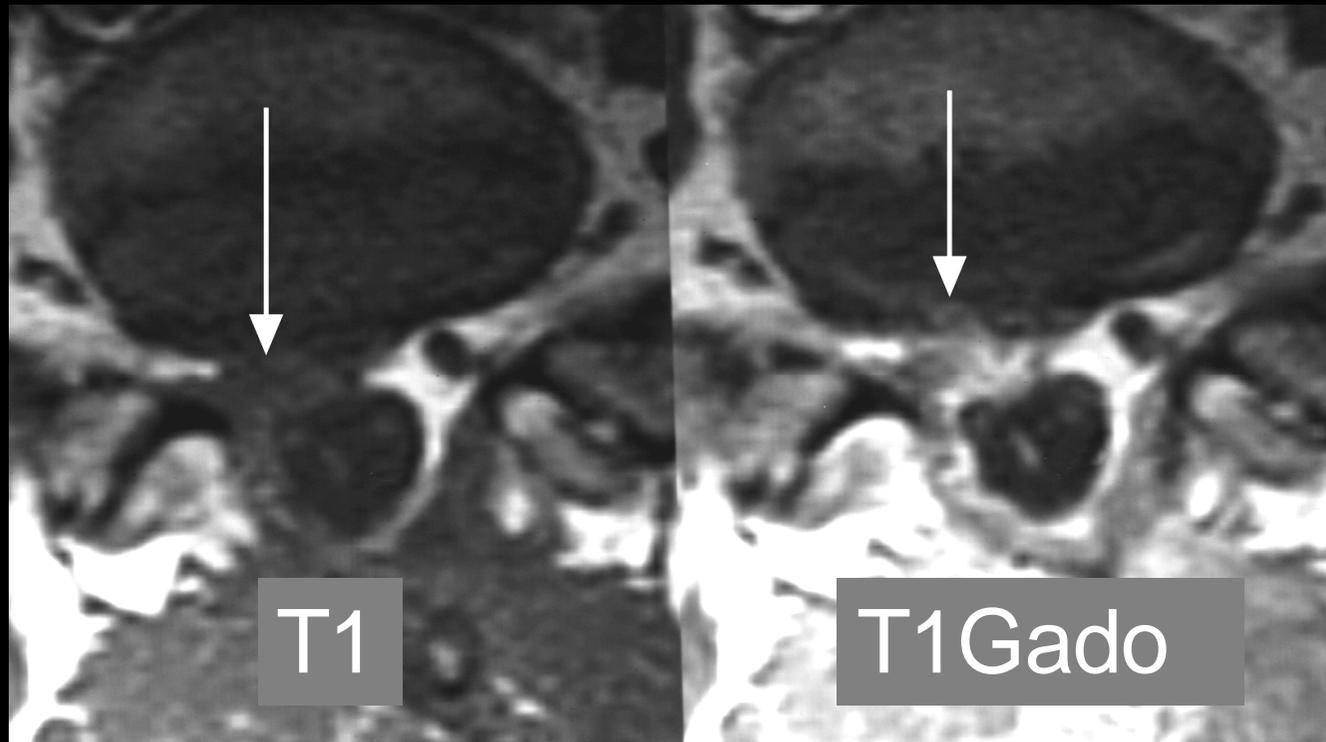
Fibrose épidurale  
engainant les racines



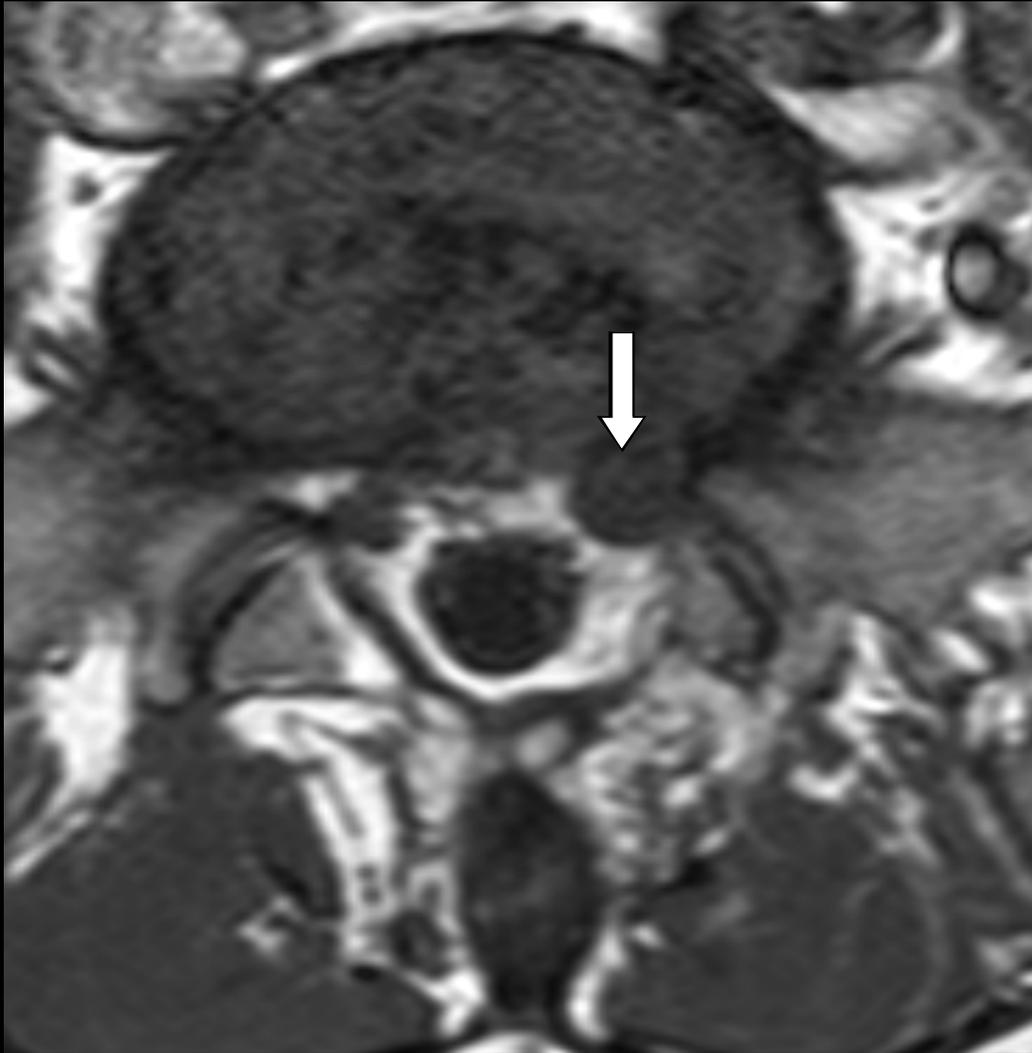
Séquelles chirurgie



# Sciatalgie droite chez un patient déjà opéré de hernie discale droite



Fibrose épidurale

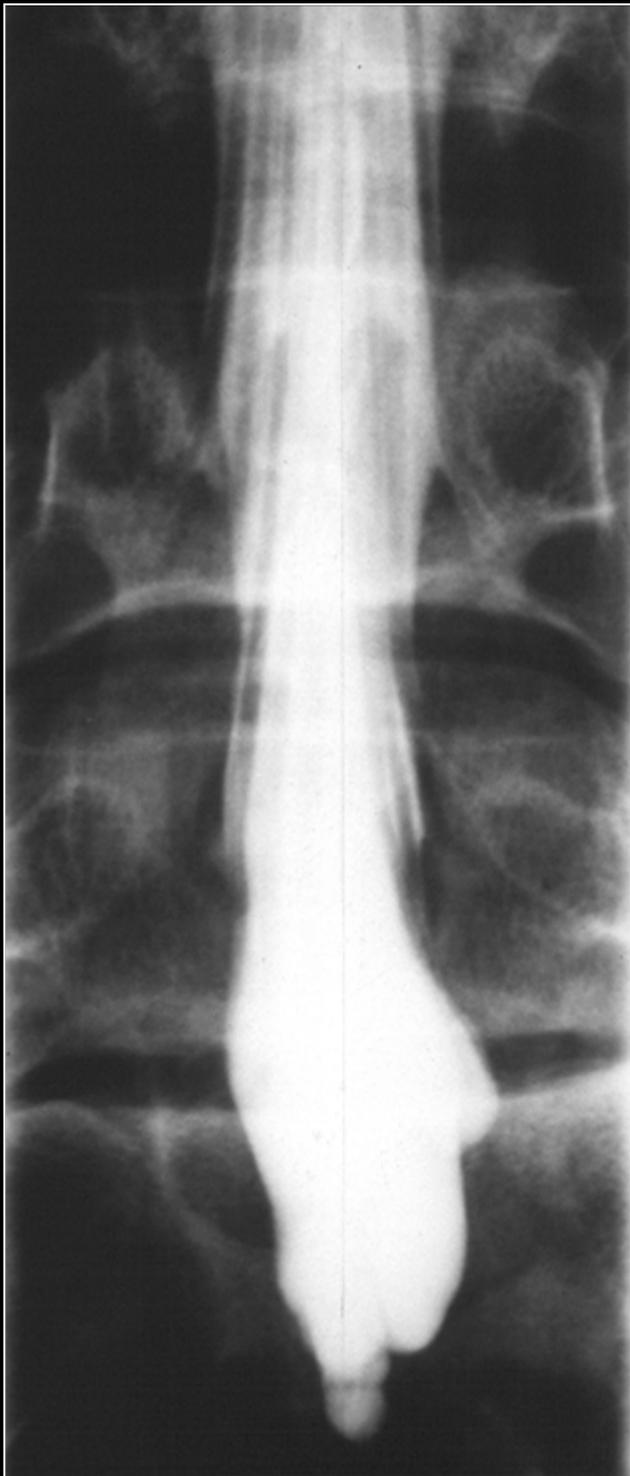


T1



T1G

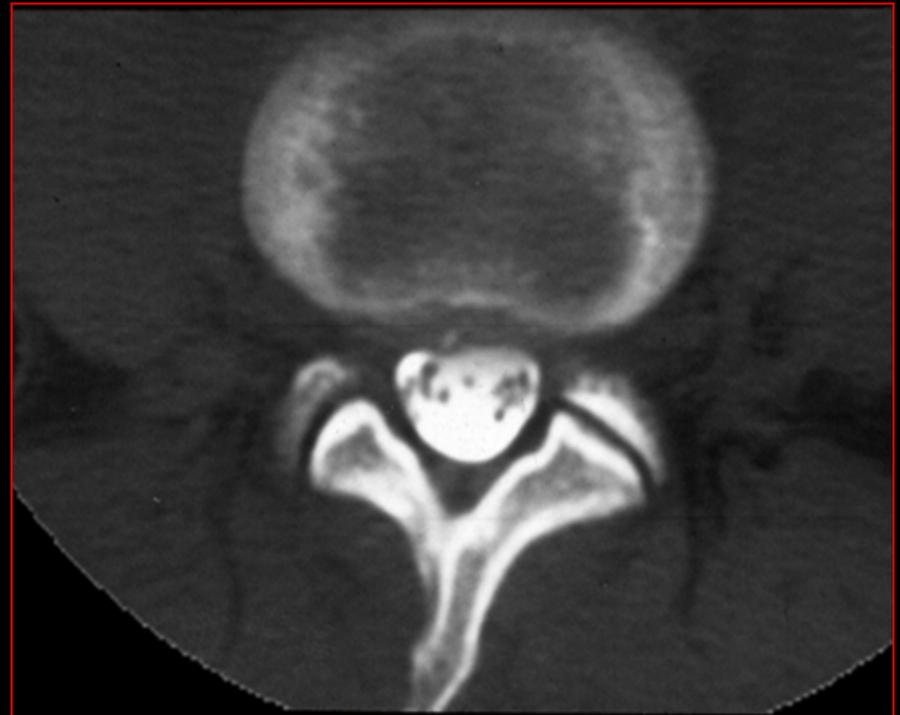
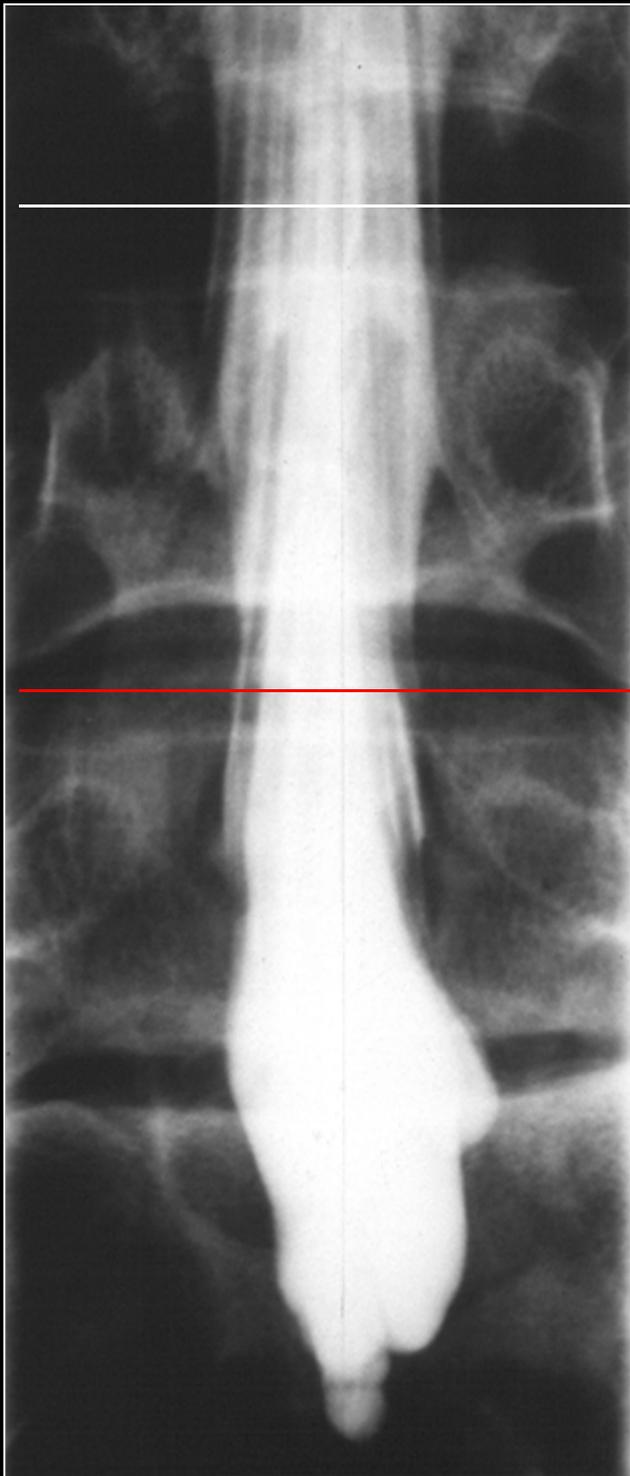
Sac  
Vide  
?



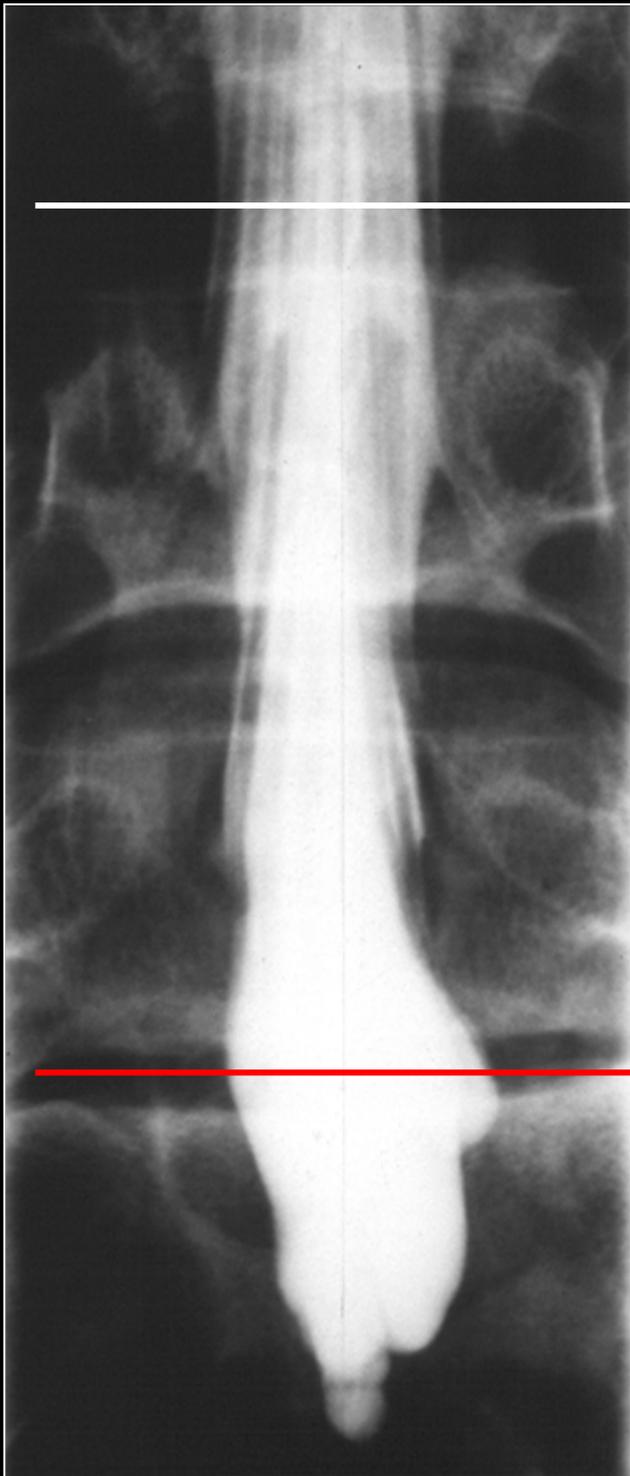
Normal



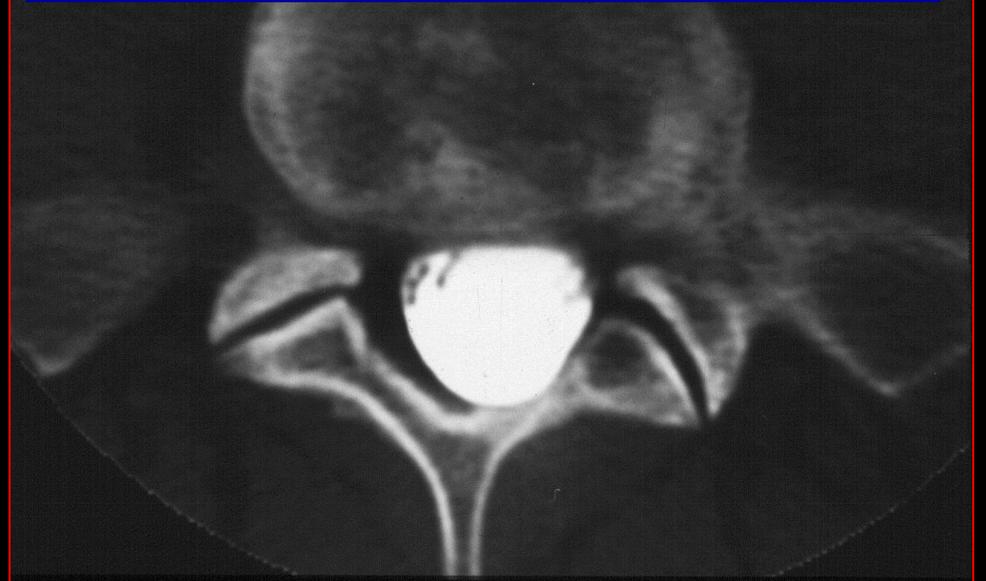
Sac  
Vide  
?



Cause  
!



Arachnoïdite ...!





?





Arachnoïdite ...!



# Lombo-sciatalgie

Soit

Commune,  
Mécanique, Guérit  
spontanément

Soit

Secondaire,  
à pathologie active  
S'aggrave !!!

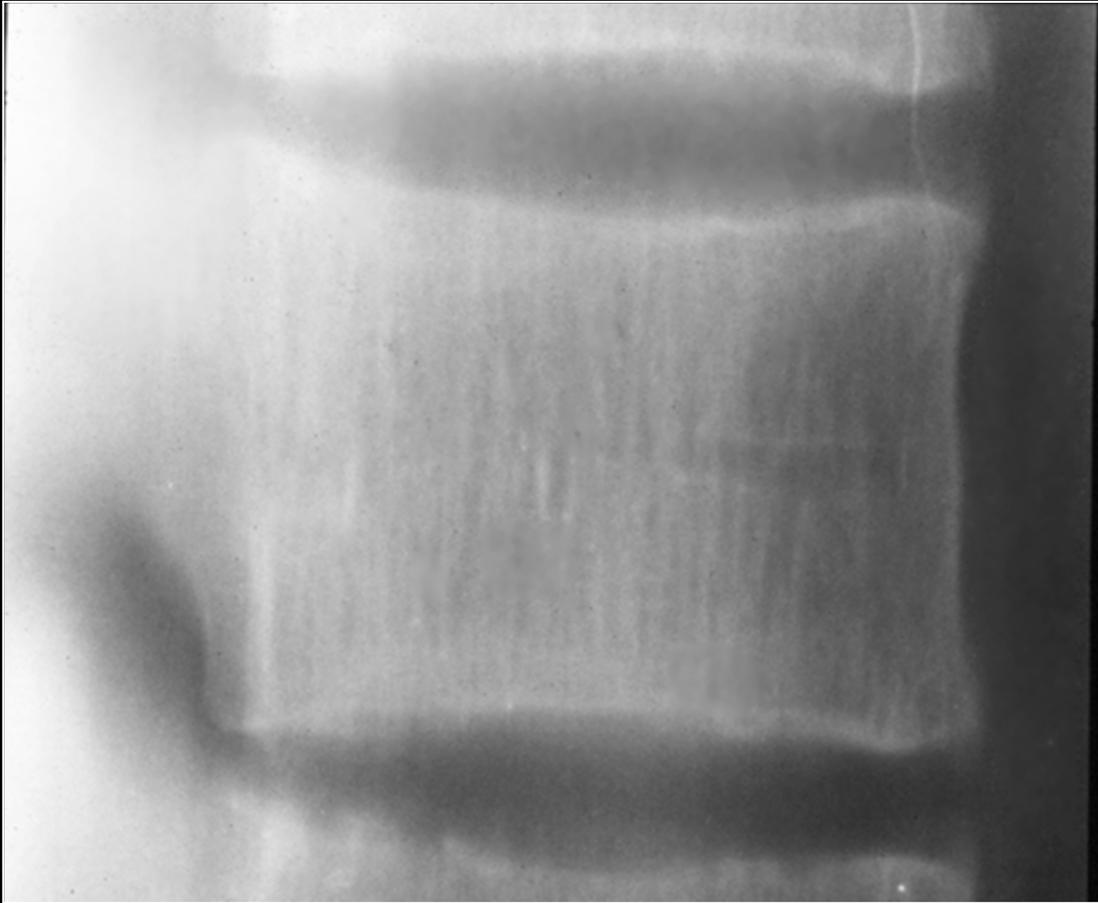
→ Pas d'imagerie !

→ Imagerie indiquée!

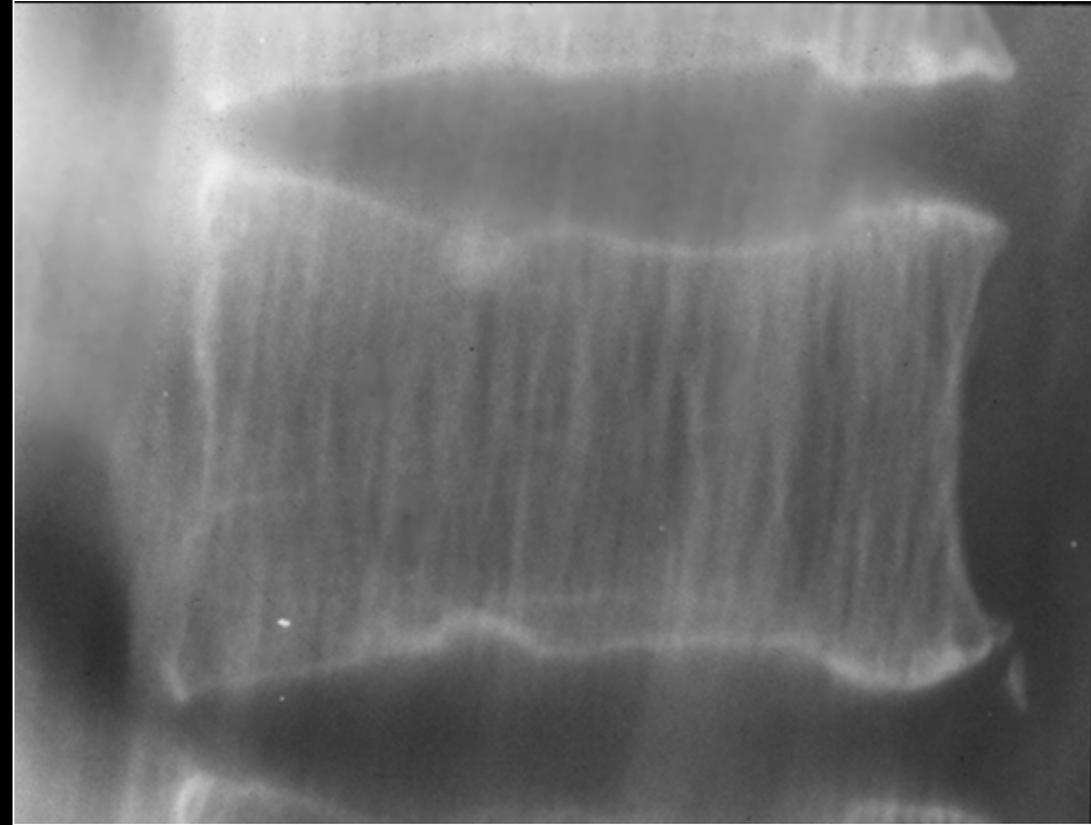
## Lombo - sciatalgies secondaires

- Ostéoporose
- Infections : spondylodiscite
- Tumeurs : métastases, myélome (Kahler)

# Os trabéculaire



Normal



Ostéoporose



Tassement traumatique



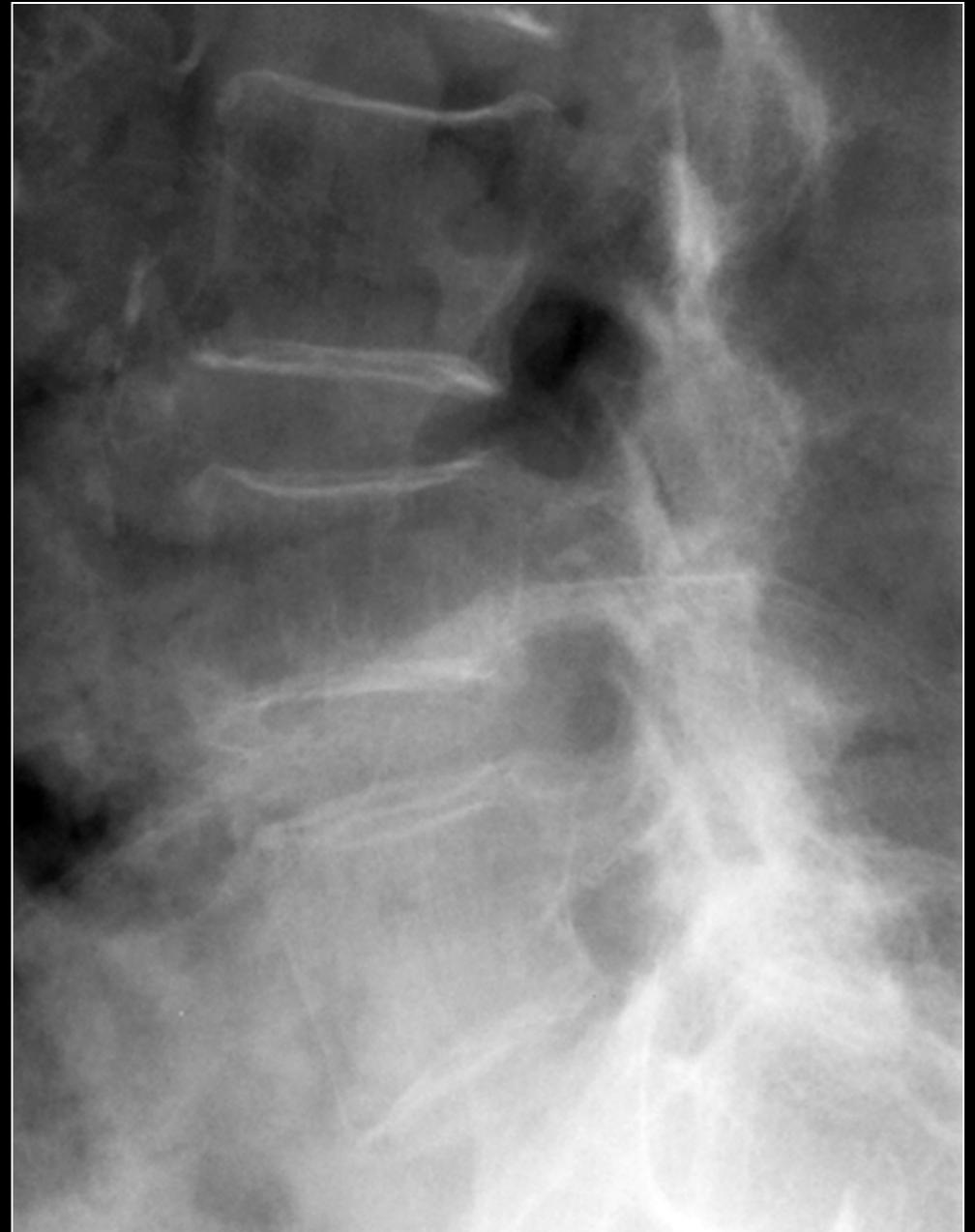
Tassement ostéopénique

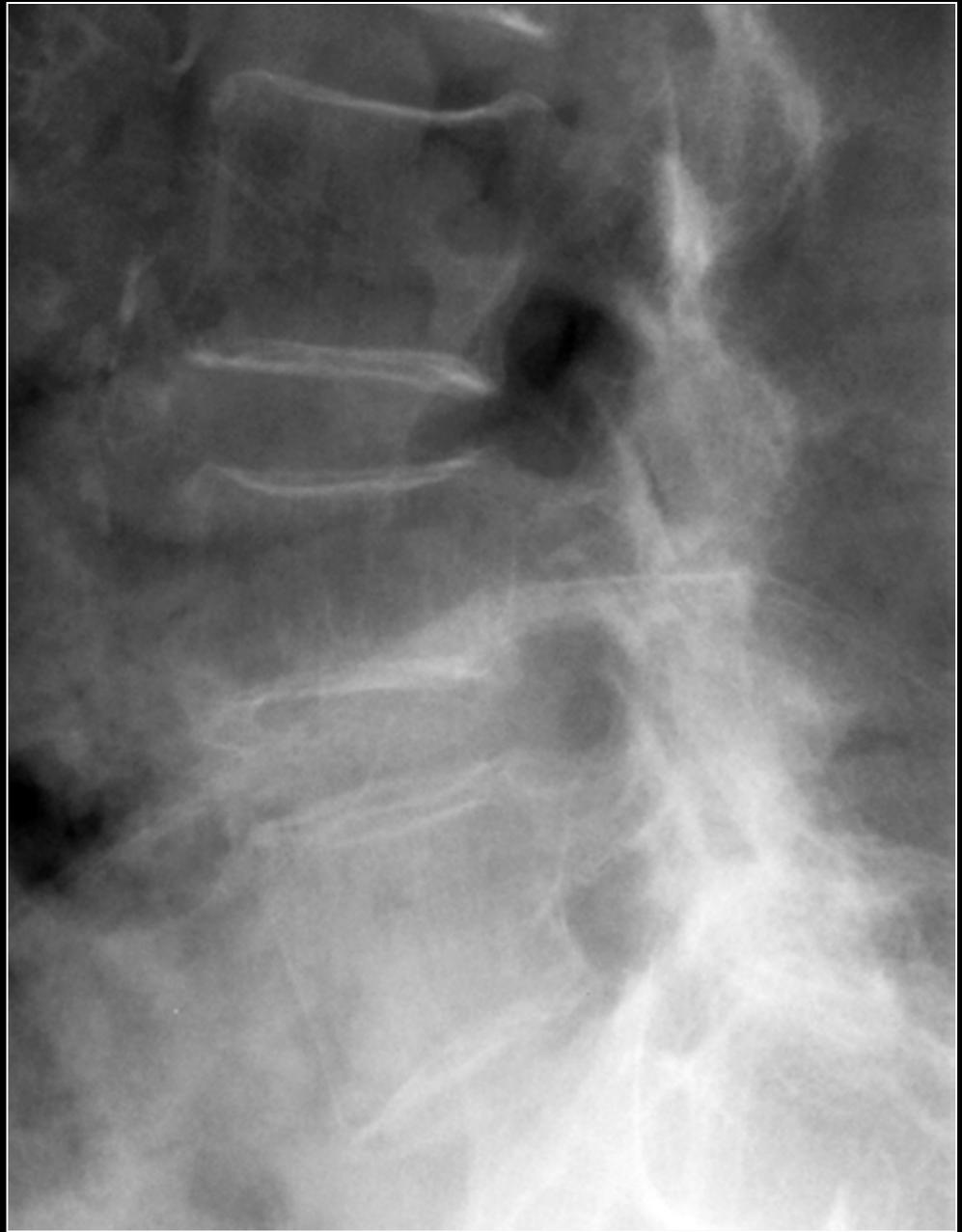
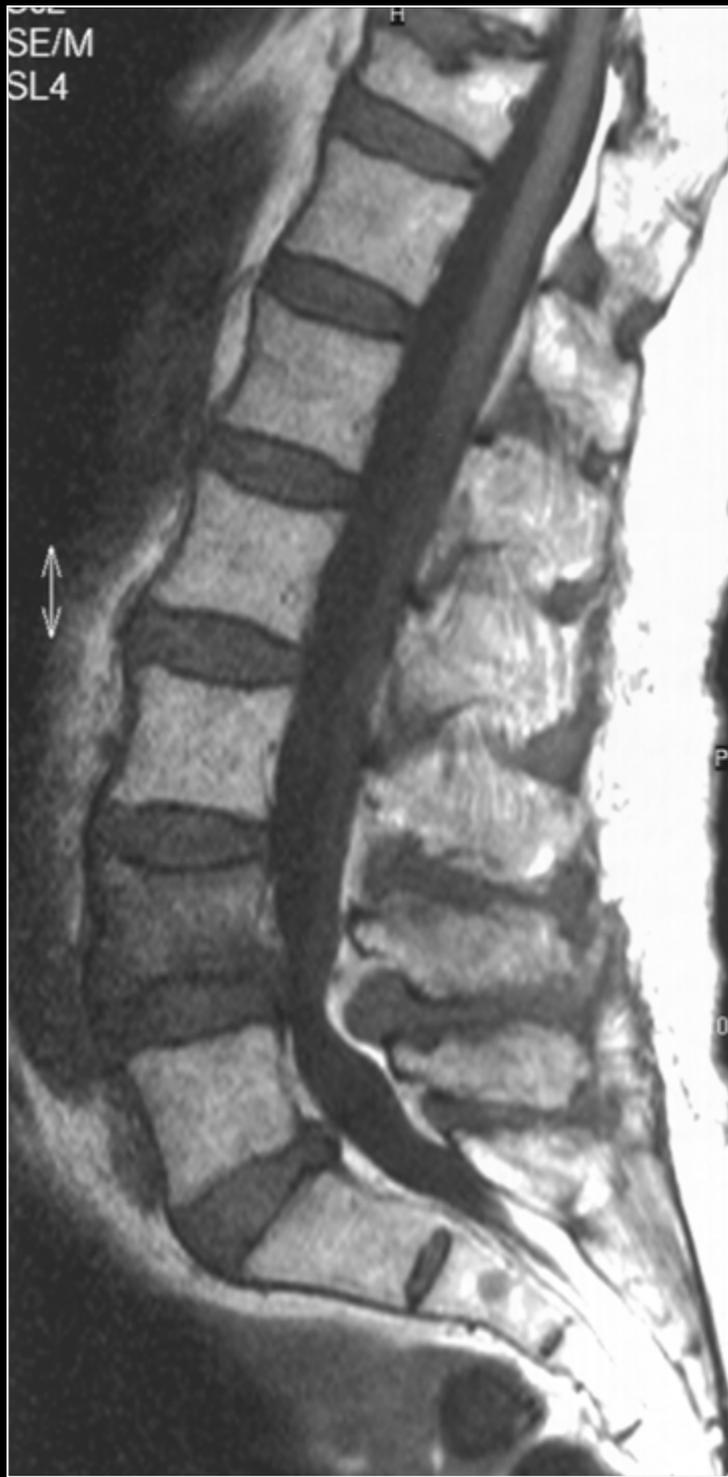


Ostéoporose  
cortisonique

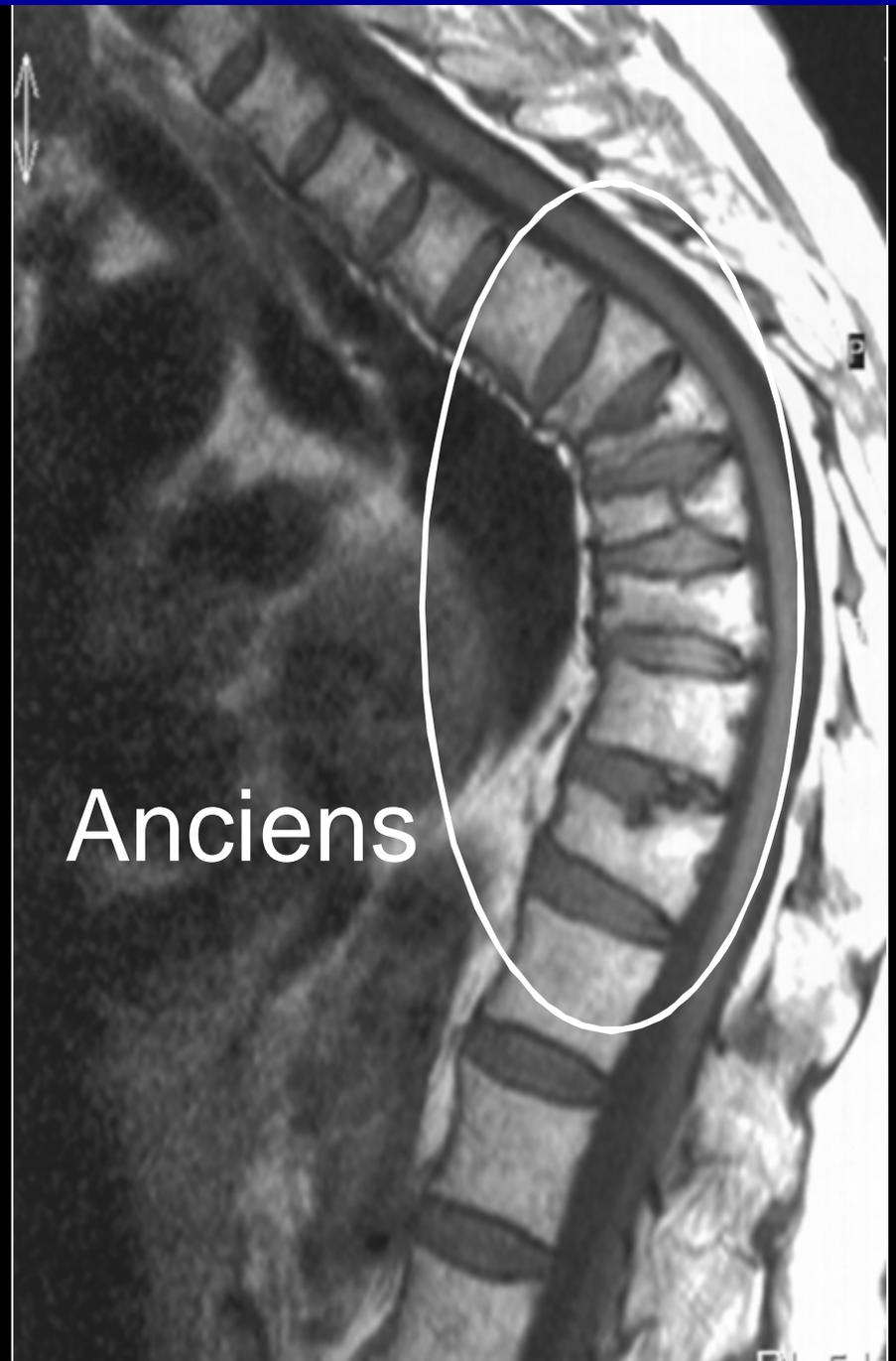
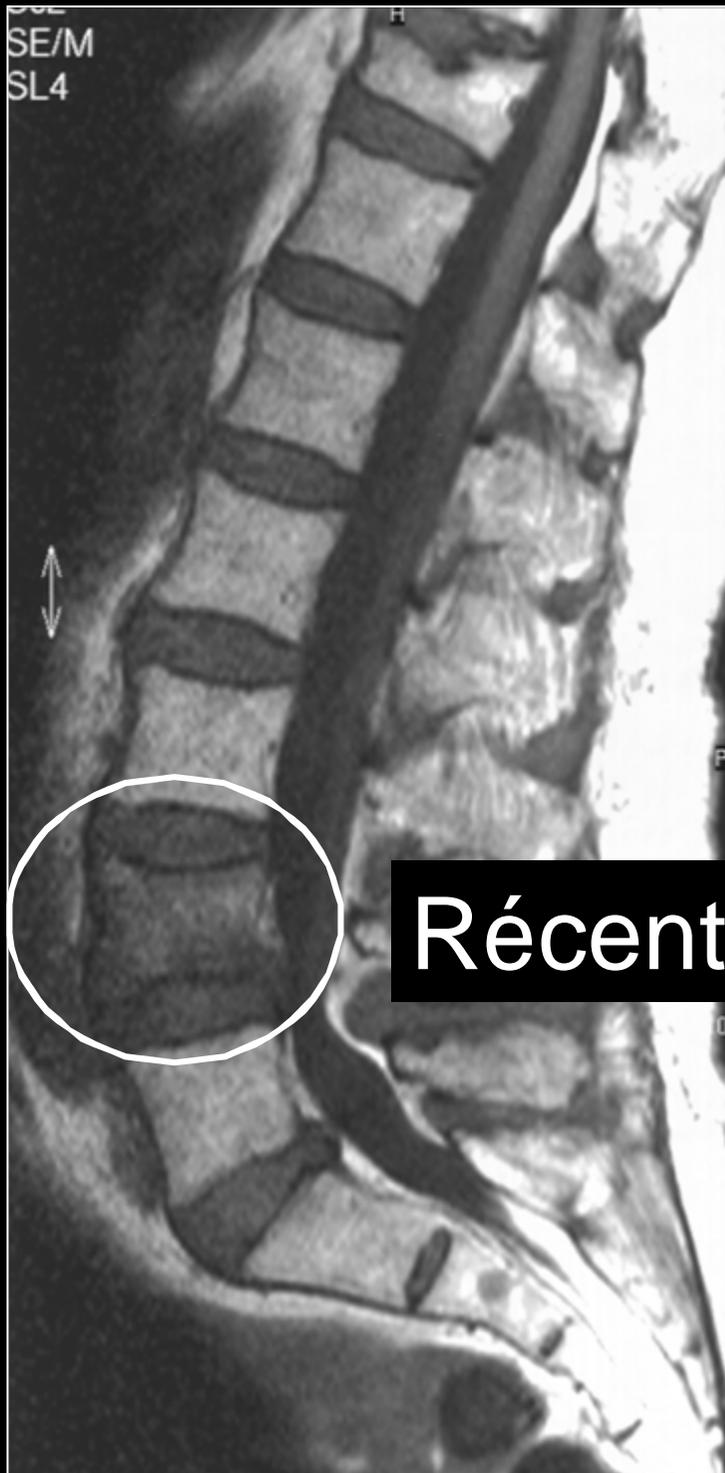


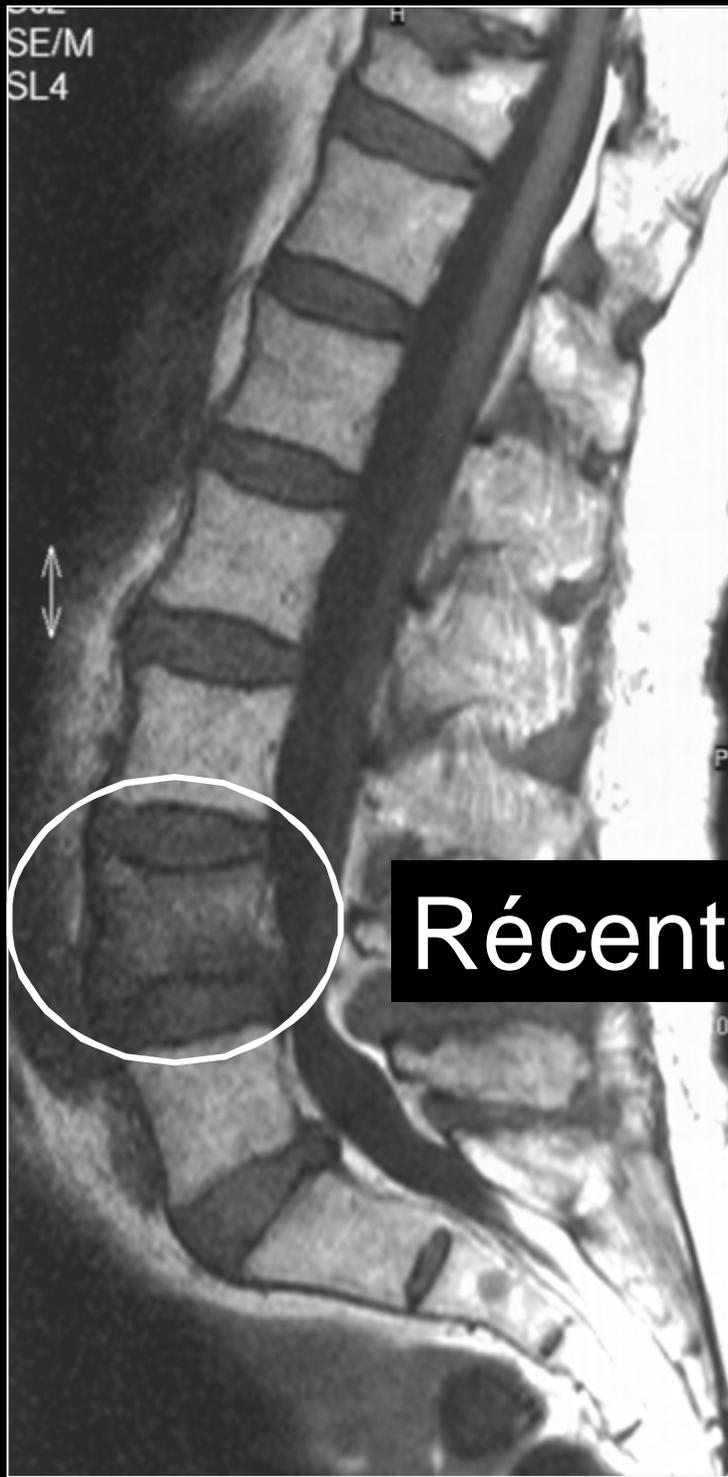
Tassement spontané de L4





# Tassements ostéopéniques





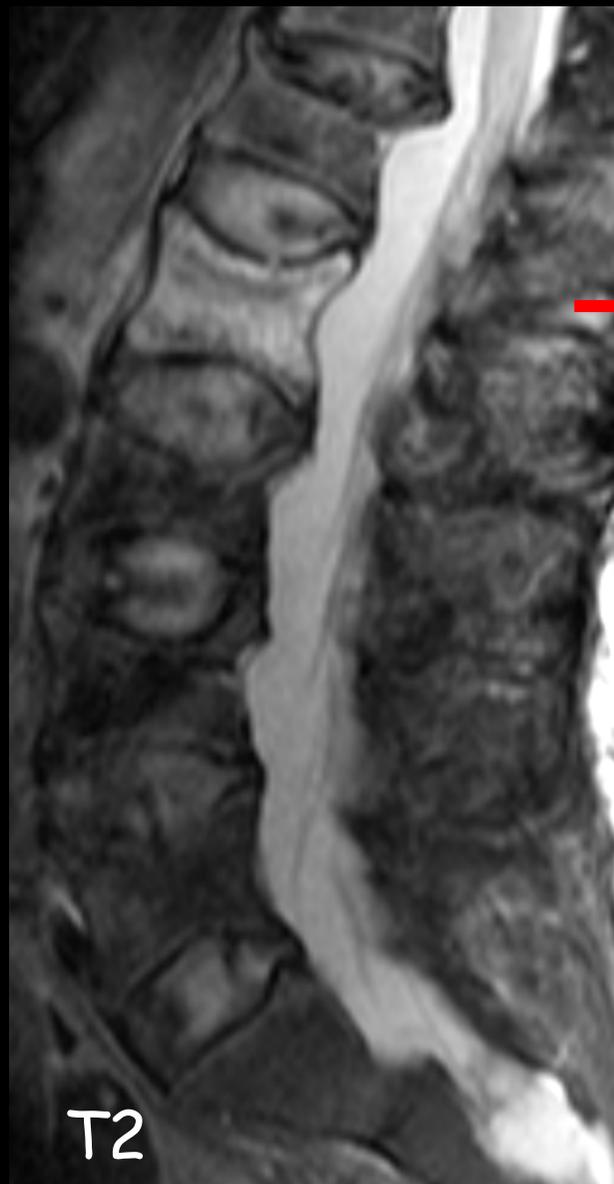
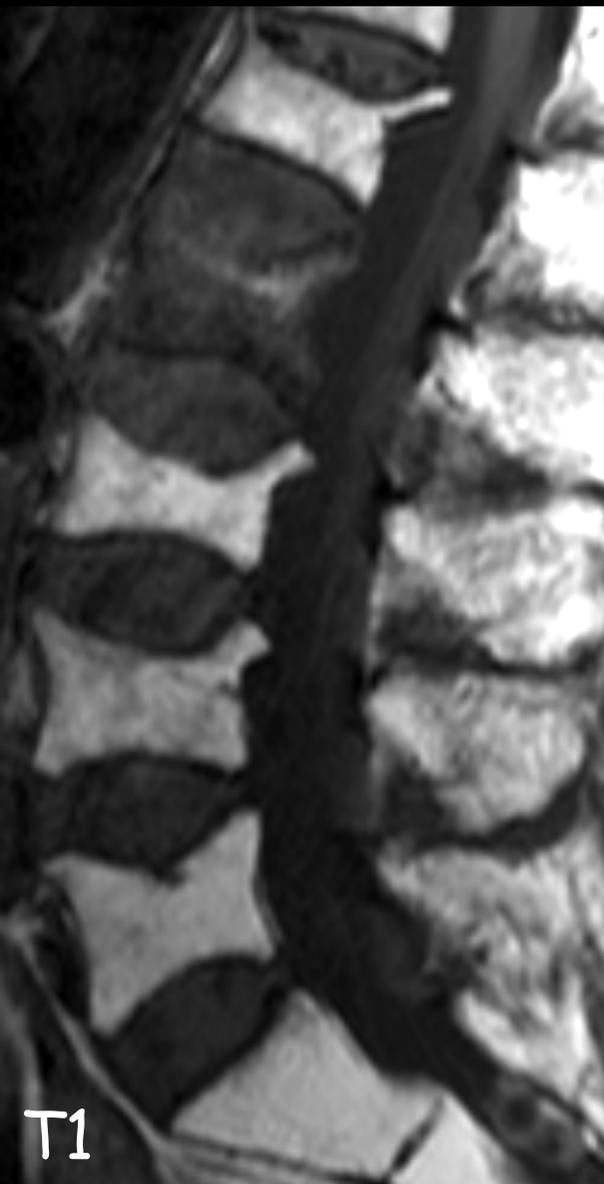


Recent



Old



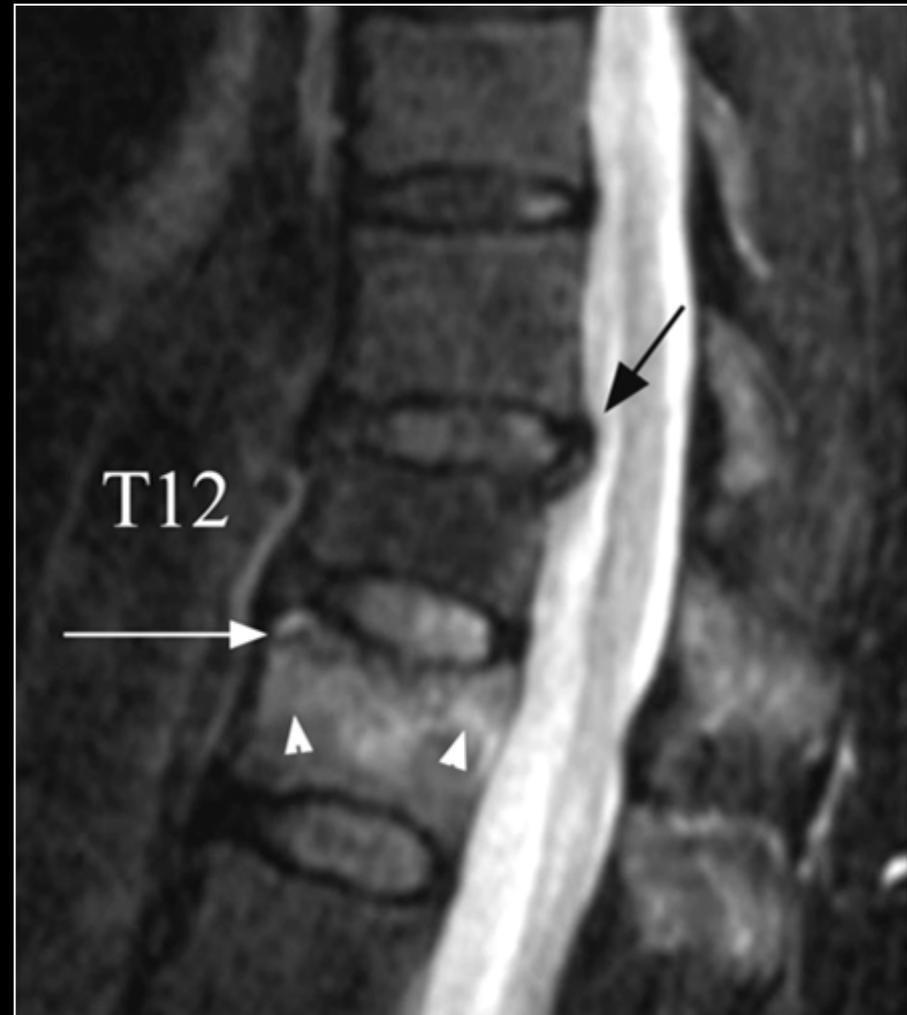


# Tassements ostéopéniques en IRM



Impactions trabéculaires

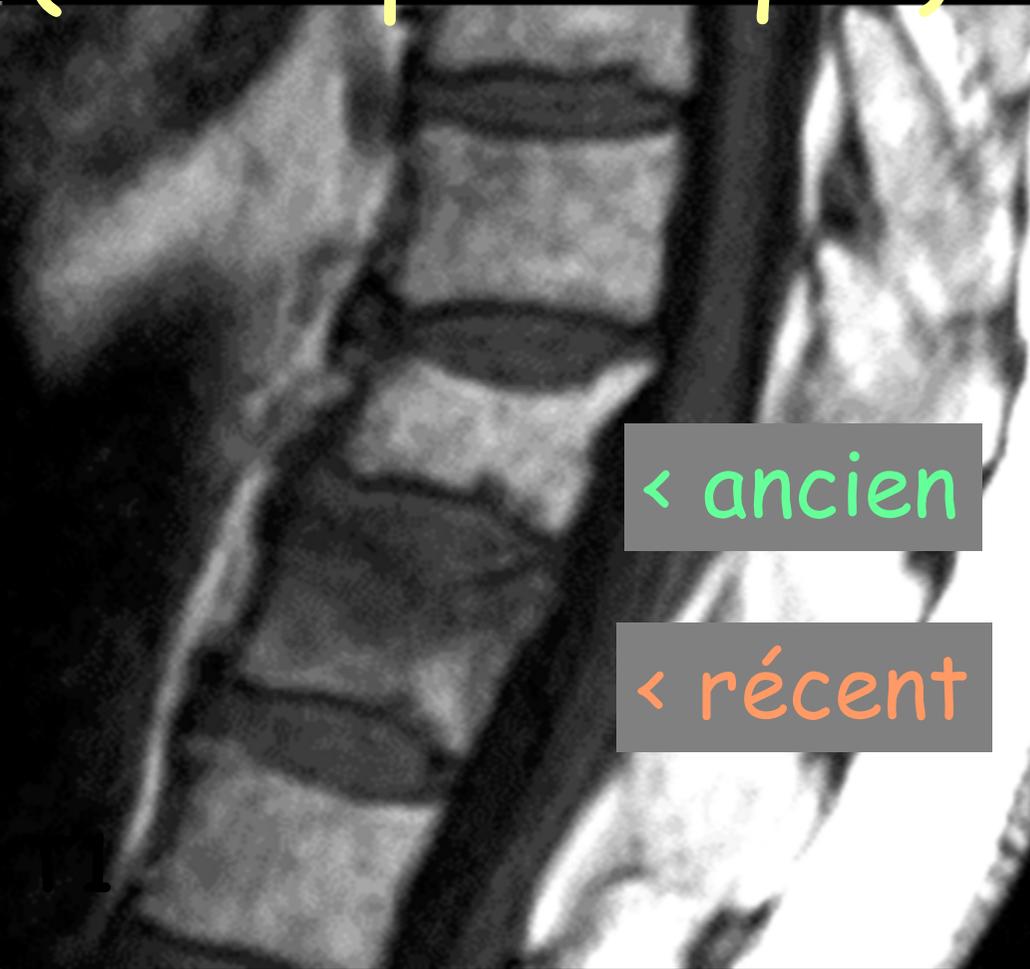
# Lombalgie symptomatique



Tassement spontané de L1

IRM

Tassement bénin  
(ostéoporotique)



< ancien

< récent

T1

Tassement malin  
(tumoral)





Lombalgie +  
Tassement spontané





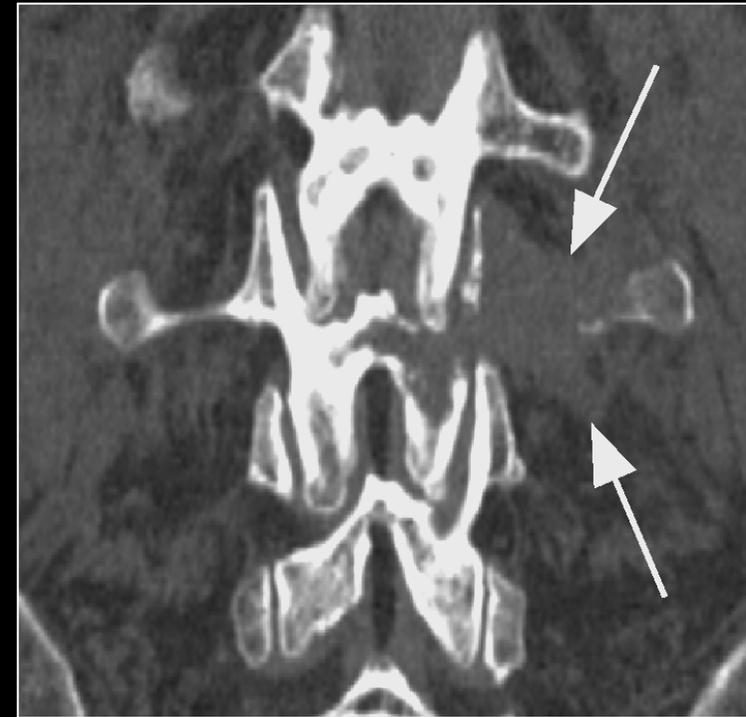
Infection



Tumeur



# Lombalgie symptomatique



Tassement spontané de L3

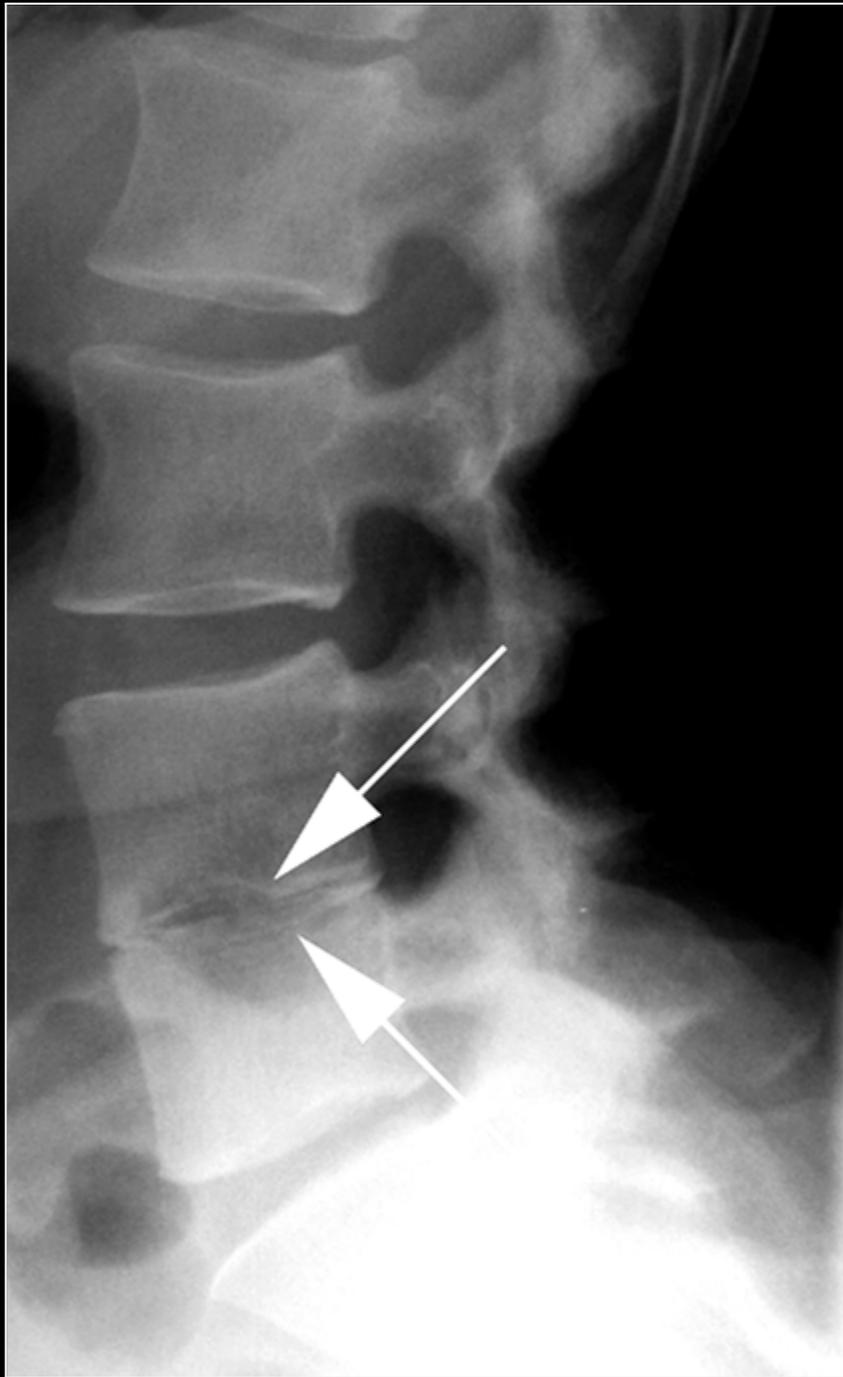
# Tumeur !

T1

Gado

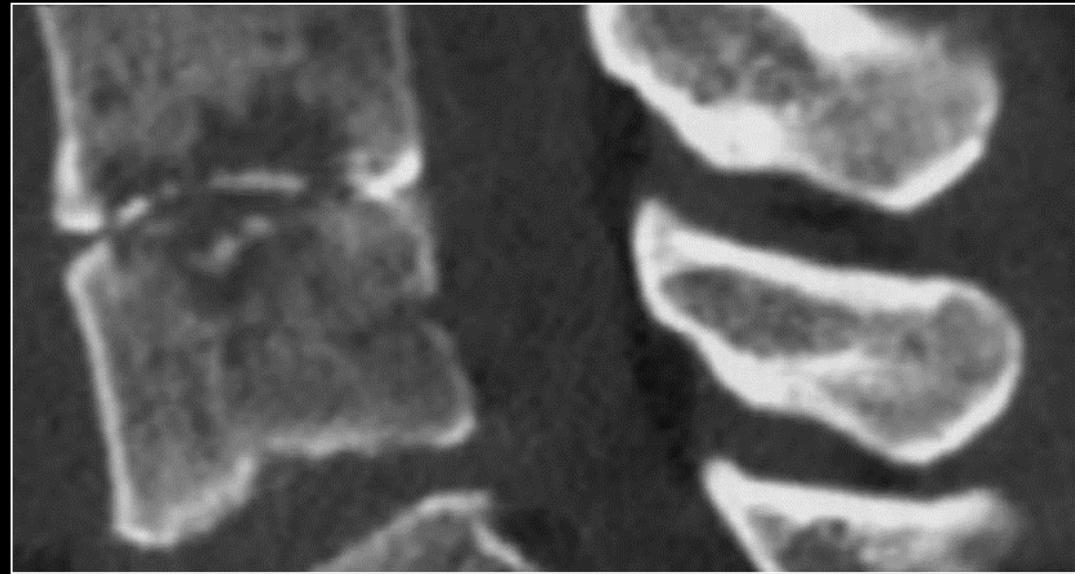
T2





# Lombalgies

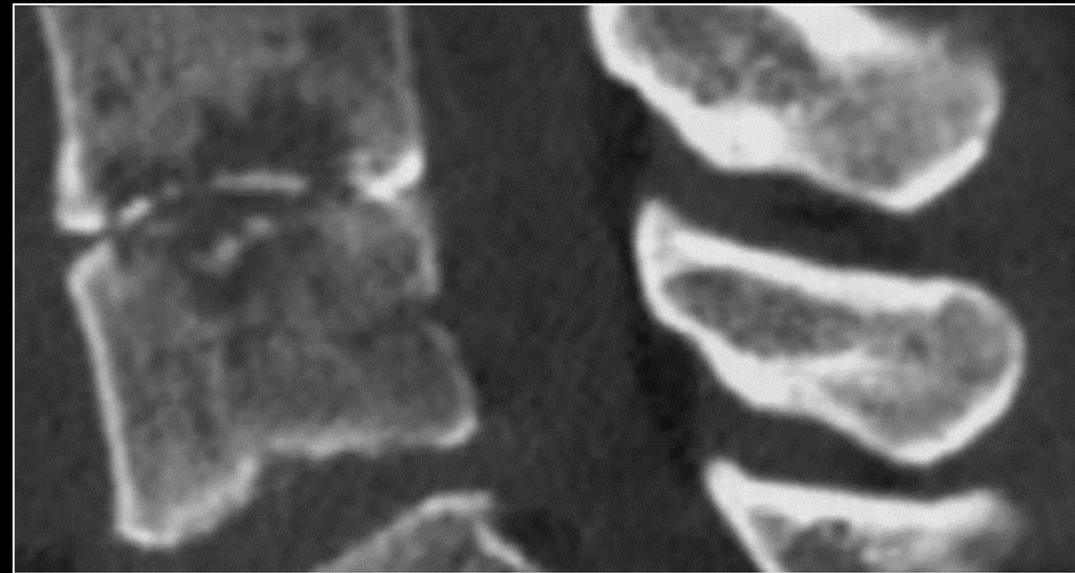
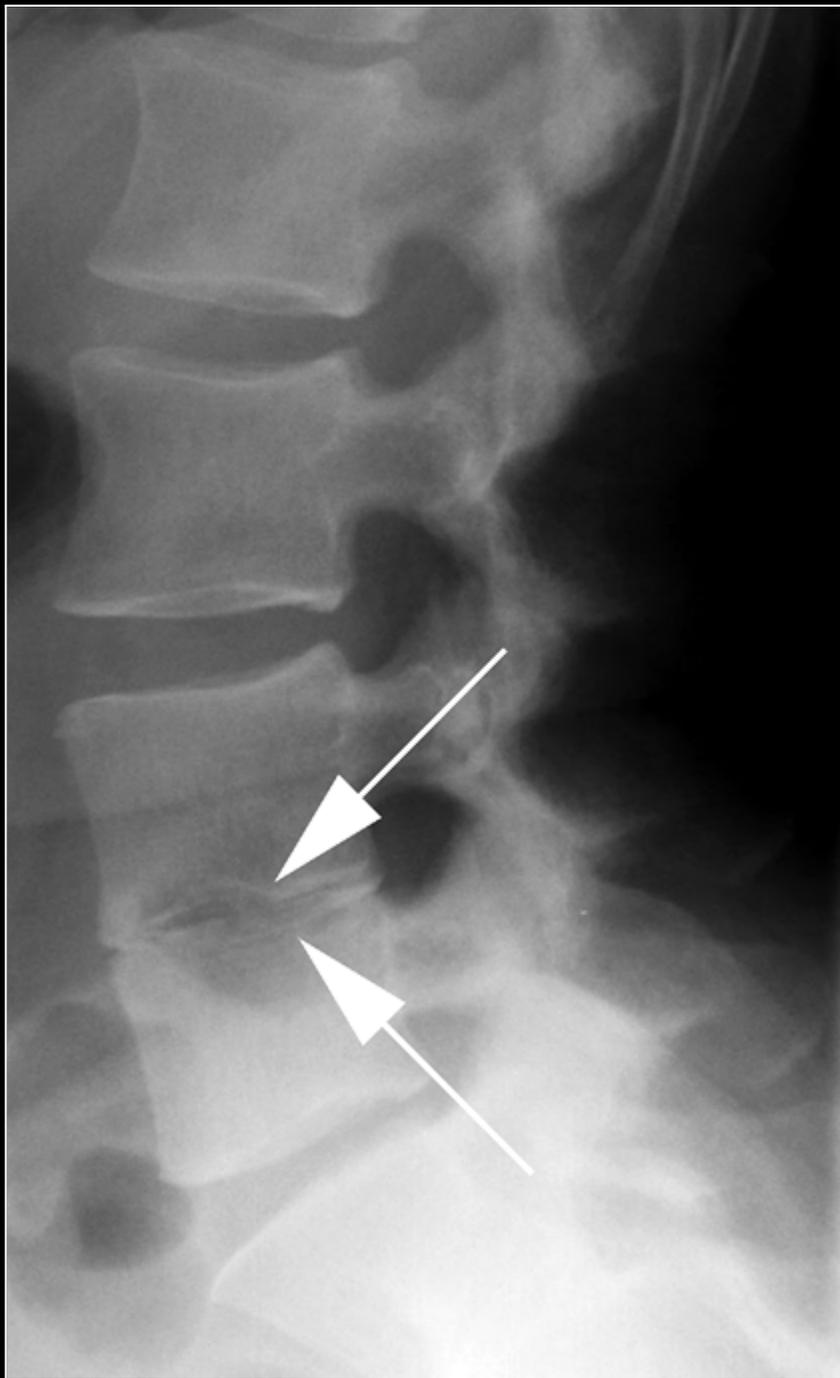
+++



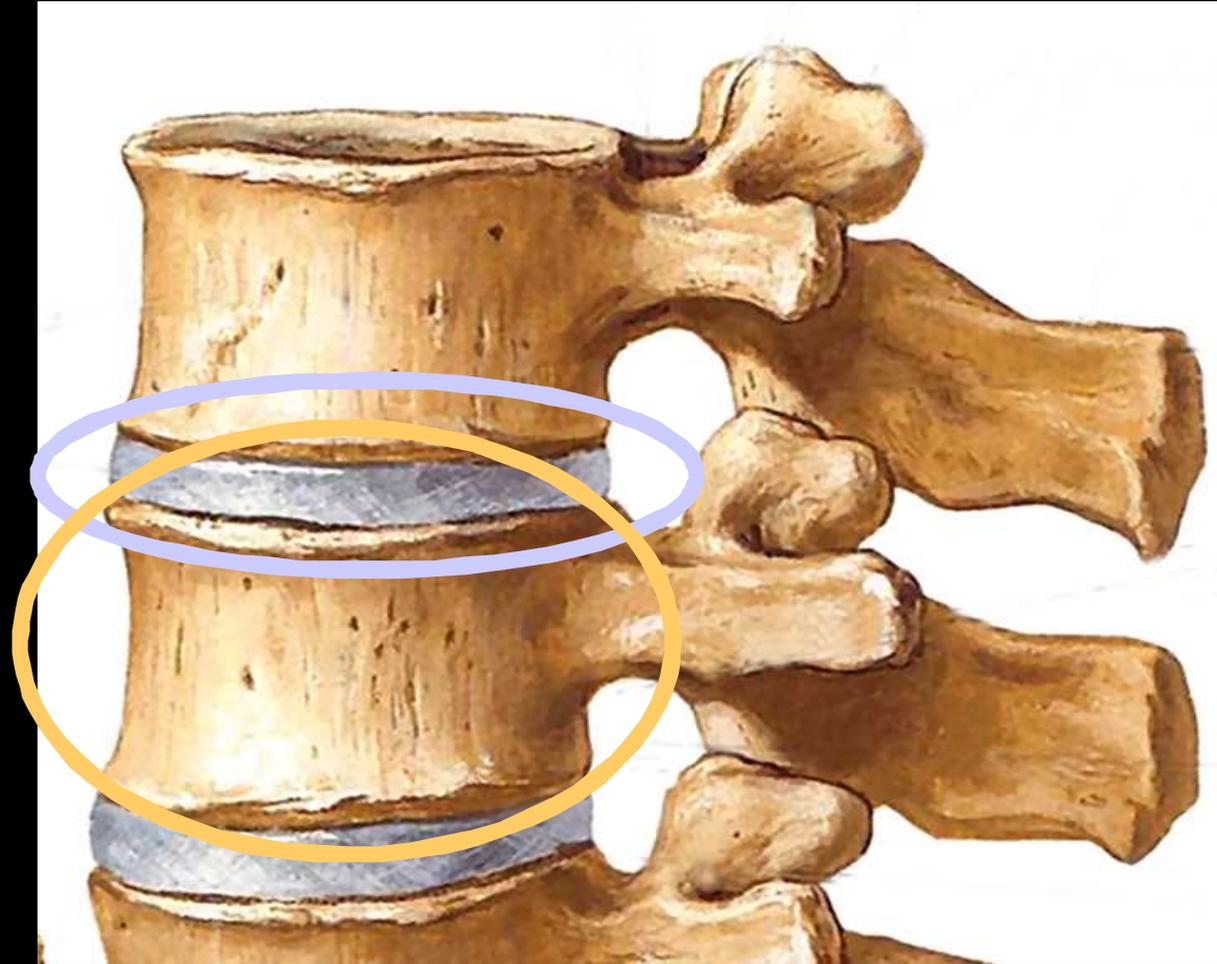
Scanner

Infection !!!

Spondylodiscite septique L4-L5  
Staphylocoques dorés

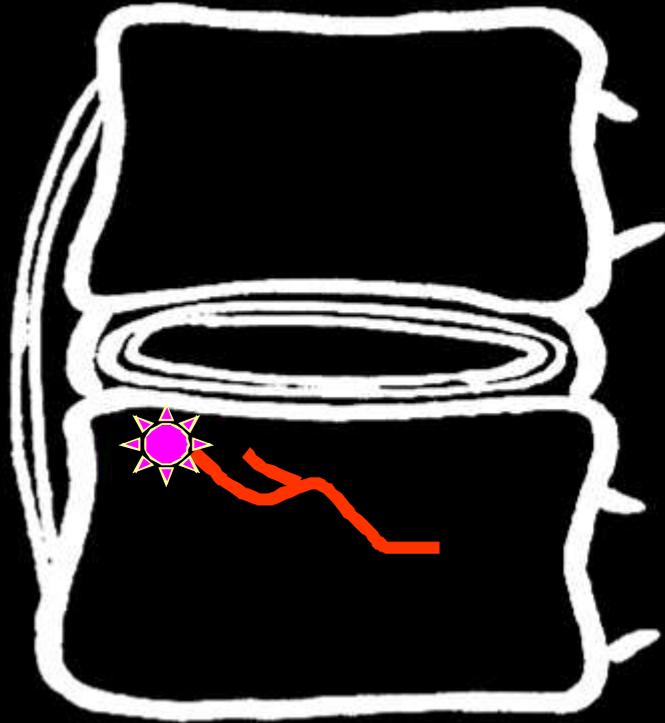


# Spondylodiscite

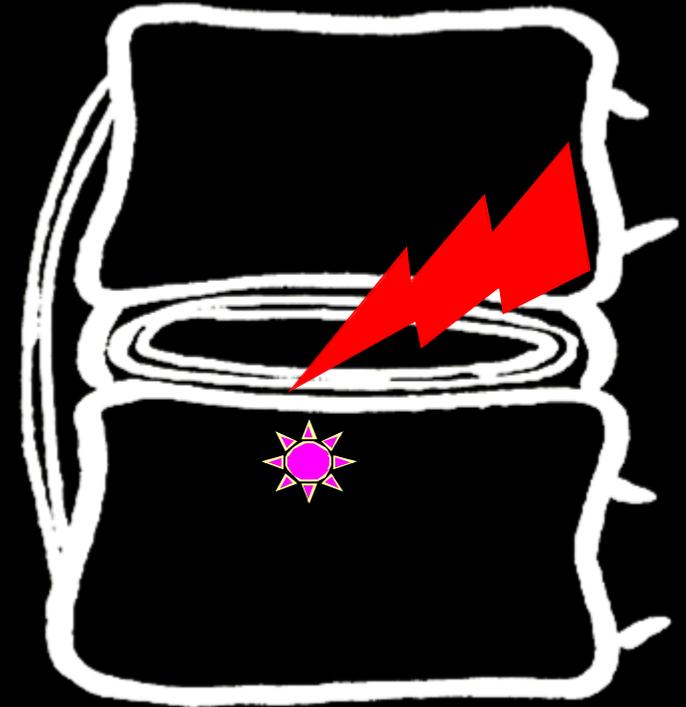


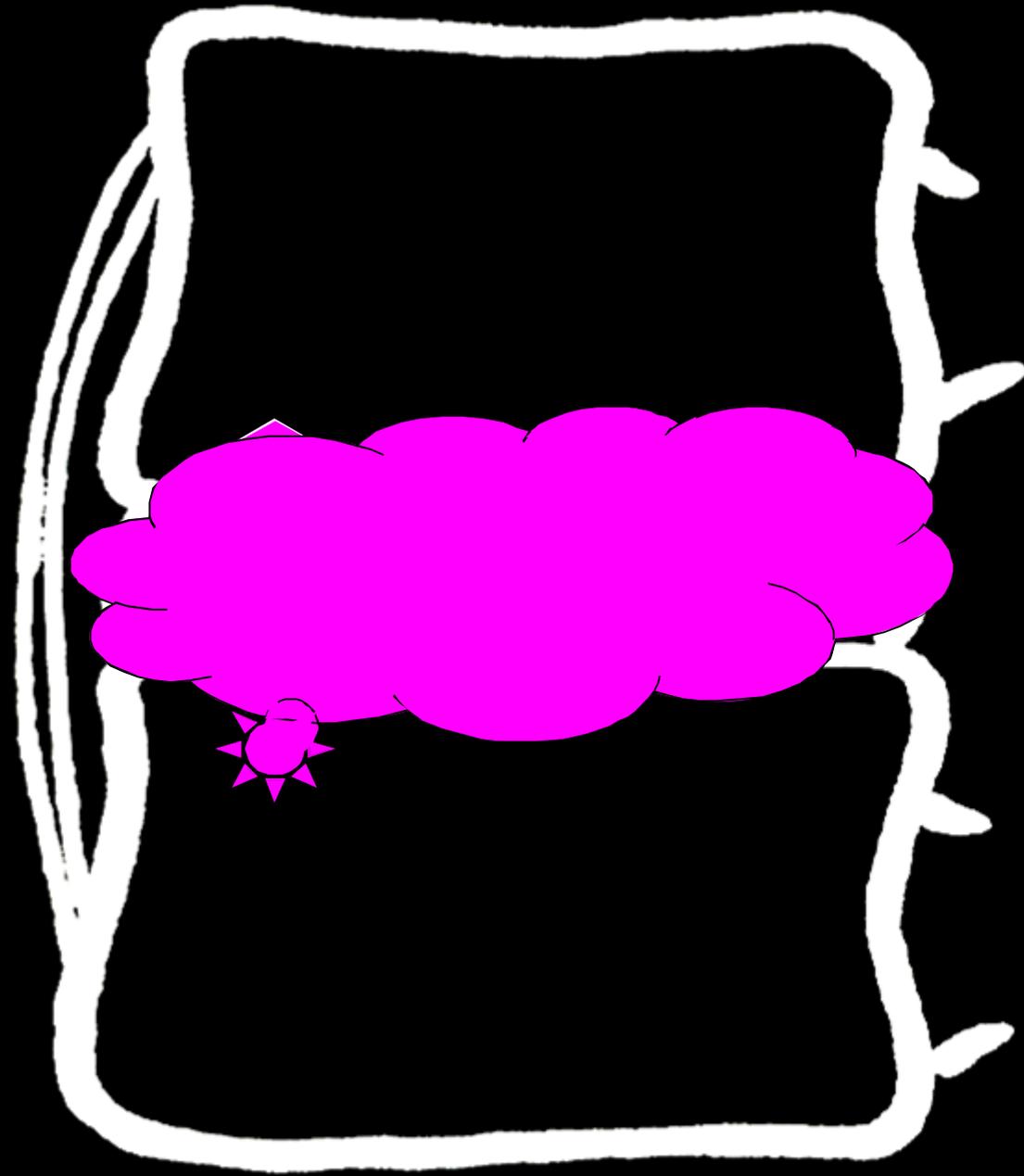
# Pathogénie

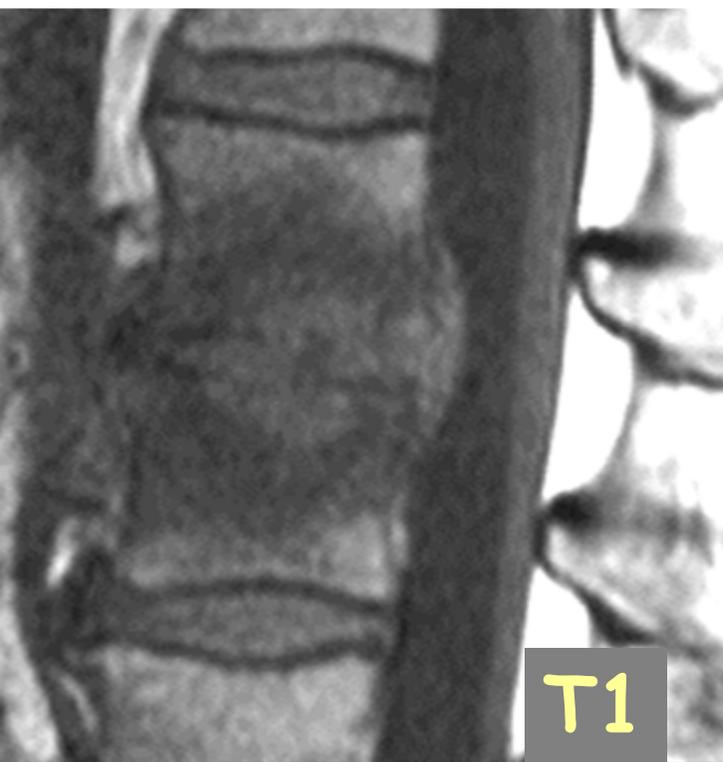
- Spontanée



Iatrogène :







T1

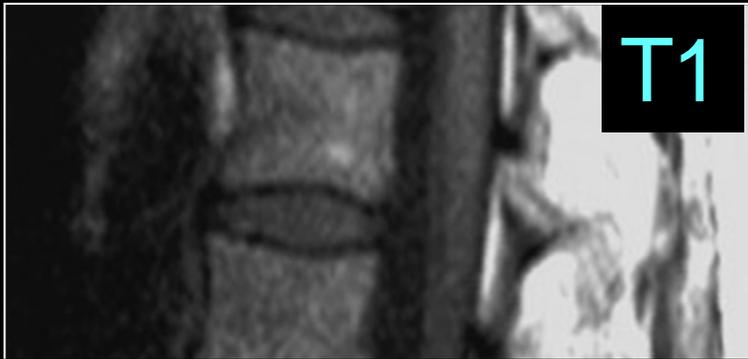


T2

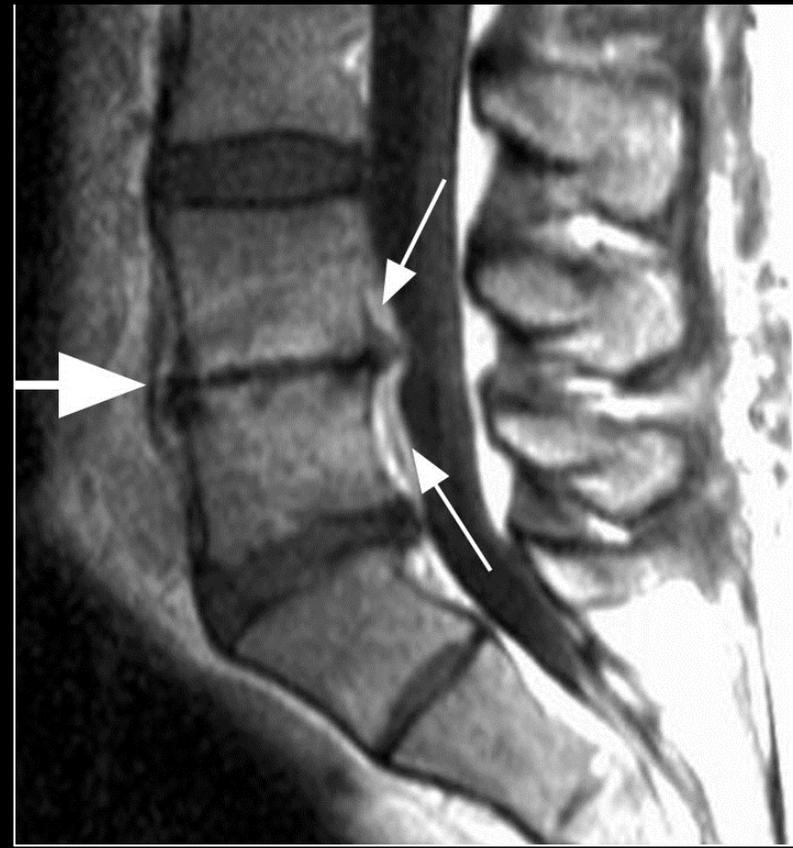


T1 gado

1. Moelle osseuse (infiltration, oedème)
2. Plateaux (destruction)
3. Disque (signal, pincement)
4. Tissus mous (epid, paraspinaux)

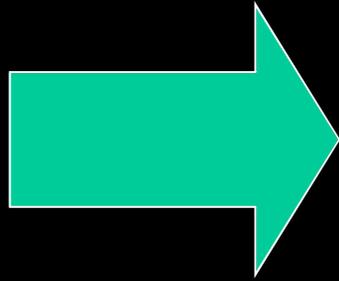


IRM = première ligne si suspicion spondylodiscite





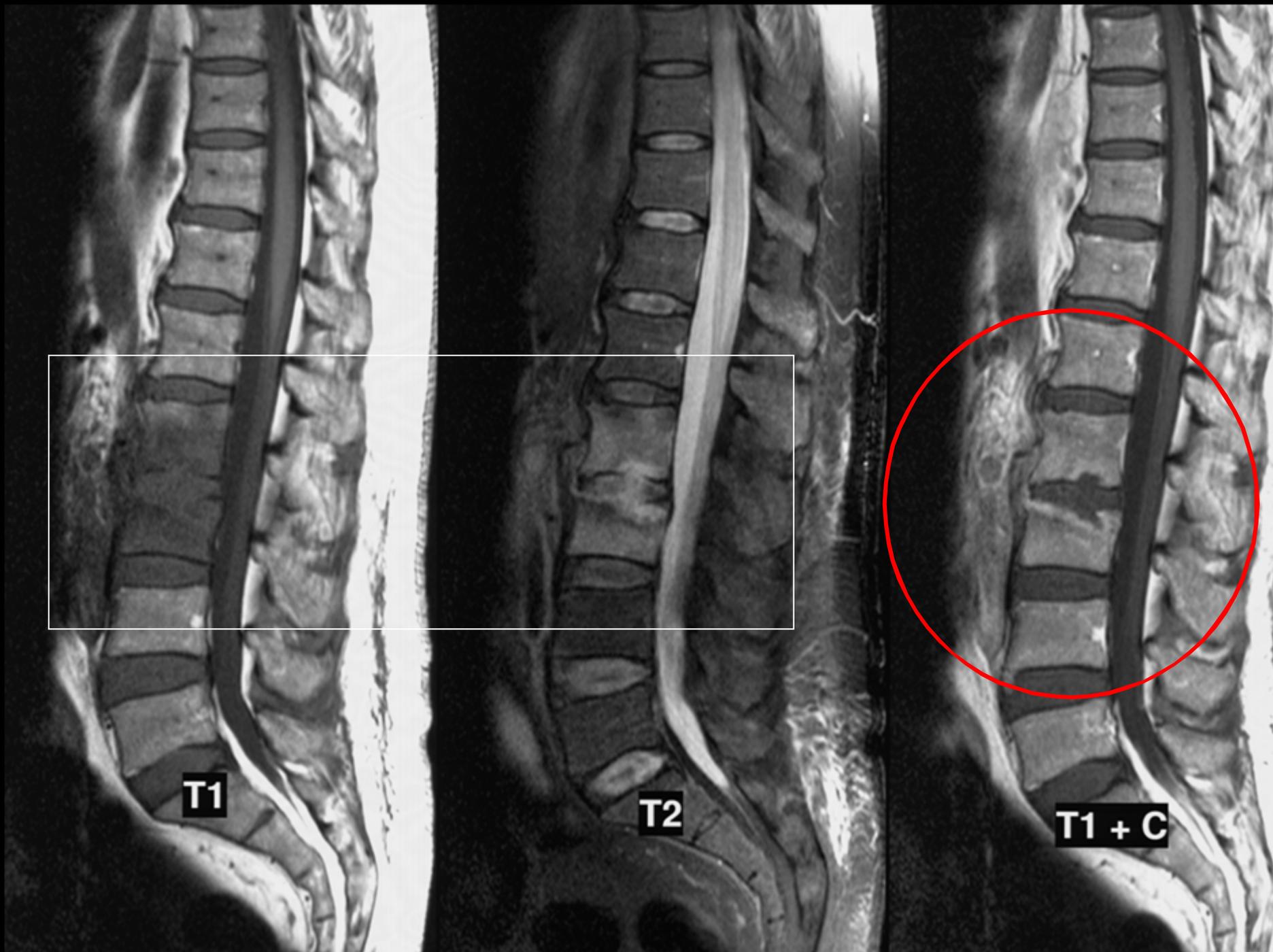




+ 2 m

## Evolution d'une Spondylodiscite septique L3-L4





**T1**

**T2**

**T1 + C**



T1

T2

Suivi 3 mois  
apres antibiotiques

# Antécédents oncologiques? Métas



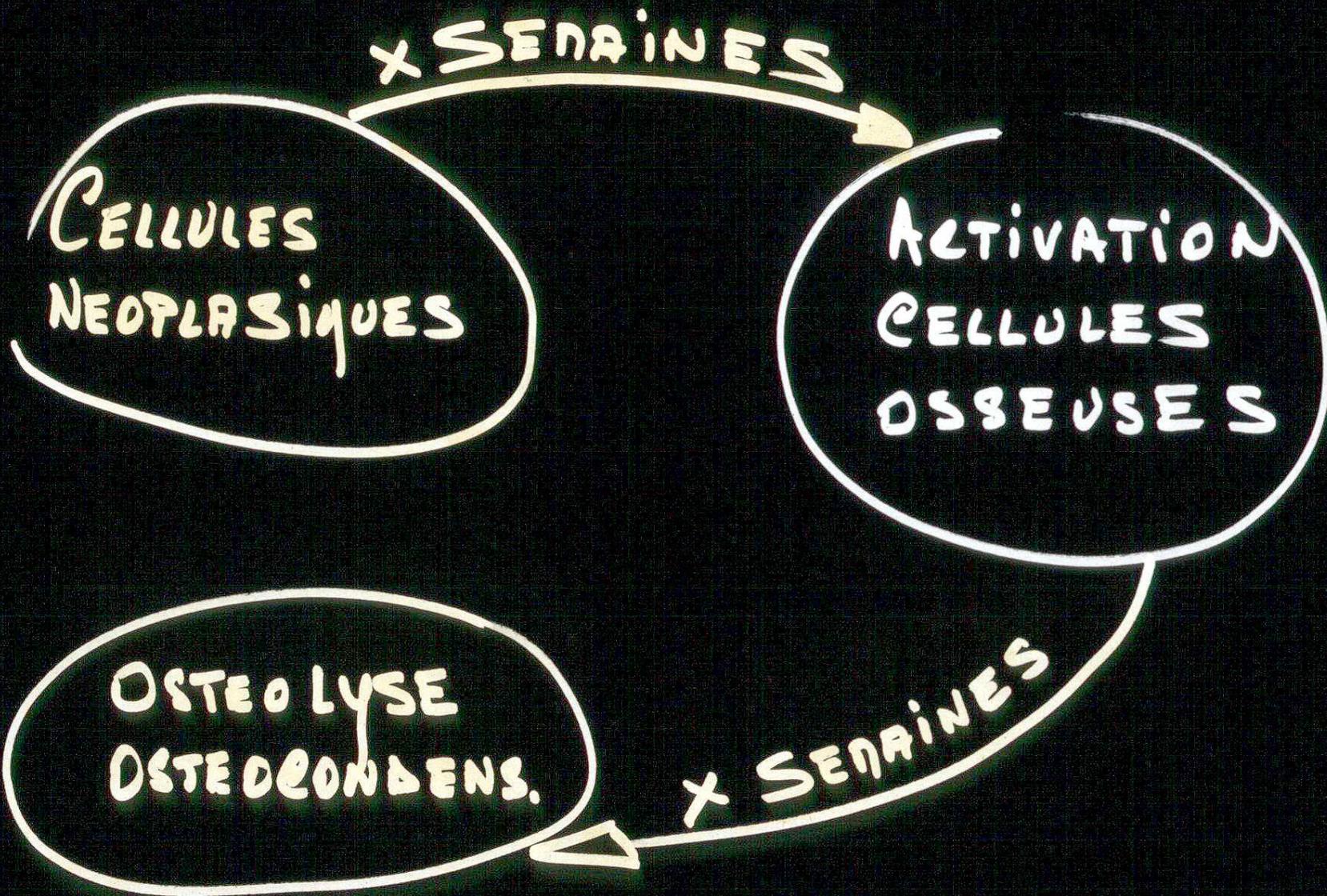
RX



TDM



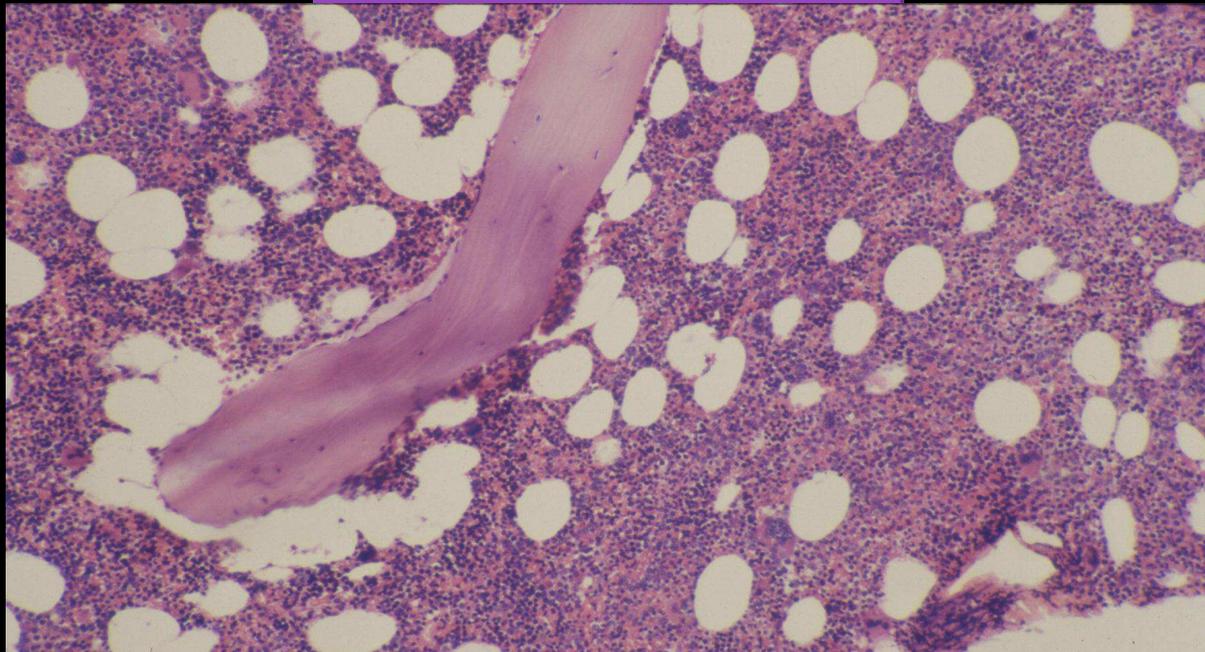
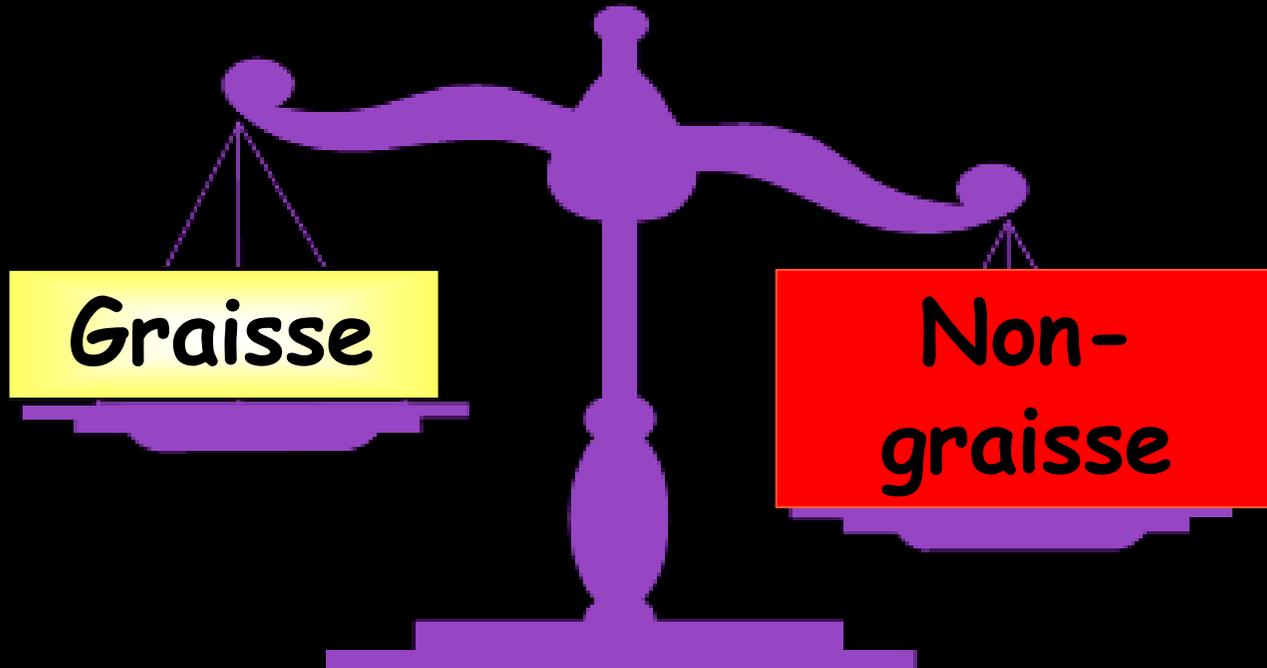
IRM

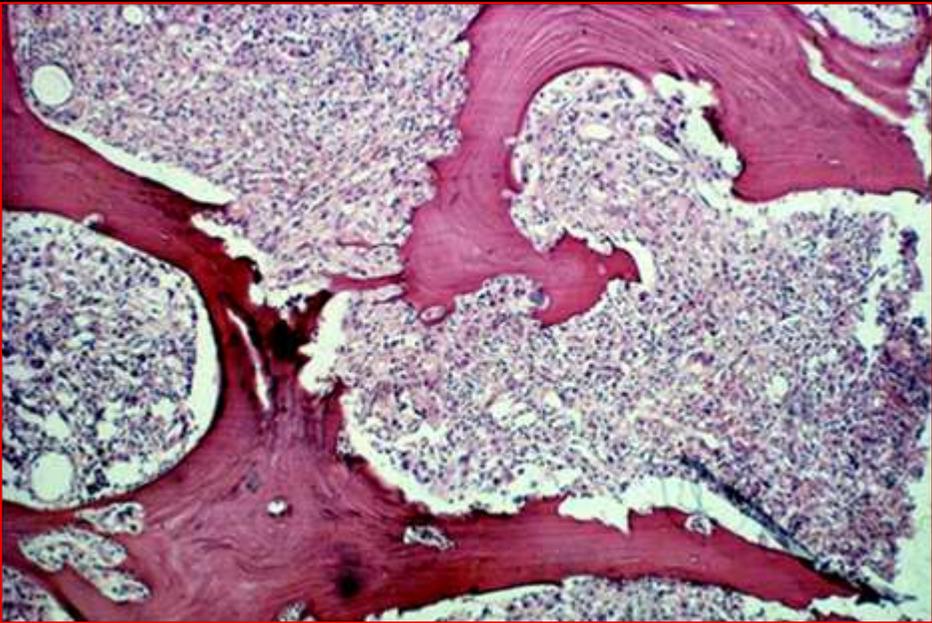
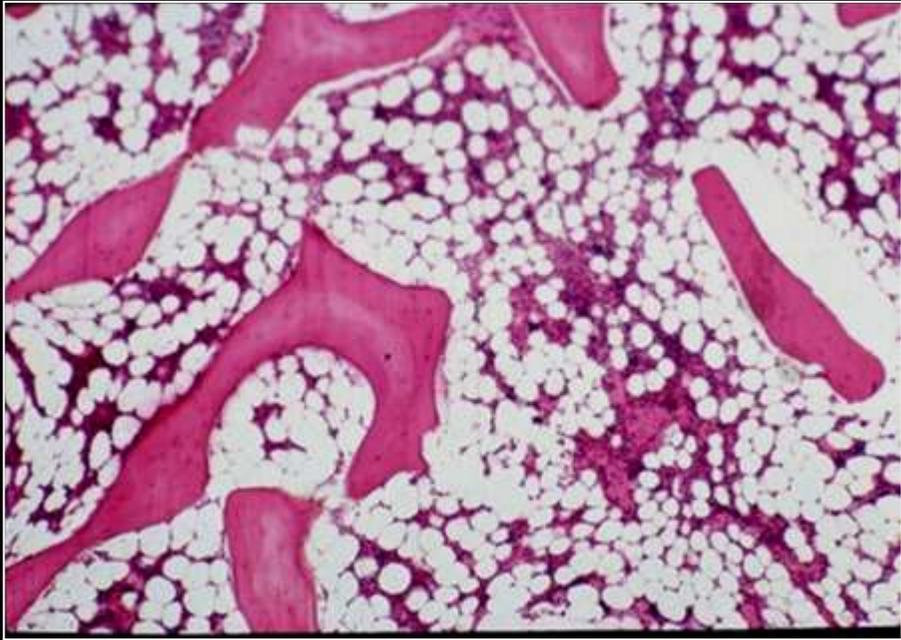






# IRM OS (moelle osseuse)





# Recherche de Métastases occultes



# Métastases ?



T1



T2fs

# Tassement patho (tumeur) + compression M. Ep.



# Métastase ?

Condensante

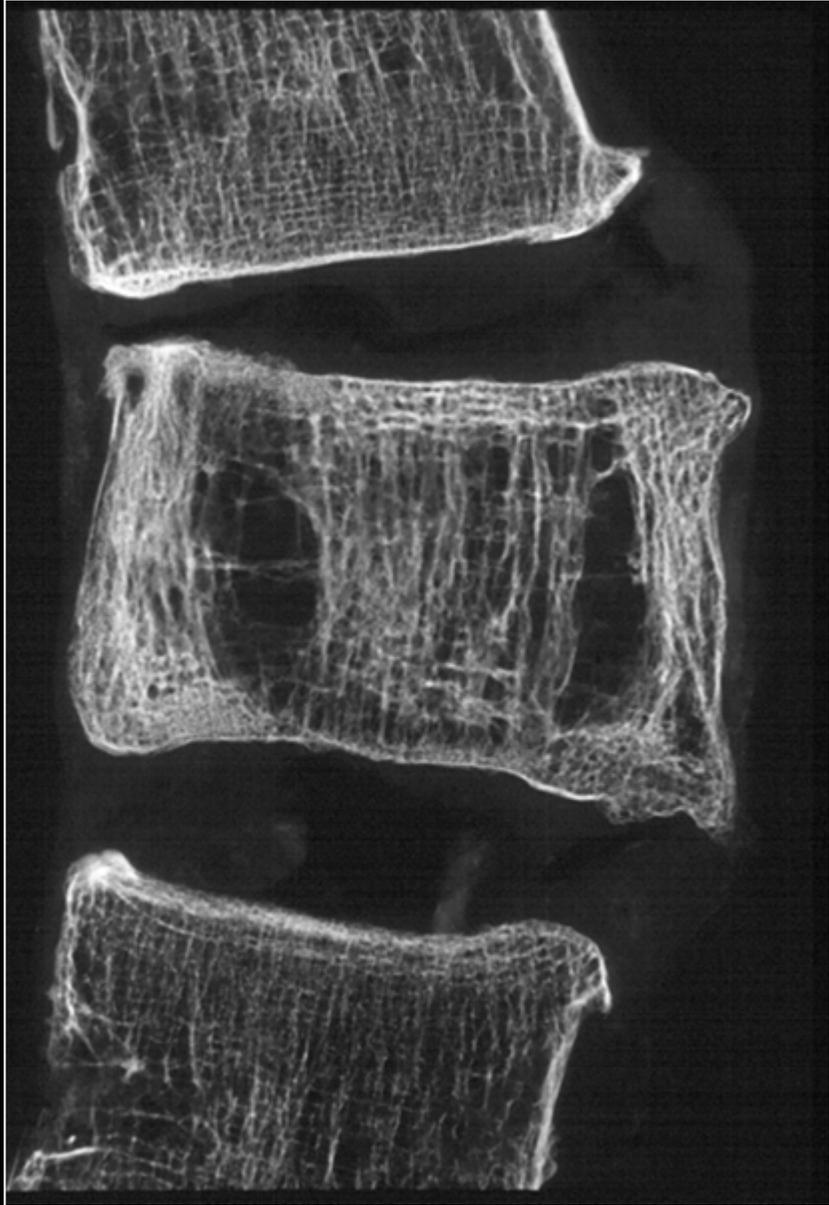


Lytique



Métastase ?  
Paget ?





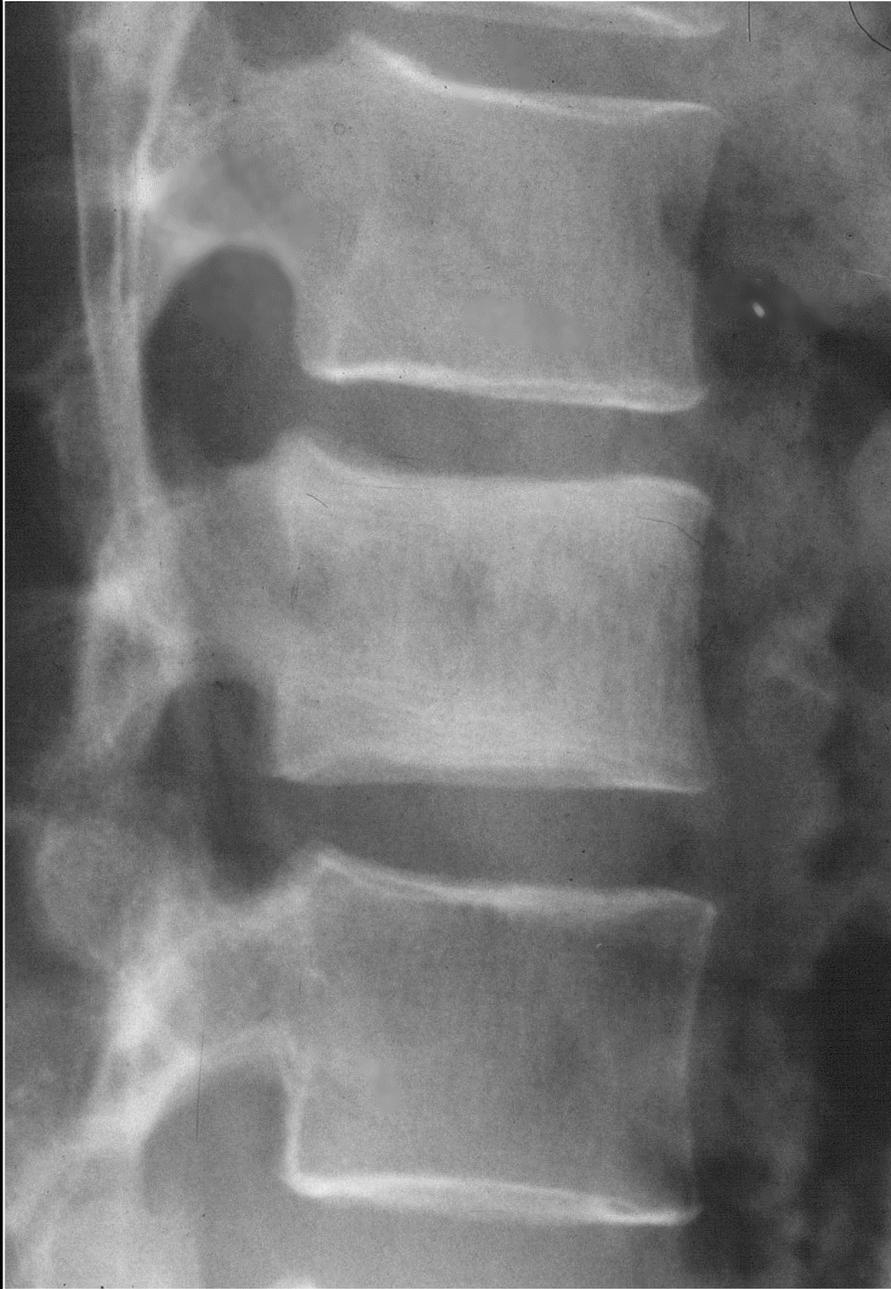
Paget



Métastases



# Paget



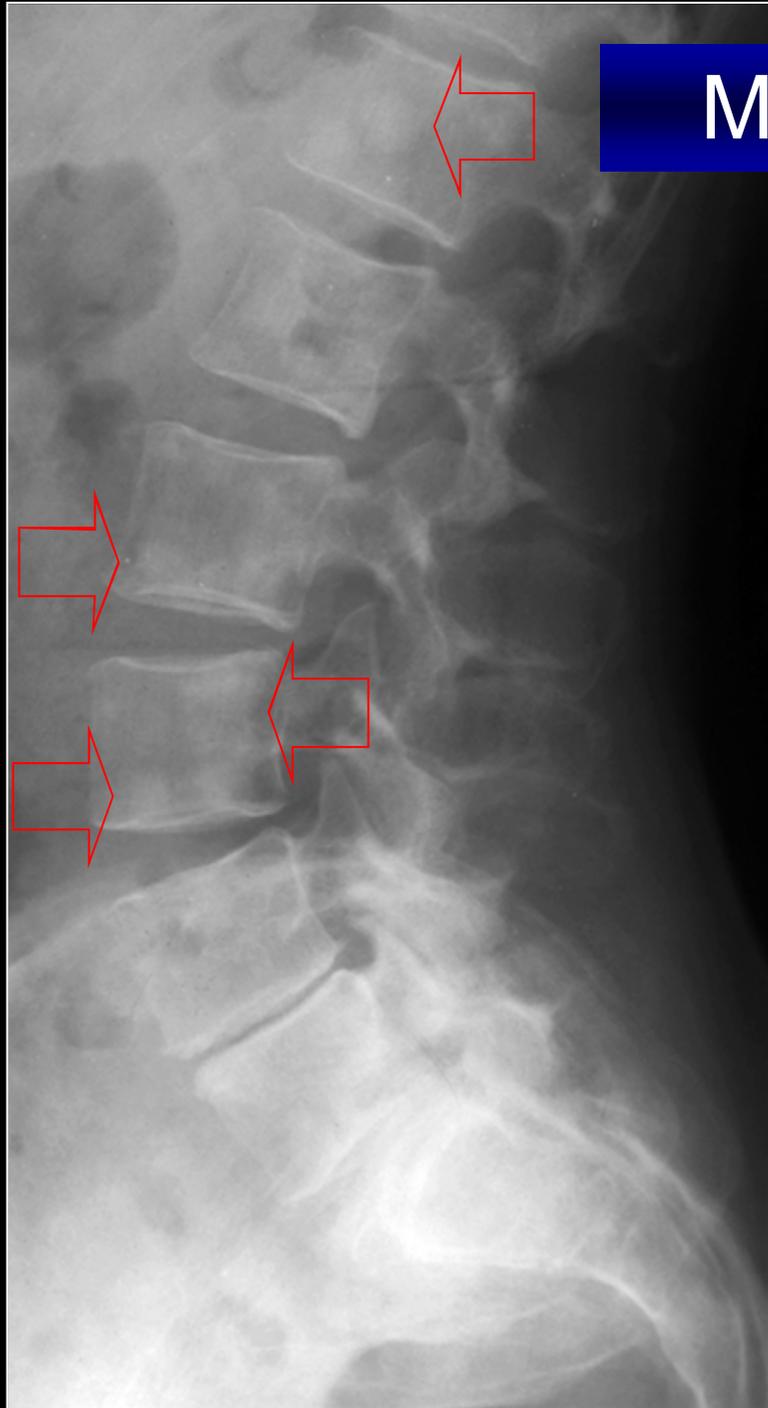
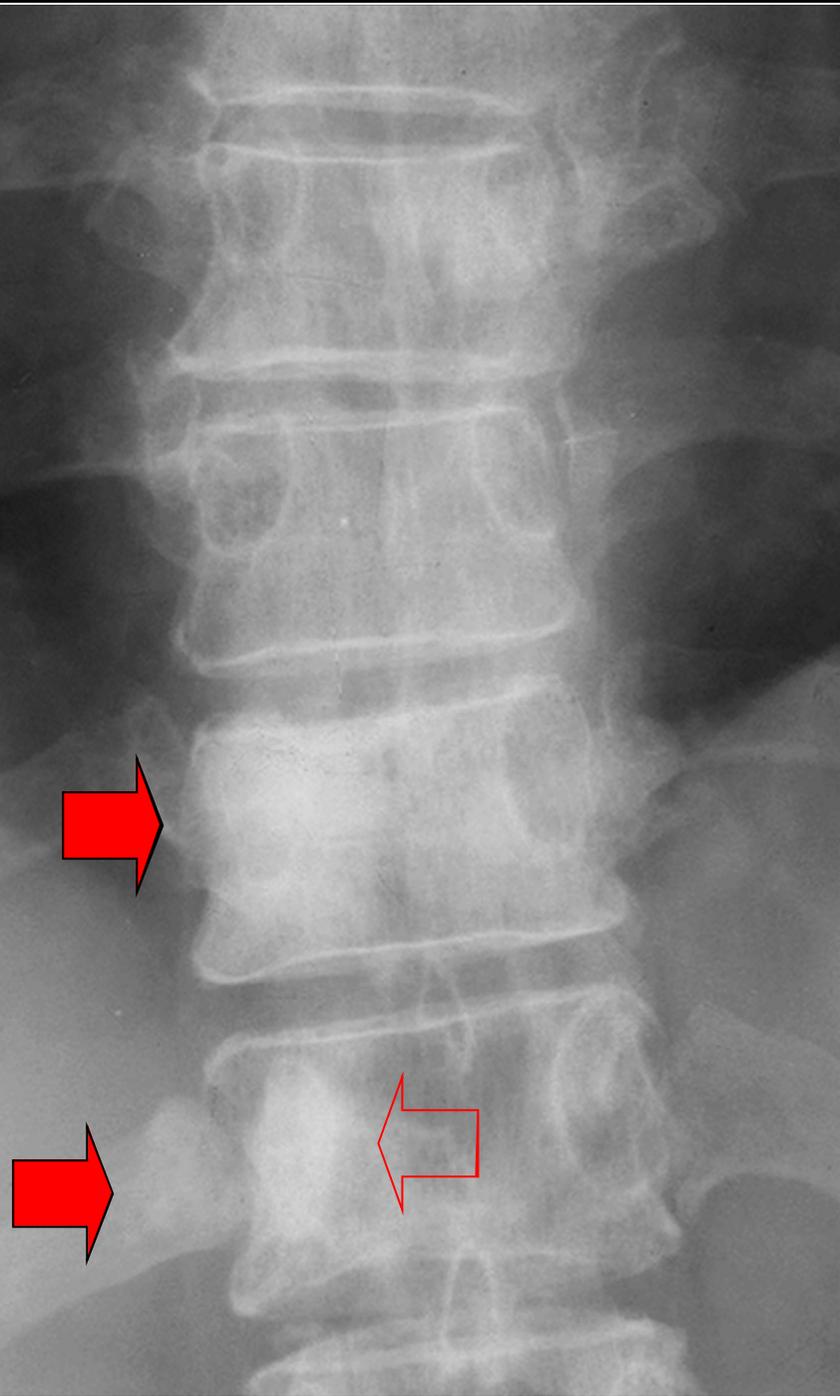
# Métastases



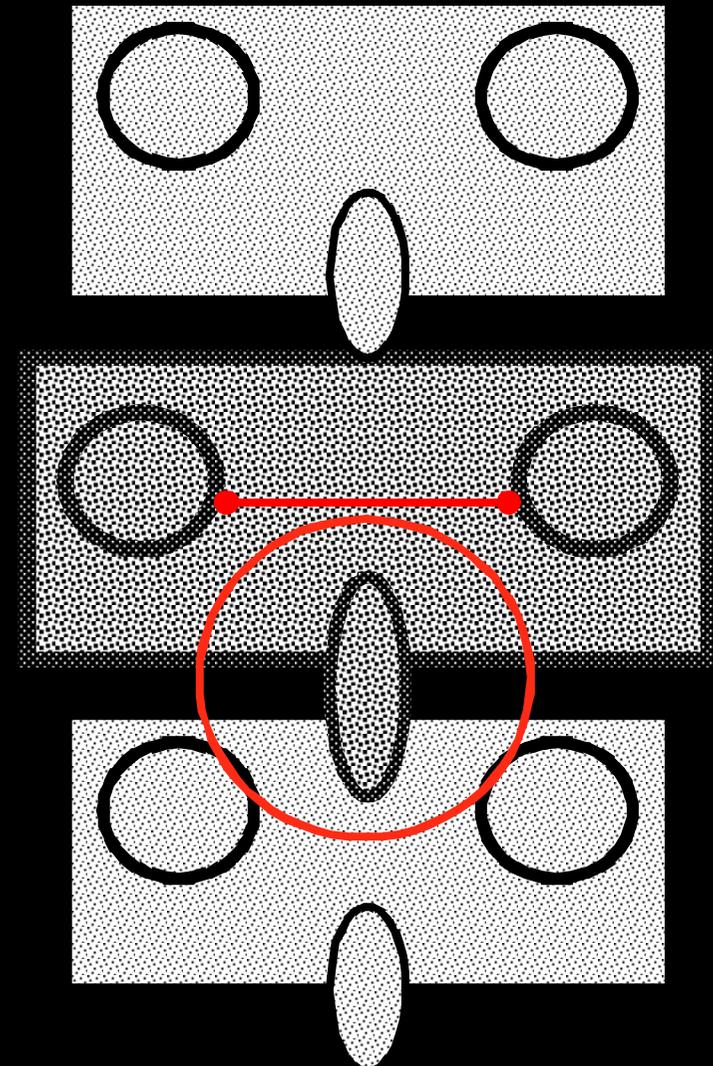
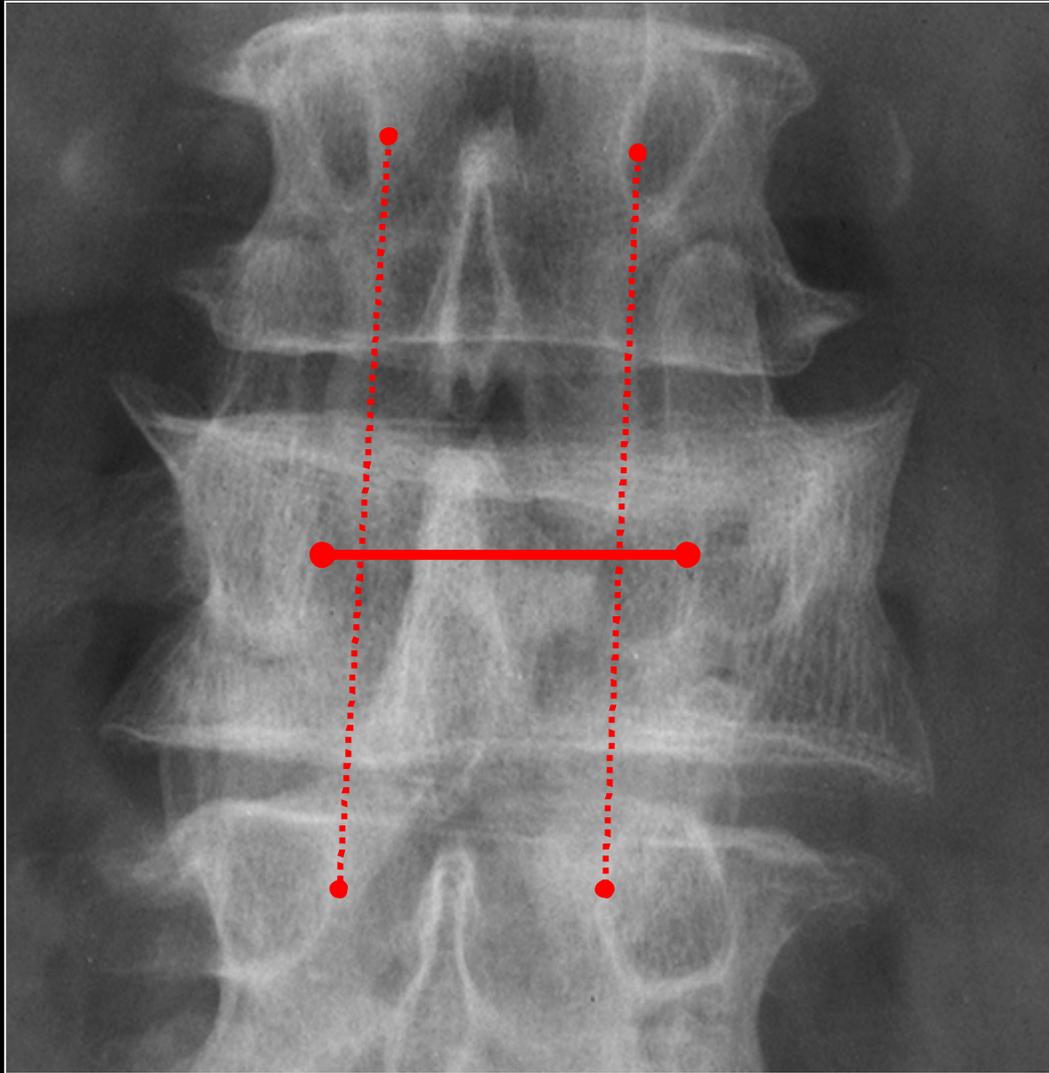




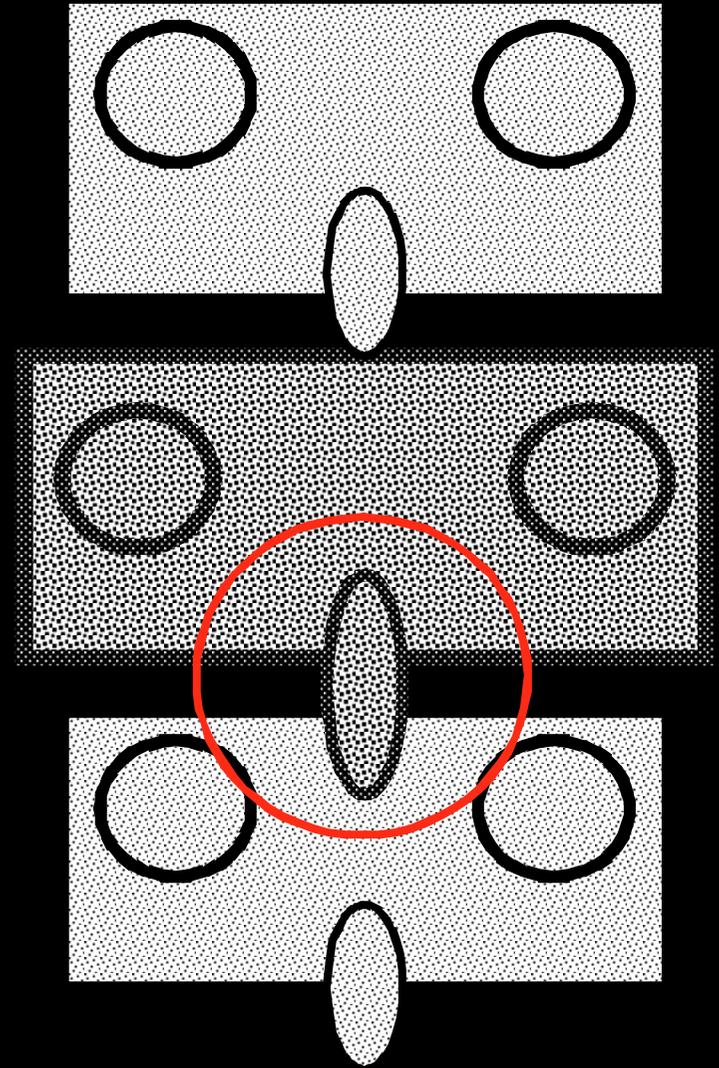
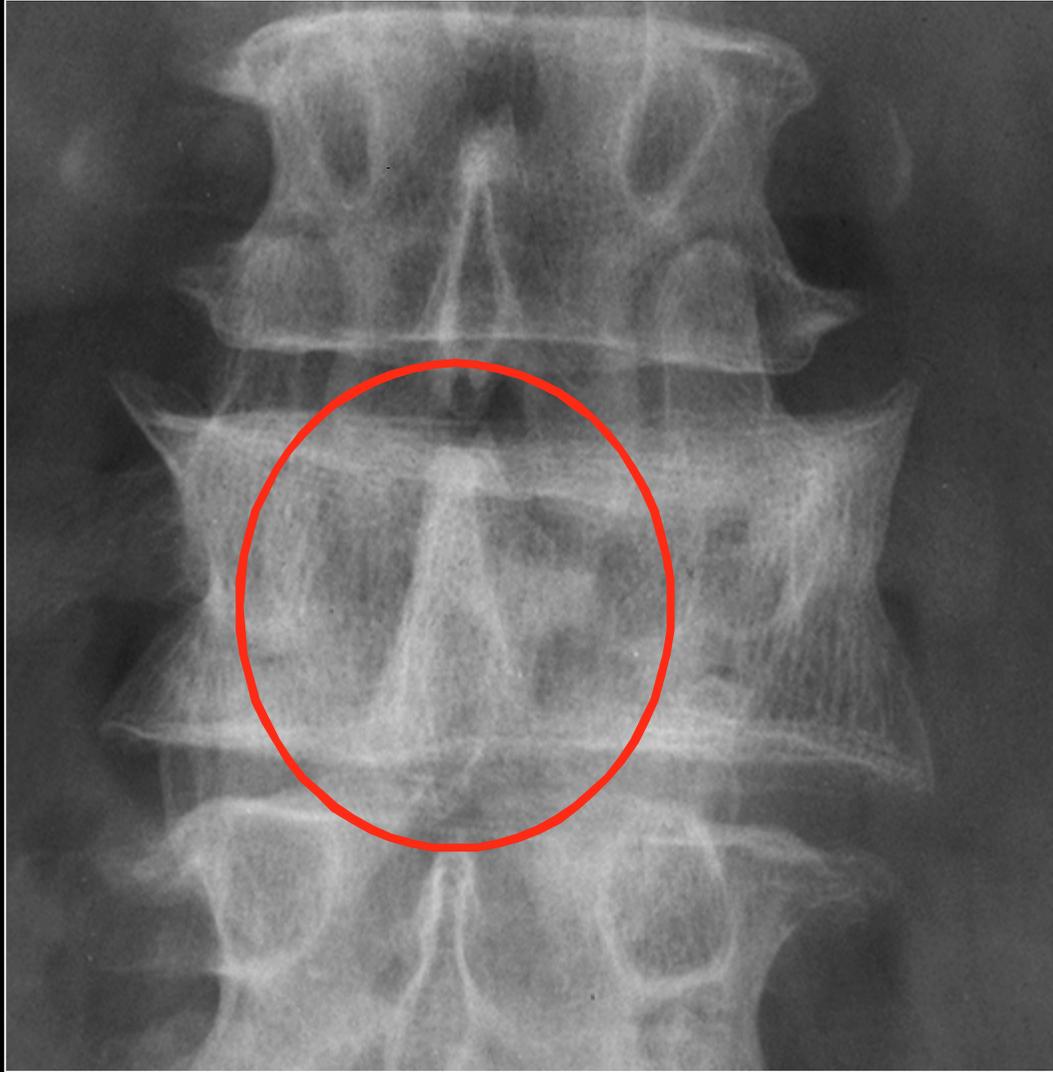
# Métastases

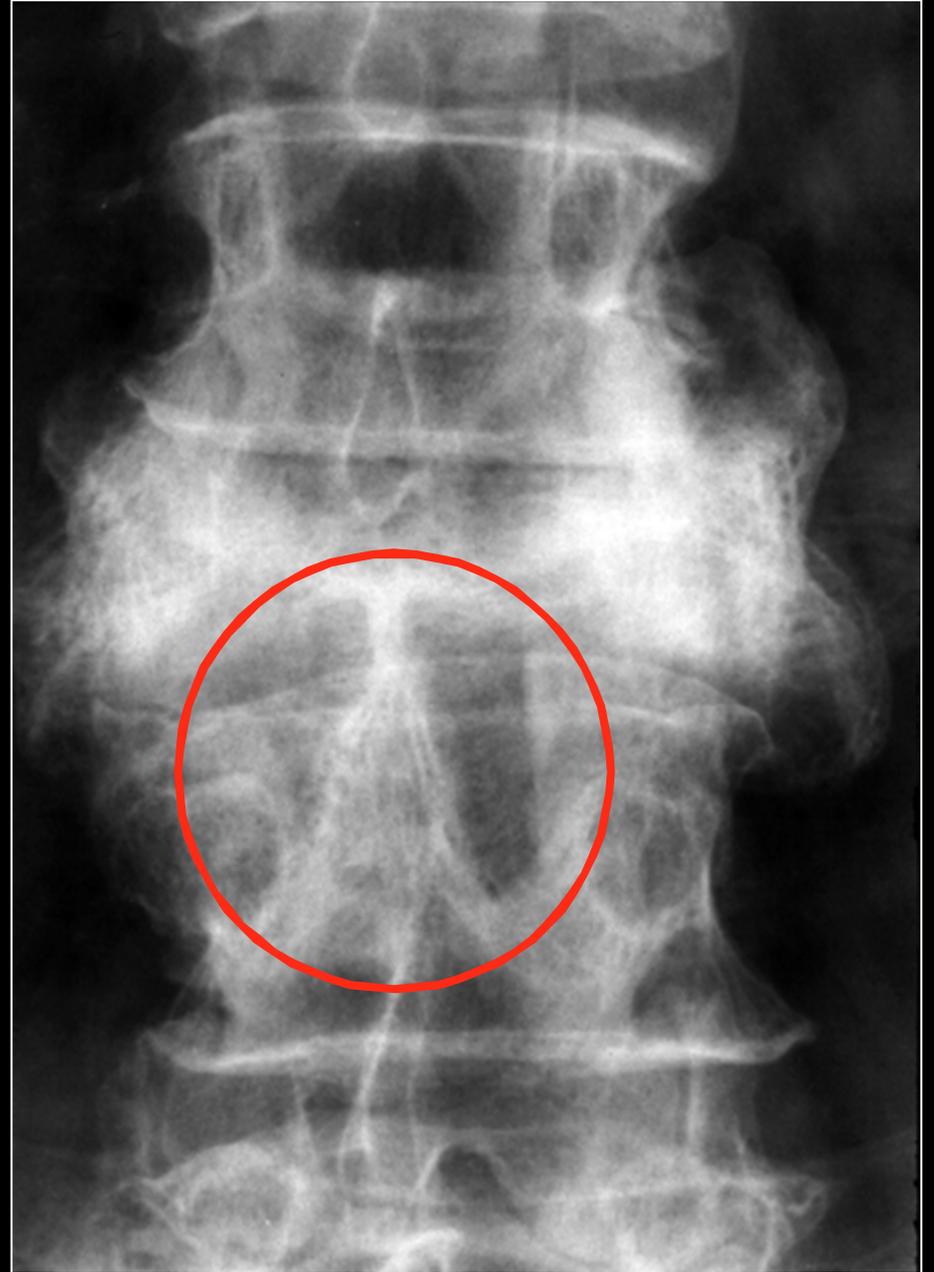
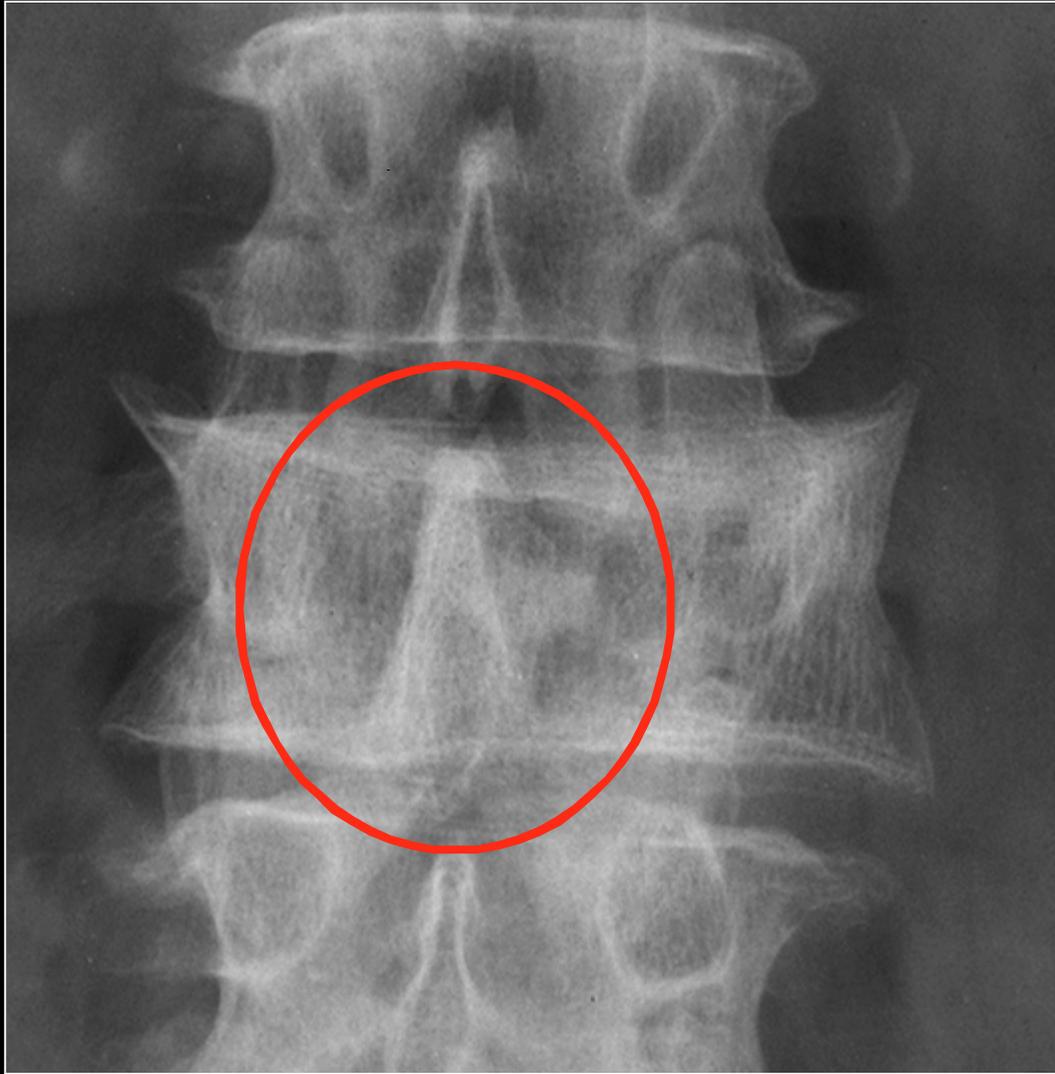


# Métastase ? Paget ?

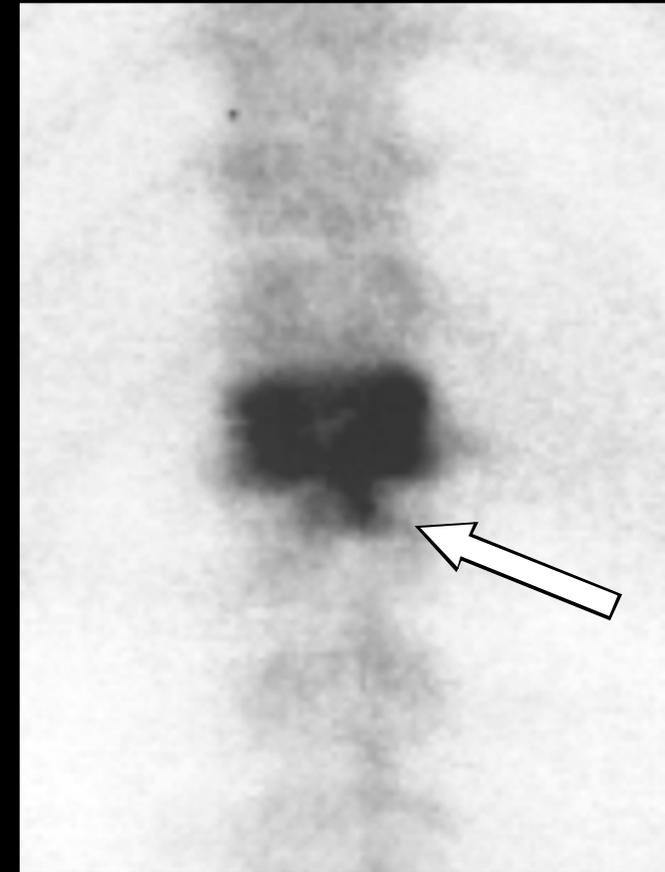


Hypertélorisme





# Processus épineux, aussi en scintigraphie





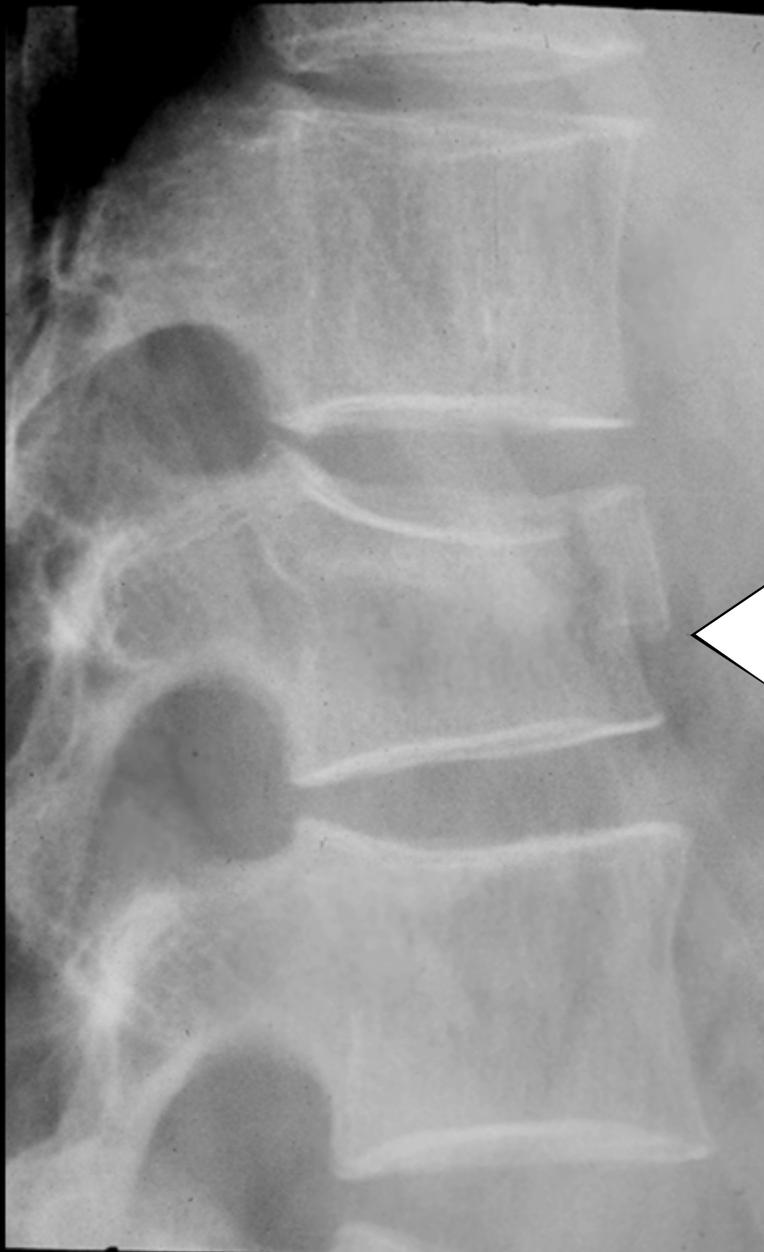
# Paget, très raréfiant



Paquet, la moelle osseuse est normale!!!



# Trauma

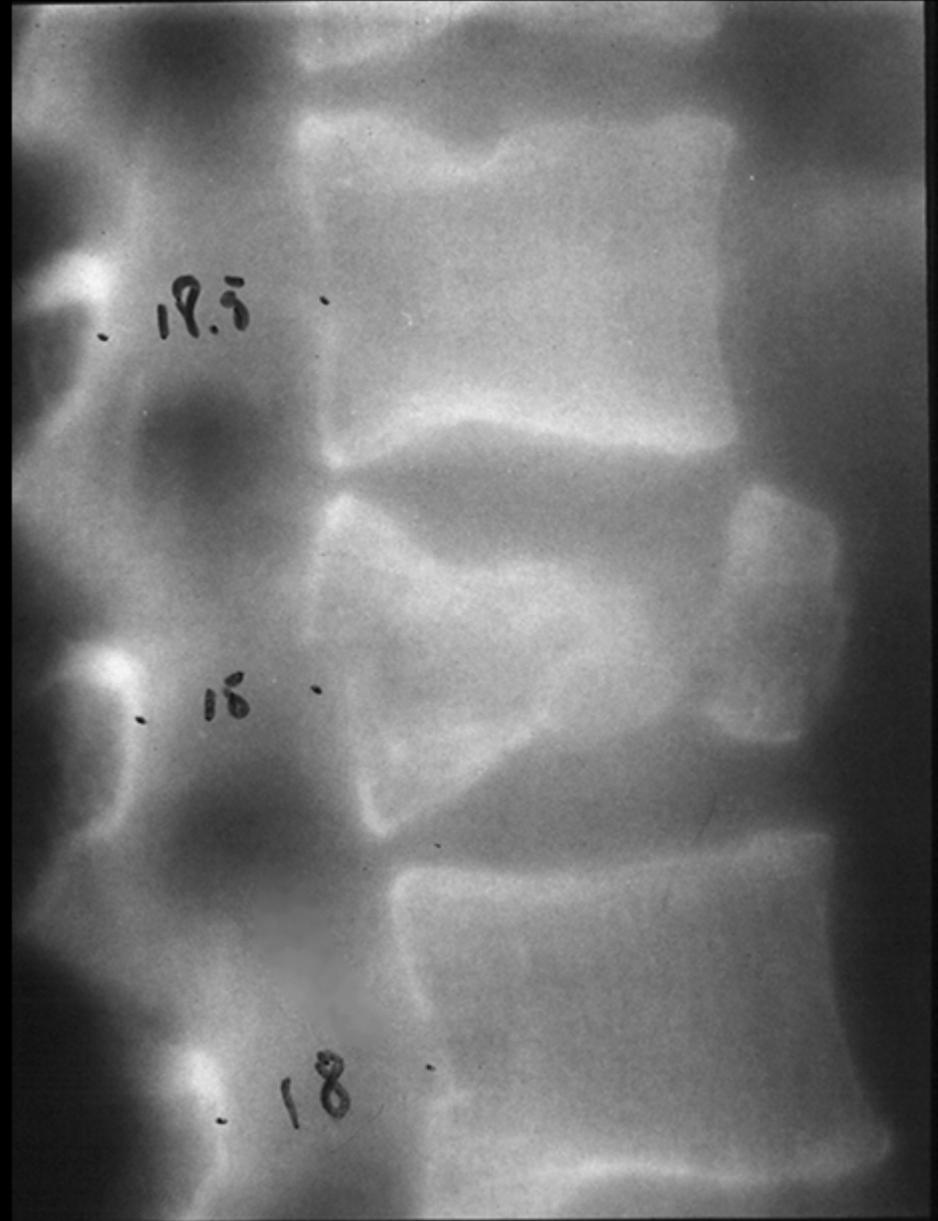


Impaction avec  
décrochage  
du mur antérieur

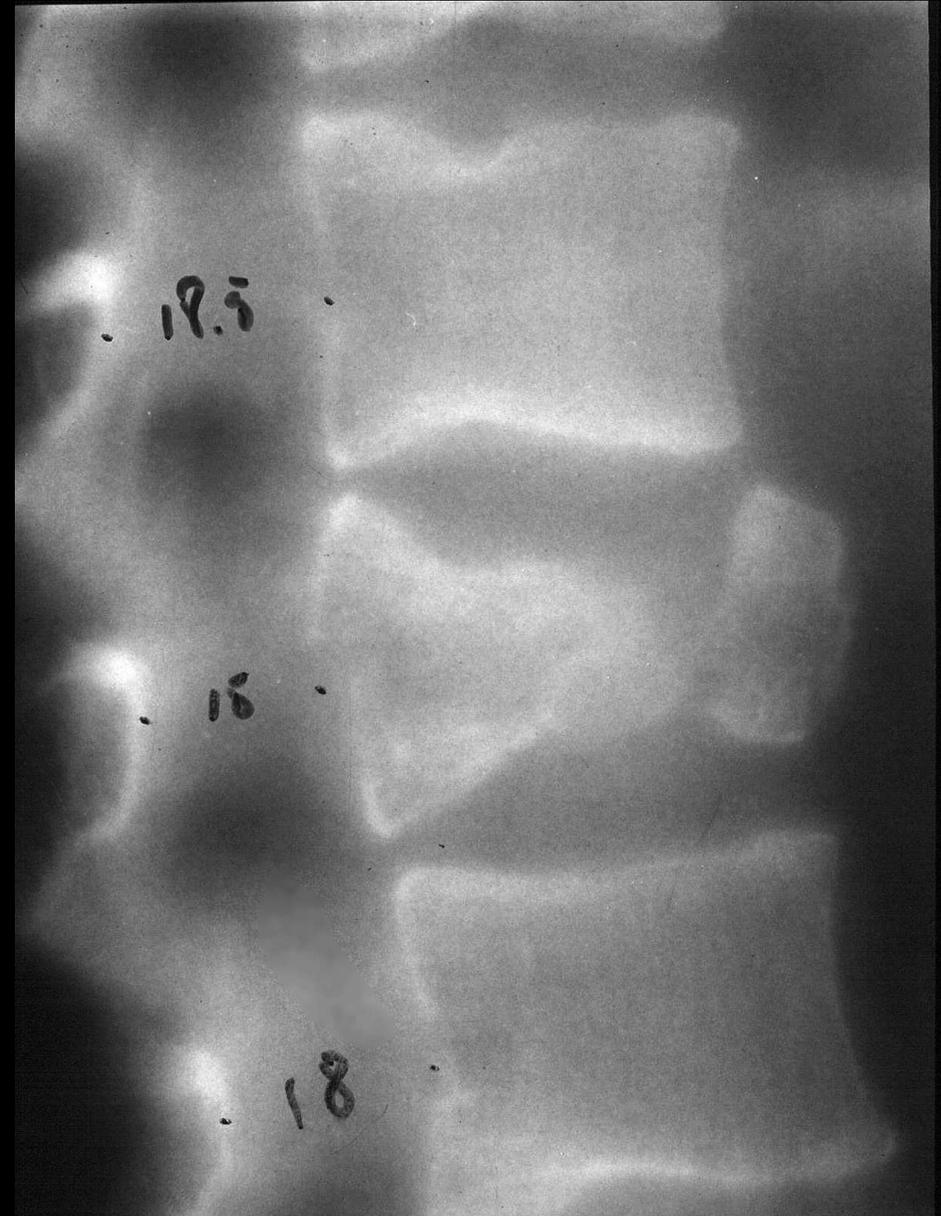
Trauma

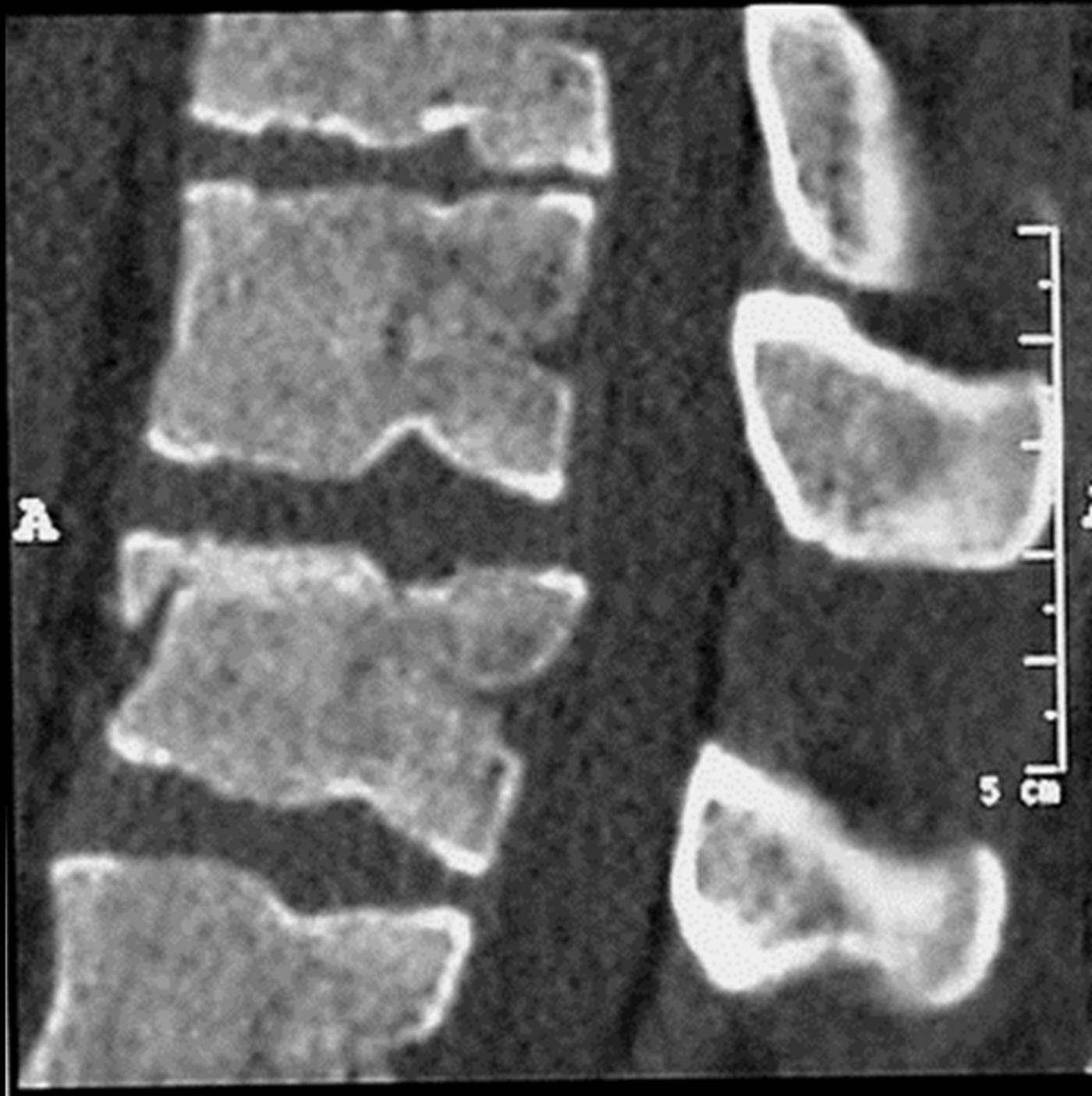


Trauma



# Eclatement (Burst)

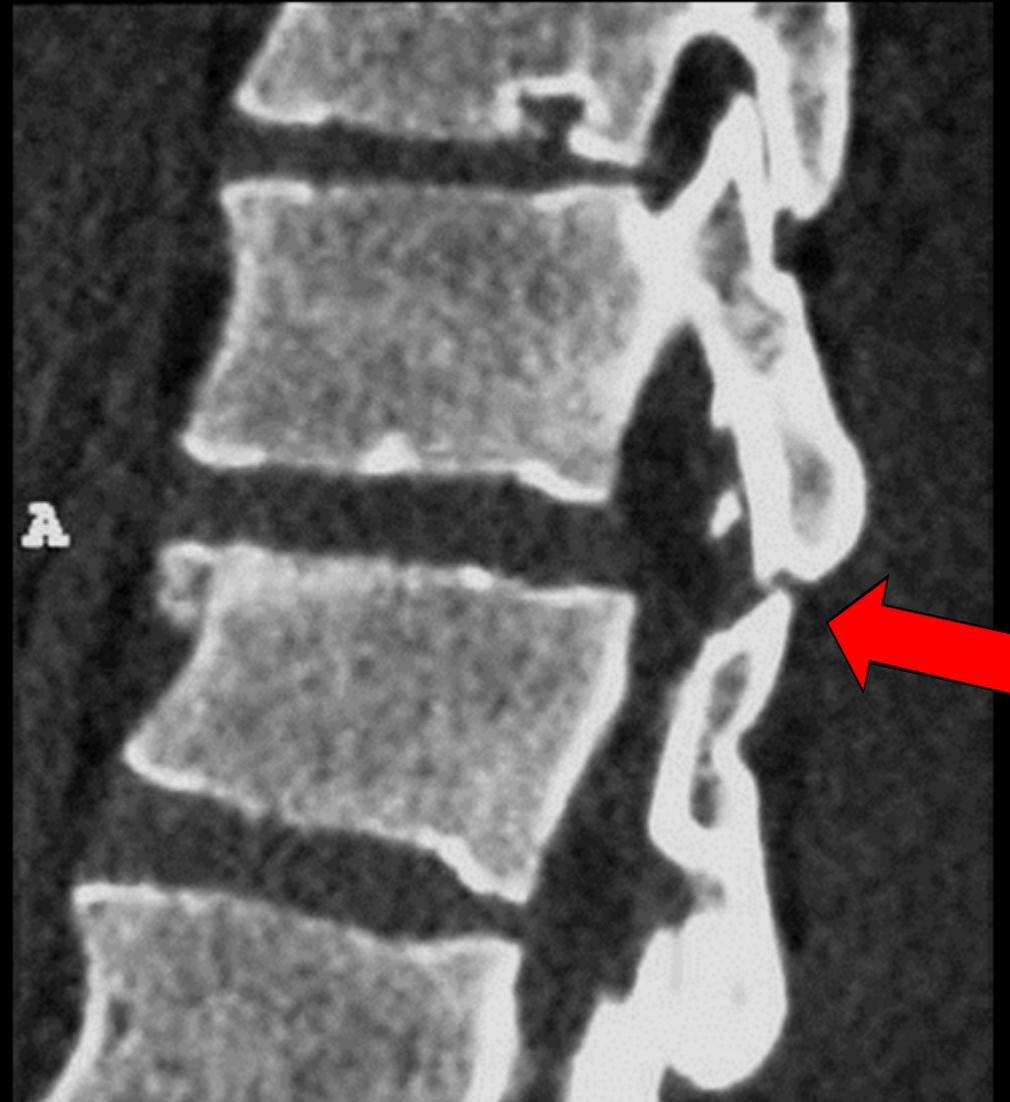




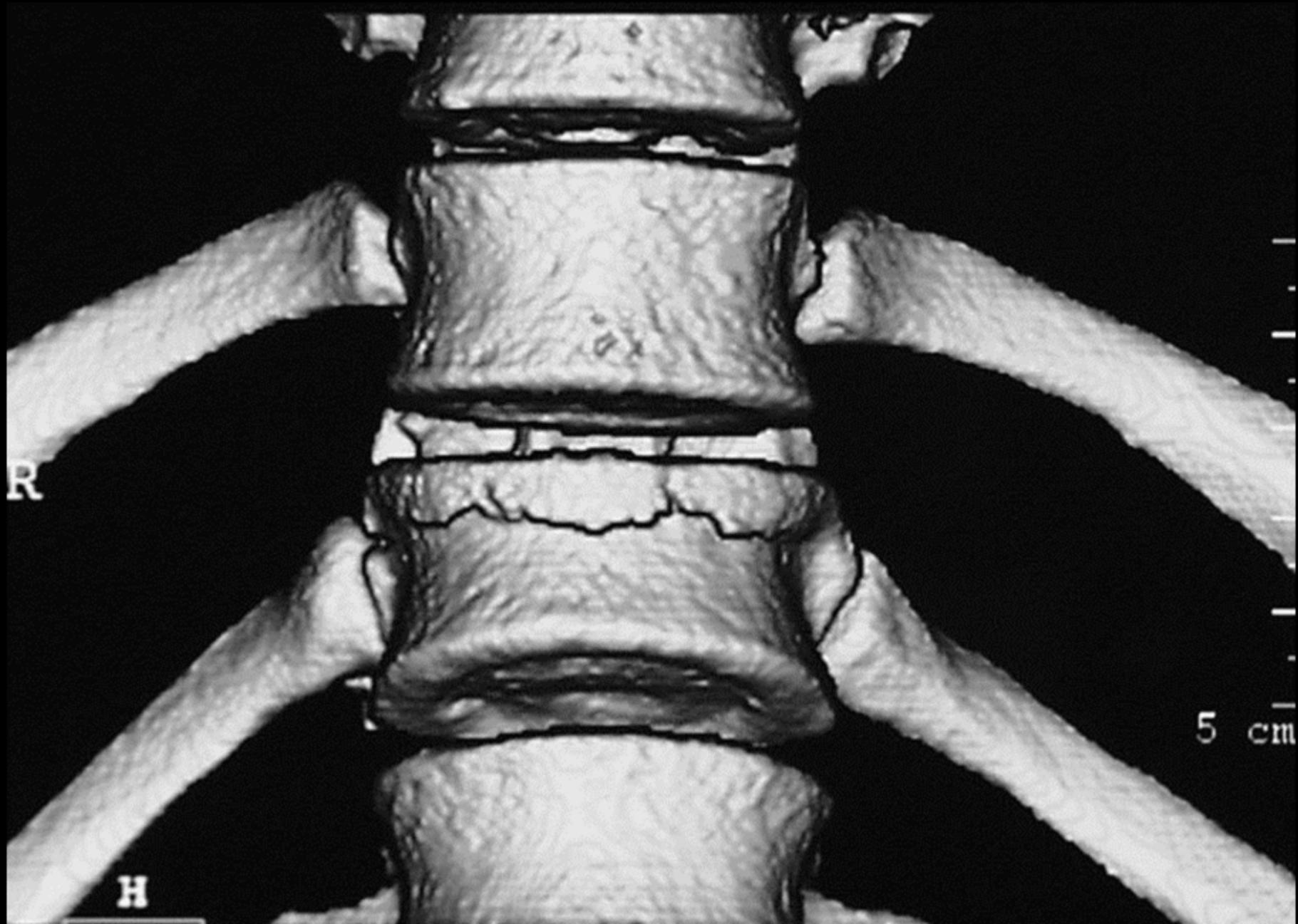
Scanner



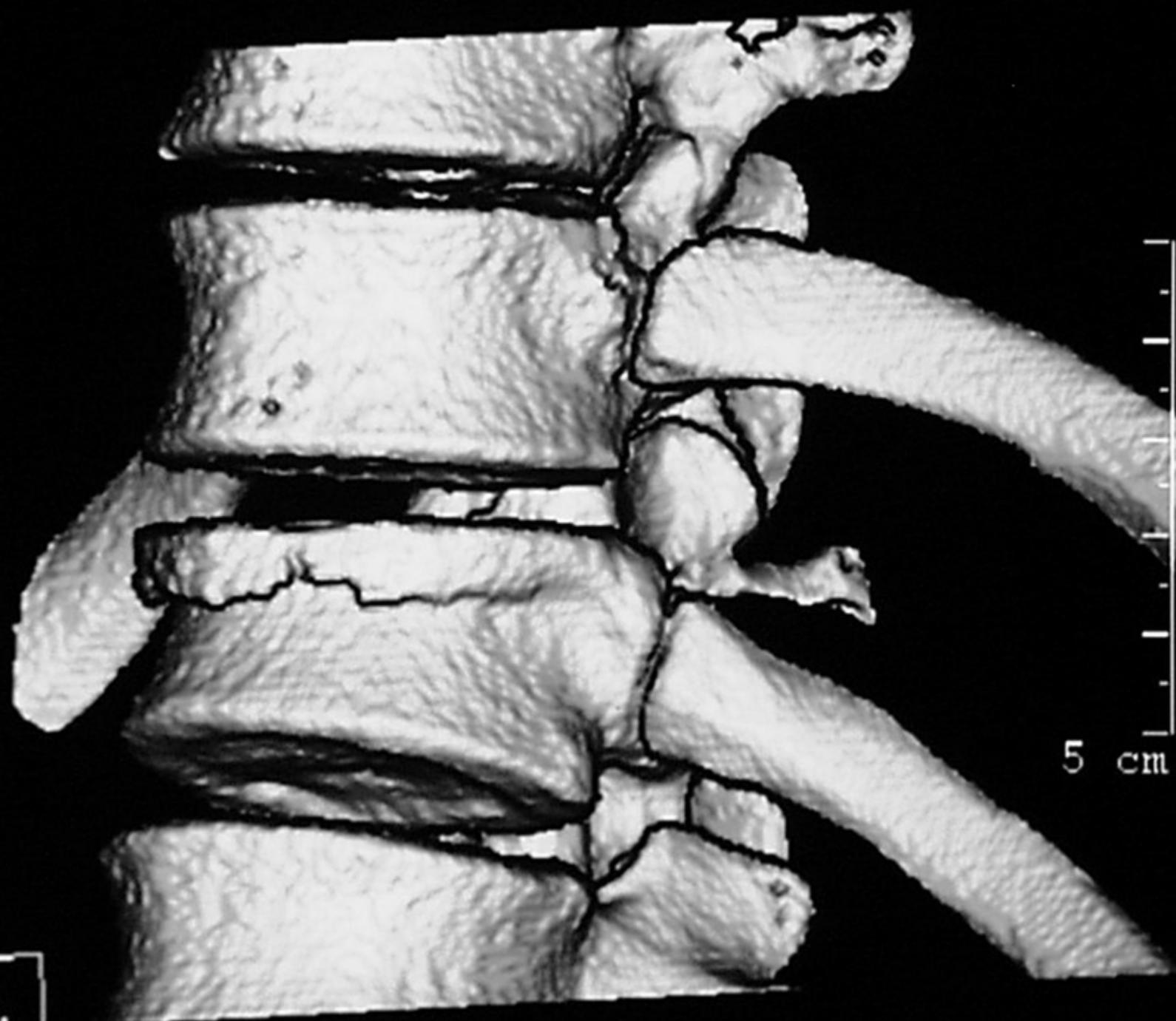
Gauche



Droit



RA



5 cm

A	L
---	---