

► 脊椎疾病影像學

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學習目標

藉由本課程，可說出檢查工具、正常脊椎之X光、CT、MRI解剖以及判讀下列疾病的影像學診斷

- 1. Lumbar HIVD & spondylosis**
- 2. Cervical HIVD & spondylosis**
- 3. Spinal injury**
- 4. Spinal tumors**
- 5. Spinal infectious diseases and spinal cord inflammatory diseases**

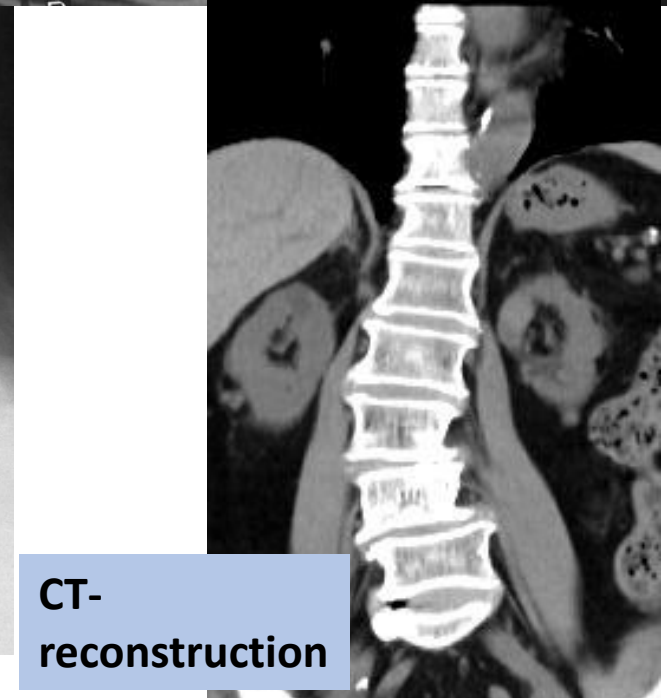
検査工具



X-ray



CT



CT-reconstruction



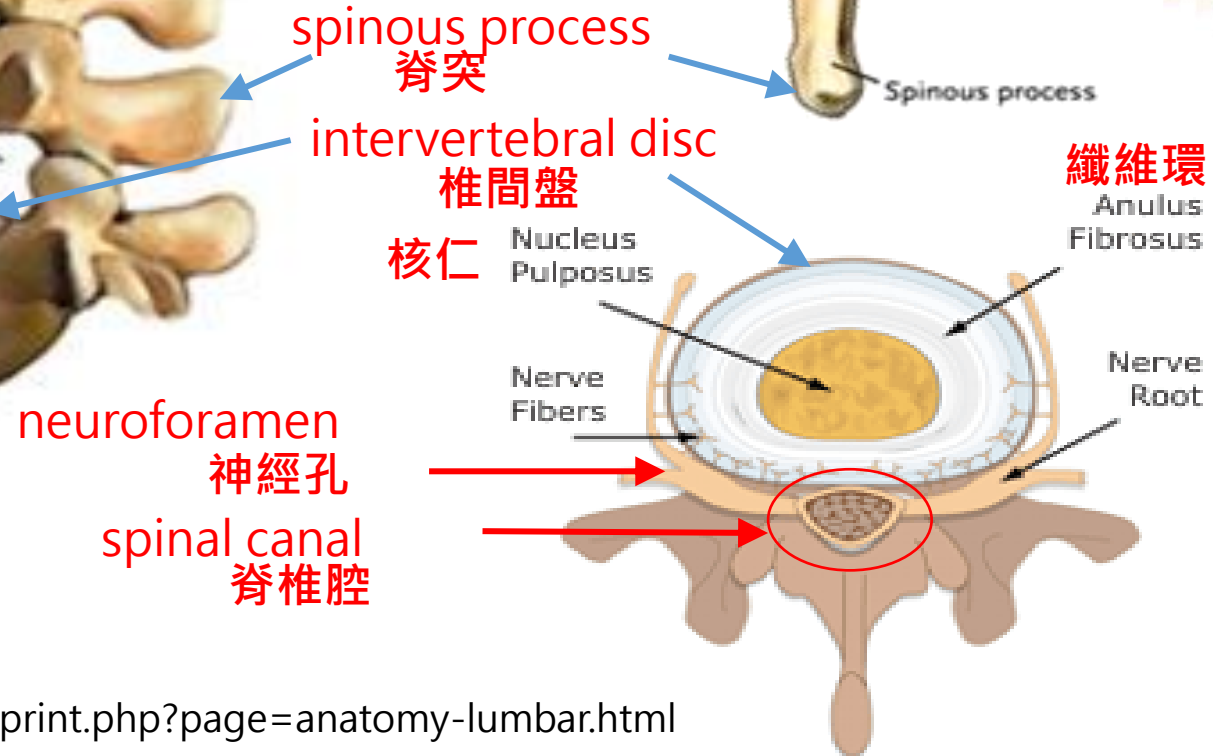
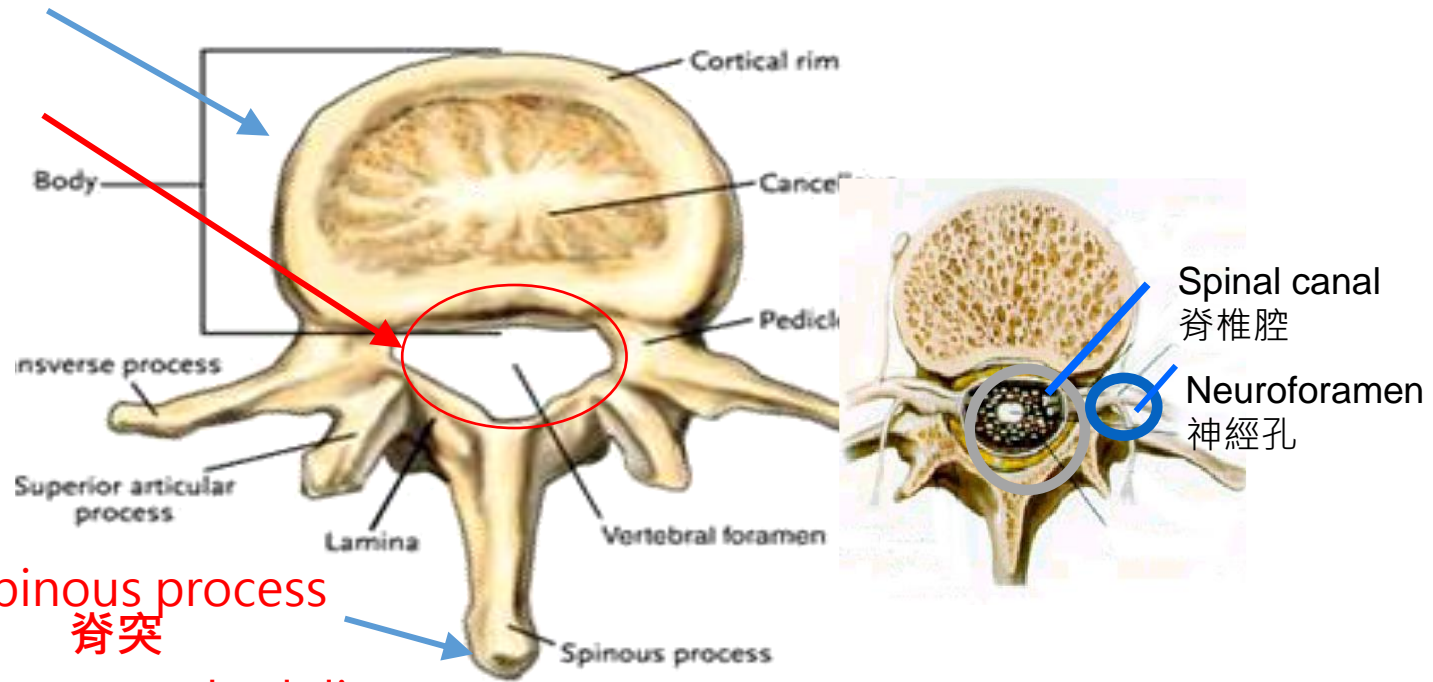
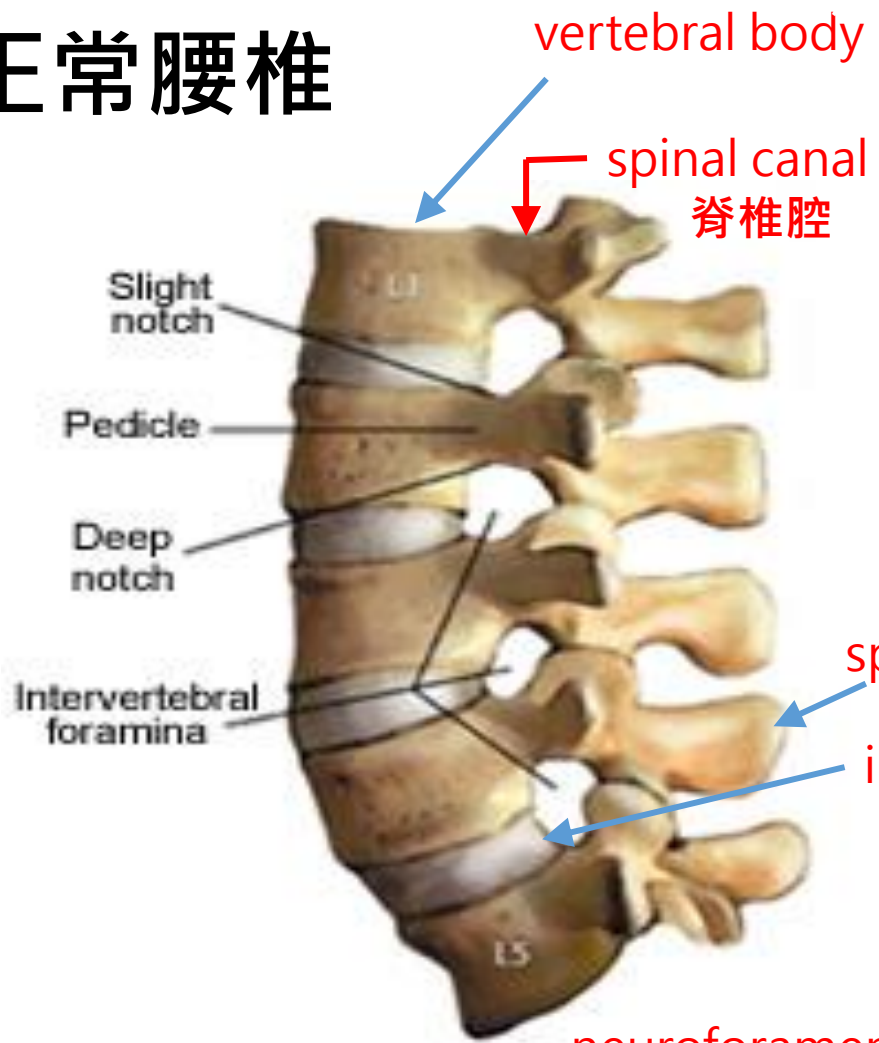
MRI



1. Lumbar HIVD & spondylosis



正常腰椎

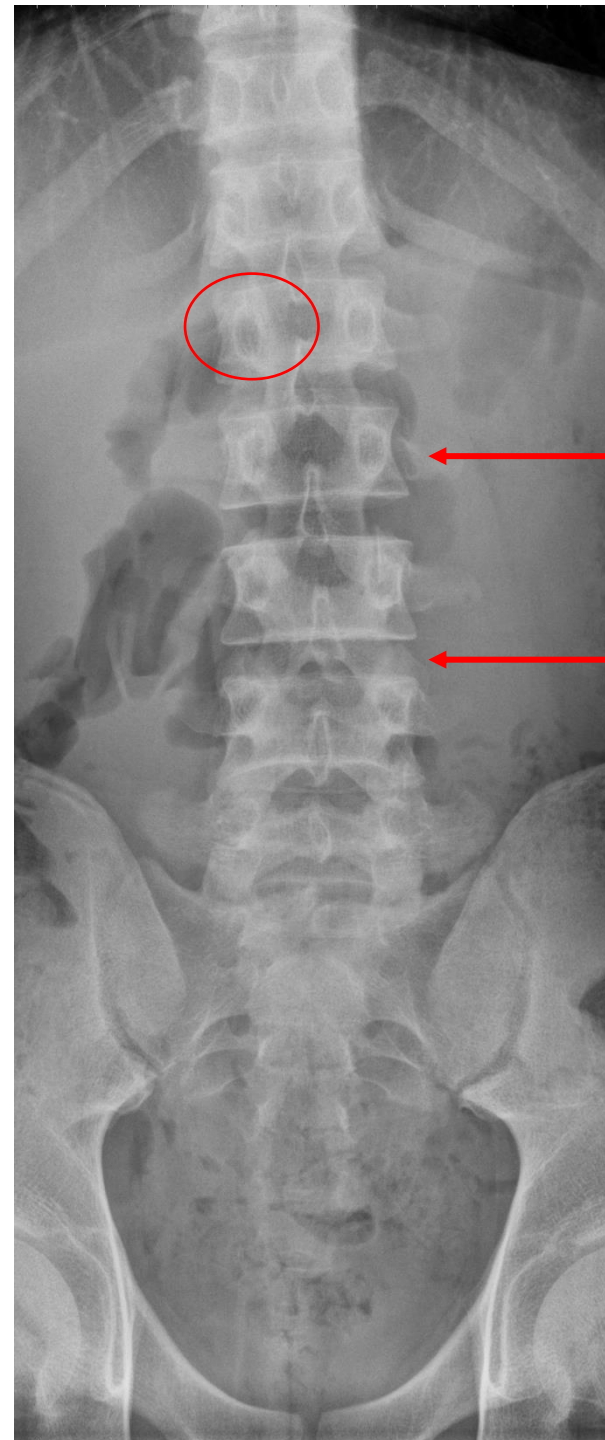
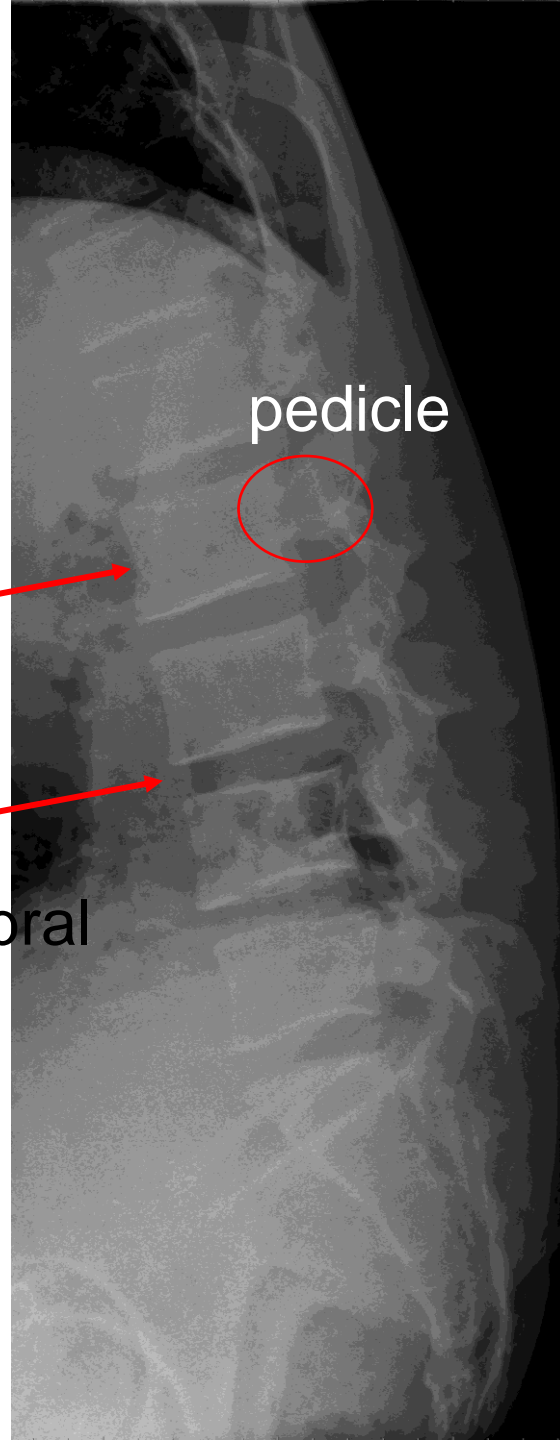


M/20
normal L-spine

pedicle

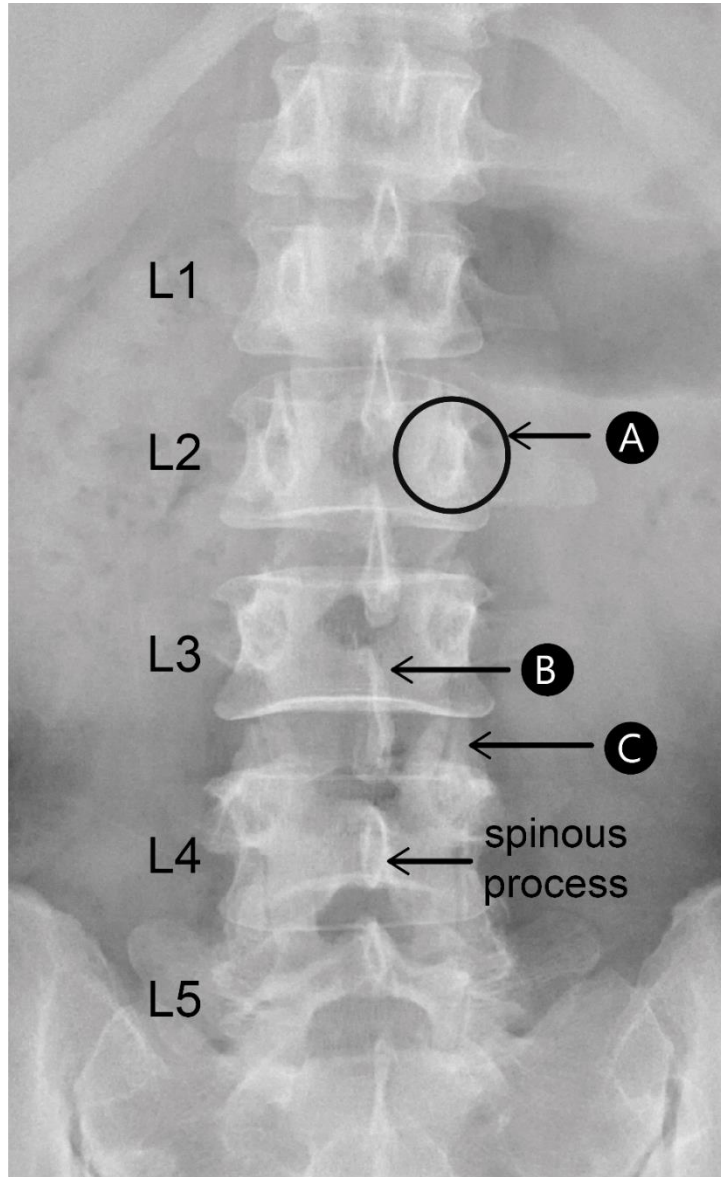
脊椎體
Vertebral
body

椎間盤
Intervertebral
disc

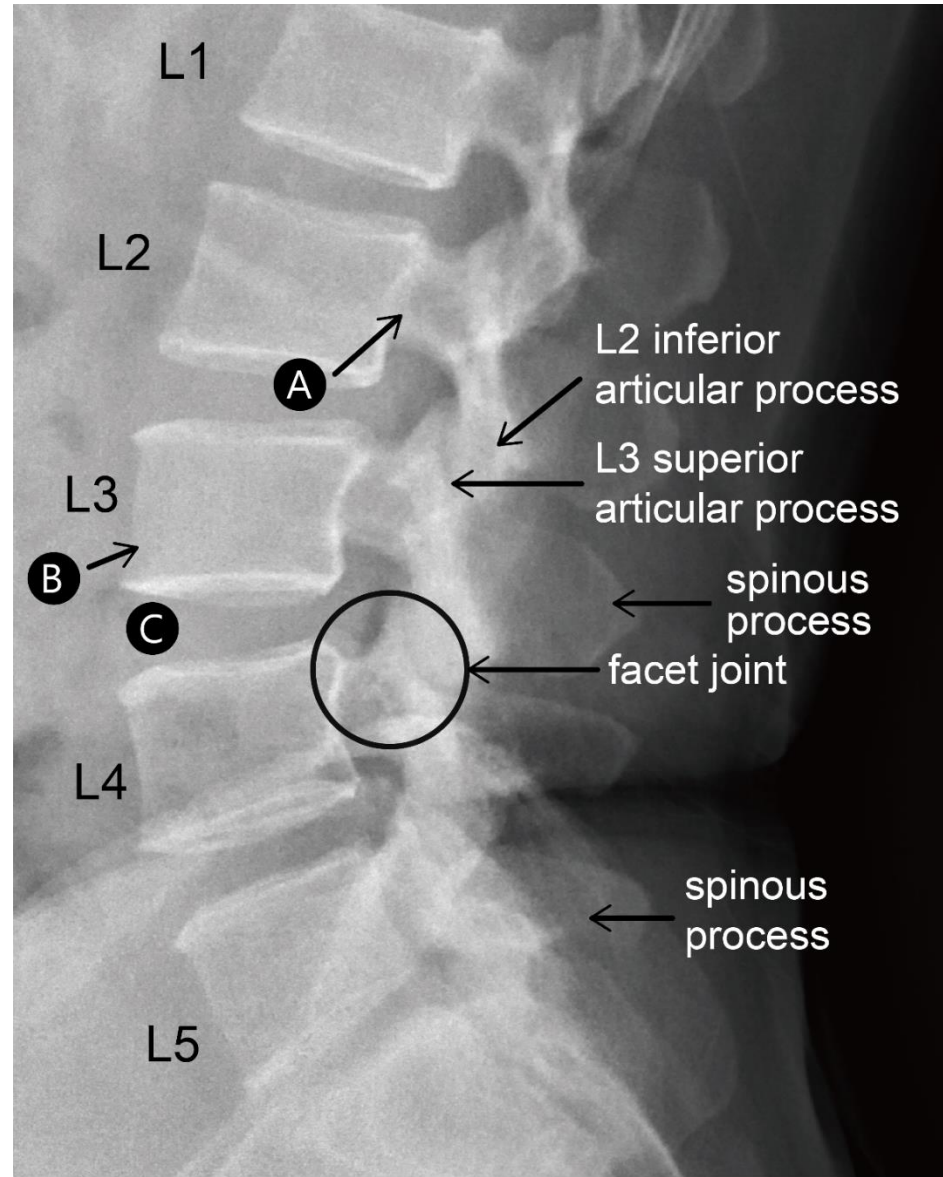


脊椎體

椎間盤

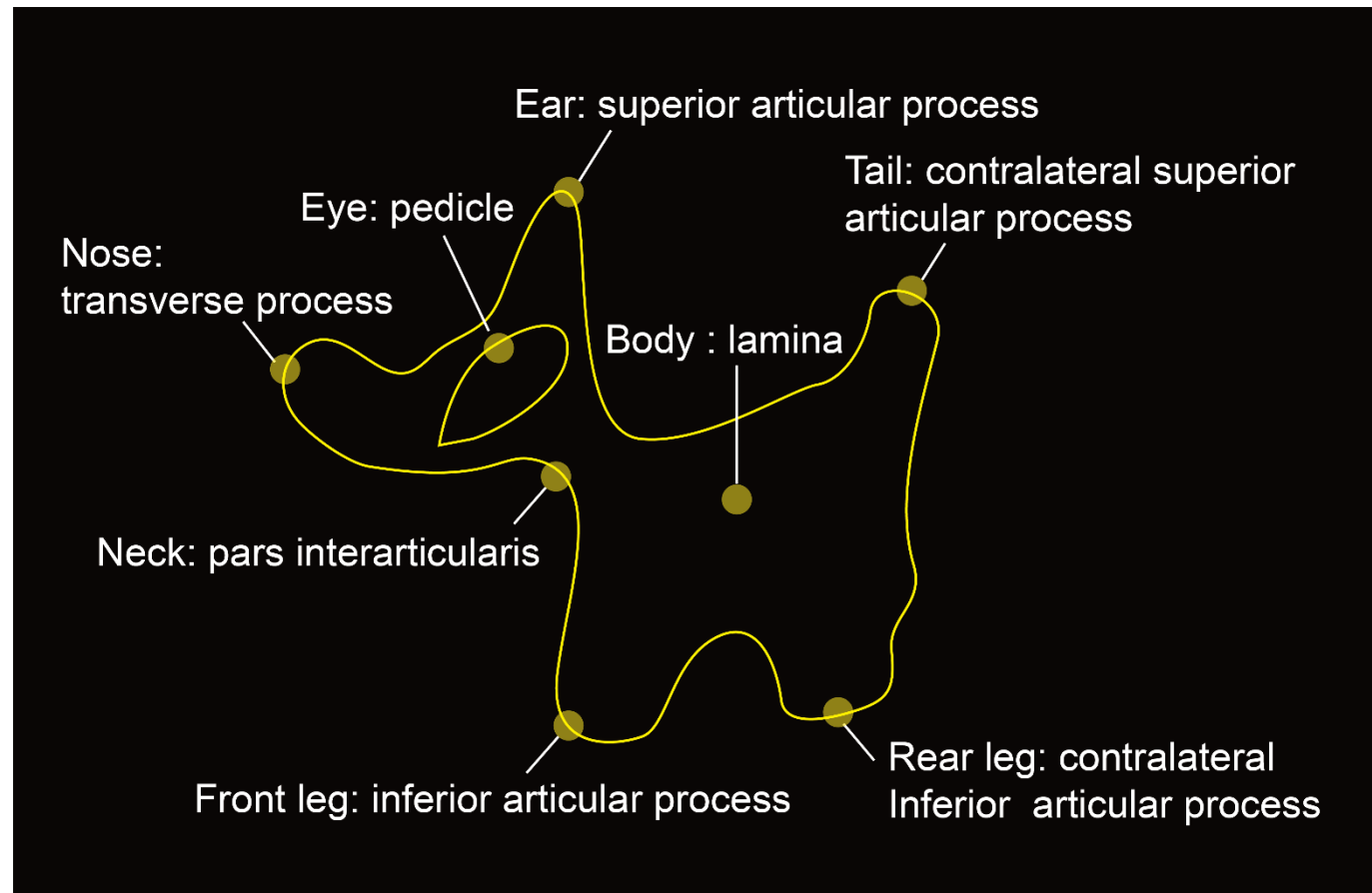
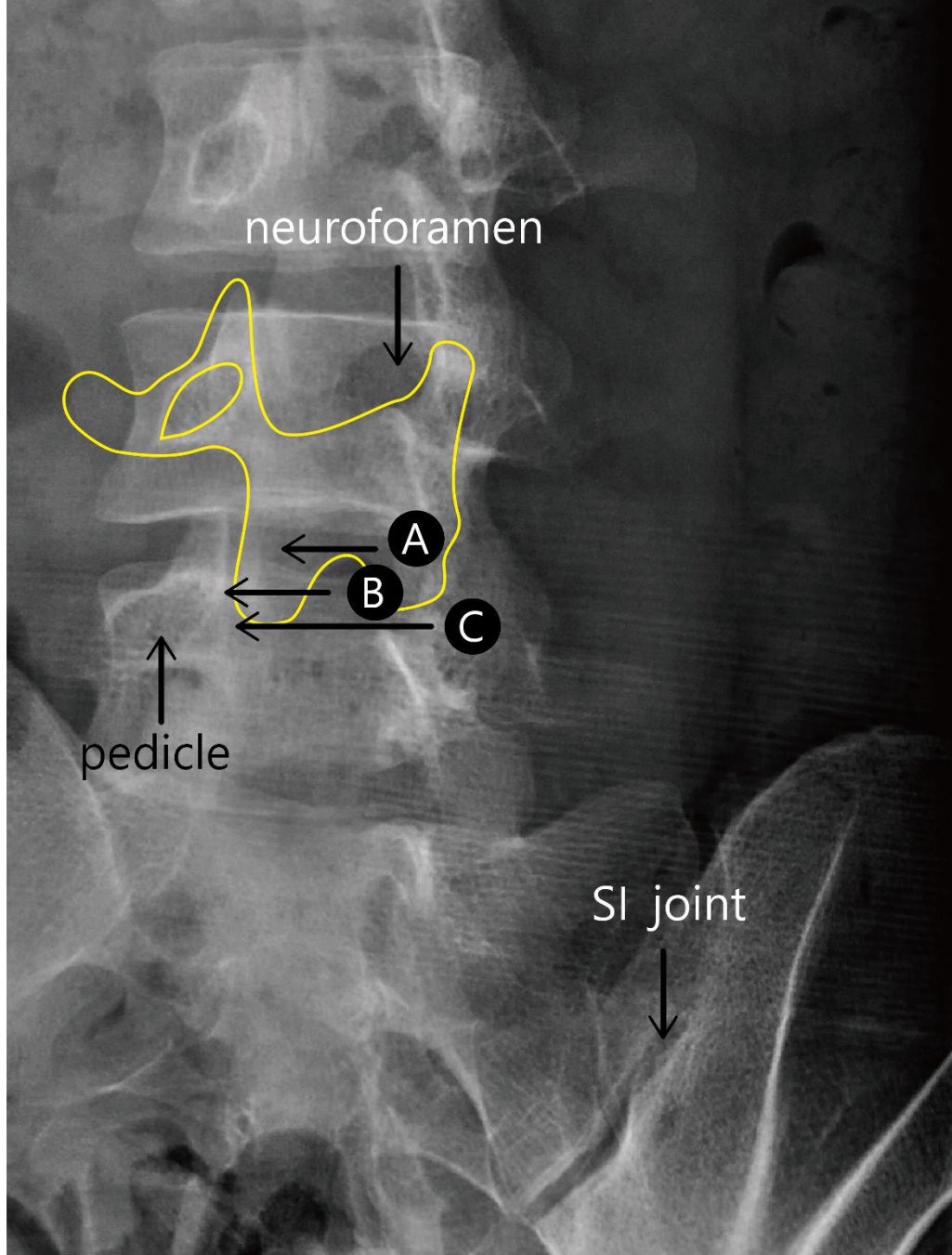


A **A** pedicle **B** vertebral body **C** intervertebral disc space



B **A** pedicle **B** vertebral body **C** intervertebral disc space

正常腰椎之X-光 (A)
AP view (B) lateral
view (C) oblique
view



(C) oblique view: 斜位時，脊椎後面的結構看起來像一隻小狗。

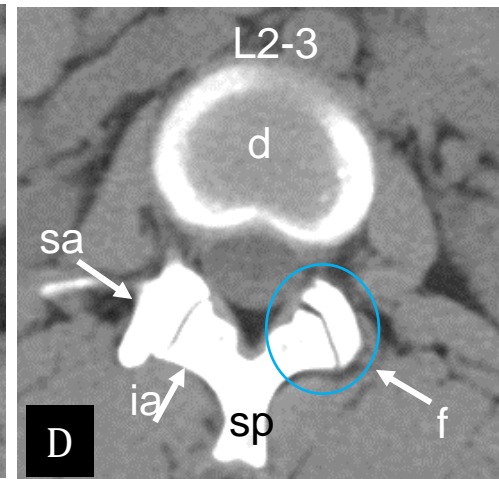
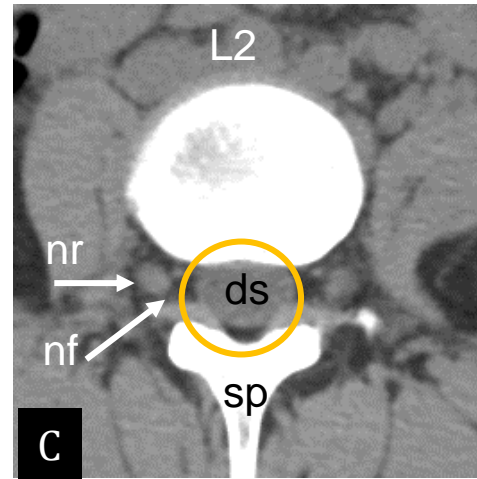
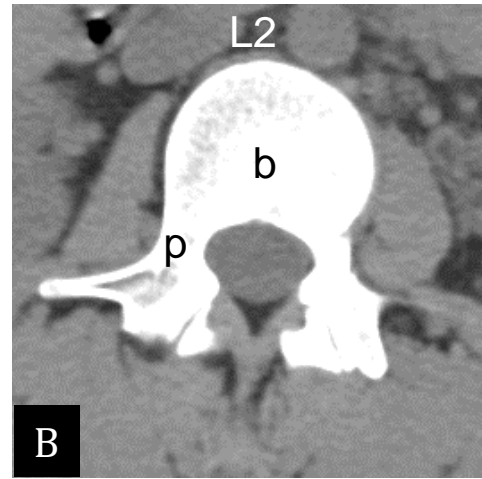
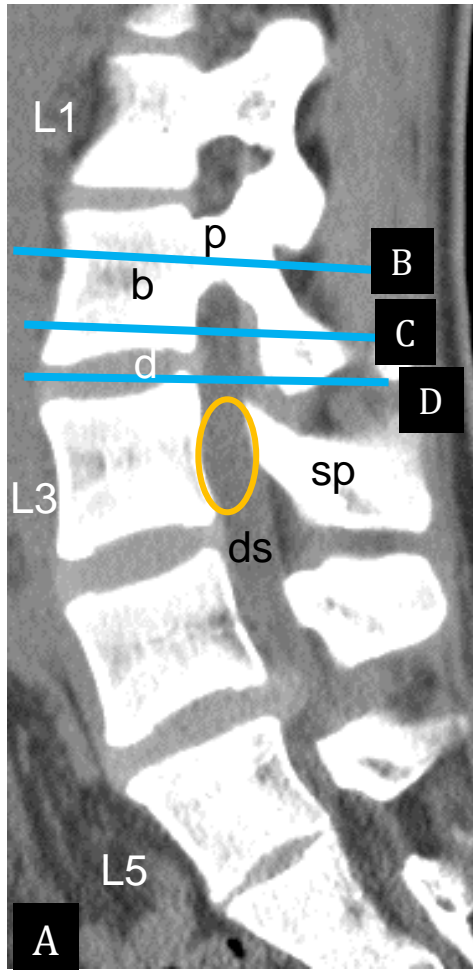
C

A L4 inferior articular process

B L5 superior articular process

C facet joint

C: 19931251



正常腰椎之 CT

A圖是sagittal reconstruction 影像，B~D圖是直接切的axial images。

b: 脊椎體 L2 vertebral body p: 脊椎腳 pedicle

d: 椎間盤 L2-3 intervertebral disc

黃色圓圈: 脊椎腔 spinal canal

ds: 硬膜囊 dural sac (thecal sac)，內含CSF

nf: 神經孔 neuroforamen

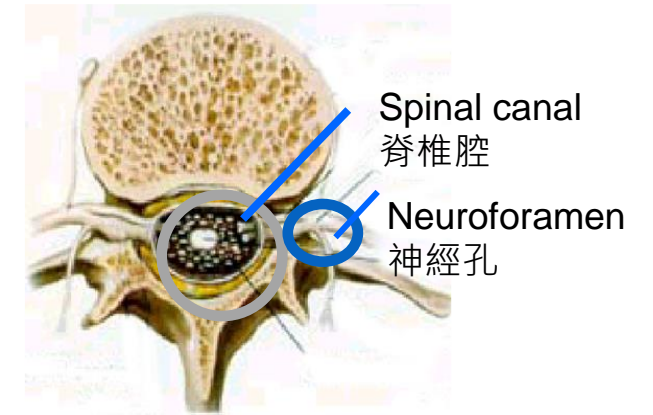
nr: 神經根 L2 nerve root

藍色圓圈 f: 小面關節 facet joint

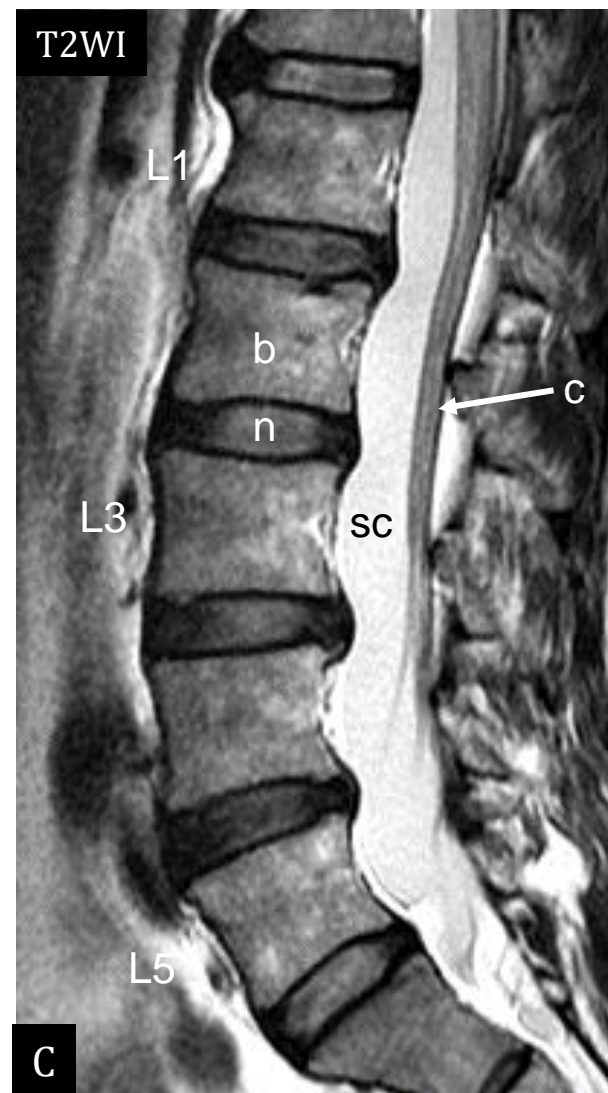
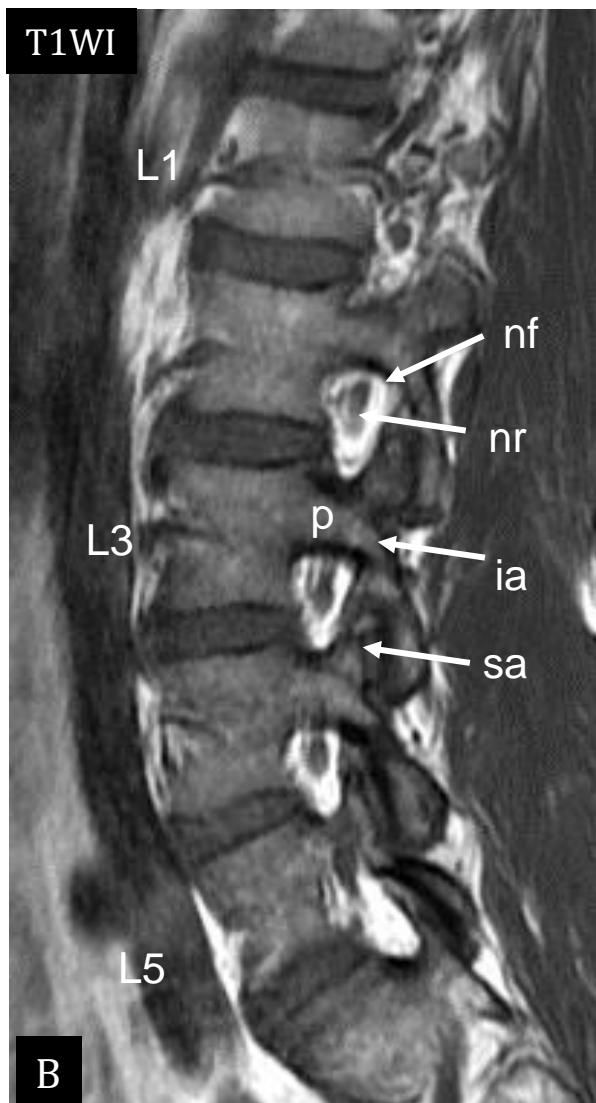
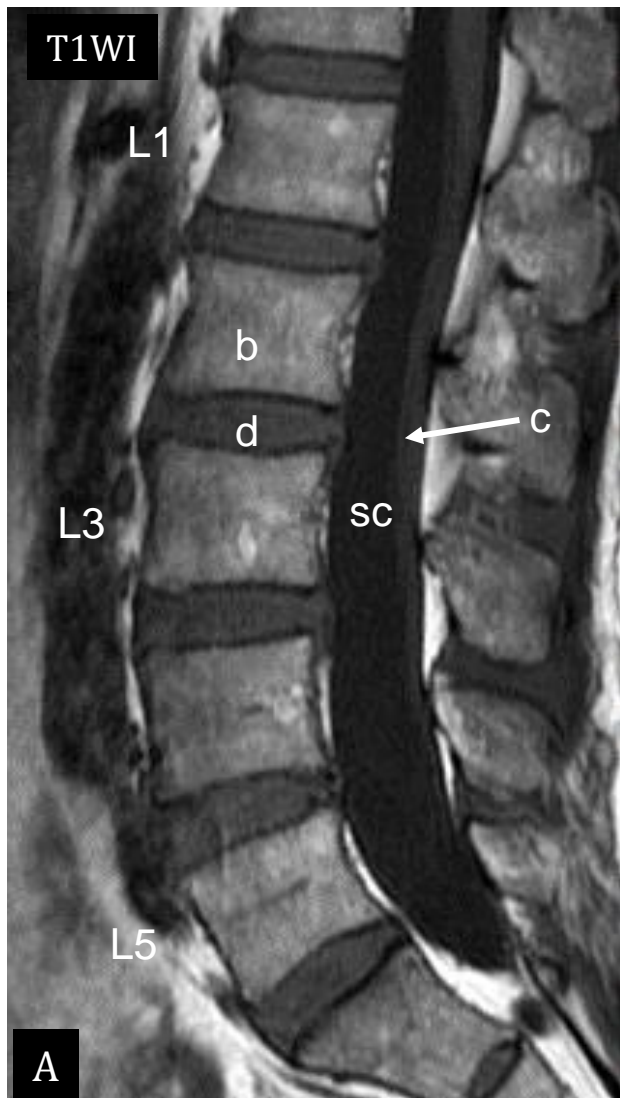
sp: 脊突 spinous process

ia: L2 之下關節突 inferior articular process

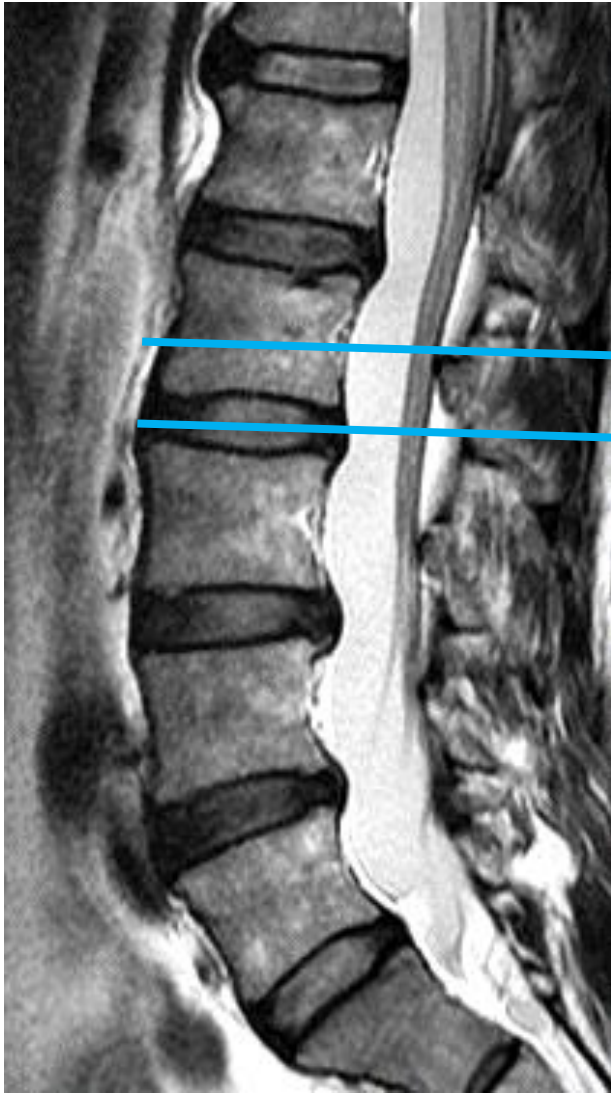
sa: L3 之上關節突 superior articular process



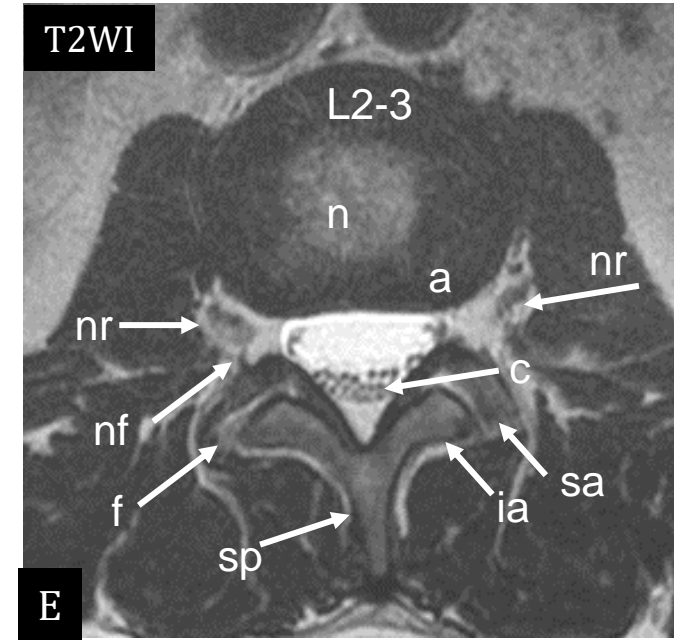
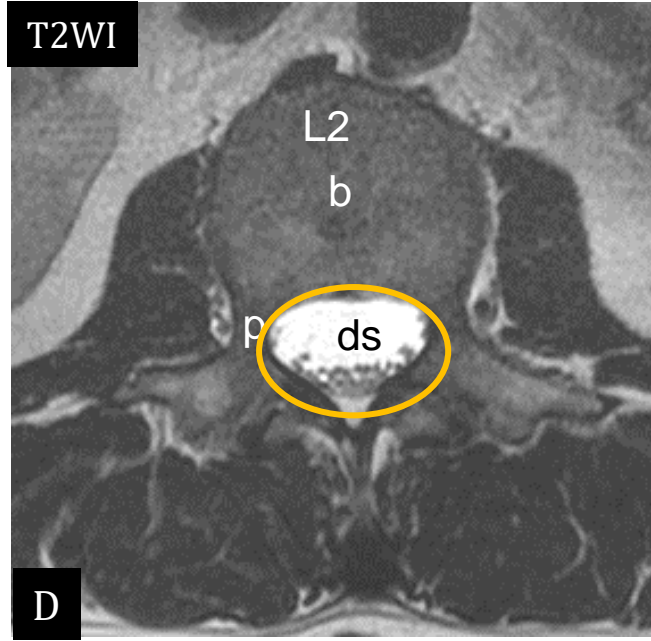
** CT 無法看到dural sac 內之馬尾束神經叢 caudal equinal nerves，也不能區分椎間盤之髓核 nucleus pulposus 及纖維環 annulus fibrosus。



正常腰椎之MRI

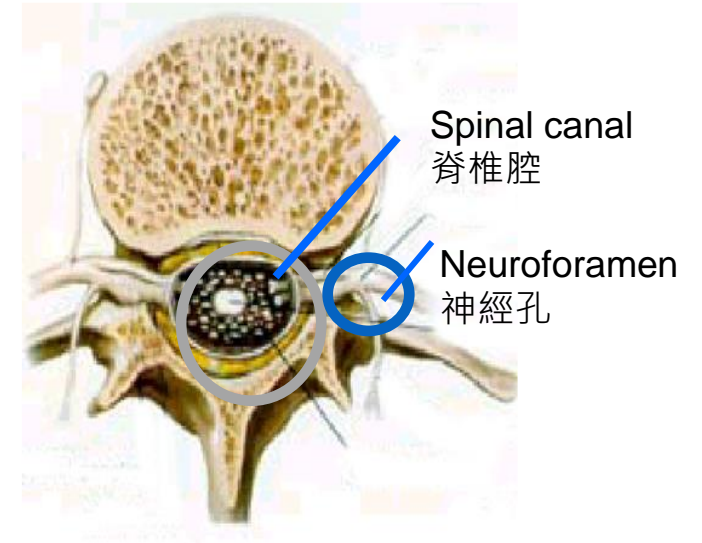


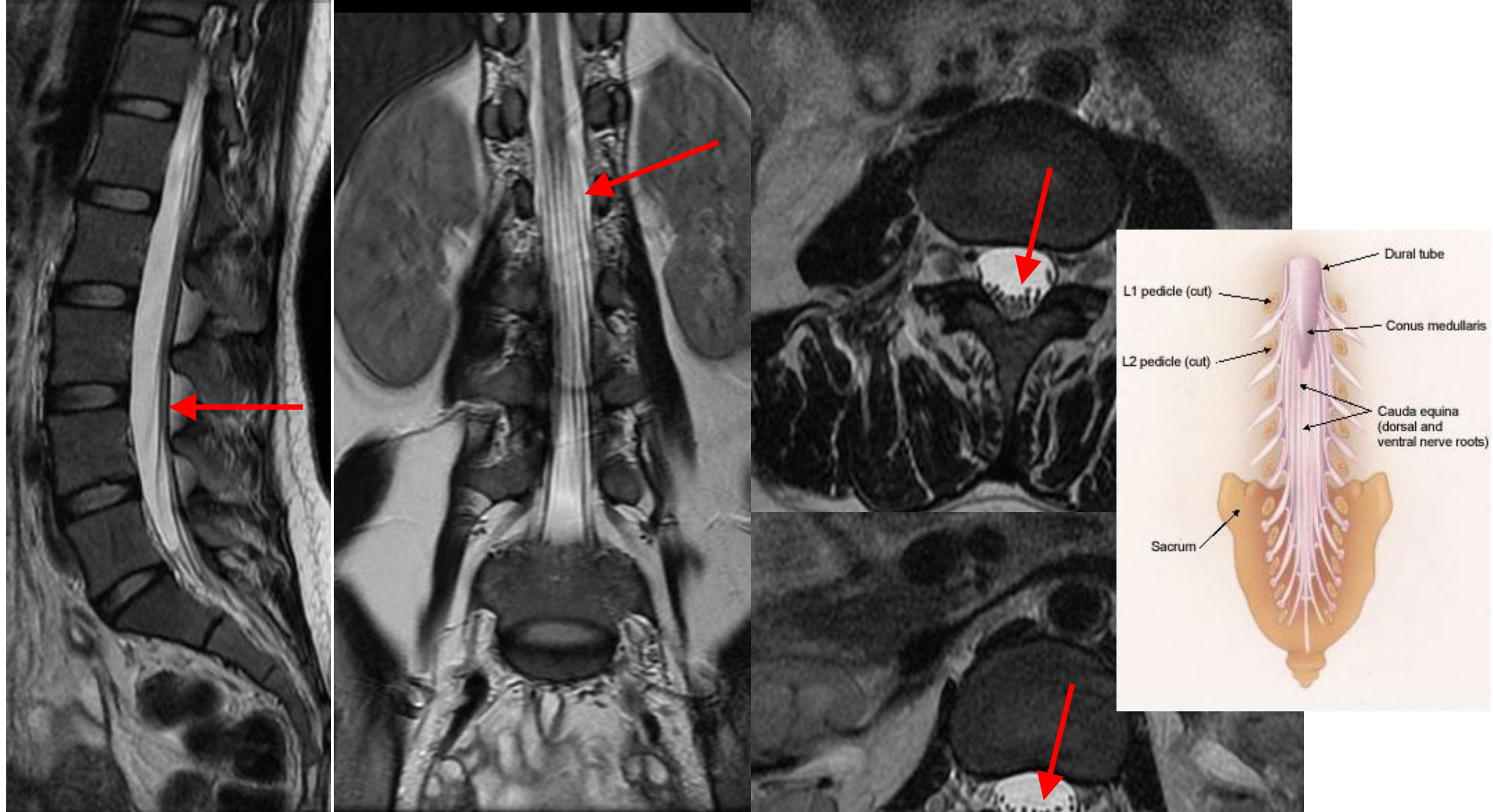
D
E



正常腰椎之MRI

- b: 脊椎體 vertebral body p: 脊椎根 pedicle
- d: 椎間盤 intervertebral disc 黃色圓圈: 脊椎腔 spinal canal (sc)
- ds: 硬膜囊 dural sac (thecal sac), 內含CSF 及 caudal equinal nerves
- nf: 神經孔 neuroforamen nr: 神經根 nerve root
- c: 馬尾束神經叢 caudal equinal nerves
- n: 椎間盤核仁 nucleus pulposus
- a: 椎間盤纖維環 annulus fibrosus
- f: 小面關節 facet joint sp: 脊突 spinous process
- ia: L2 之下關節突 inferior articular process
- sa: L3 之上關節突 superior articular process





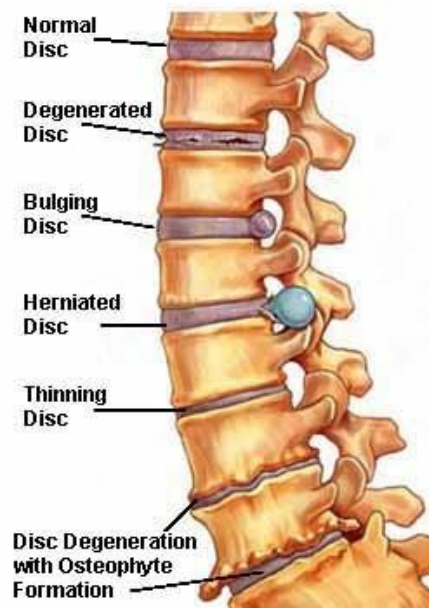
Normal caudal equine nerves
馬尾束 神經叢

腰椎HIVD Lumbar HIVD & Spondylosis

[國家網路醫院](#)



Examples of Disc Problems



HIVD(The herniation of intervertebral disc)

腰椎椎間盤突出 (Lumbar HIVD)

椎間盤突出的症狀相當多樣化性，若纖維外環尚未被撐破，上面的神經纖維會因為承受不正常的壓力跟局部的發炎反應而引發明顯的下背痛情形；若突出的椎間盤容易造成神經根的壓迫，那會引發相對性神經根的坐骨神經痛和神經症狀，如感覺功能異常、運動功能異常以及闊約肌功能障礙或者是行動不便等。有些人會先經歷嚴重的下背痛，等到纖維外環被撐破，髓核破出後外環壓力減小，下背痛反而減緩，但取而代之的卻是更為難受的坐骨神經痛及其他神經疼痛的症狀。

Spondylosis (degeneration of spine 脊椎退化)

脊椎關節退化 (英語：Spondylosis) 又稱退化性脊椎炎

椎關節病變和退化性椎間盤疾患指的是椎間盤磨損和撕裂的變化導致脊椎管狹窄現象，這脊椎管狹窄現象會壓迫到神經成分，而使神經功能受干擾，我們幾乎所有人都會有，只是程度上的差別；大於四十歲的人都會有這個問題。

HIVD (椎間盤疝出症)



**(herniation of intervertebral disc,
herniation of nucleus pulposus)**

85% occurs in the L4-5, L5-S1 level.

85% are posterio-lateral herniation:

HIVD in L4-5: compressing the L5 nerve root.

HIVD in L5-S1: compressing the S1 nerve root.

Lumbar HIVD

臨床症狀:

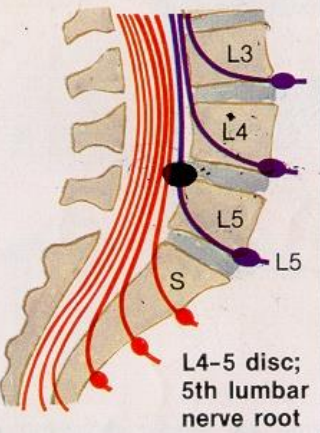


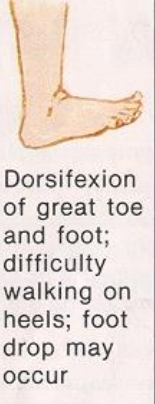
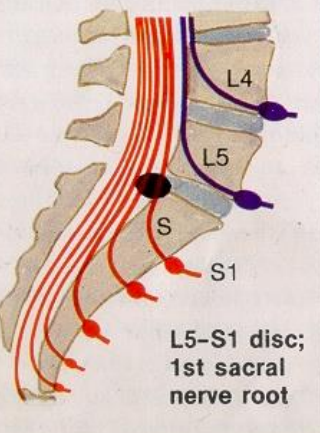





Sciatica (坐骨神經痛)

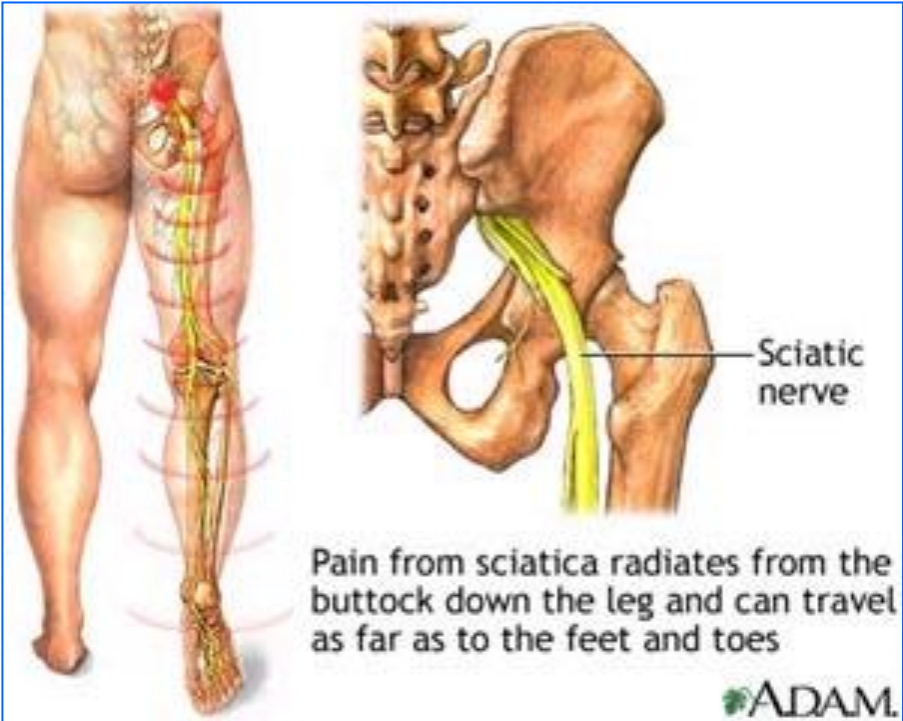
low back pain (下背痛)

Severe HIVD:

caudal equinal syndrome
(馬尾神經症狀群：大小便失禁)

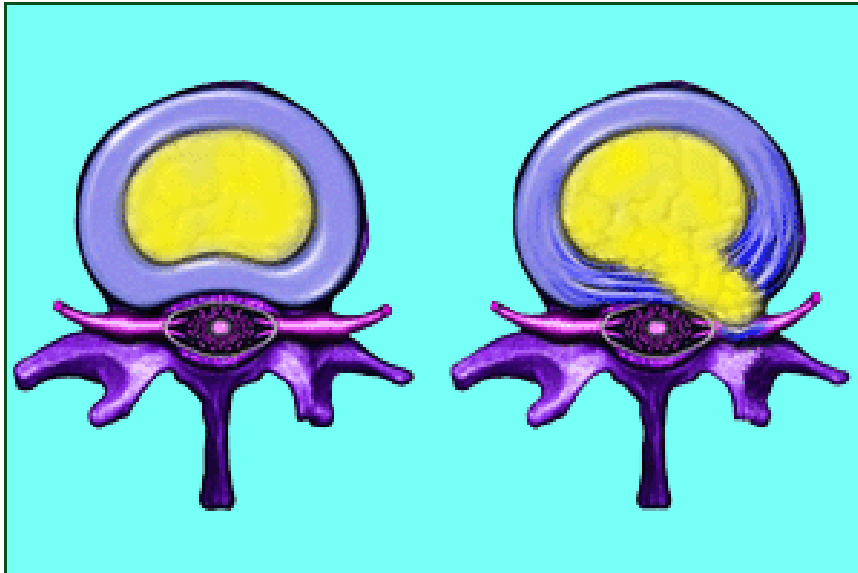
Clinical features of herniated lumbar nucleus pulposus

Level of herniation	Pain	Numbness	Weakness	Atrophy	Reflexes
 <p>L4-5 disc; 5th lumbar nerve root</p>	 <p>Over sacroiliac joint, hip, lateral thigh and leg</p>	 <p>Lateral leg, first 3 toes</p>	 <p>Dorsiflexion of great toe and foot; difficulty walking on heels; foot drop may occur</p>	Minor	Changes uncommon in knee and ankle jerks, but internal hamstring reflex diminished or absent
 <p>L5-S1 disc; 1st sacral nerve root</p>	 <p>Over sacroiliac joint, hip, postero-lateral thigh and leg to heel</p>	 <p>Back of calf, lateral heel, foot and toe</p>	 <p>Plantar flexion of foot and great toe may be affected; difficulty walking on toes</p>	 <p>Gastrocnemius and soleus</p>	 <p>Ankle jerk diminished or absent</p>



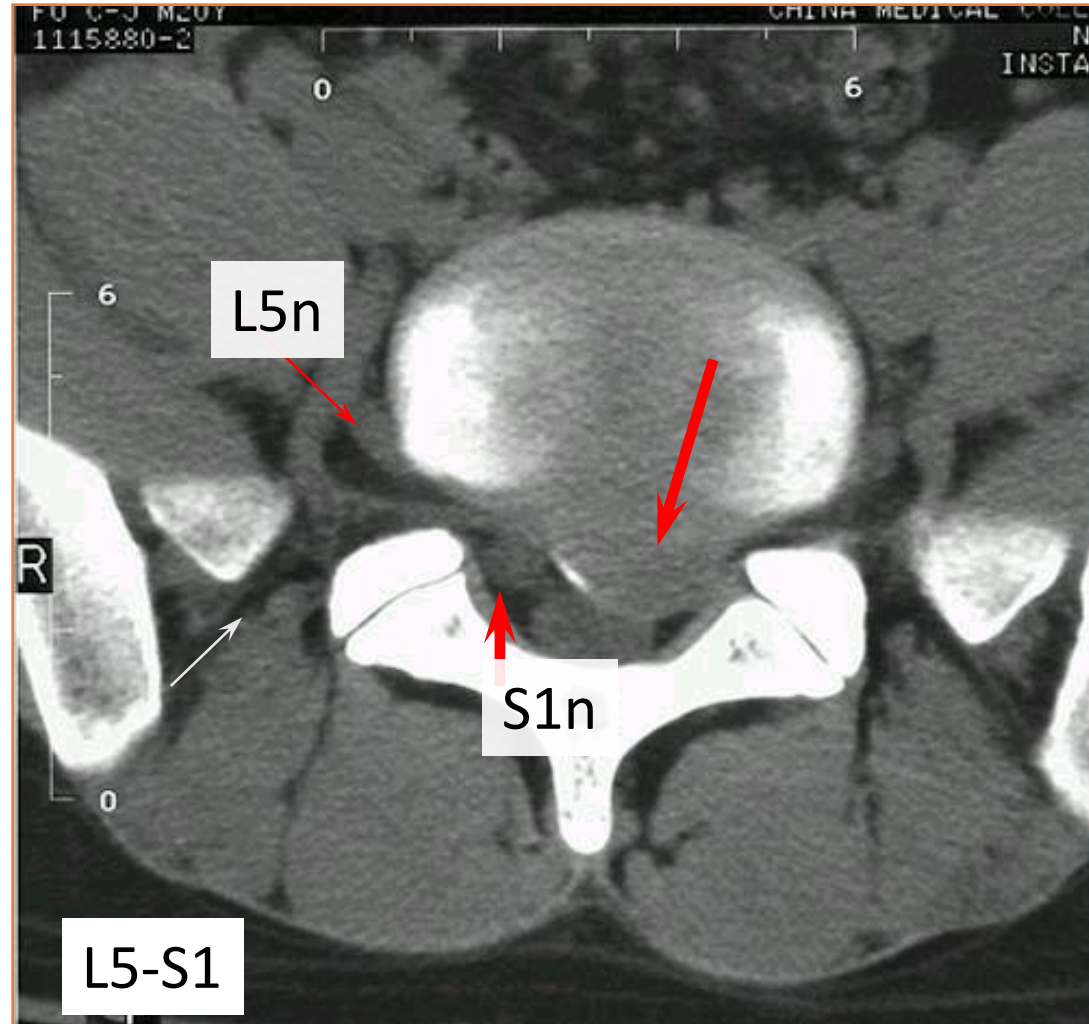
CT:

1. Focal bulging out of disc
2. Obliteration of ipsilateral epidural fat and nerve root
3. Deformity of dural sac



F/59

Big HIVD in left side of L5-S1,
compressing the left S1 nerve



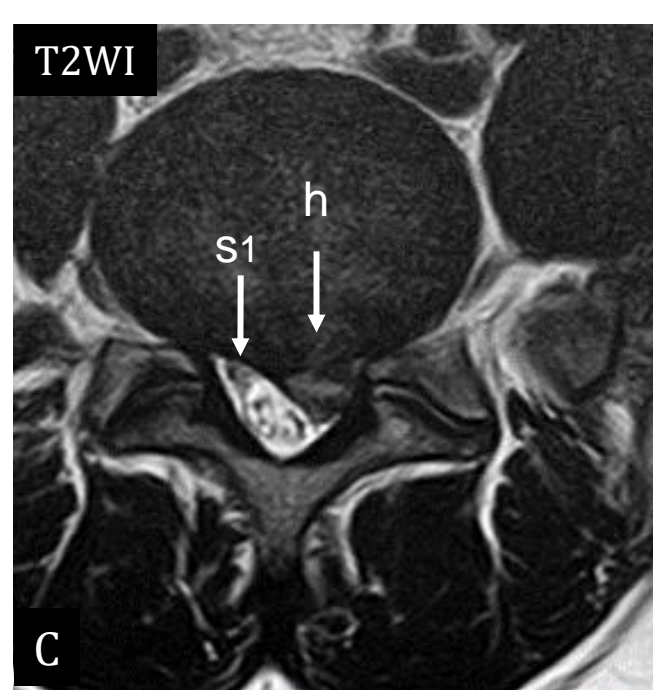
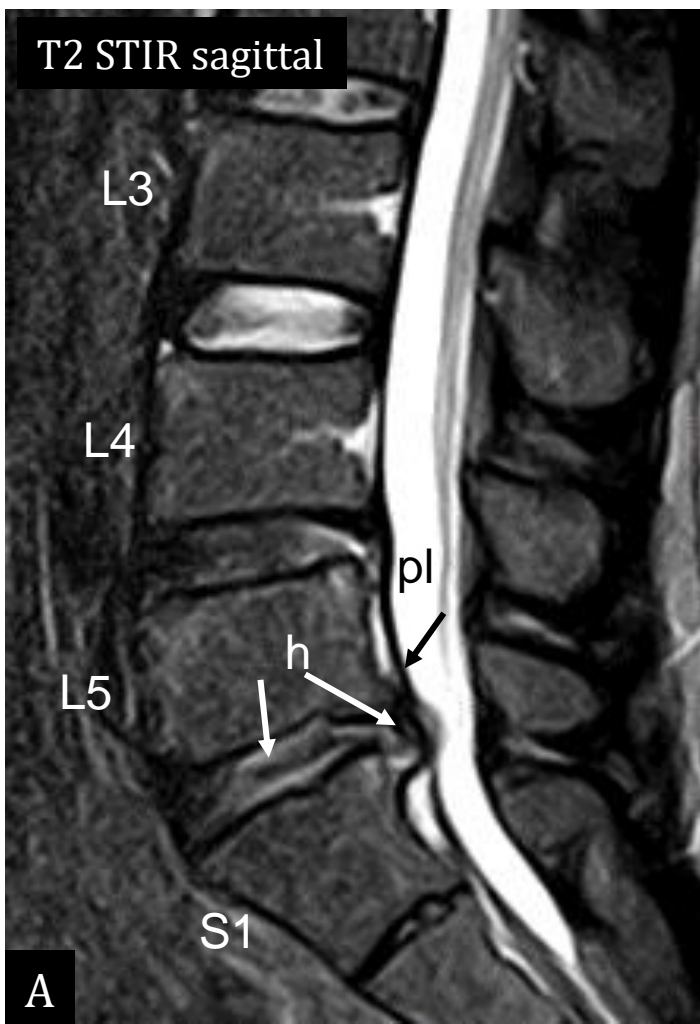


M/26

lower back pain after 彎腰撿球 this afternoon

2021,3,20 MRI:

HIVD, L4-5, more on left side, compressing the left L5 nerve.

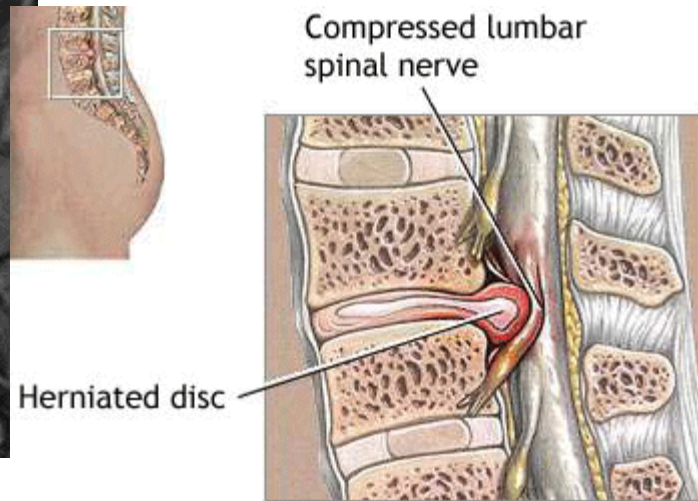
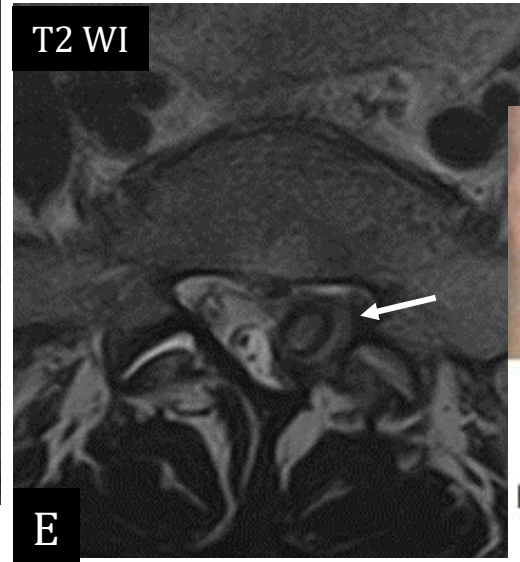
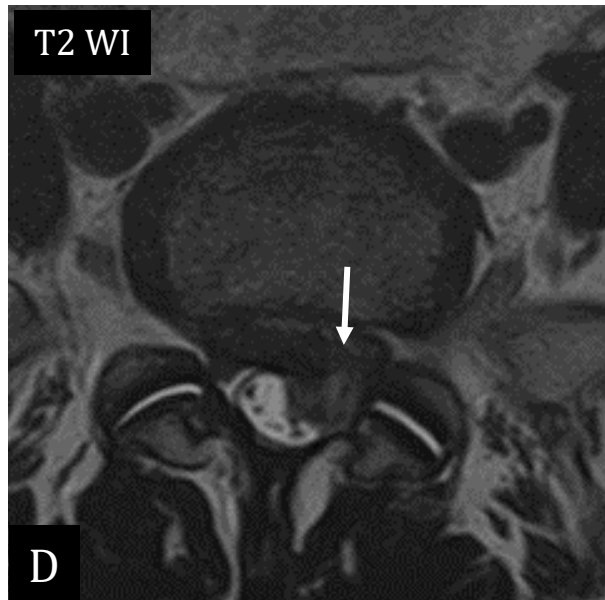
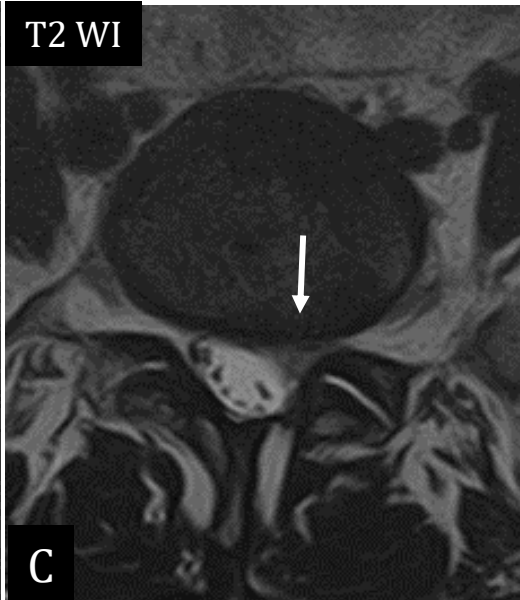
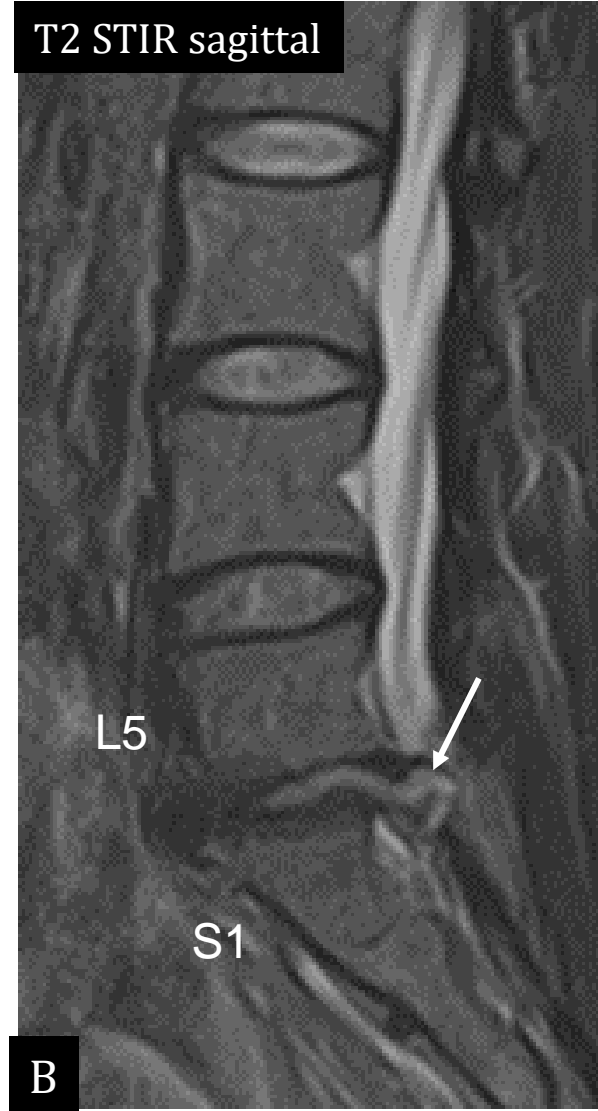
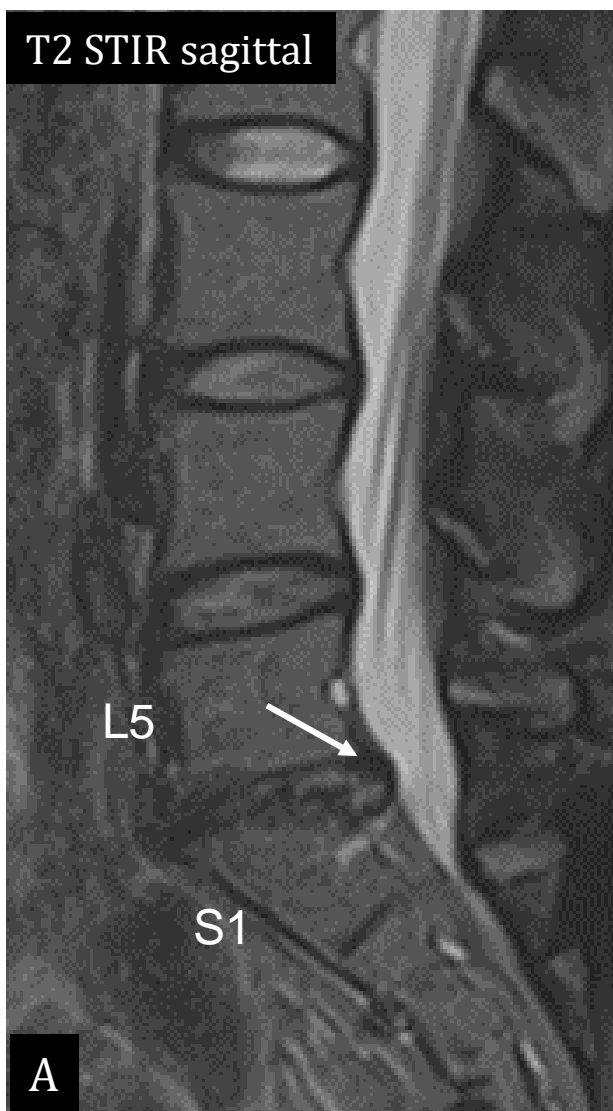


男/41 disc degeneration and HIVD

2個月前跌倒後引發嚴重的左側sciatica。

(A,B) MRI, T2 STIR, sagittal: L3-4 disc 正常，但disc中間有一條暗線(arrow)，表示disc有輕微退化。L4-5 disc 水份減少，稍暗，且往後bulging out，表示disc退化，L5-S1 disc 則很嚴重herniation (h)，是annulus 破裂，中間較亮的nucleus 往後擠出(extrusion)。後縱韌帶(posterior longitudinal ligament, pl)被往後推。

(C,D) 這是中間靠左後側之HIVD(h)，嚴重壓迫dural sac 及左側S1 nerve root。右側S1 nerve root (s1) 正常。

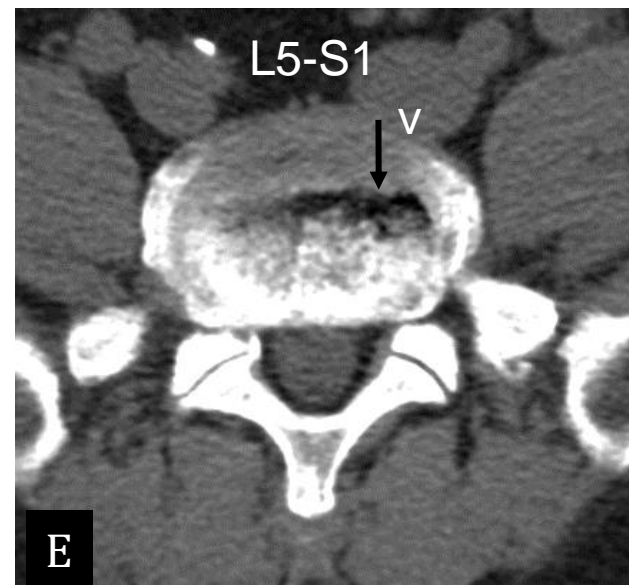
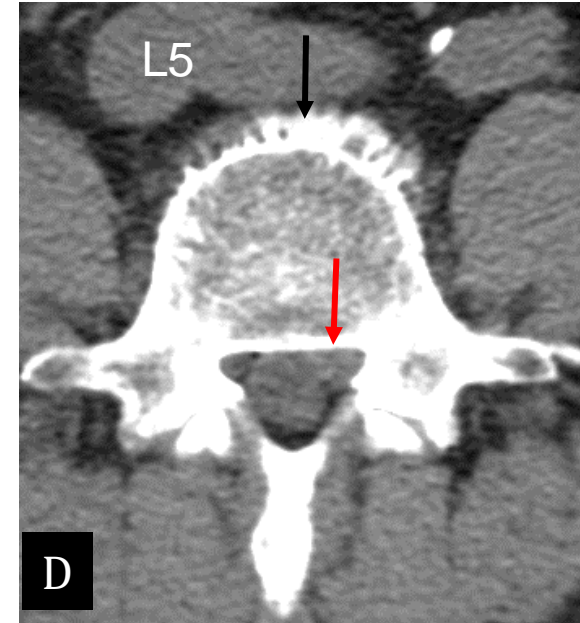
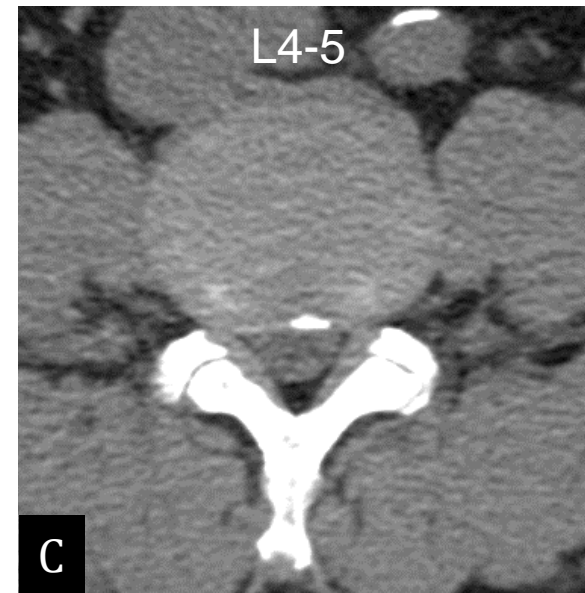
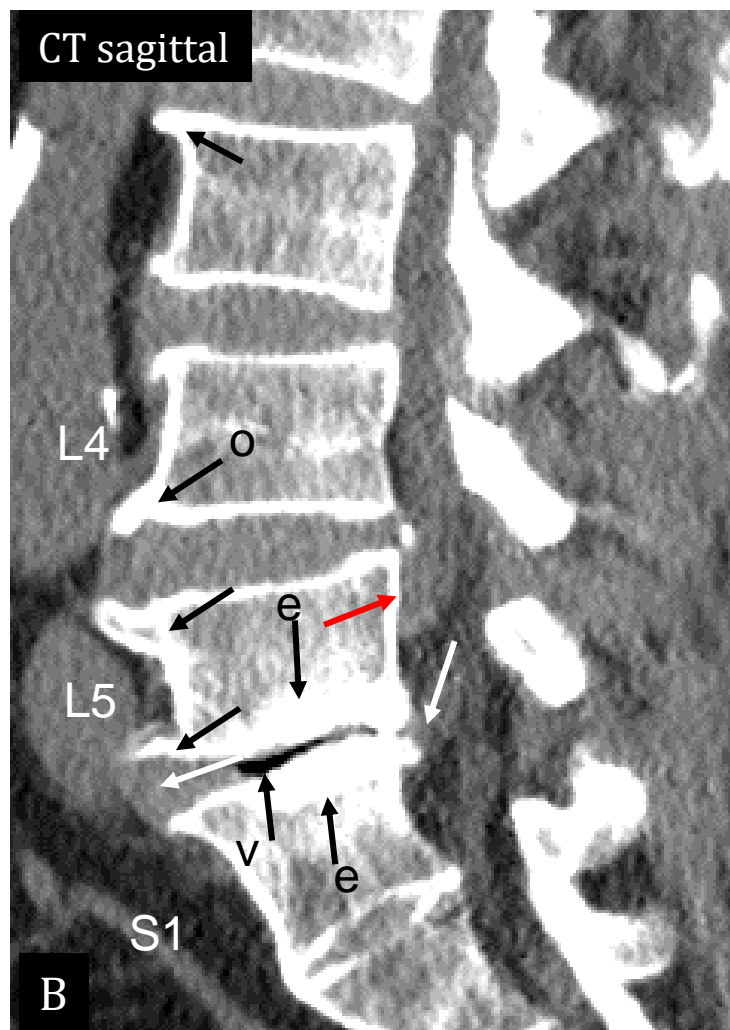


女/45 HIVD and ruptured disc

L5-S1 disc 變矮，表示有退化。

Annulus破裂，裡面的nucleus往左後疝出(arrows)，而且斷裂，往下游離。

這是典型的、嚴重的HIVD，是extrusion with sequestration (擠出加游離)，疝出的nucleus離開disc母體。

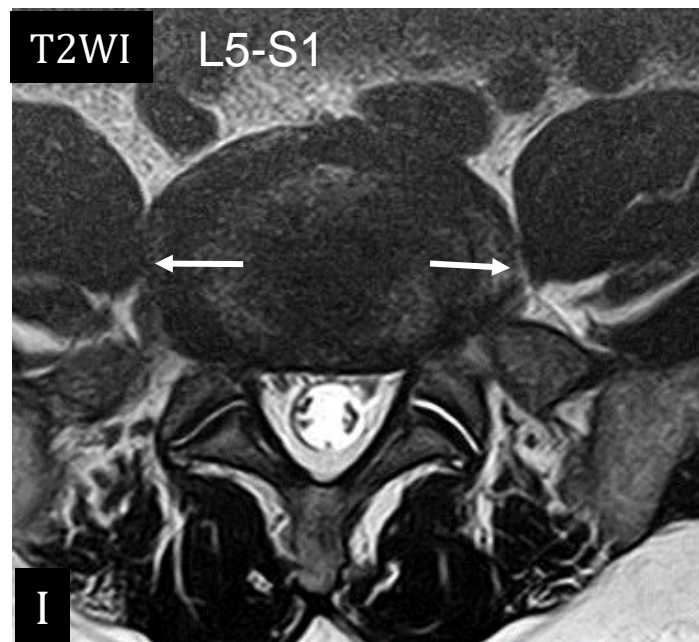
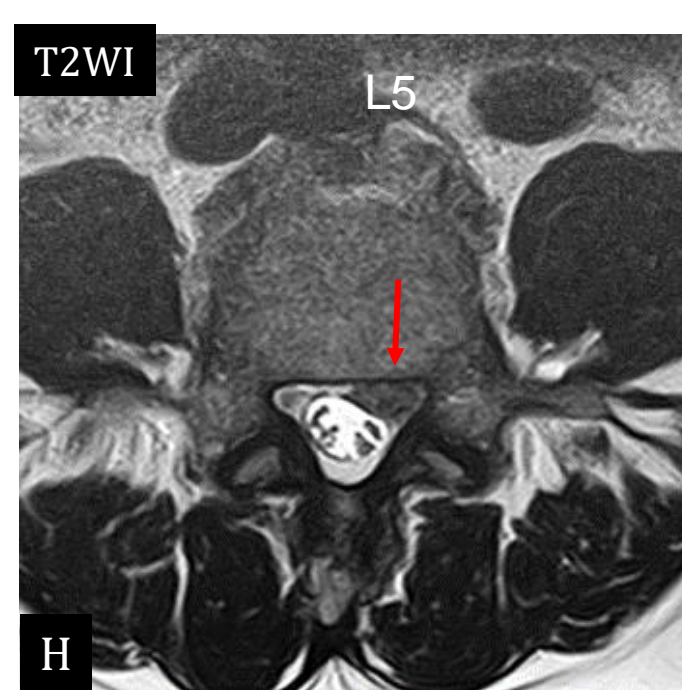
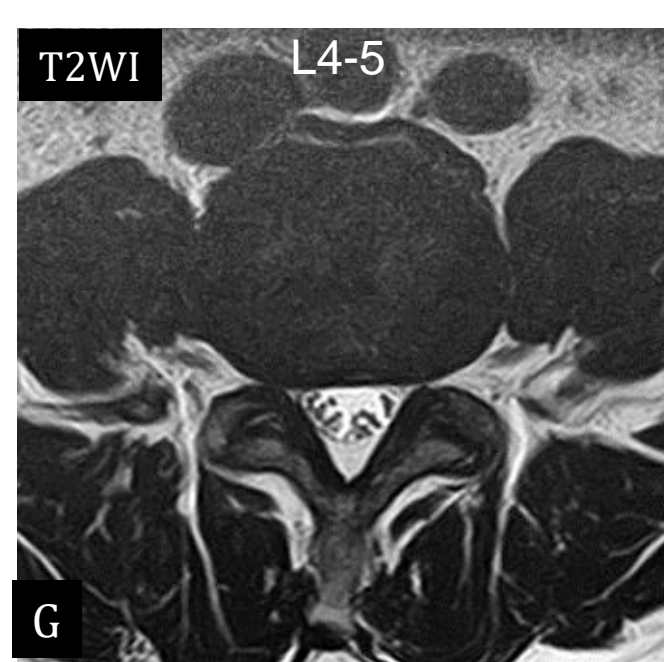
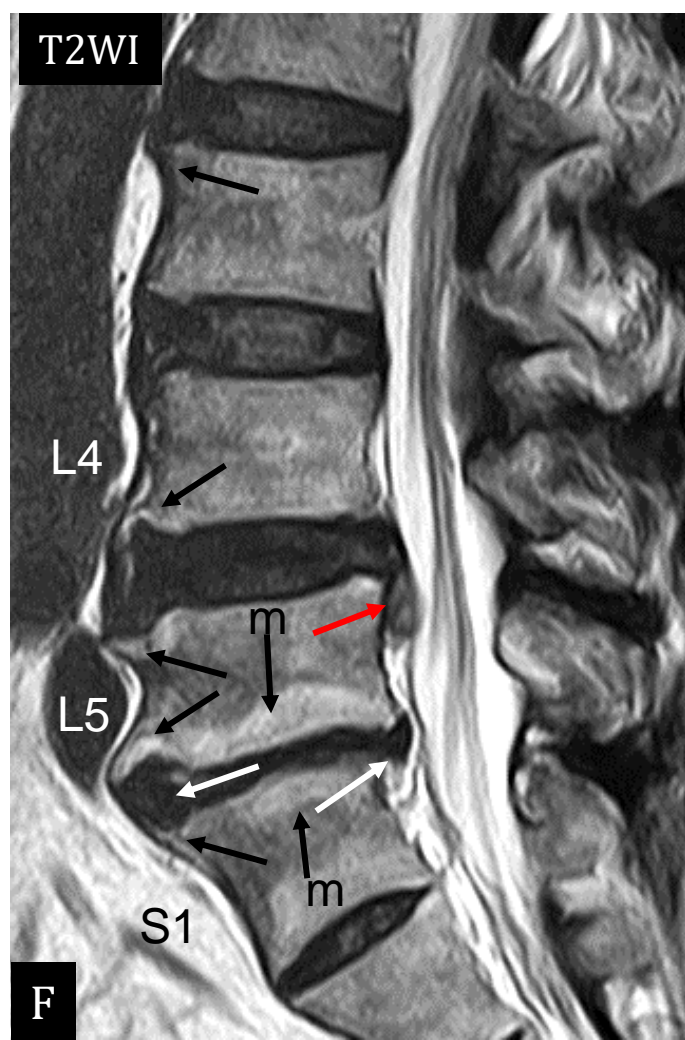


左側sciatica

(B-E) CT: 每一節都有骨刺(o: osteophyte),
L4-5: 在L5後方可見局部disc往左後下疝脫
(herniation) (red arrow), 這是HIVD。

L5-S1: disc 嚴重狹窄而且前後膨出(bulging
out, white arrows), 且含空氣(v: vacuum), 表
示嚴重disc degeneration。

L5 inferior endplate, S1 superior endplate 都變
象牙白(e: eburnation)。



(F-I) MRI: 看到與CT相同的變化，對L4-5 HIVD比CT清楚(red arrow)。
 L5-S1之disc前後左右膨出(white arrows)及水分乾燥變暗，但看不到disc內的vacuum。
 L5,S1 endplates 呈現Modic type II degeneration (m) 相對應CT所見之eburnation。

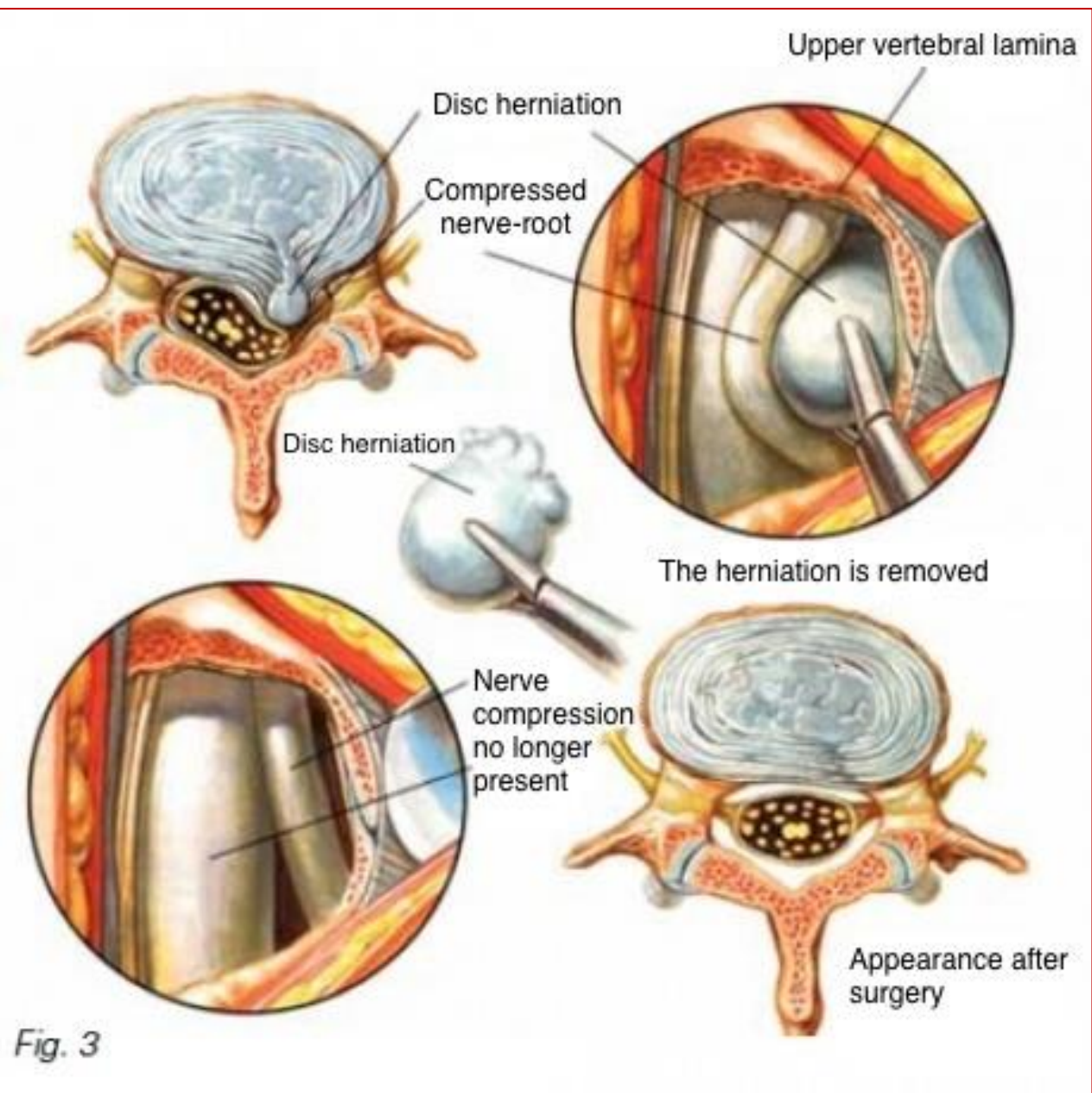
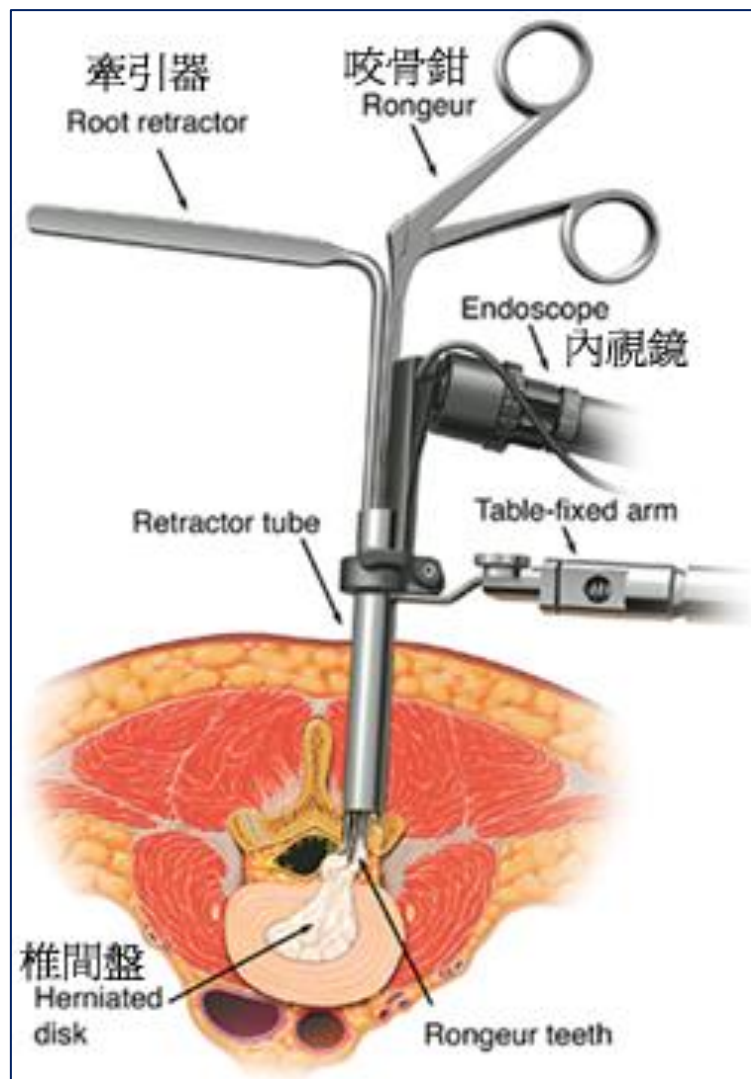


Fig. 3



M/66
Severe degenerative spondylosis
and scoliosis



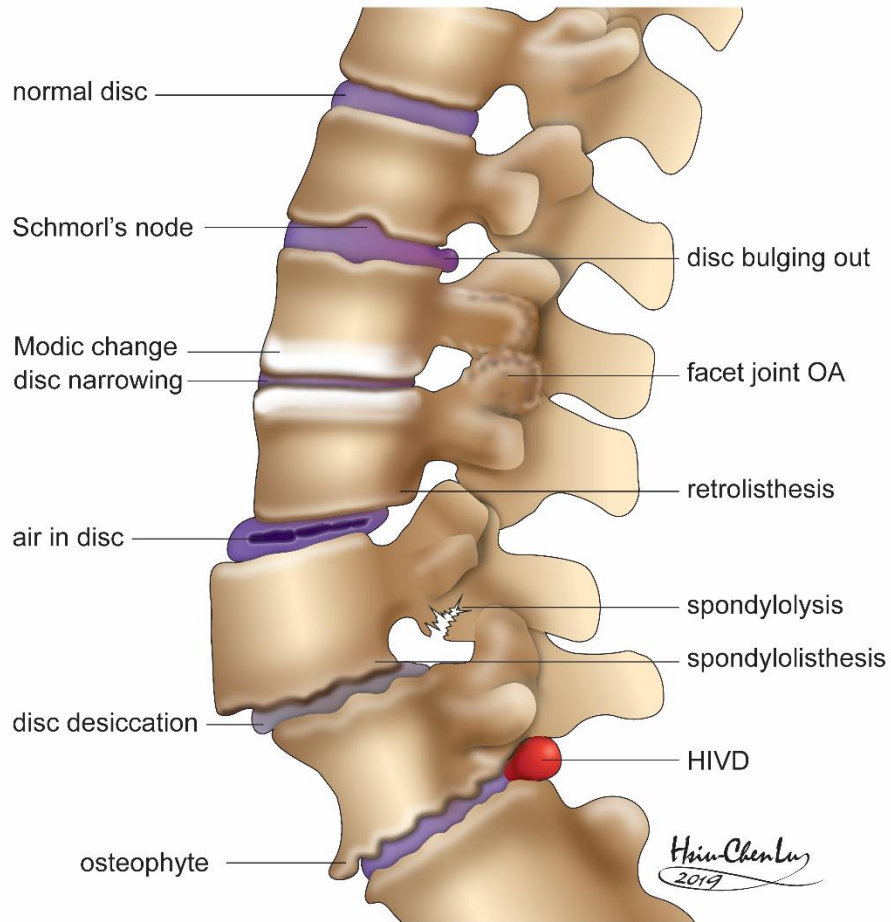
F/86
Severe degenerative spondylosis
with compression fracture of L2

Degenerative lumbar spondylosis

脊椎退化



Degenerative lumbar spondylosis:



脊椎退化(degenerative spondylosis)
脊椎退化涵蓋:
Intervertebral discs退化: 高度變矮、水分減少、內含空氣, bulging out, HIVD。
Vertebral bodies退化: 長骨刺(osteophyte or spur), Modic changes, Schmorl's node.
Facet joint退化: 因osteoarthritis (OA) 肥厚長骨刺。
Ligaments退化: 肥厚、鈣化、骨化(ossification)。
Spondylolysis.
Spondylolisthesis, retrolisthesis.
以上病變引起spinal canal stenosis以及neuroforamen stenosis, 壓迫脊椎神經, 在頸椎、胸椎也會壓迫spinal cord.

Degenerative lumbar spondylosis

脊椎退化

The above lesions causes:

- Stenosis of central spinal canal (脊椎腔狹窄).....
low back pain, claudication, caudal equinal syndrome.
- Stenosis of lateral recess or neuroforamen.....root pain.

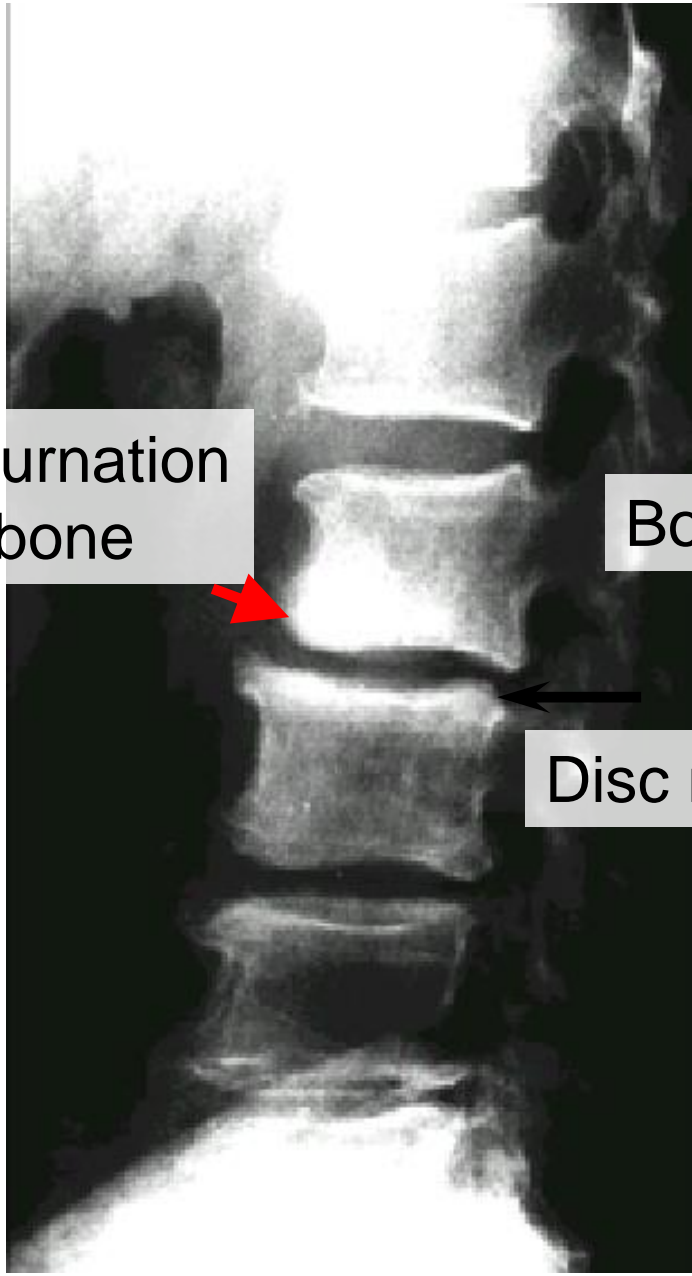
英文名稱： Spondylosis

中文名稱： 退化性脊椎炎

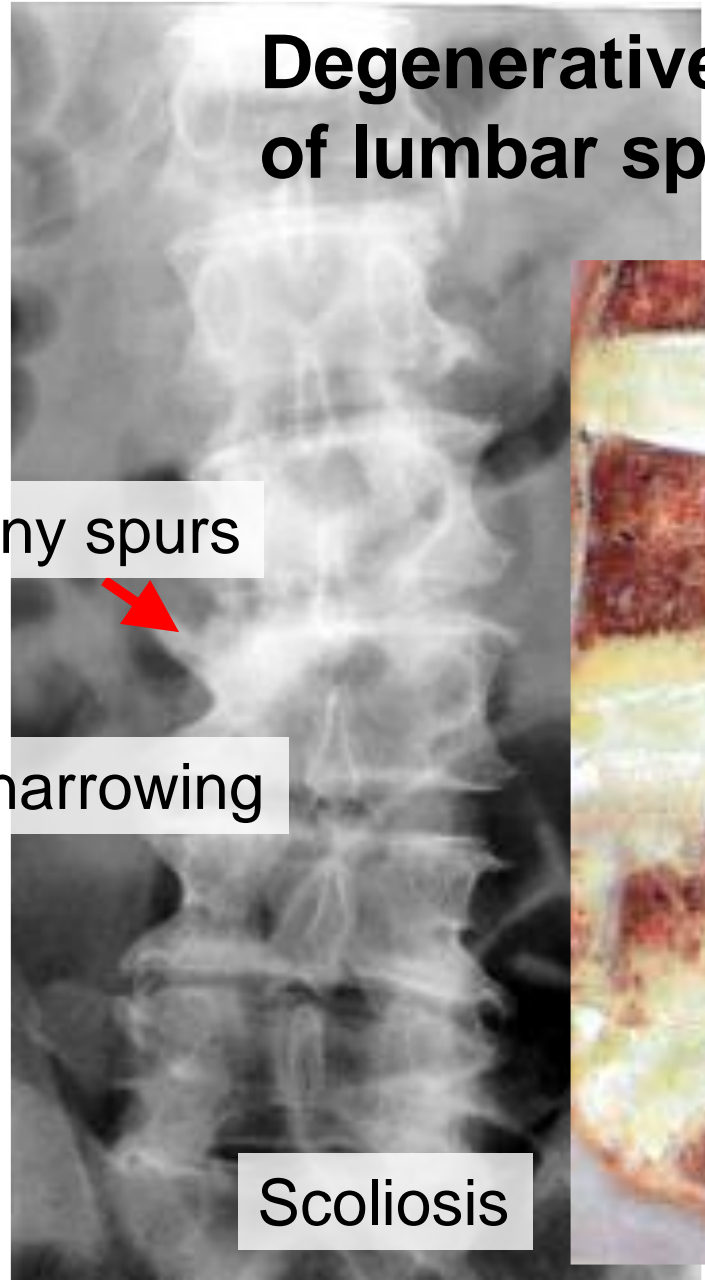
名詞解釋： 椎關節病變和退化性椎間盤疾患指的是椎間盤磨損和撕裂的變化導致脊椎管狹窄(spinal canal stenosis) 現象，這脊椎管狹窄現象會壓迫到神經成分而使神經功能受干擾，我們幾乎所有人都會有，只是程度上的差別；大於四十歲的人都會有這個問題。

Degenerative spondylosis of lumbar spine

Eburnation of bone



Bony spurs



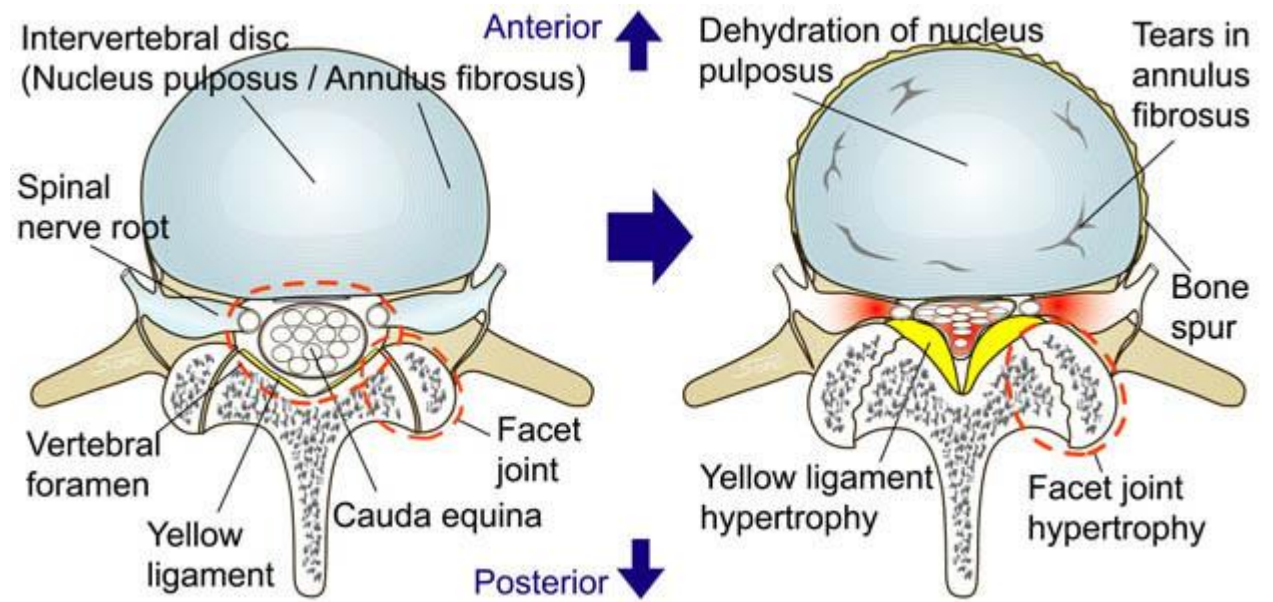
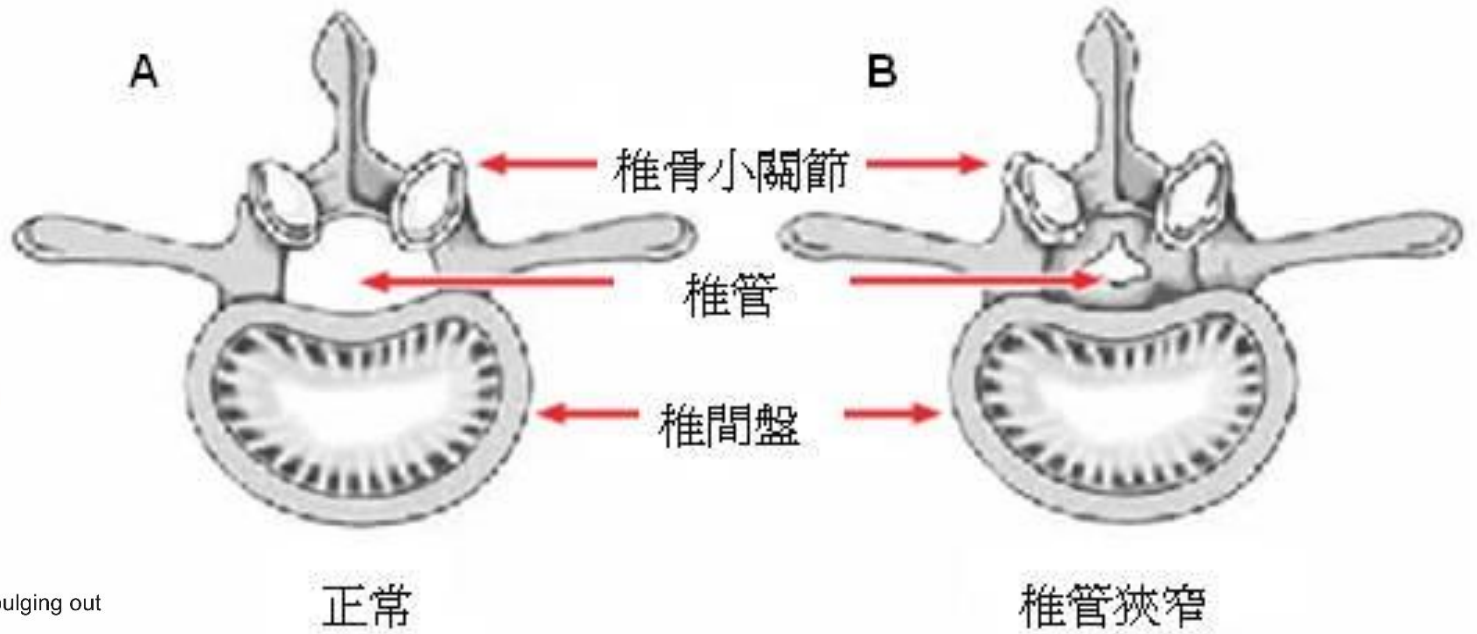
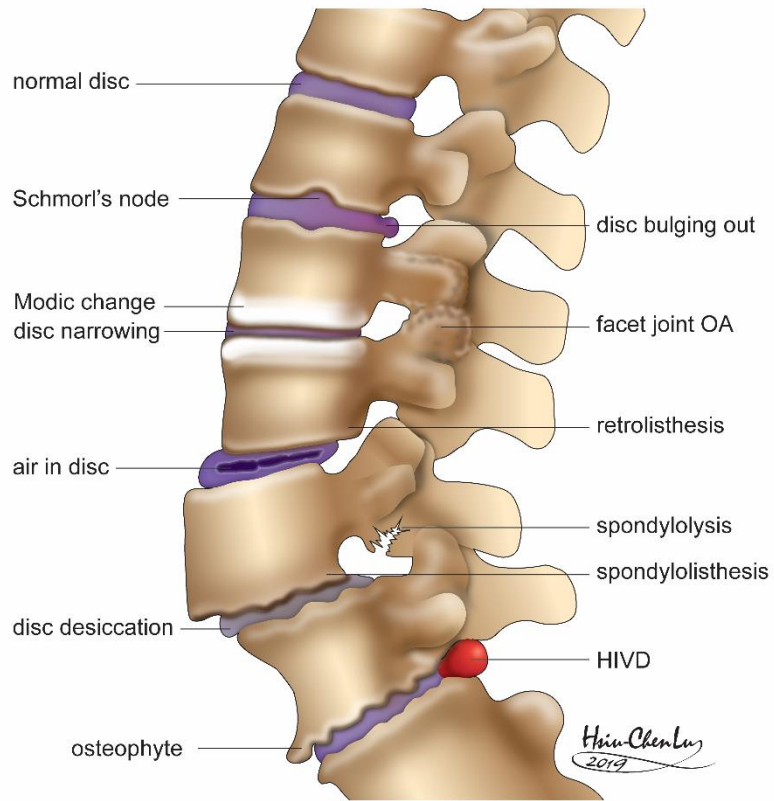
Disc narrowing

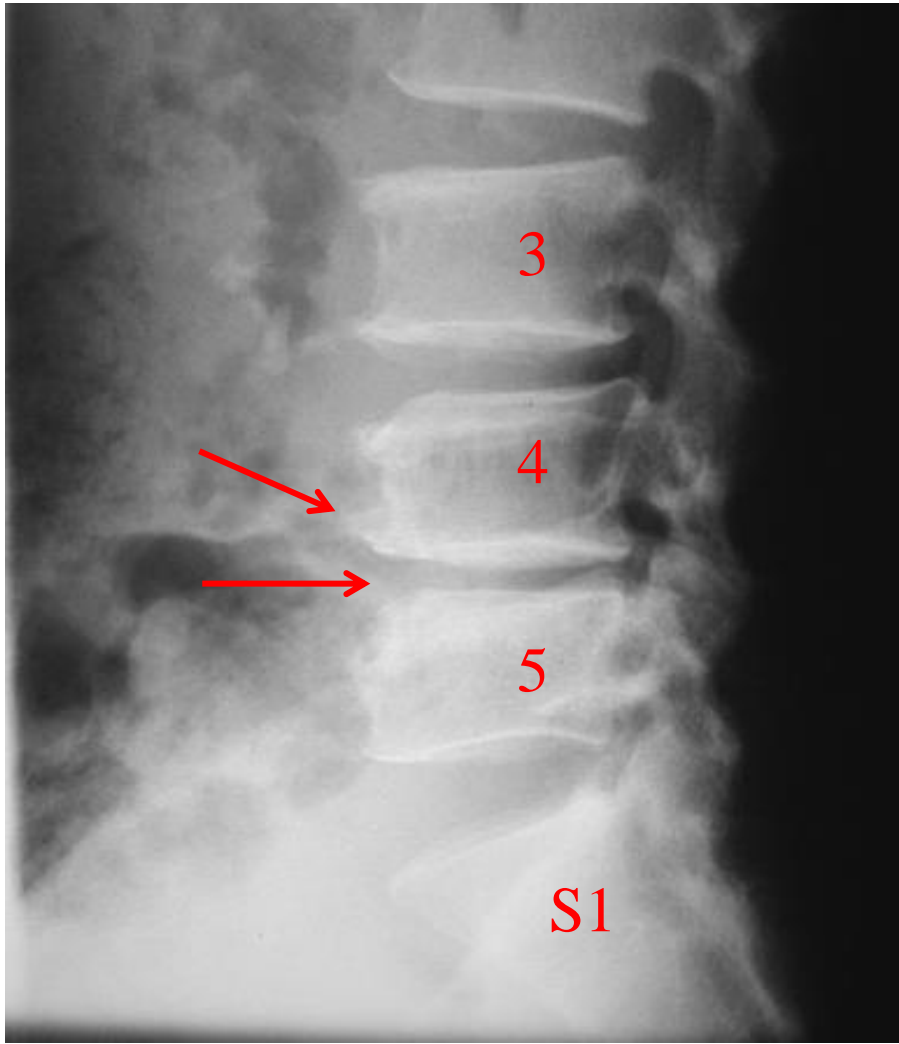
Scoliosis

Bulging disc

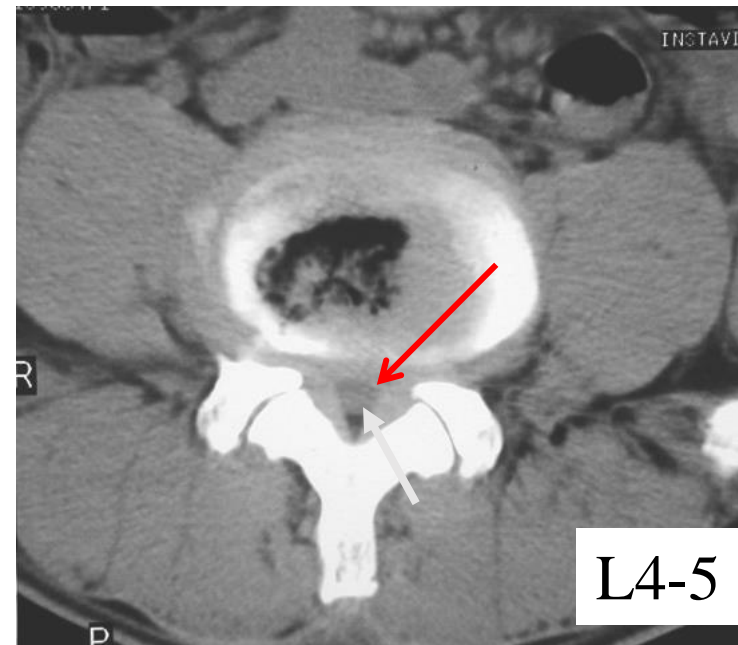
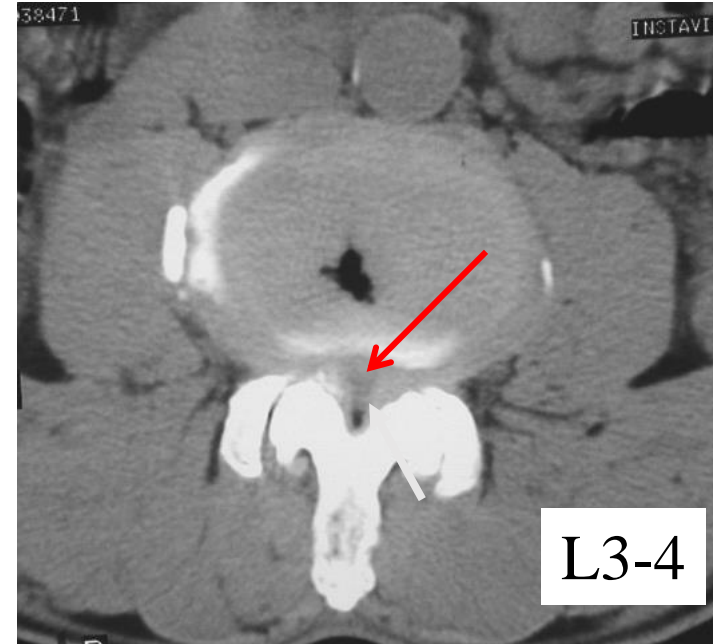
Spinal canal stenosis

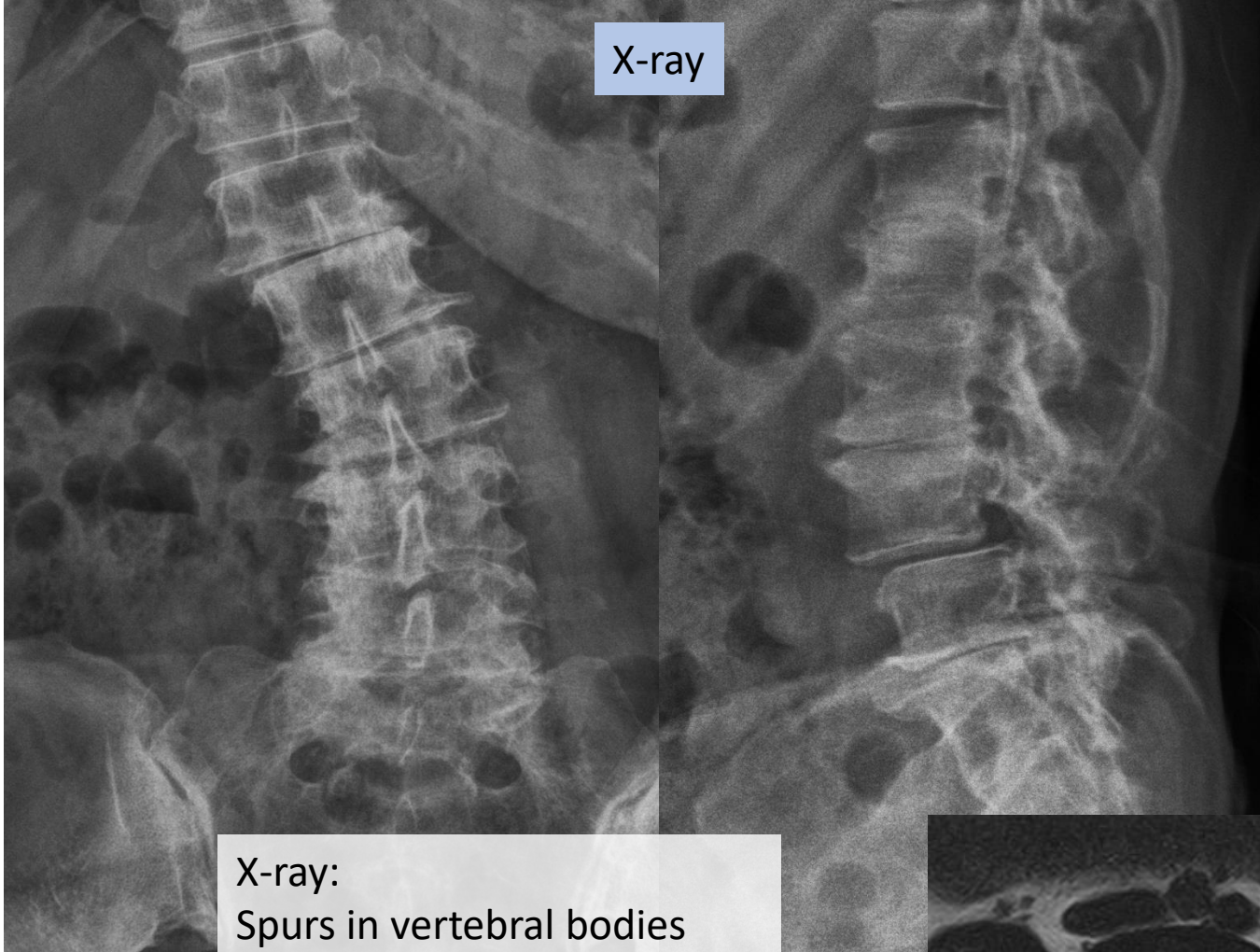






L-spine: degenerative spondylosis with spurs, narrowing of disc of L4-5. Degenerative disc with bulging out and vacuum; DJD of bil. facet joints, causing spinal canal stenosis.





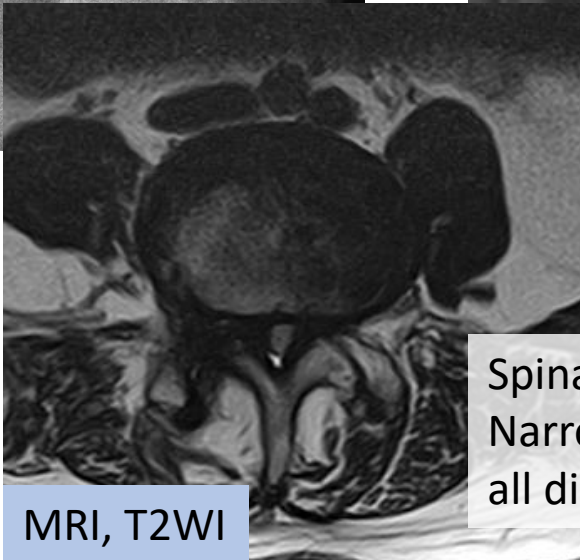
X-ray

X-ray:
Spurs in vertebral bodies
Scoliosis of L-spine
Narrowing of disc spaces
Spondylolisthesis of L4 on L5

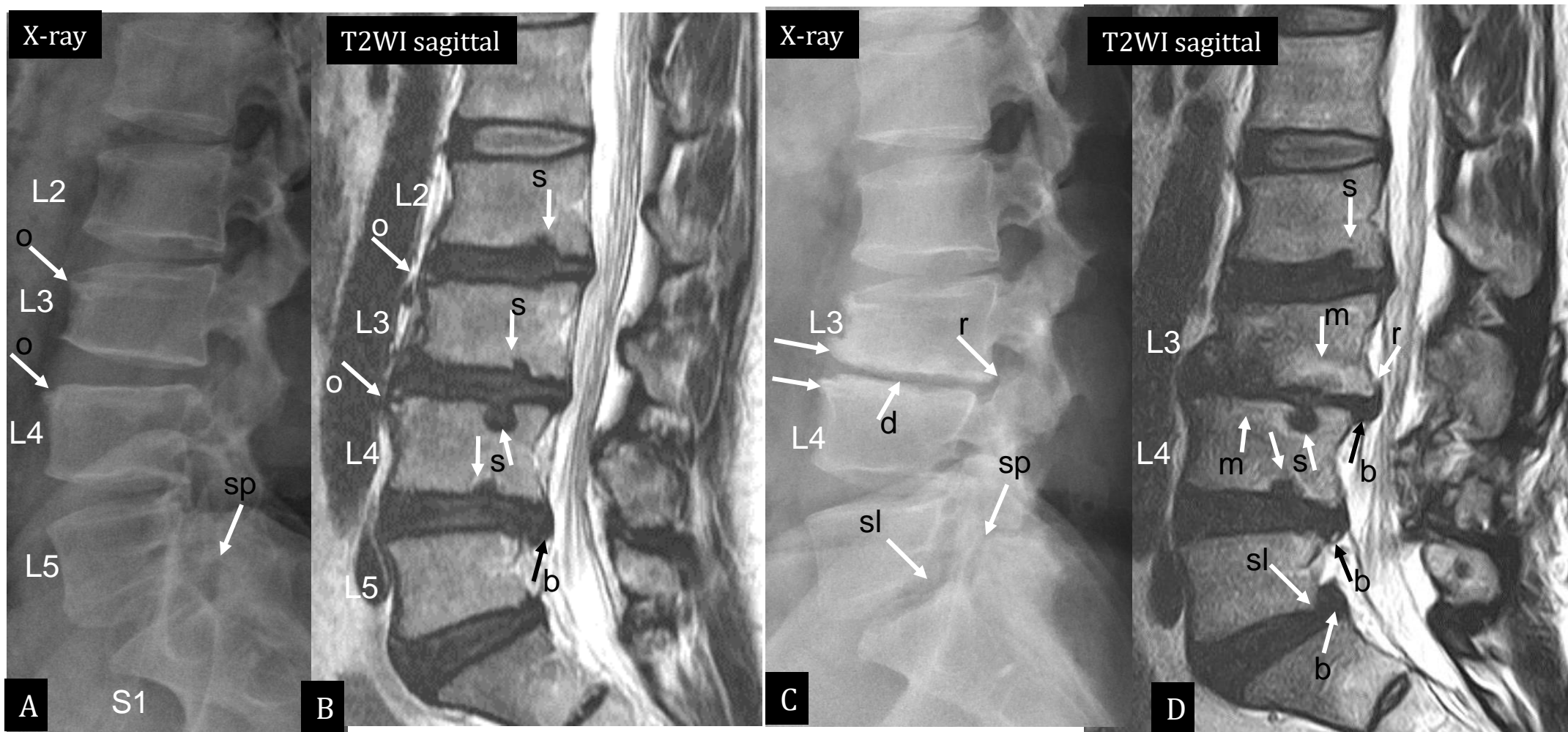
F/62
Severe degenerative spondylosis with
spinal canal stenosis



Spinal canal stenosis in L4-5
Narrowing and bulging out of
all discs



MRI, T2WI



男/53，腰椎退化，十年之間的變化

Degeneration spondylosis可能自年輕就開始，而且變化緩慢。此53歲男性長年有腰酸背痛的困擾，偶爾sciatica。

(A) 43歲時X-ray，可見L3、4前緣長小骨刺(o)，L5有spondylolysis (sp)。

(B) 同時間MRI多看出L2、3、4之endplates有Schmorl's nodes(s)。除L1-2 disc較亮之外，其餘discs都稍暗，表示水分減少，L4-5 disc bulging out (b)。

(C) 10年後53歲，X-ray: 最明顯的變化是L3-4 disc變得很矮(d)，骨刺稍微變大，L3對L4有輕微retrolisthesis(r)，L5 spondylolysis更明顯(sp)，L5對S1有輕微滑脫 spondylolisthesis(sl)。

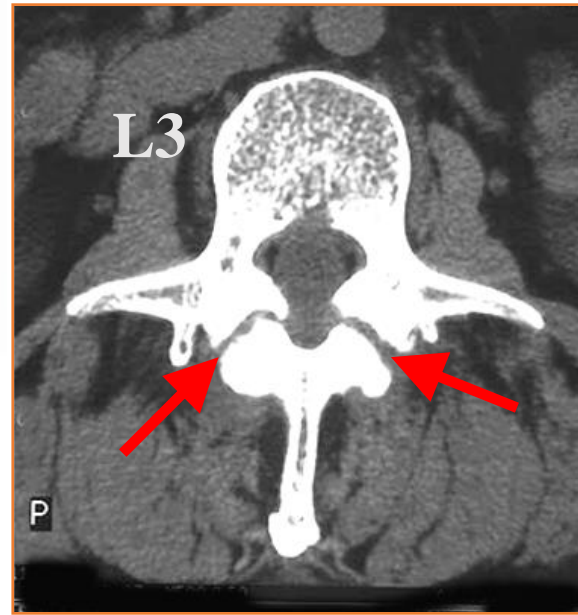
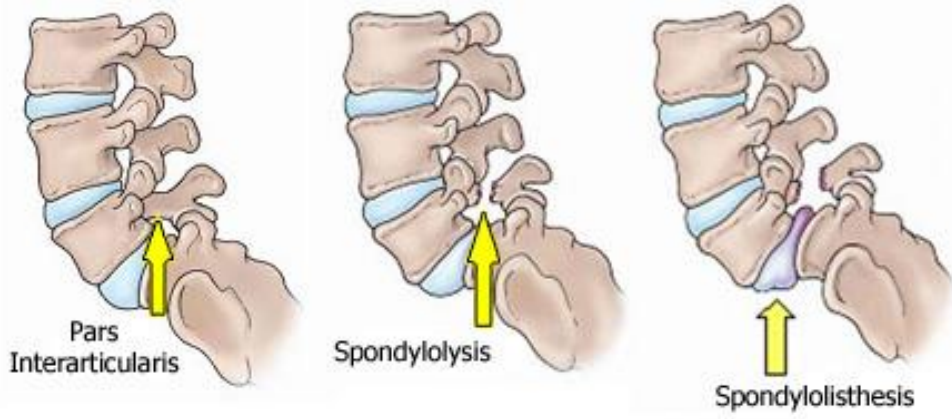
(D)同時間MRI多看到L3,4 endplates有 Modic II退化(m)，L3-4 disc更矮且bulging out(b)，L5-S1 spondylolisthesis(sl)及 disc bulging(b)。Schmorl's nodes (s)沒有變化。



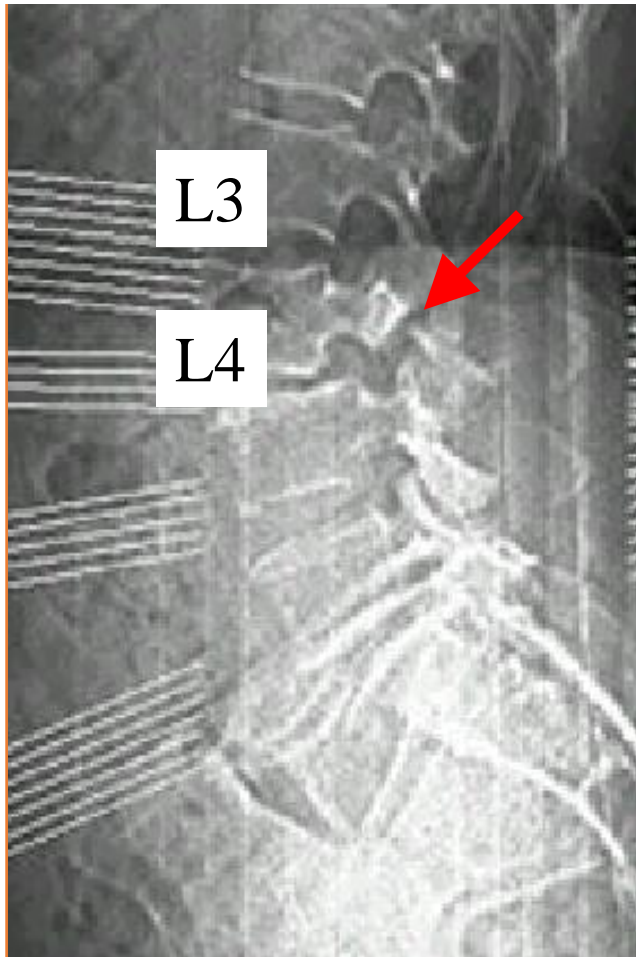
2023/3/7 66 y/o

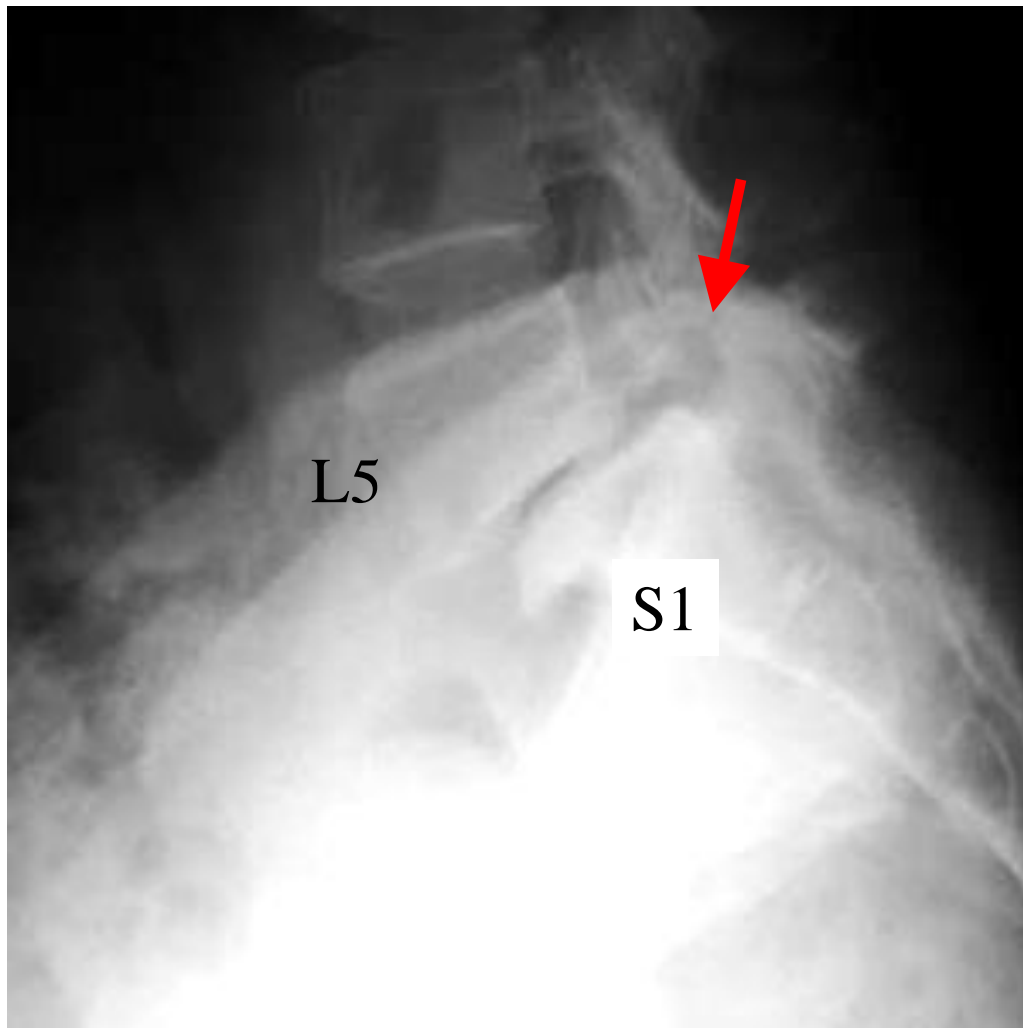


2013/11/3 56 y/o

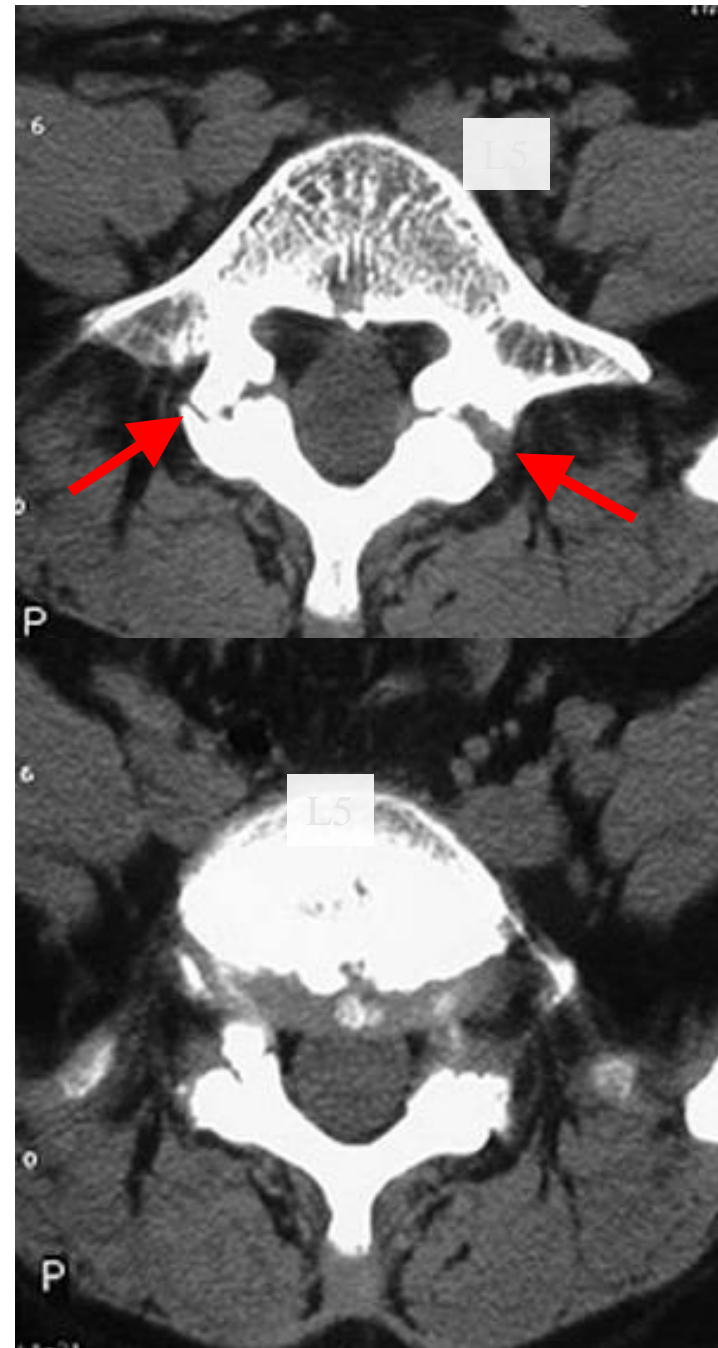


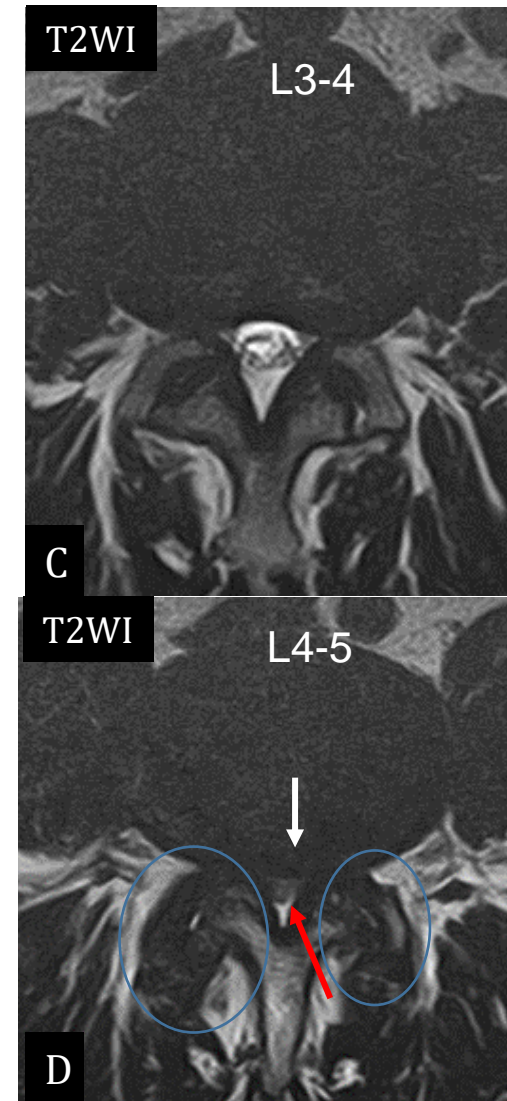
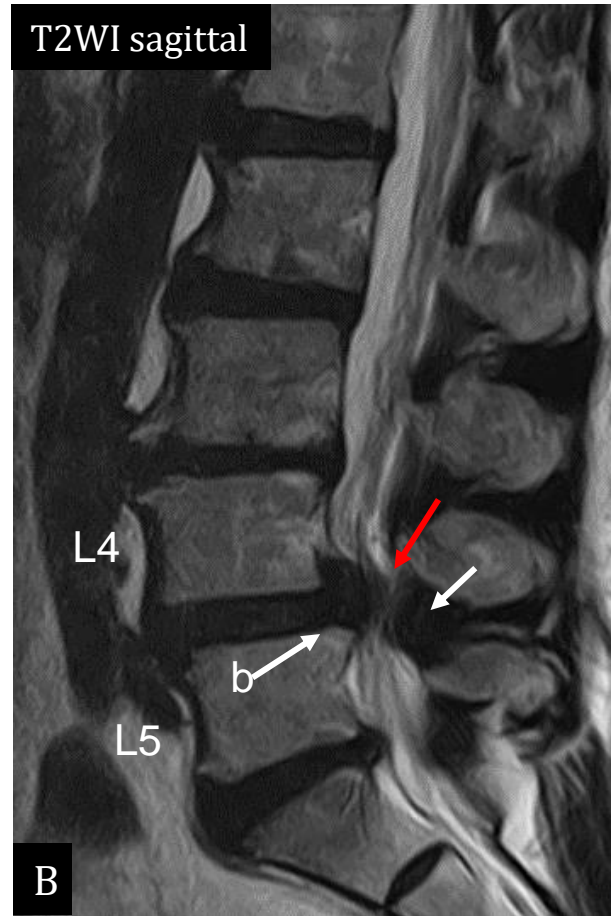
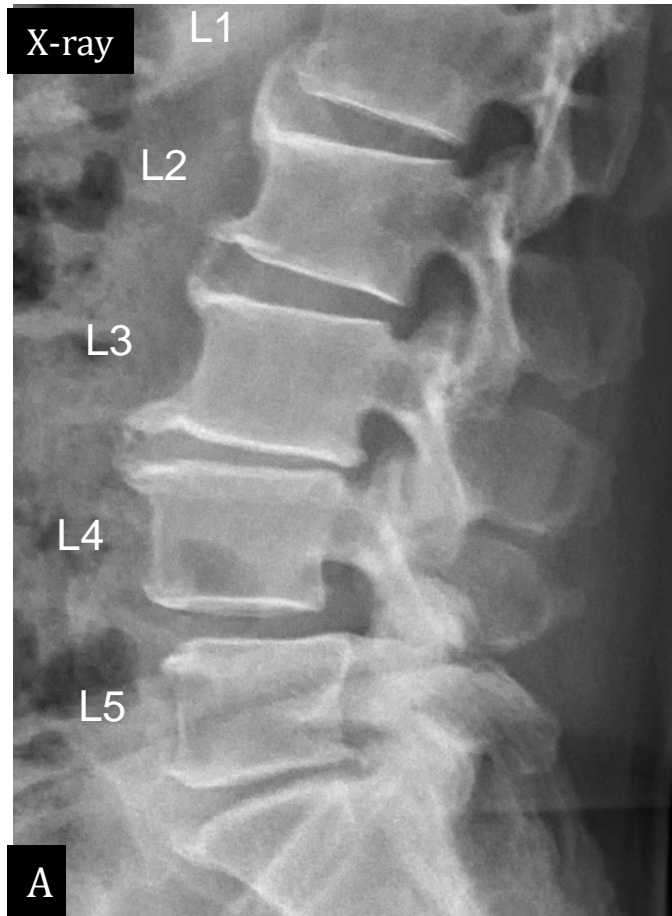
Spondylolysis of lamina of L3 with spondylolisthesis of L3 on L4





F/45
Spondylolysis of L5 causing spondylolisthesis
of L5 on S1



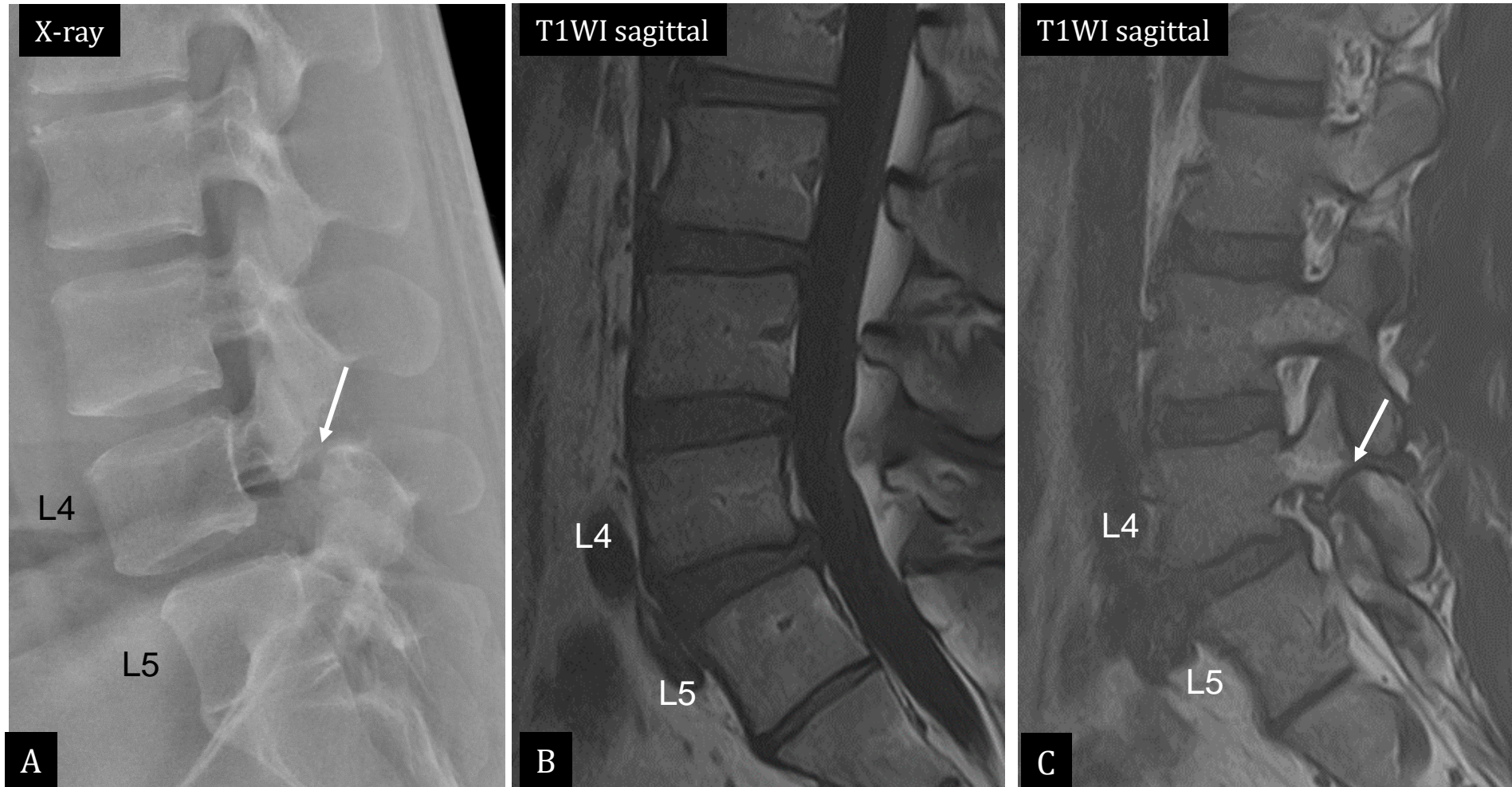


男/63 嚴重脊椎腔狹窄

(A) X-ray可見腰椎每一節都長骨刺，L3-4及L5-S1，椎間盤空間變矮，

(B) L4-5滑脫(spondylolisthesis)，表示腰椎退化(degenerative spondylosis)。X光無法看到脊椎腔情況。

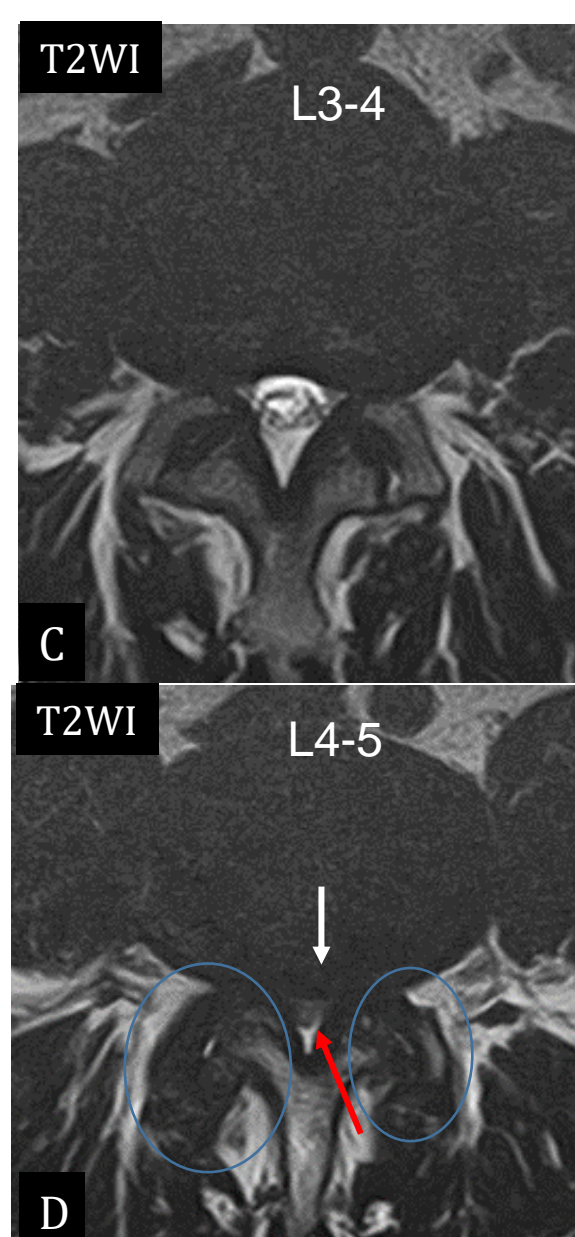
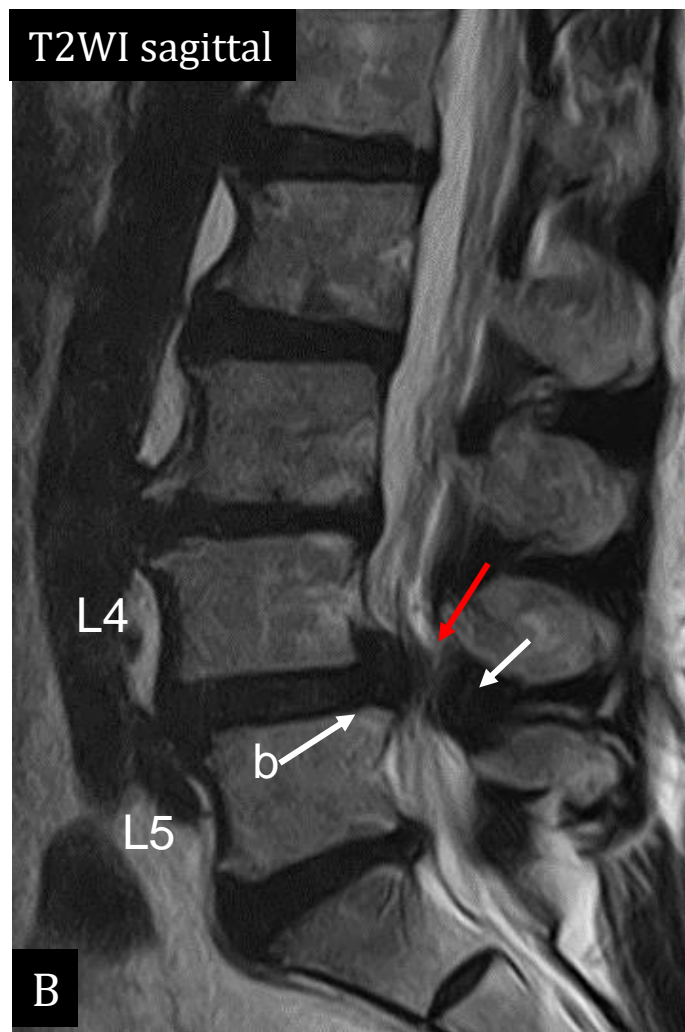
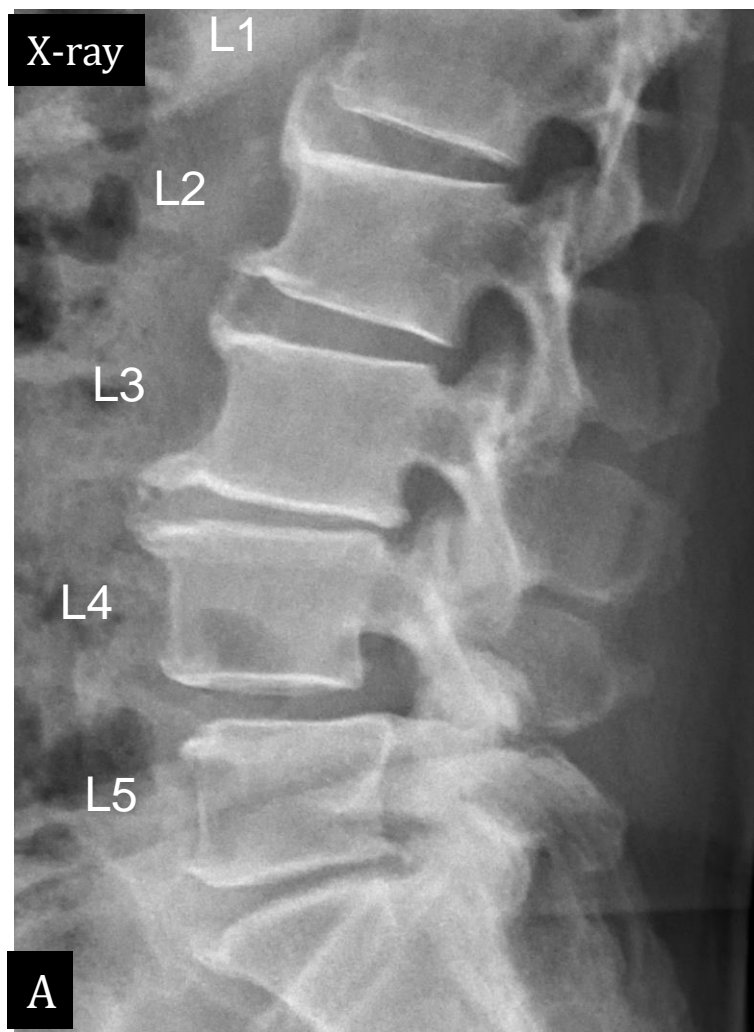
(B-D) MRI可見L4-5脊椎腔嚴重狹窄(spinal canal severe stenosis)(red arrow)，乃因disc膨出(b: bulging out)，雙側小面關節退化長骨刺且肥厚(circles)，以及L4-5滑脫所共同造成的。



男/30，椎弓斷裂 (spondylolysis)

(A) X-ray可見L4的下關節突(inferior articular process)有斷裂(white arrow)，這稱為spondylolysis，L4-5輕微滑脫(spondylolisthesis)。

(B,C) MRI,T1WI可見spondylolysis (white arrow)。



男/63 嚴重脊椎腔狹窄

(A) X-ray可見腰椎每一節都長骨刺，L3-4及L5-S1，椎間盤空間變矮，L4-5滑脫(spondylolisthesis)，表示腰椎退化(degenerative spondylosis)。X光無法看到脊椎腔情況。

(B-D) MRI可見L4-5脊椎腔嚴重狹窄(spinal canal severe stenosis) (red arrow)，乃因disc膨出(b. bulging out)，雙側小面關節退化長骨刺且肥厚(circles)，以及L4-5滑脫所共同造成的。

全民寫作

■沈戊忠（台中榮總神經放射科醫師）

四種年齡

聯合副刊

我正忙著工作，護士帶來一位女士，說病患頗為腰痛所苦，問能否提早做電腦斷層檢查？我看申請單上描述的是位五十五歲病人，就對著這位打扮得很得體、看起來四十出頭的女士說：「好，請馬上去帶妳婆婆來檢查。」「是我自己啦，什麼我婆婆！我有這麼年輕嗎？」意外被誤認年輕十多歲的喜悅笑容掩過她原來病痛的愁苦。

檢查完後，我看了X光片，心裡暗自驚訝，一個五十五歲的人，腰椎怎麼會退化到像七十歲呢？骨頭長出許多骨刺，椎間盤乾燥而膨出，脊椎腔因而狹窄壓迫神經，難怪病患經年腰痠背痛。

眼前這位外貌與實際年齡、骨頭年齡都不一致的女士問我該怎麼辦？我勸說再去看看復健科醫師，適當的物理治療應該可以改善症狀。同時勸她多運動，保持愉快的心情。畢竟，實際年齡會增長，骨頭會退化，外貌也難長久維護，唯有努力保持心理年齡的年輕最有助於健康。

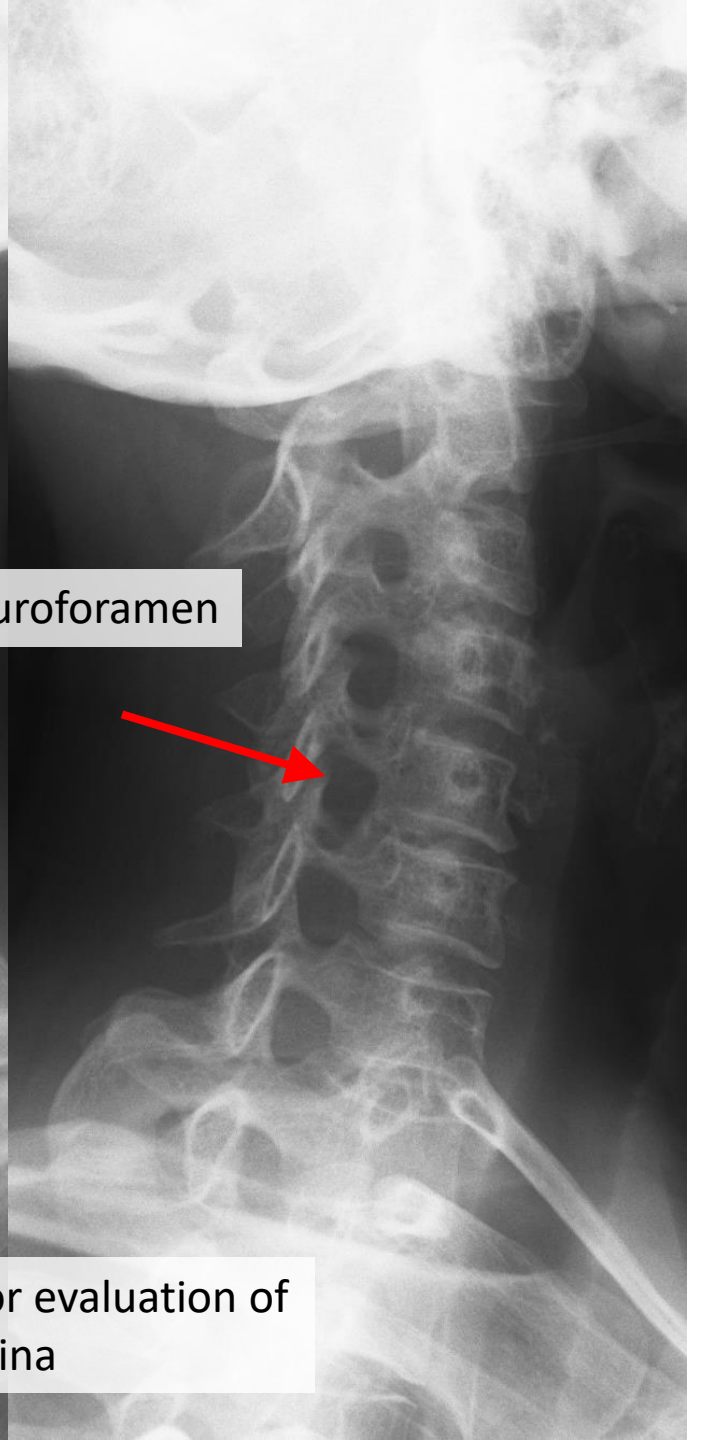
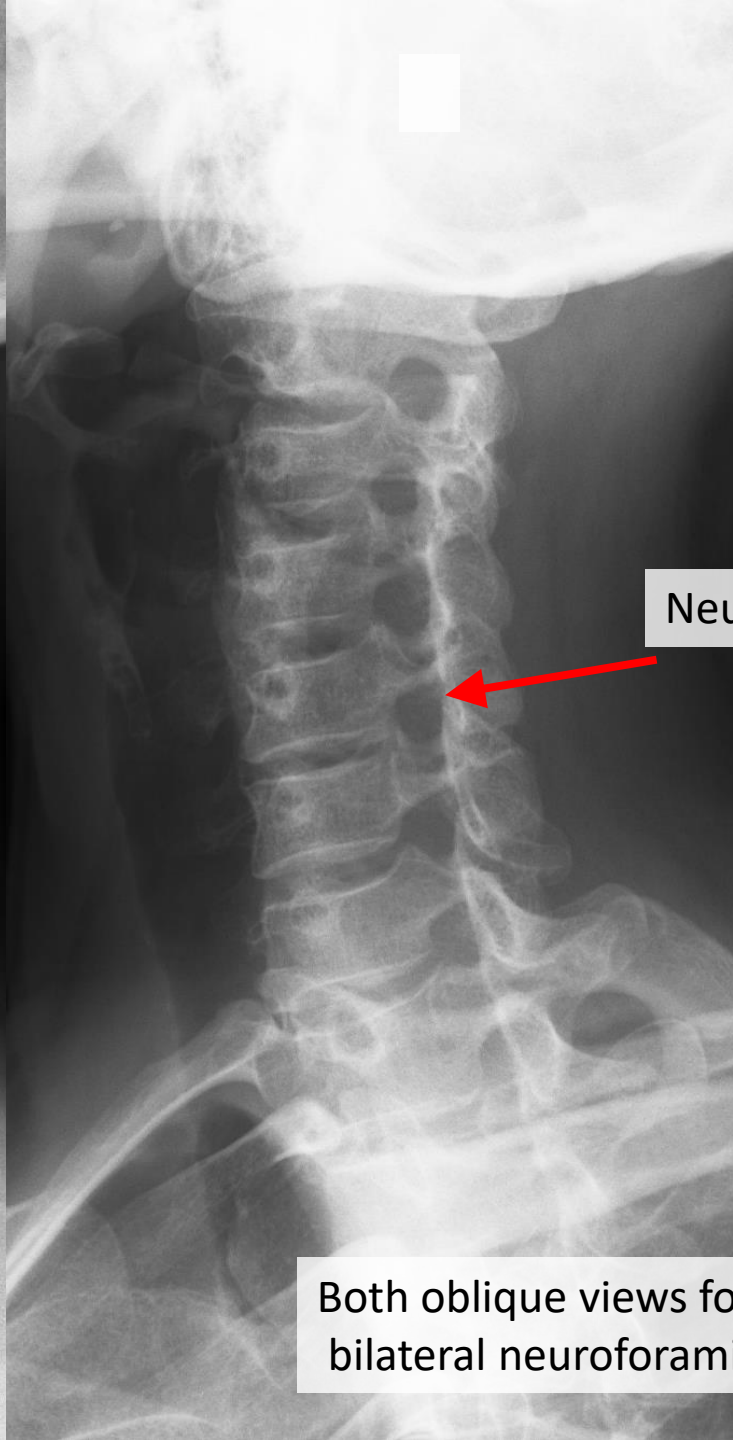
重點：

- Normal lumbar spine anatomy, and X-ray, CT, MRI images
- Lumbar HIVD, CT and MRI images
- Lumbar HIVD 好發的那些節? 症狀?
- 腰椎退化(degenerative spondylosis) 包含
vertebral body, disc, facet joint, X-ray, CT, MRI 的判讀
- 腰椎退化(degenerative spondylosis) 引起的臨床症狀
- Spinal canal stenosis 的意義
- Spondylolysis, spondylolisthesis 的意義



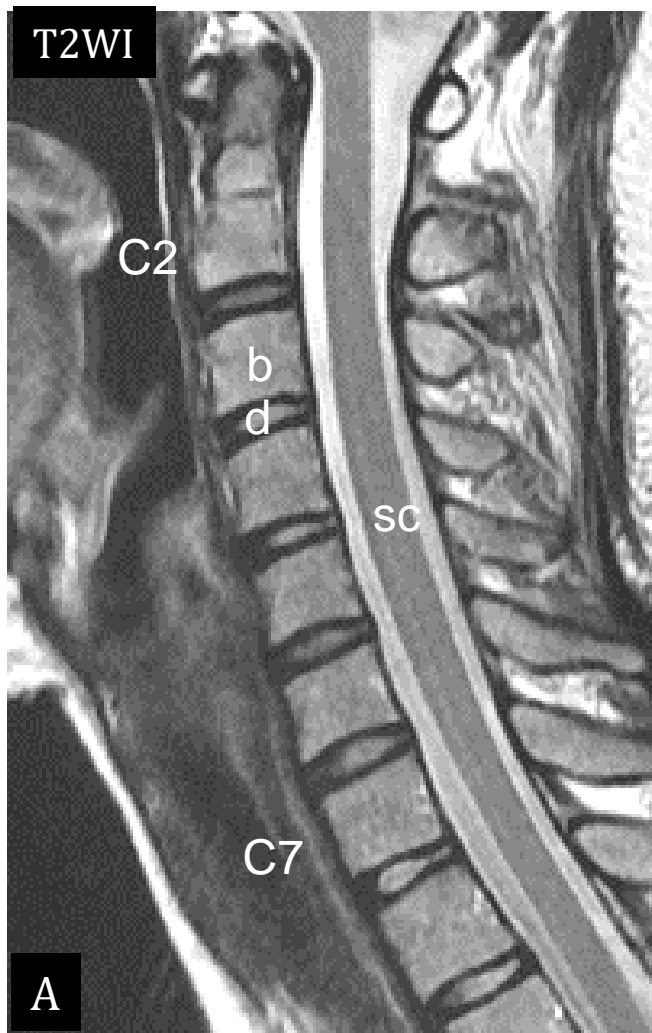
2. Cervical HIVD & spondylosis



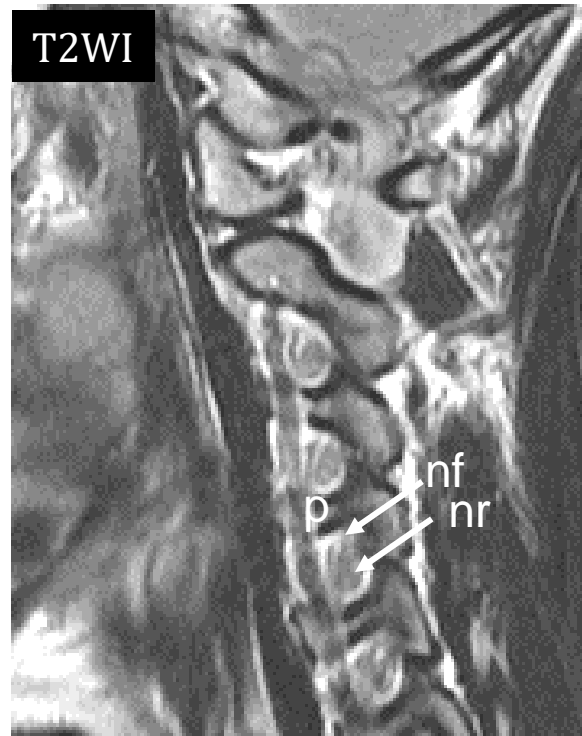


Neuroforamen

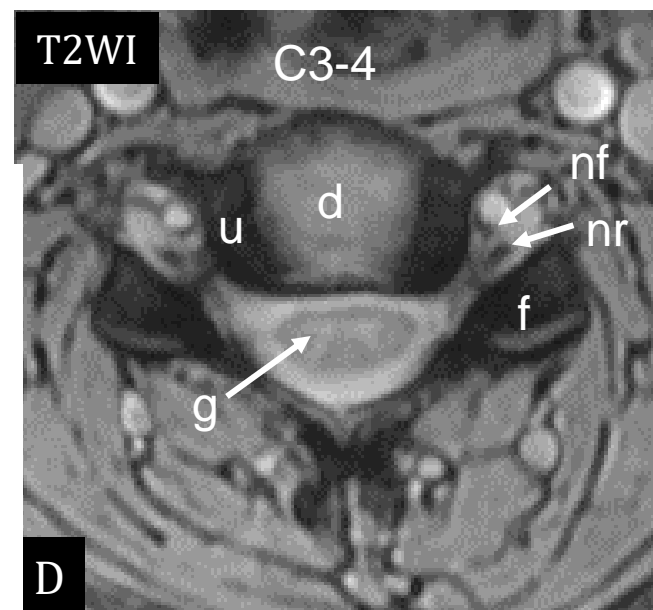
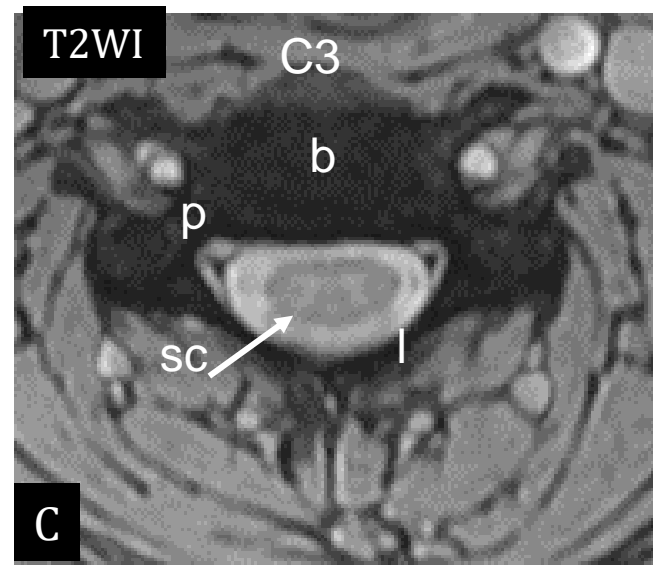
Both oblique views for evaluation of bilateral neuroforamina



410454



正常頸椎之 MRI
 b: 脊椎體 C3 vertebral body
 p: 脊椎根 pedicle
 u: 鈎狀突 uncinat process
 d: 椎間盤 C3-4 intervertebral disc
 nf: 神經孔 neuroforamen
 nr: 神經根 nerve root
 f: 小面關節 facet joint
 l: 脊椎板 lamina
 sc: 脊髓 spinal cord.
 g: 脊髓灰質 gray matter of spinal cord



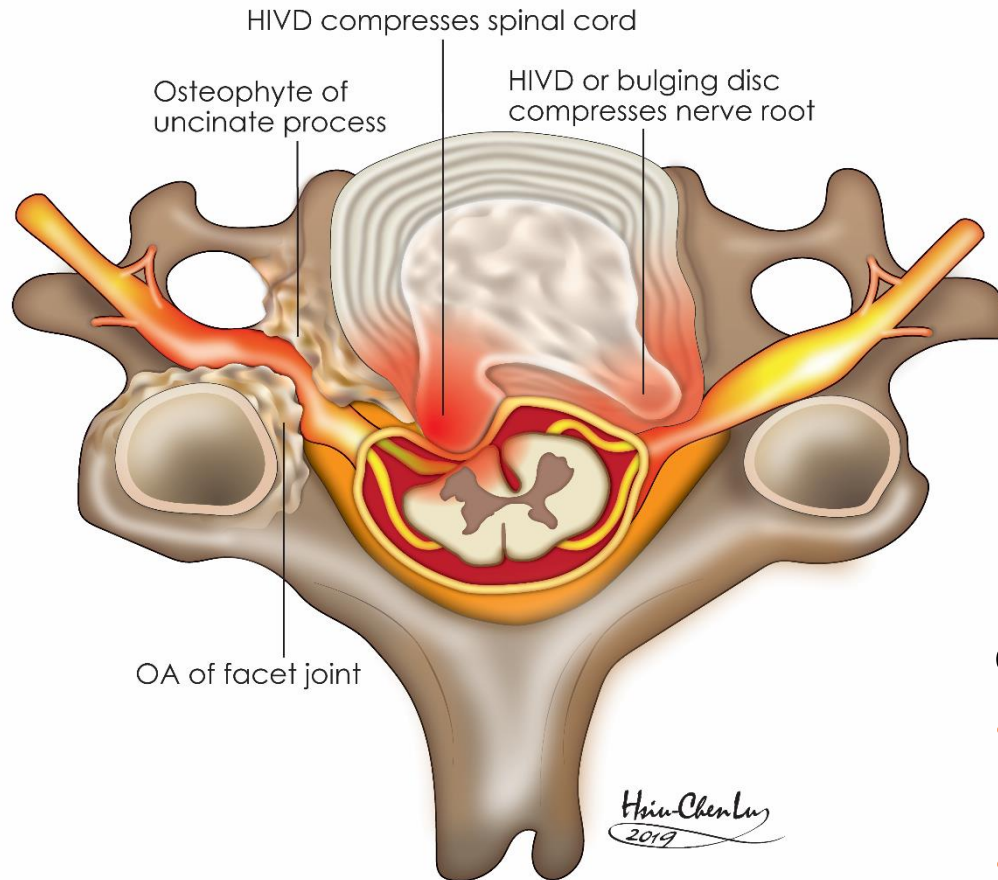
33092148

Cervical degenerative spondylosis

Degeneration of:

- **vertebral bodies....spurs.**
- **disc.....bulging out, HIVD.**
- **facet joints.....spurs, hypertrophy.**
- **ligamentum.....hypertrophy, calcification, ossification.**

Cervical degenerative spondylosis



頸椎神經根病變(cervical radiculopathy)

即神經根受壓迫，發生病因以下列為多：

a. Disc: HIVD或bulging disc，直接壓迫神經根，產生radiculopathy症狀。

b. Facet joint: 發生DJD (degenerative joint disease)，或稱OA(osteoarthritis change)，變肥厚，

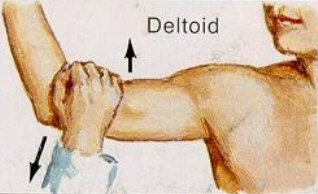

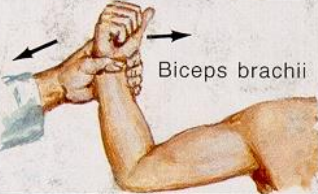


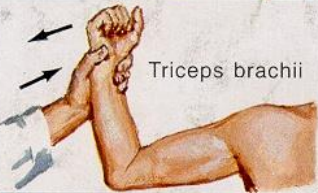





c. Uncinate process: 長骨刺(osteophyte)。

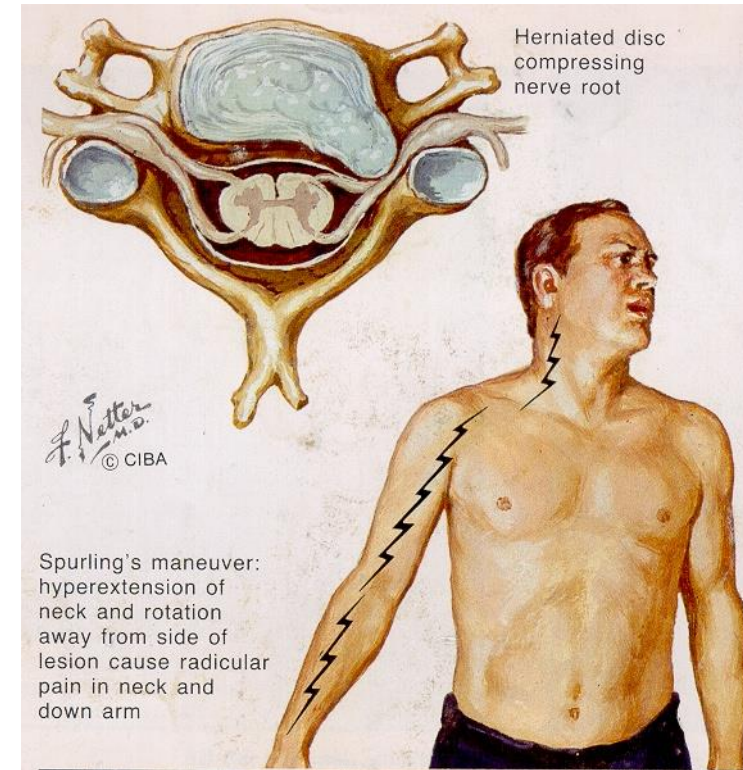
b, c 造成神經孔狹窄(stenosis of neuroforamen)，壓迫神經根，產生 radiculopathy症狀。

causing stenosis of:

- neuroforamen.....radiculopathy (神經根病變)
- spinal canal.....myelopathy (脊髓病變) or radiculomyelopathy (神經根脊髓病變)

Cervical radiculopathy (神經根病變)

Level	Motor signs (weakness)	Reflex signs	Sensory loss
C5	 Deltoid	0	
C6	 Biceps brachii	 Biceps brachii Weak or absent reflex	
C7	 Triceps brachii	 Triceps brachii Weak or absent reflex	
C8	 Interossei	 Horner's syndrome	



causing stenosis of:

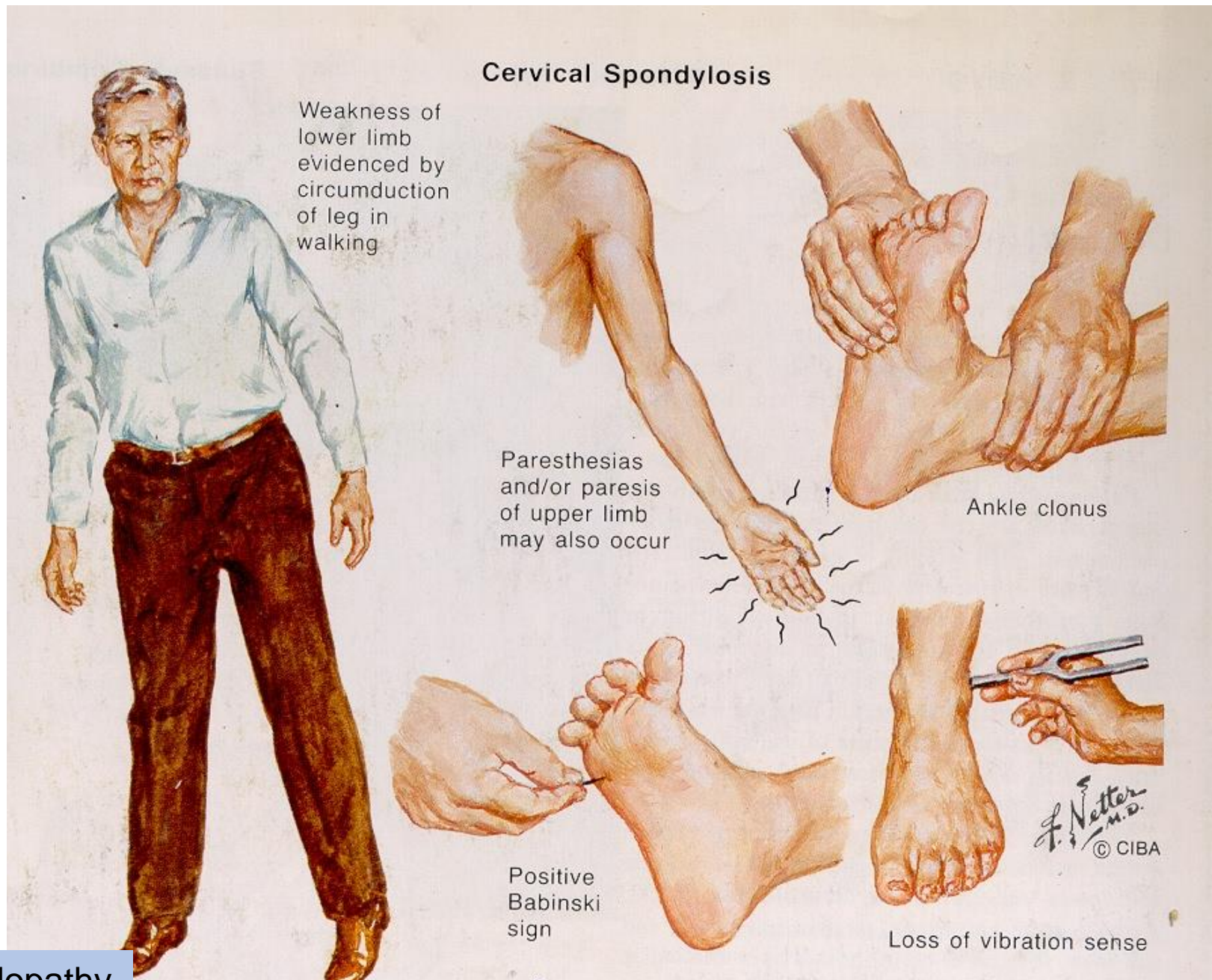
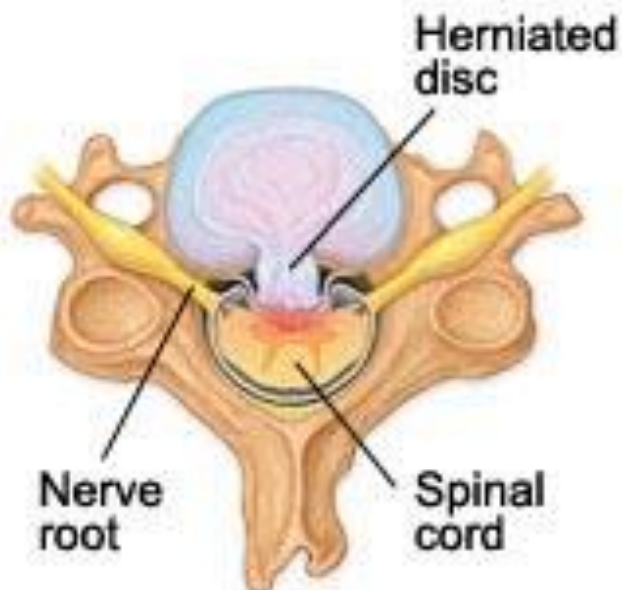
- neuroforamen.....radiculopathy (神經根病變)
- spinal canal.....myelopathy (脊髓病變) or radiculomyelopathy (神經根脊髓病變)

Cervical myelopathy

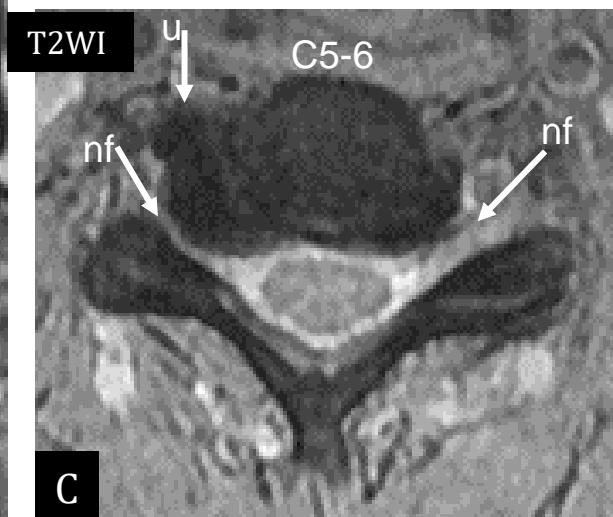
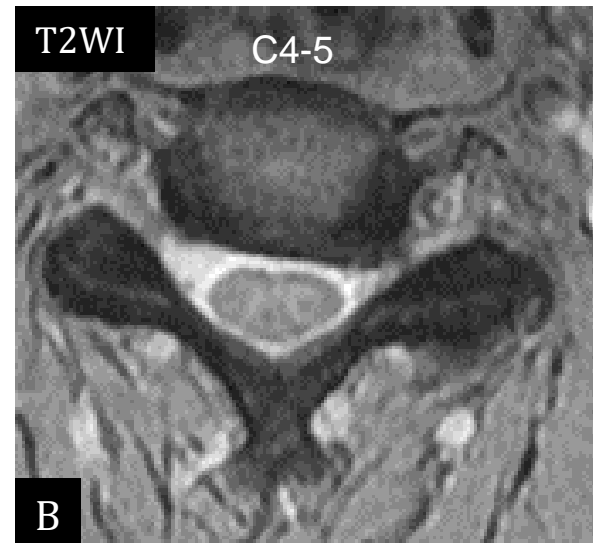
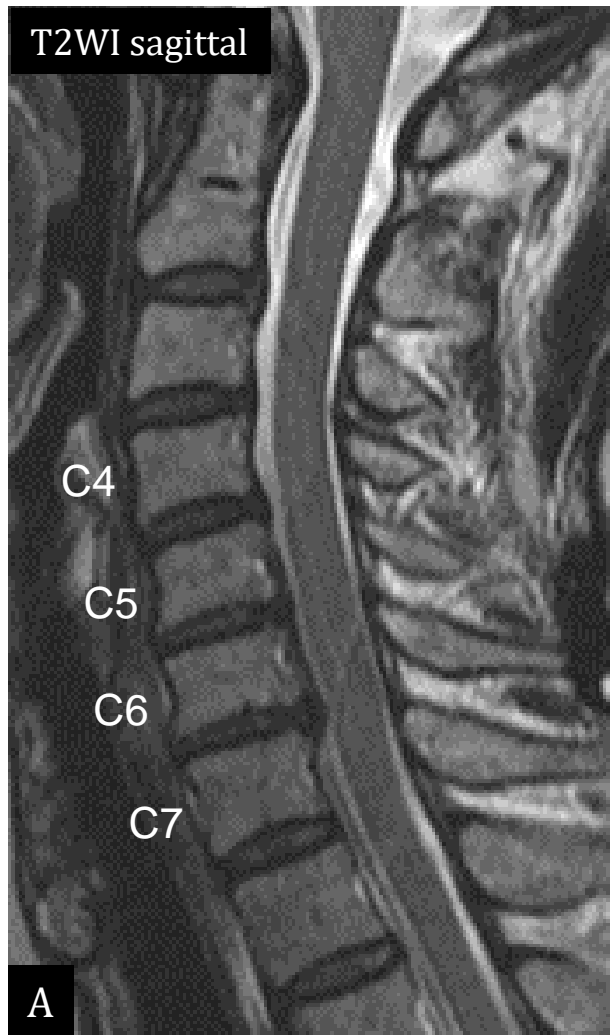
(脊髓病變)

頸椎退化性脊髓病變
(Cervical Spondylotic Myelopathy, 簡稱CSM)

spasticity



Posterior-central HIVD-----myelopathy



女/61，uncinated process骨刺引起 neuroforamen狹窄。

右手痠麻。

(A)T2WI, sagittal只見C5-6、C6-7之 discs 稍矮、C6-7 disc 稍膨出。

(B)C4-5正常。

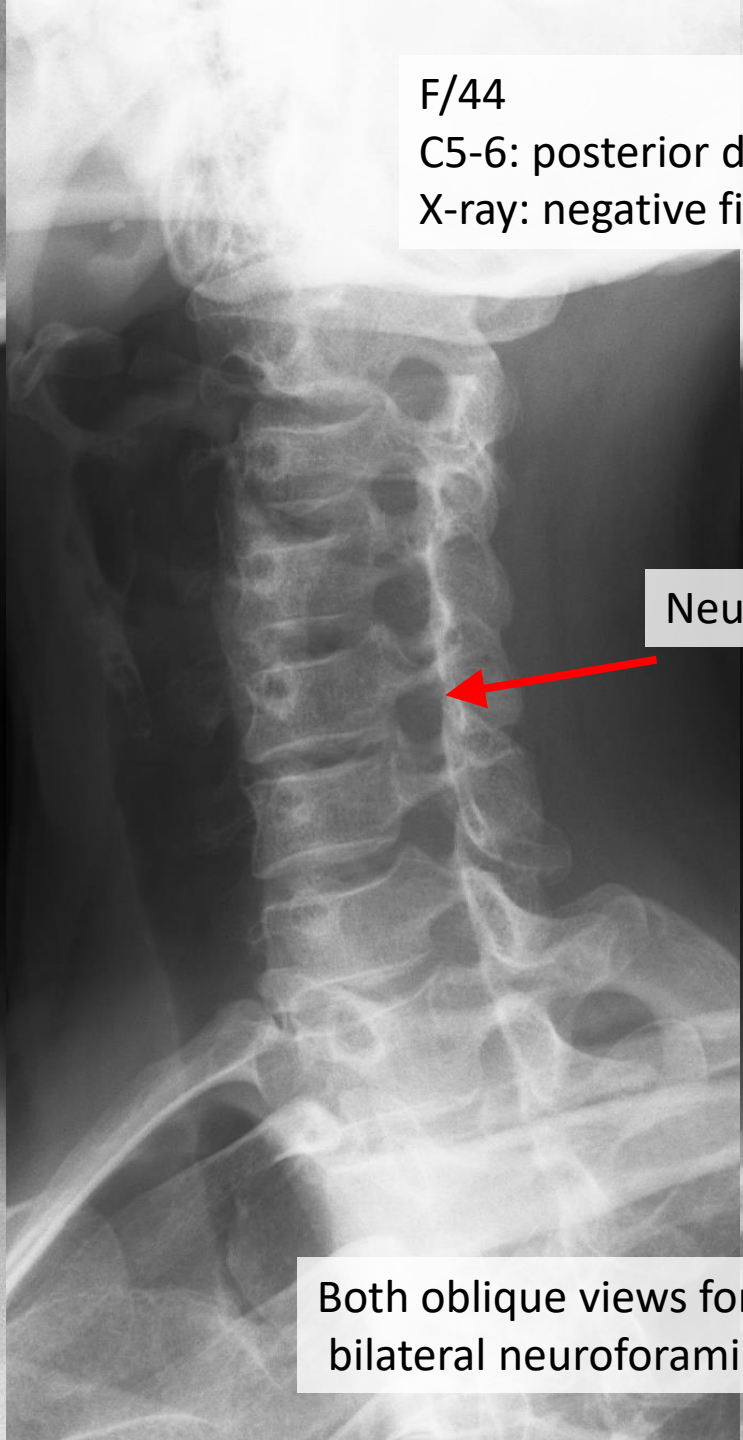
(C)C5-6: C6右側uncinated process長骨刺(u)，引起neuroforamen(nf)狹窄，壓迫C5神經。



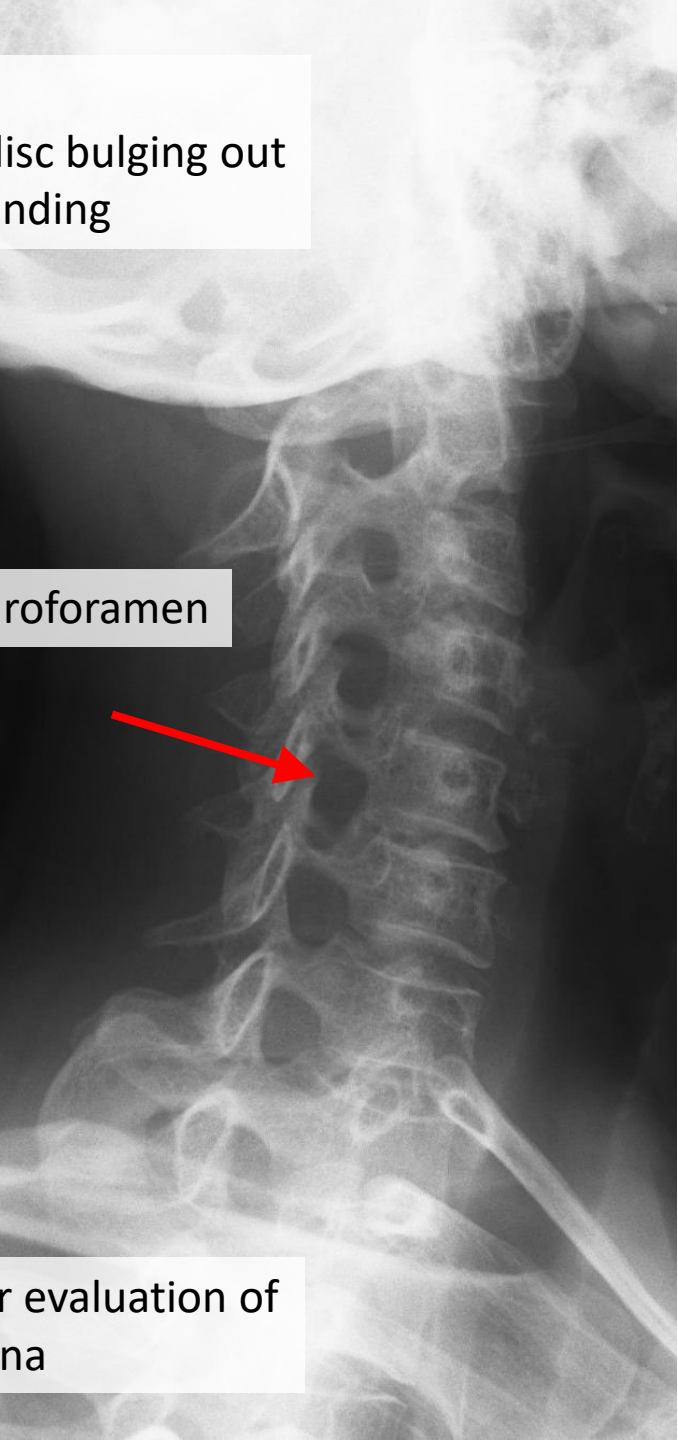
F/44

C5-6: posterior disc bulging out

X-ray: negative finding

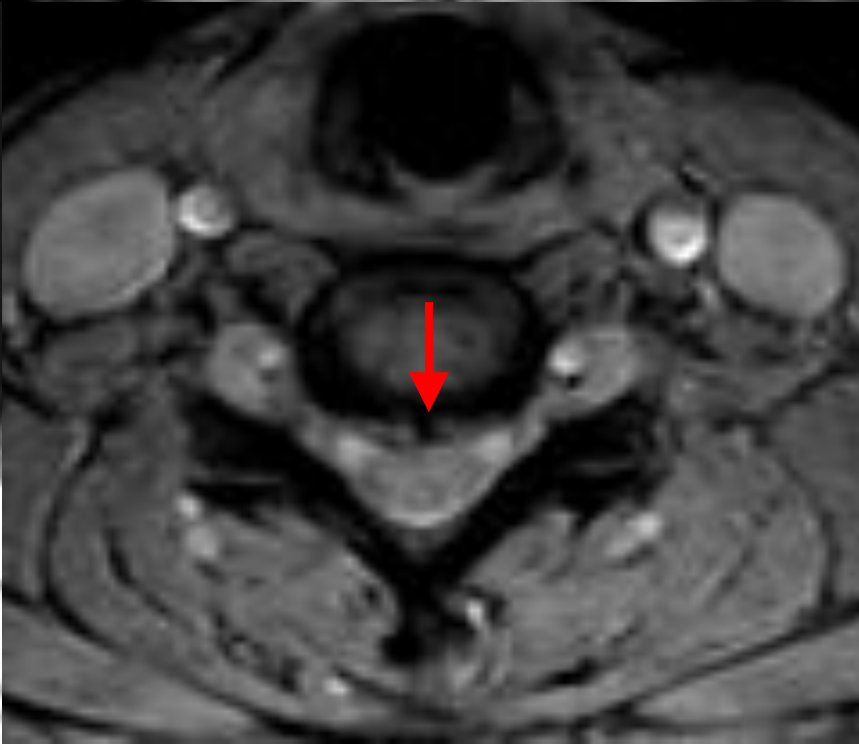


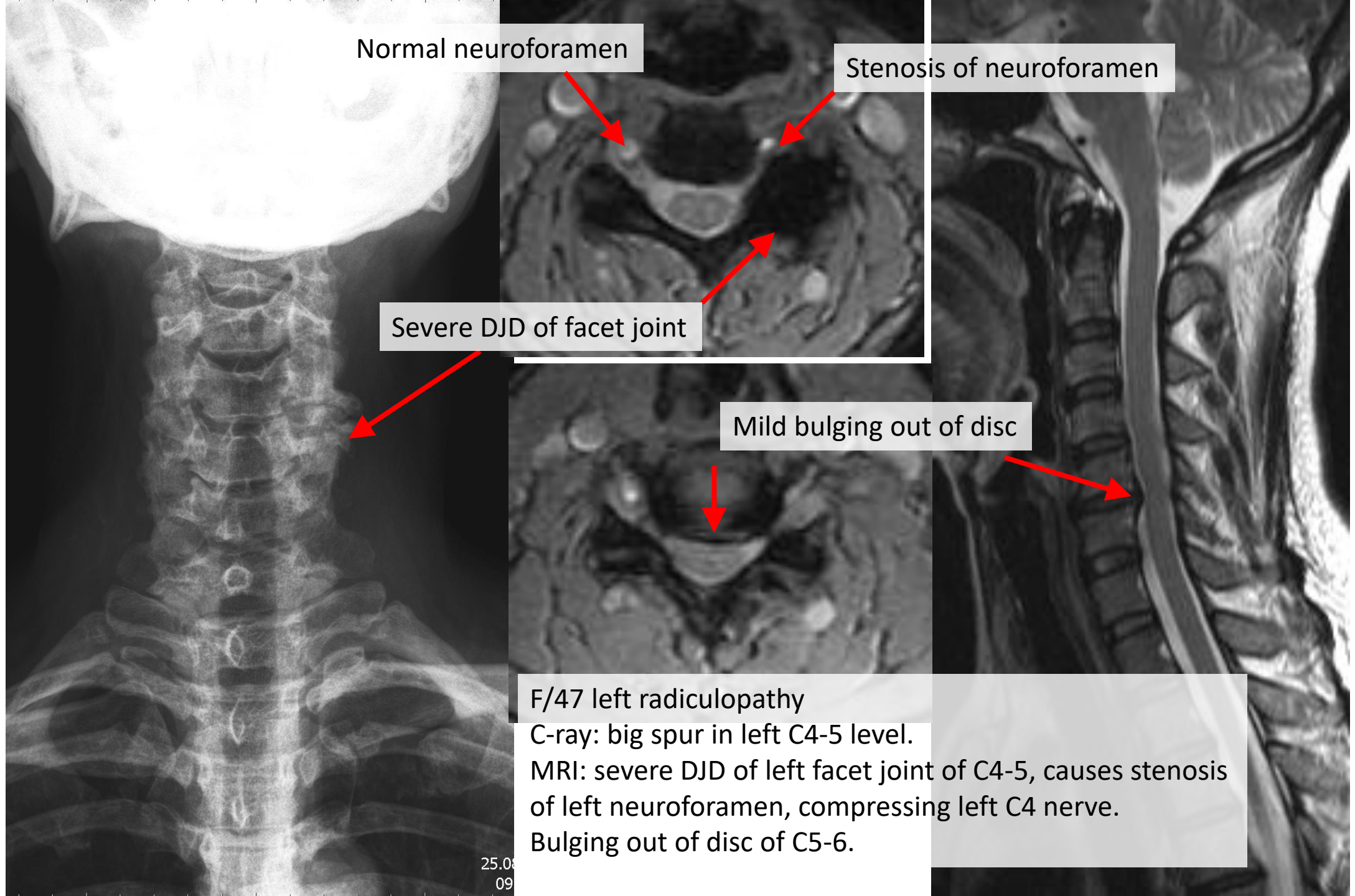
Neuroforamen



Both oblique views for evaluation of bilateral neuroforamina

F/44
C5-6: posterior disc bulging out





Normal neuroforamen

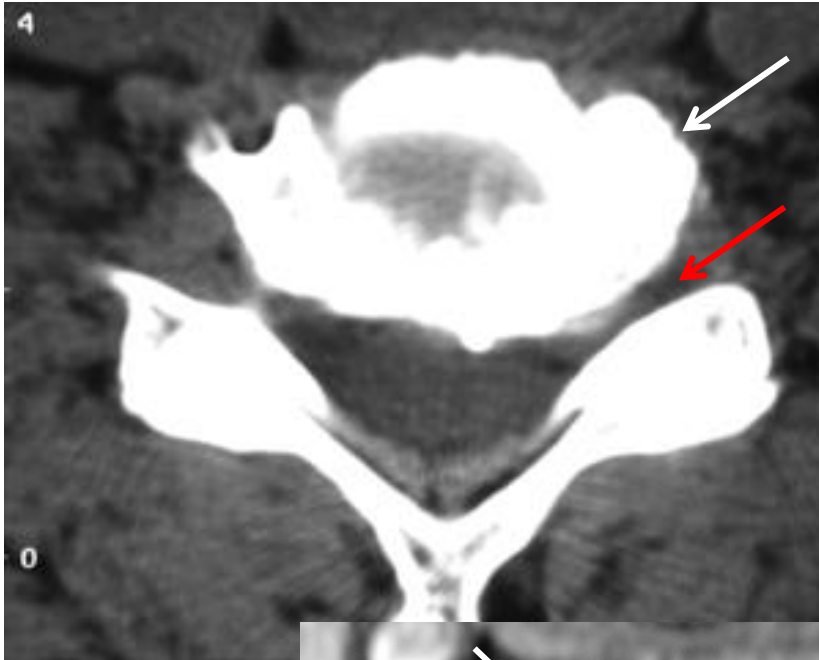
Stenosis of neuroforamen

Severe DJD of facet joint

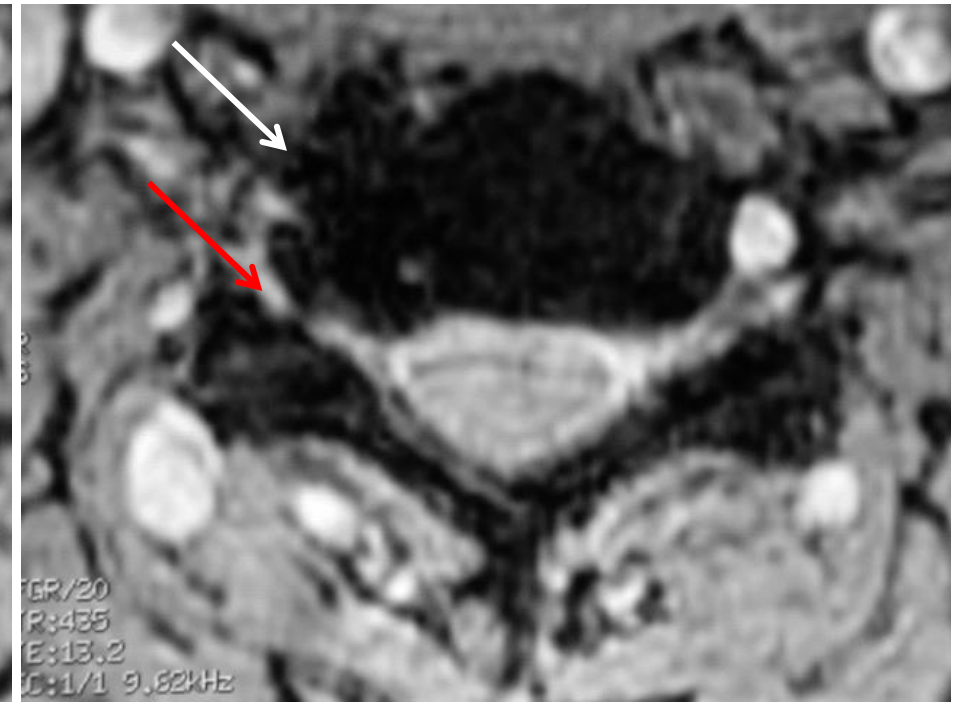
Mild bulging out of disc

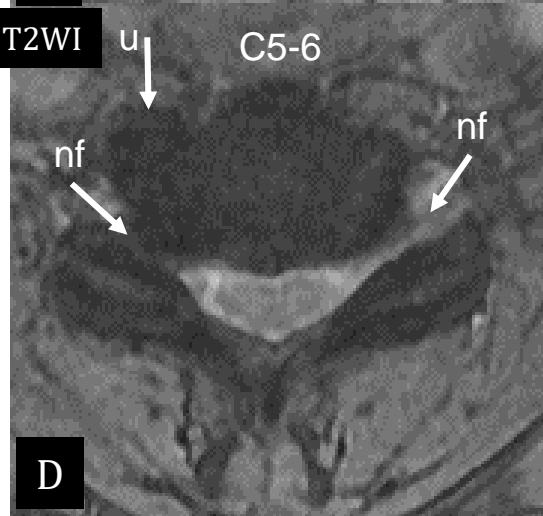
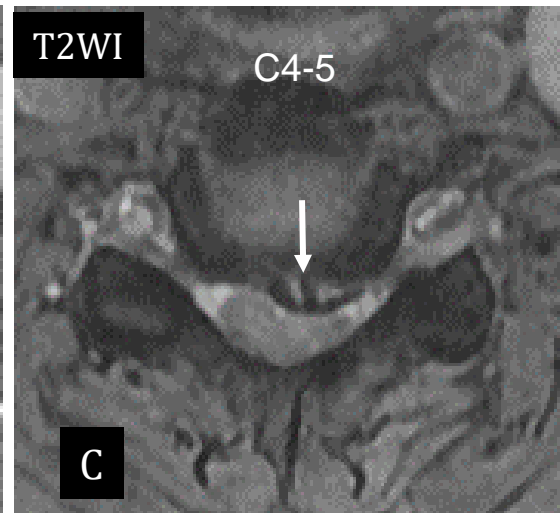
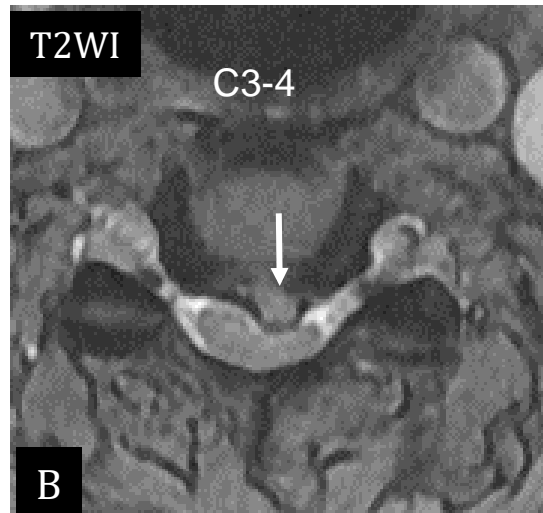
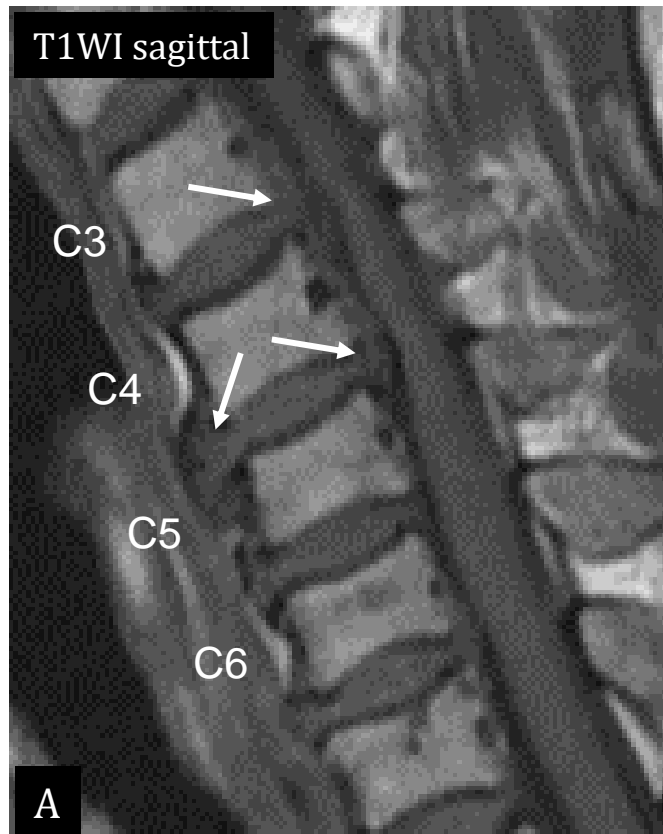
F/47 left radiculopathy
C-ray: big spur in left C4-5 level.
MRI: severe DJD of left facet joint of C4-5, causes stenosis of left neuroforamen, compressing left C4 nerve.
Bulging out of disc of C5-6.

Cervical radiculopathy



Stenosis of the neuroforamen,
due to bony spur from the
uncinate process





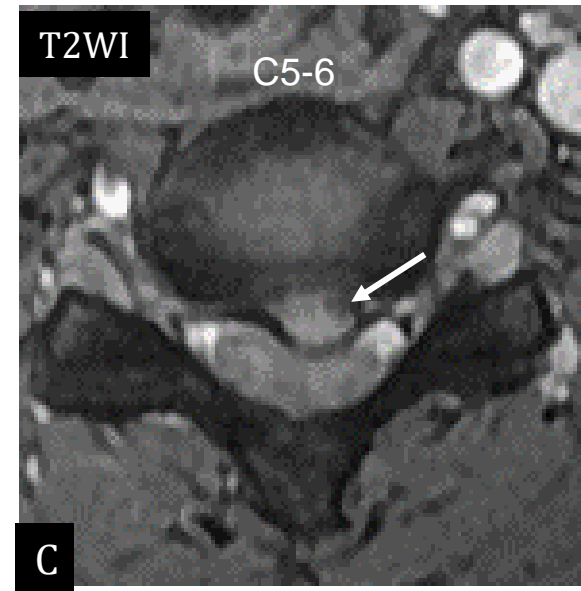
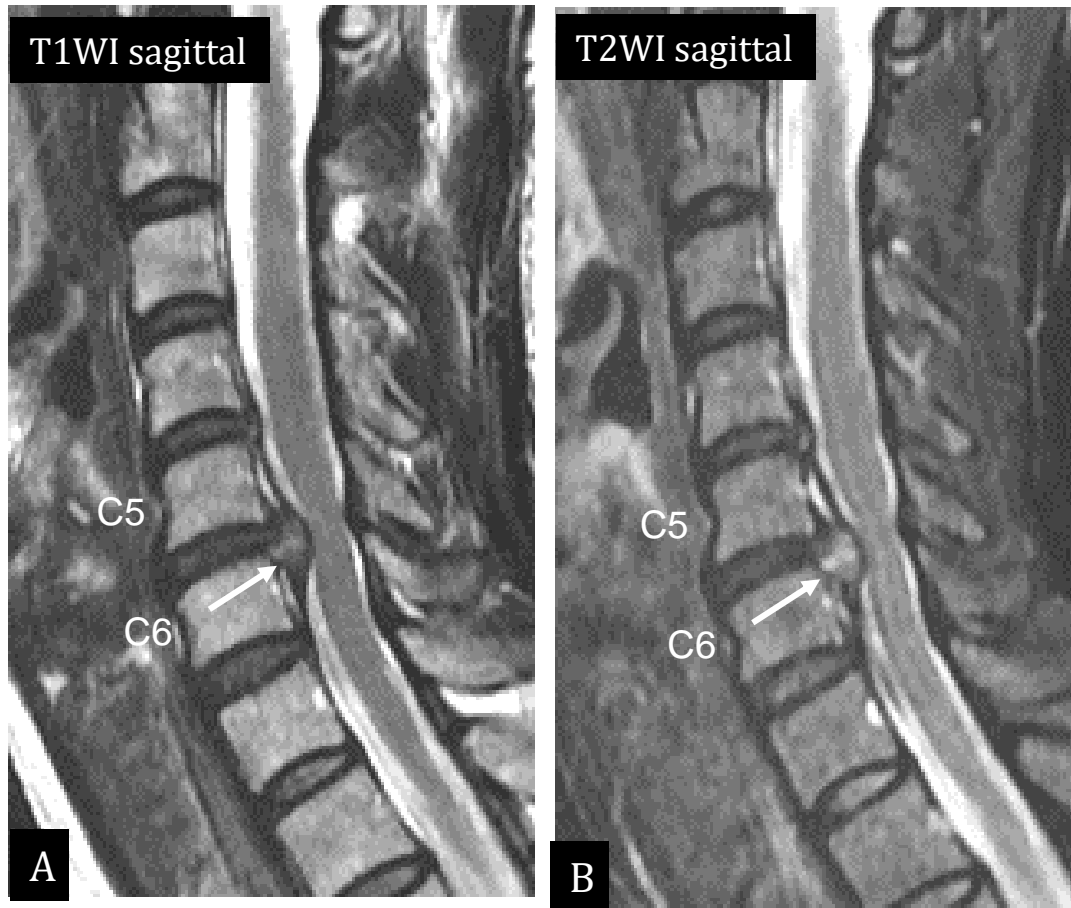
女/71，HIVD及骨刺

左右手皆痠麻

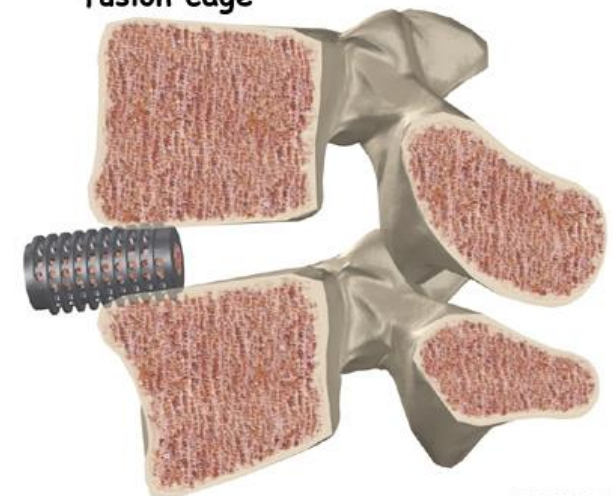
(A) T1WI, sagittal: 可見C3-4 disc往後突出 (arrow)，C4-5往前往後突出 (arrows)。

(B,C) T2 WI, axial: C3-4、C4-5 左後有HIVD (arrows)，壓迫左側C4、5 nerve roots及 spinal cord。C3-4 HIVD 很明確是核仁擠出 (extrusion)。

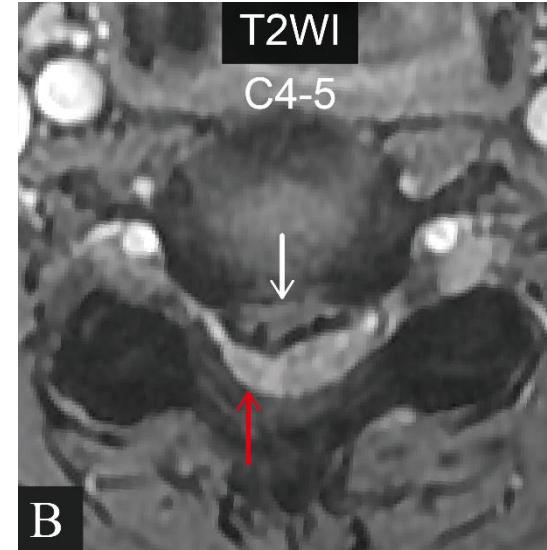
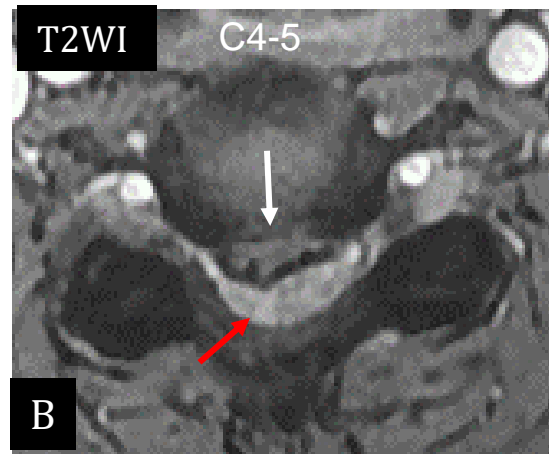
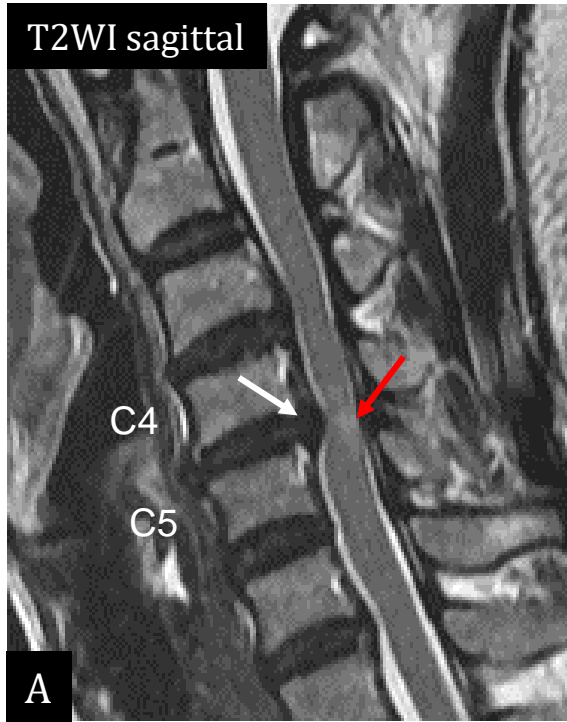
(D)C5-6：C6之右側鉤狀突(uncinate process) 肥厚長骨刺(u)，造成右側neuroforamen(nf) 狹窄，右側C5 nerve root會受到壓迫。



Bone graft inside fusion cage



女/44, C5-6 HIVD, 壓迫nerve及spinal cord。
 C5-6 disc向後偏左疝出(herniation), 裡面訊號高, 代表纖維層破裂, 核仁擠出(extrusion) (arrow)。
 這HIVD壓迫左側C6 nerve及spinal cord前緣。

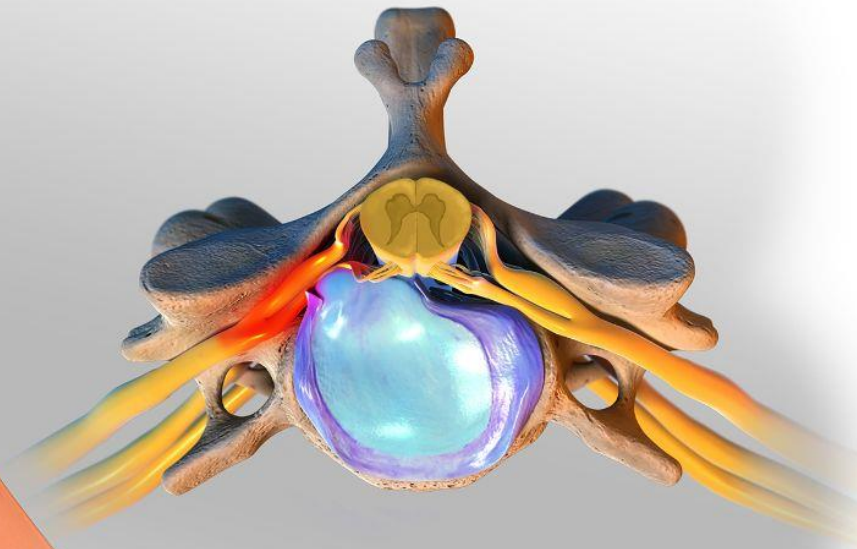
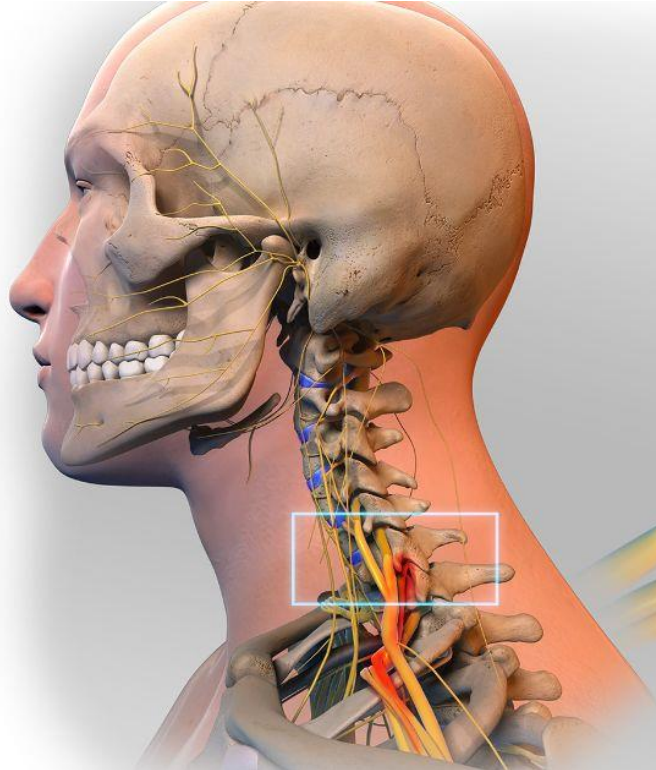


女/44 C4-5 HIVD，壓迫脊髓，spinal cord edema

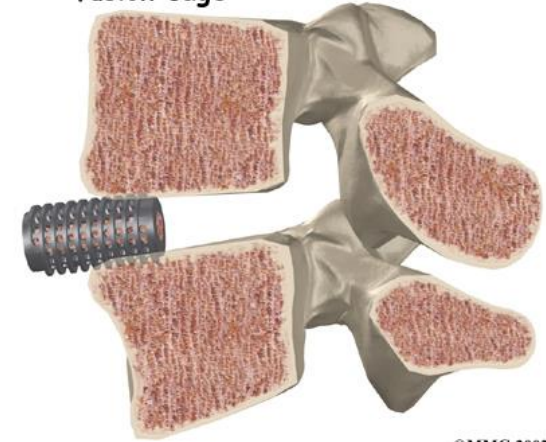
外傷之後，雙側上肢痠麻，下肢無力，大小便失禁。

(A) MRI, T2WI, sagittal 可見C4-5之disc 往後突出(white arrow)，spinal cord有高訊號(red arrow)，表示有水腫(edema)，可能是因spinal cord被壓迫的關係。

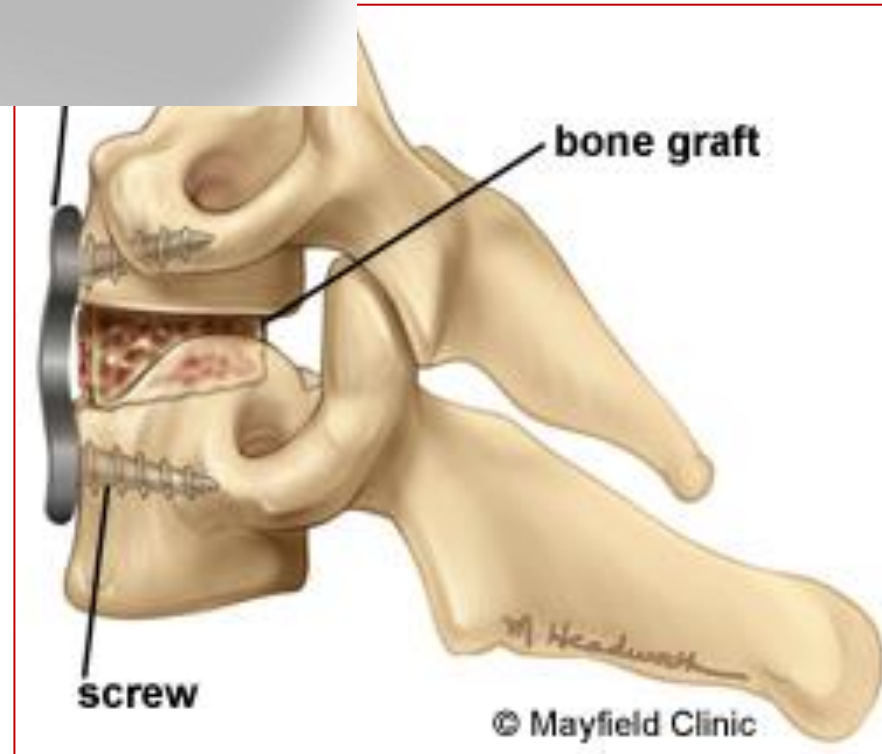
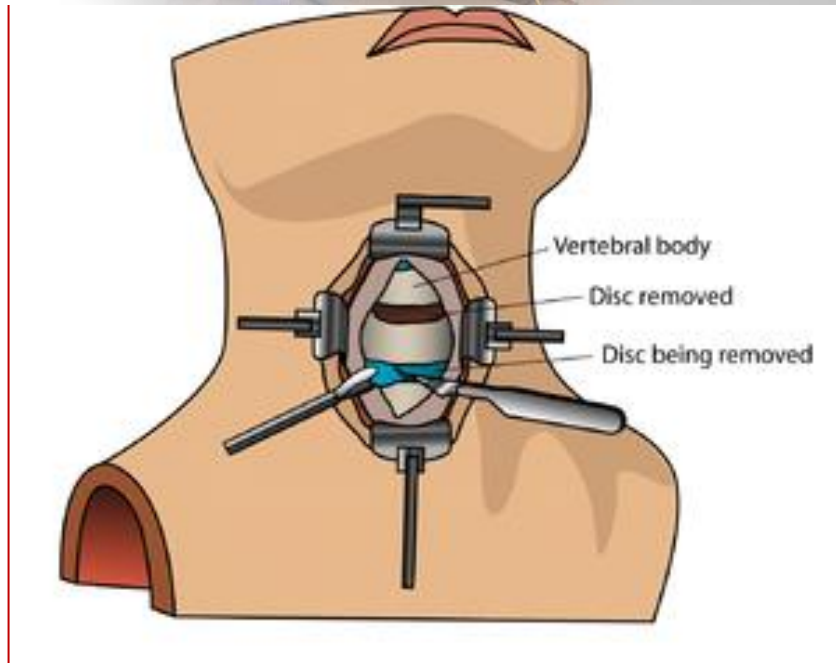
(B) T2WI, axial：可見C4-5 disc往後extrusion，嚴重壓迫spinal cord，spinal cord 右側有高訊號，是edema。

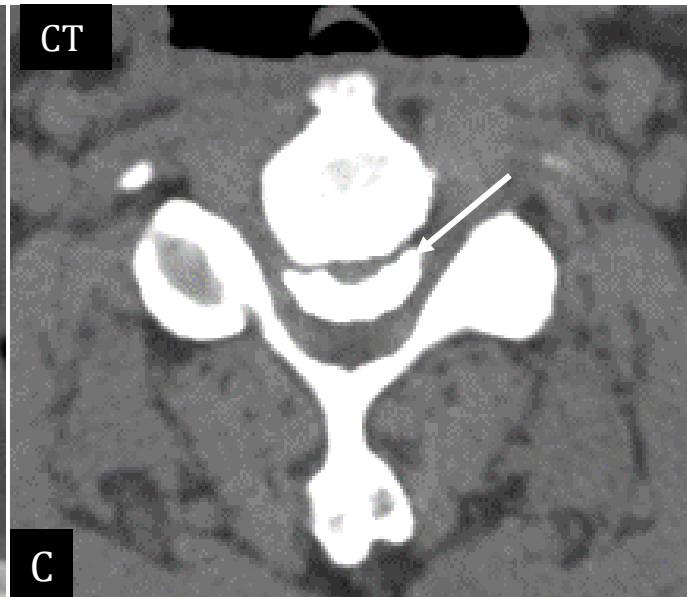
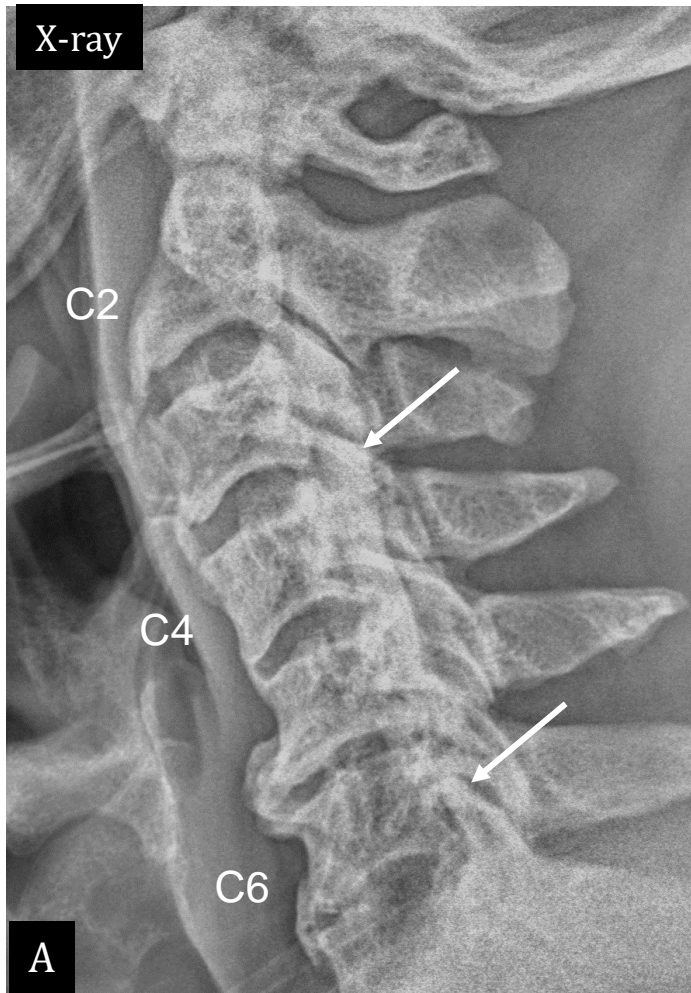


Bone graft inside fusion cage



©MMG 2002



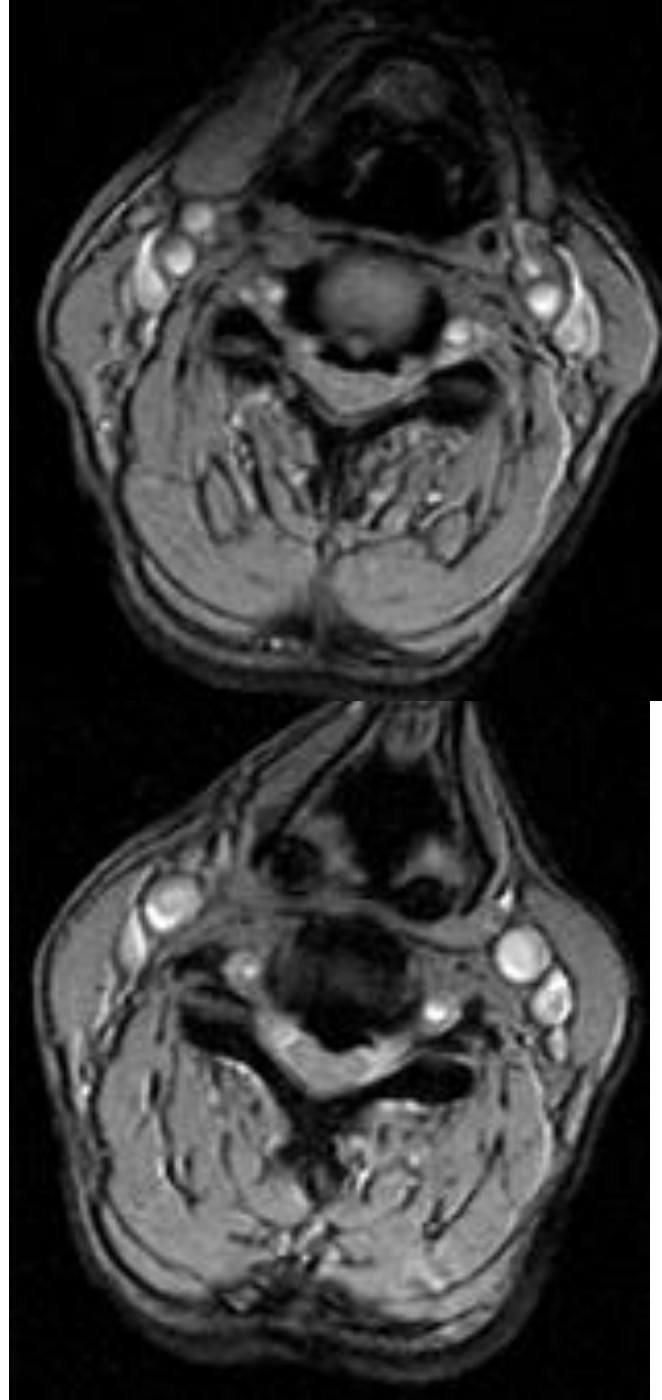
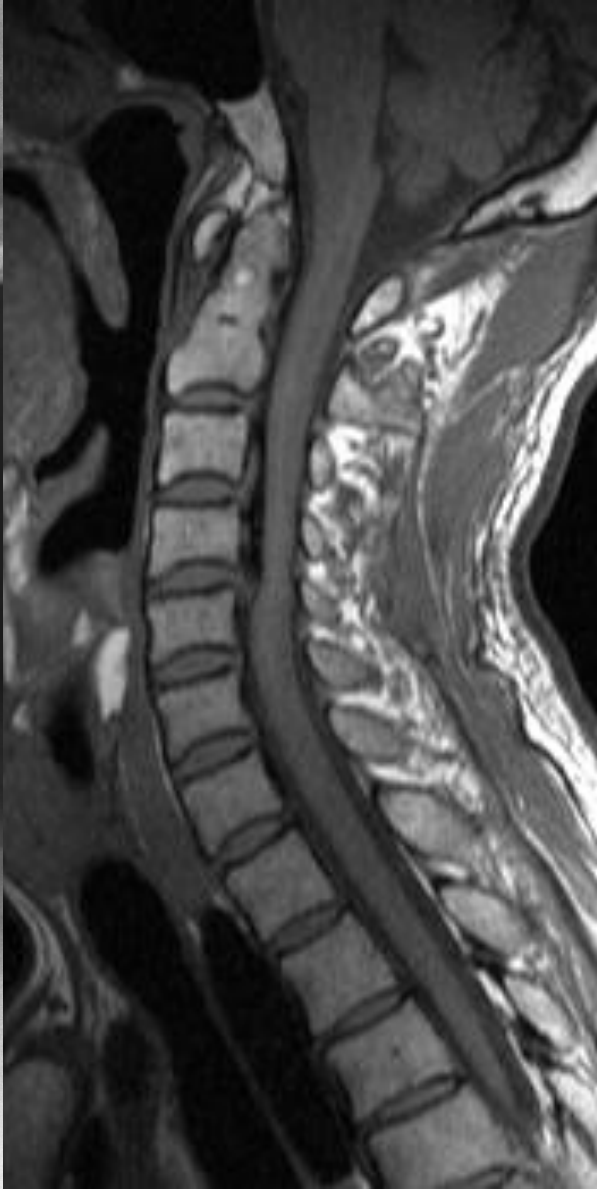


男 / 75歲 OPLL

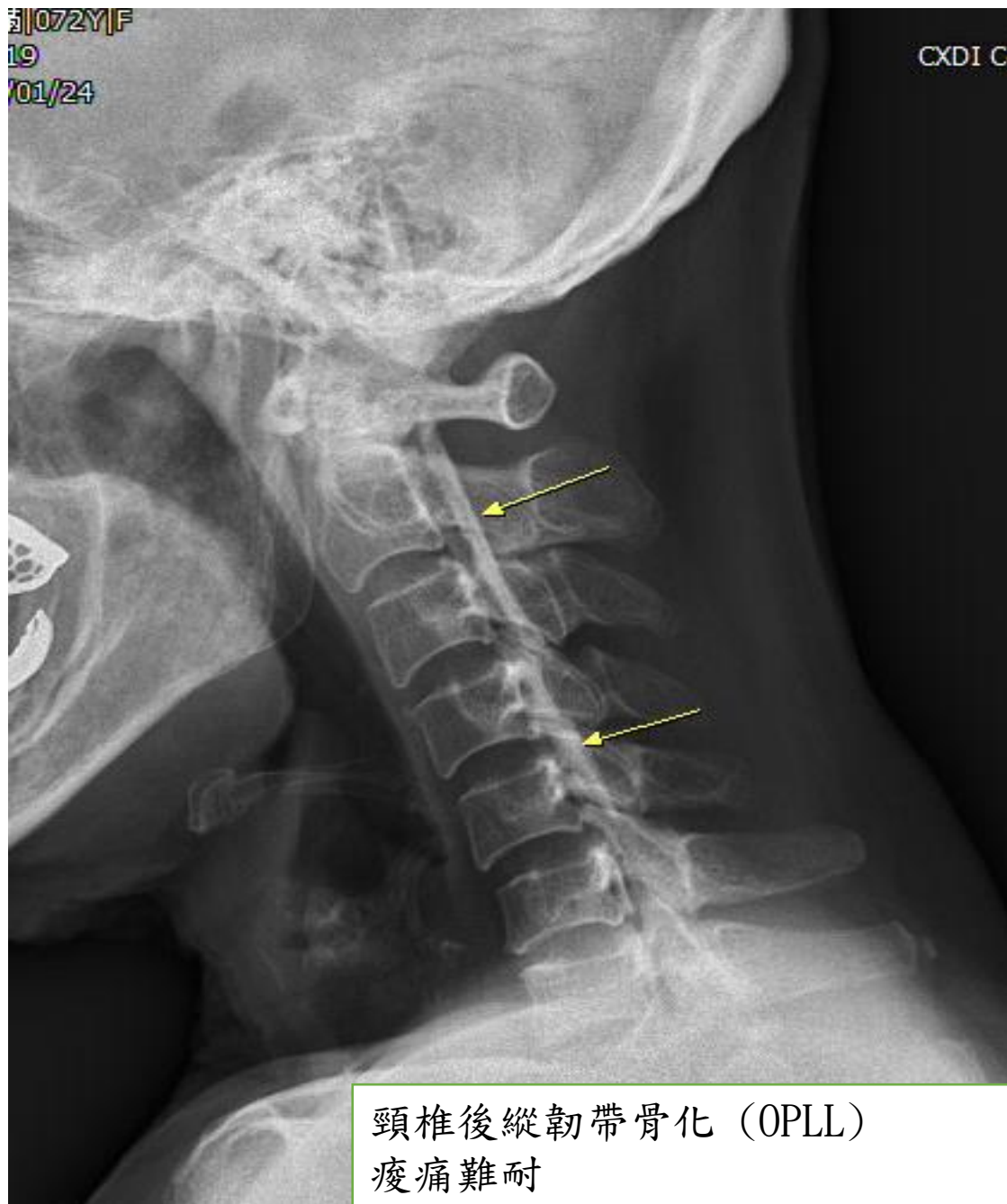
(A) X-ray: 可見頸椎脊椎體退化長骨刺，後縱韌帶骨化(arrows)。

(B) CT, sagittal reconstruction: 更清楚看到OPLL(arrows)。

(C) CT, axial: 可見OPLL (arrow)佔了脊椎腔之一半，想像spinal cord會被壓迫。



頸椎後縱韌帶骨化 (OPLL)
痠痛難耐



重點：

- Normal cervical spine anatomy, and X-ray, MRI images
- 頸椎退化(degenerative spondylosis) 包含
vertebral body, disc, facet joint, ligamentum, X-ray, CT, MRI 的判讀
- 頸椎退化(degenerative spondylosis) 引起的臨床症狀
- Cervical radiculopathy, myelopathy 臨床症狀
- OPLL 是什麼？



中國醫藥大學附設醫院

3. Spinal injury



Spinal Injury

Fracture

Subluxation

Epidural or subdural hematoma

Spinal cord edema and hemorrhage

Myelomalasia of the spinal cord

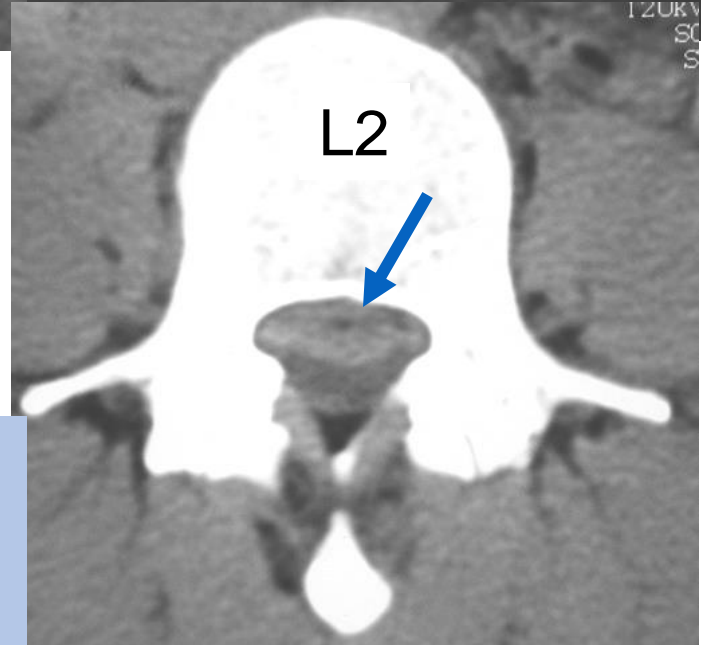
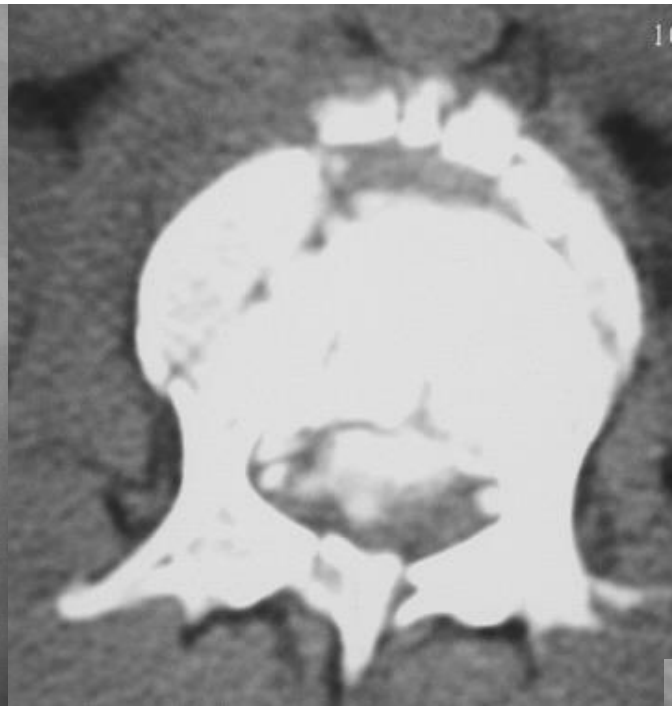
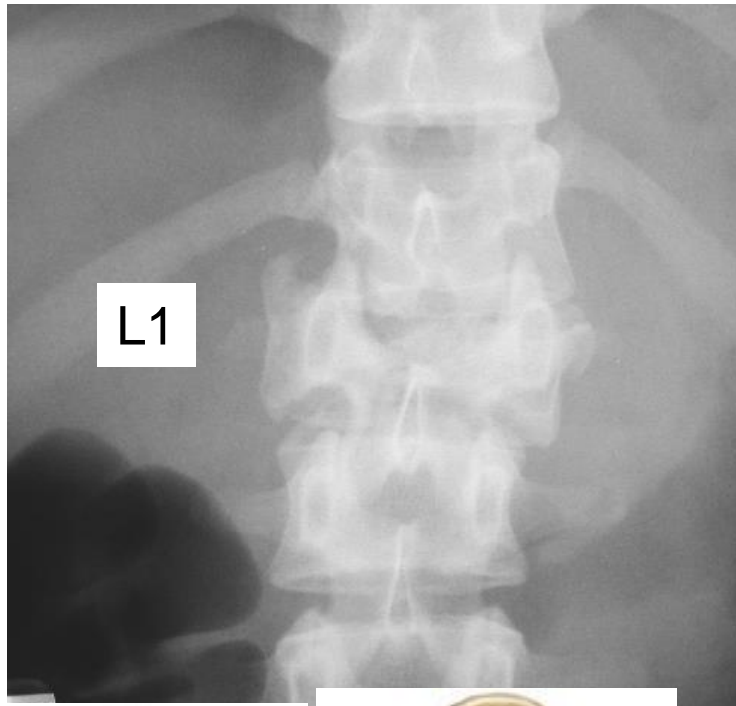
Traumatic HIVD

Diagnostic tools:

Plain films

CT

MRI

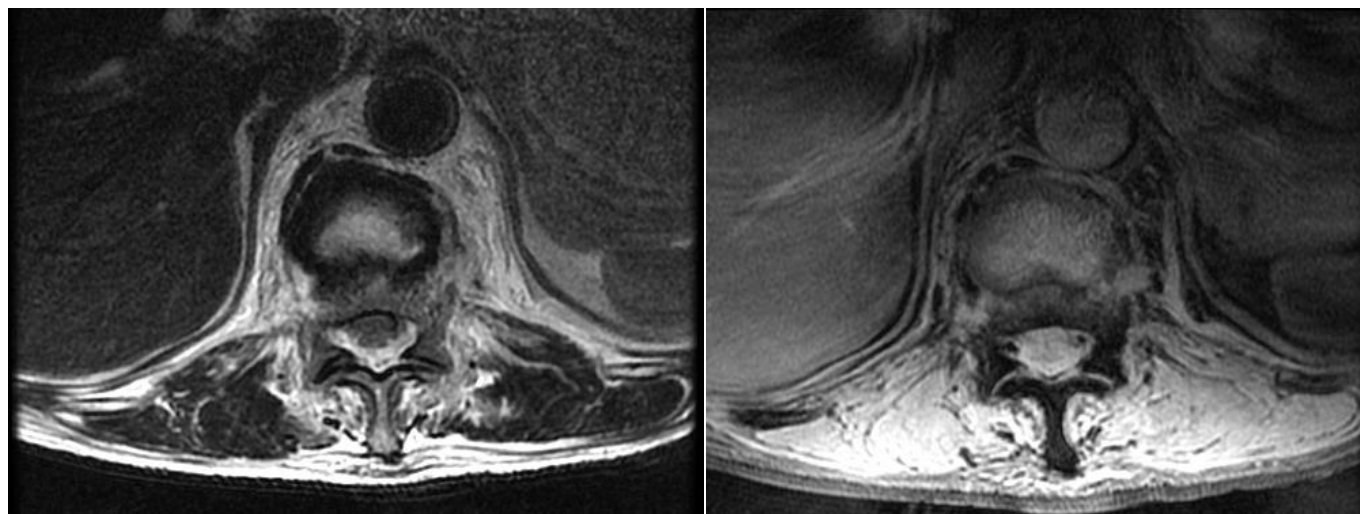


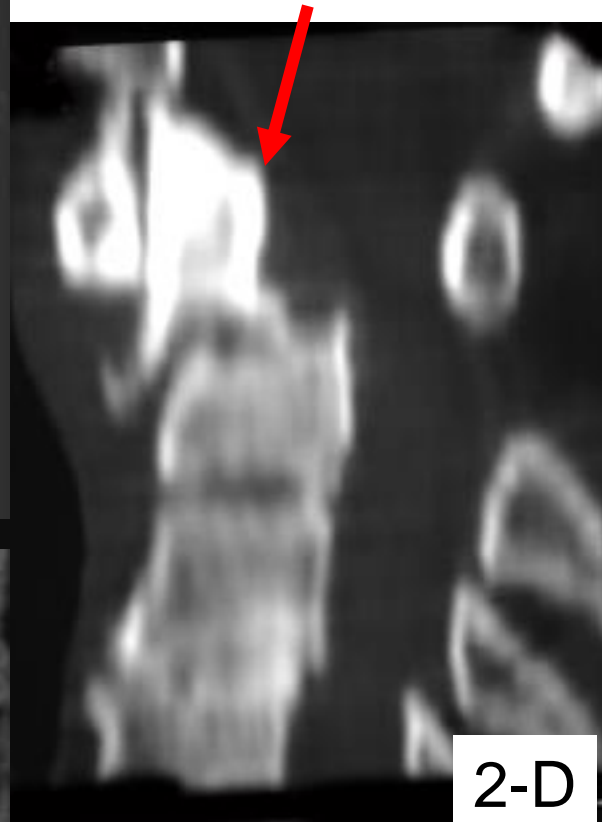
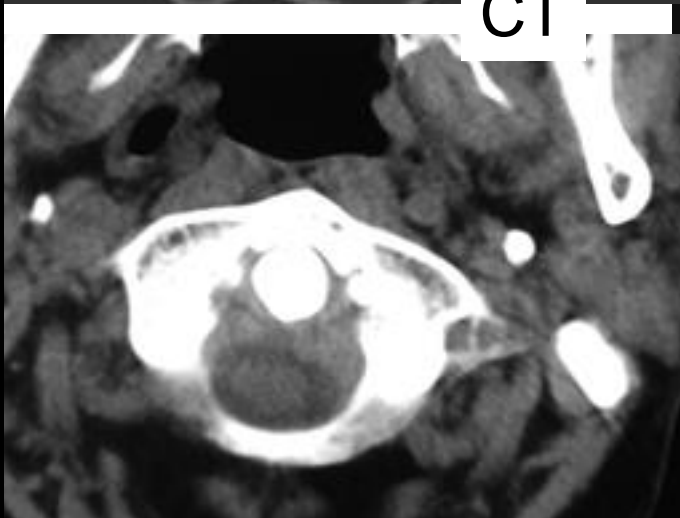
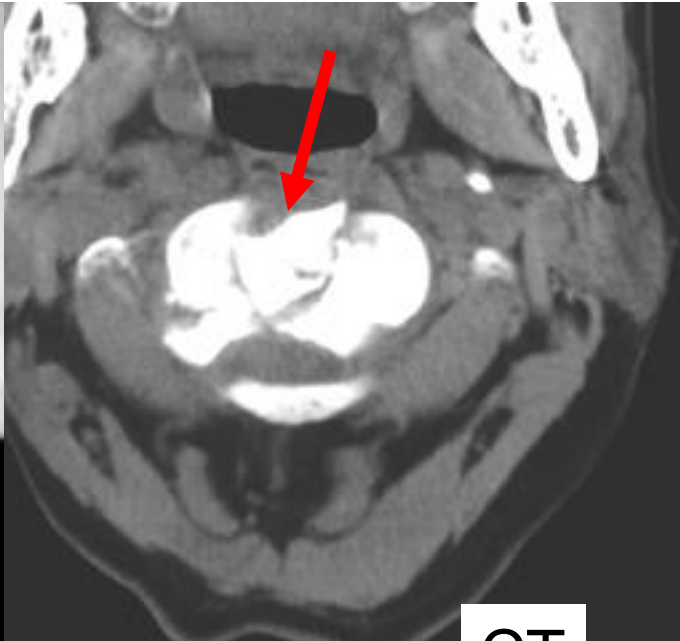
Burst fracture of L1, the bony fragments inserting into the spinal canal. Epidural hematoma is seen in L2-5 levels (red arrow).



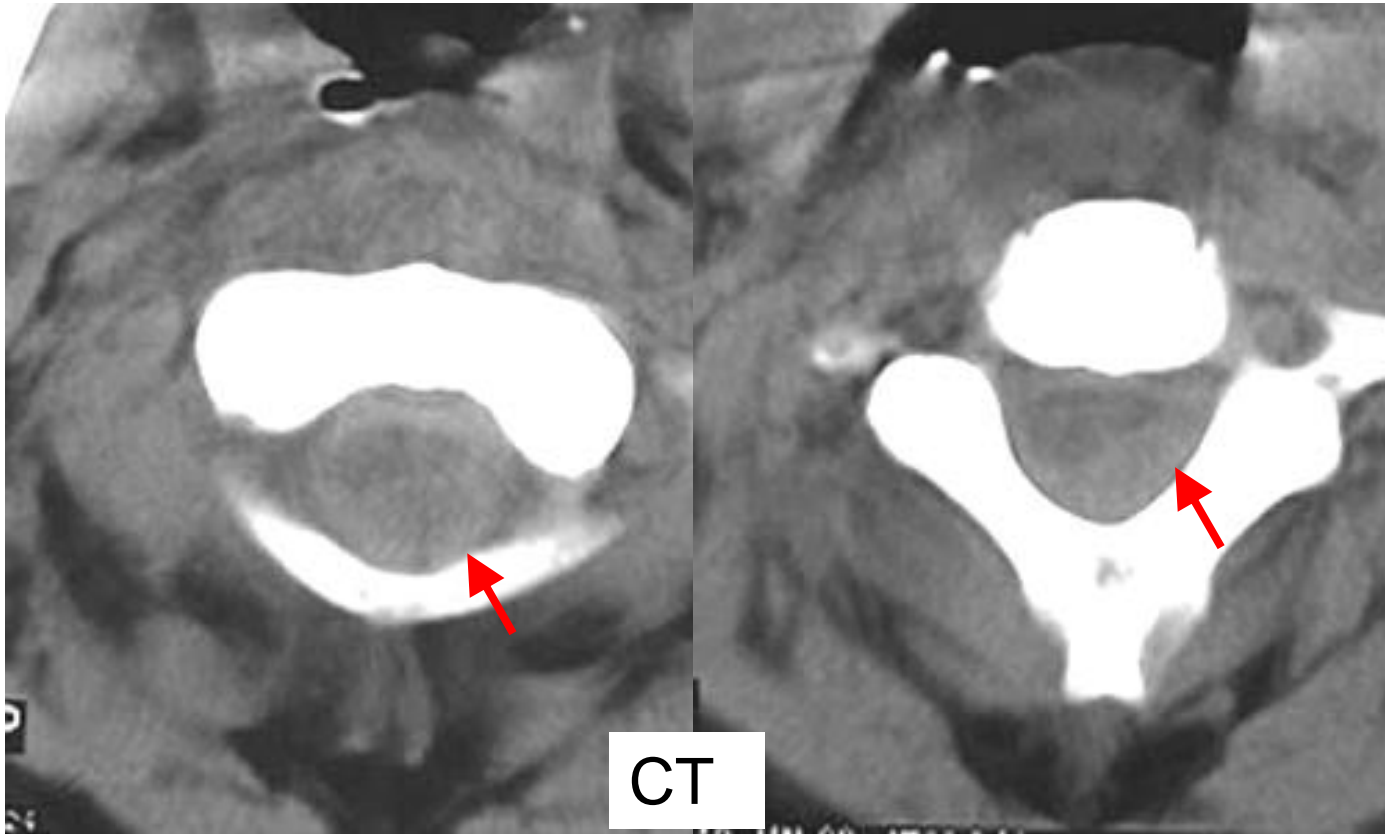
M/67

Spinal injury, victim of 柯羅莎颱風
compression fracture of T12
a vertical fracture separate the
vertebral body, the posterior part
sliding into the spinal canal



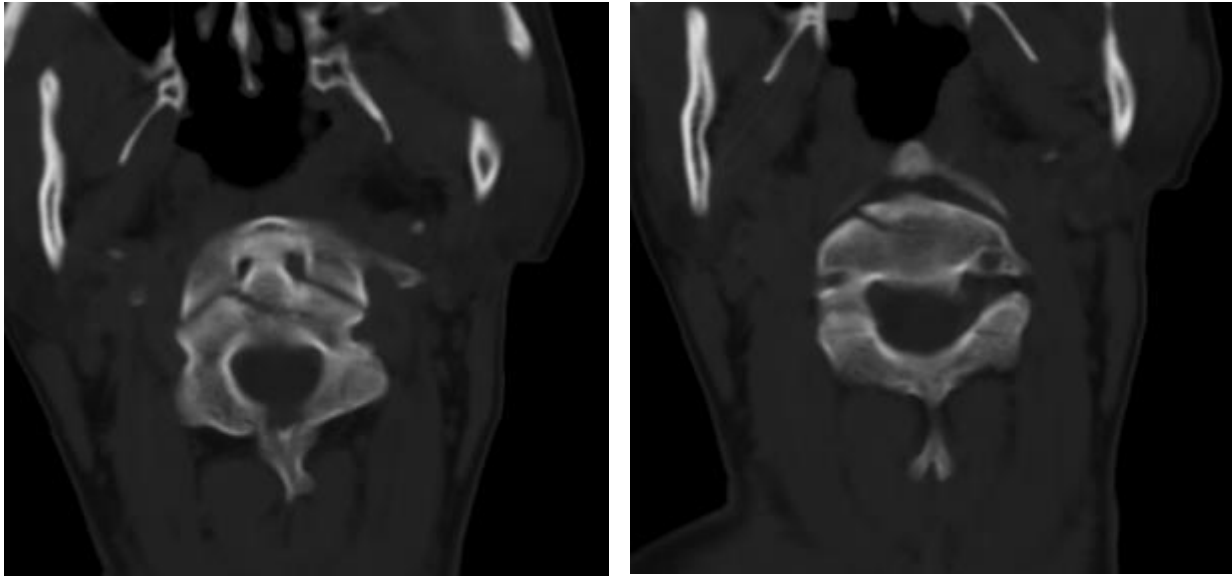
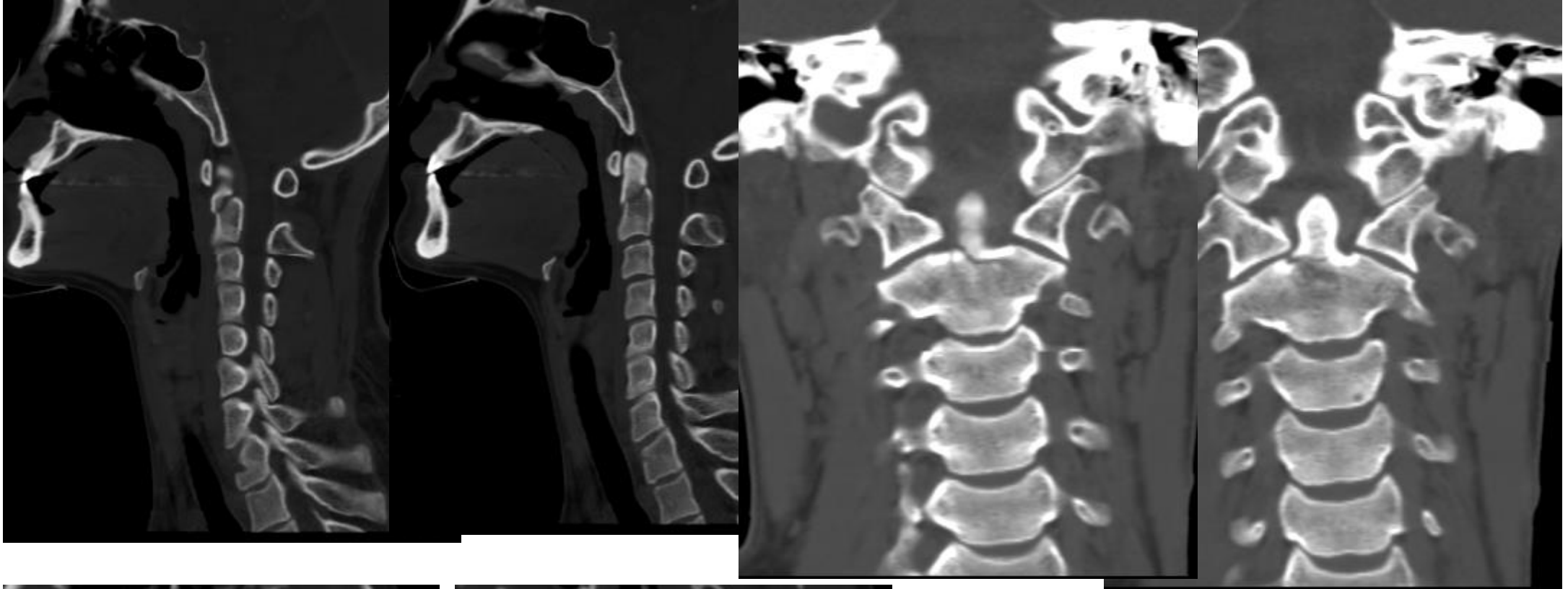


M/63
Type III compression fracture of C2, with anterior
subluxation of odontoid process



M/42

Acute epidural hematoma in the C1-2 and posterior fossa, due to trauma



F/25
Fracture of C2



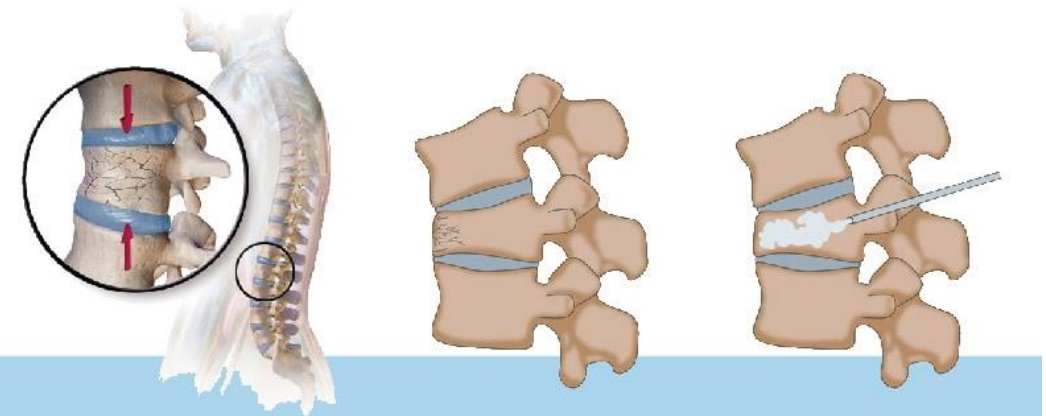
F77

Felt down, severe back pain.

X-ray: compression fracture of T12.

MRI: compression fracture of T12.

骨水泥手術：椎體成形術 微創手術過程



脊椎/腰椎壓迫性骨折

骨折椎體塌陷處

於骨折處注入骨水泥

Osteoporosis associated with compression fracture



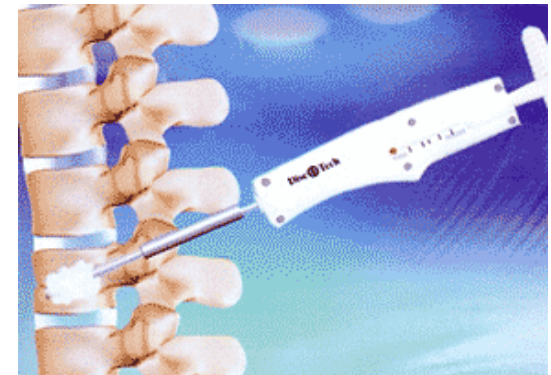
F/82

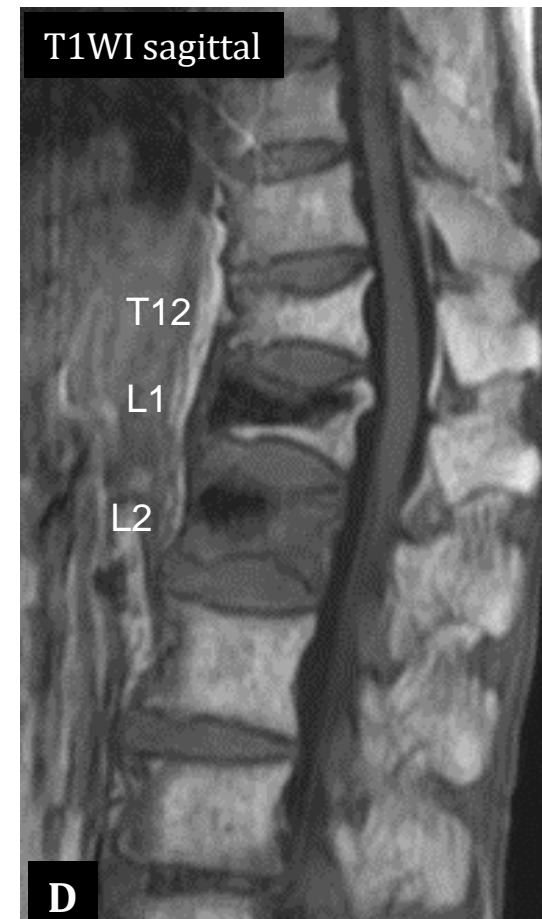
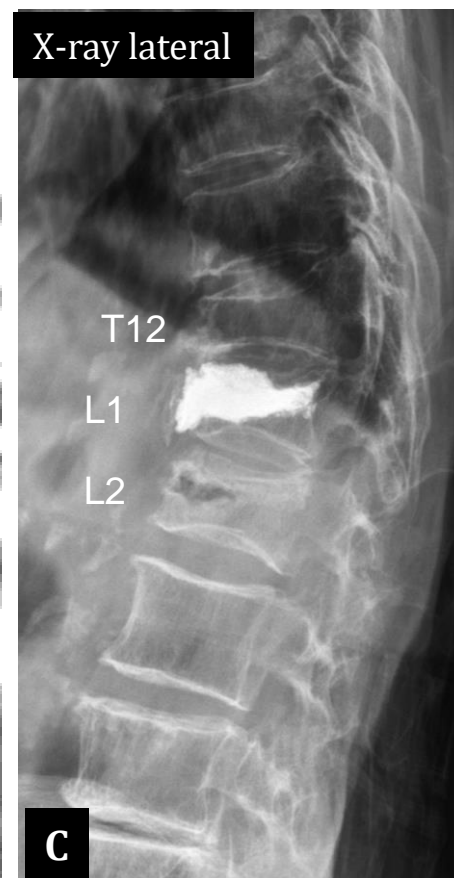
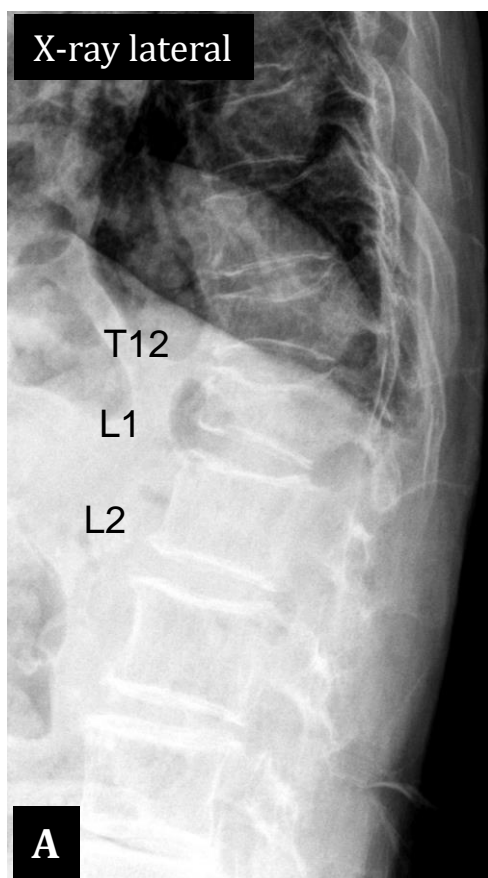
Jan 25 X-ray
Old compression fracture
of T12



Feb15 MRI
Old compression fracture of T12
No lost signal of bone marrow of T12
New compression fracture of L2
Lost signal of bone marrow of L2 in T1WI

判斷
compression fracture
新舊，
作為灌骨泥之依據





F/87 骨質疏鬆，一再骨折 (osteoporosis, repeat fractures)

(A) 因跌倒引起厲害背痛，X-ray: T12, L1 vertebral bodies 變矮而且形成楔狀形(wedge shape)，表示有 compression fractures, 無法分辨新舊。

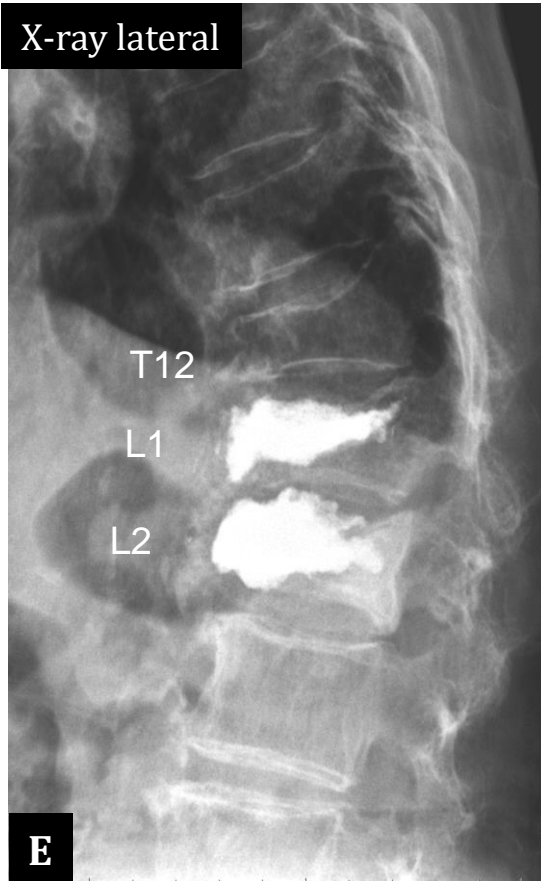
(B) 同時做了MRI, T1WI: L1 vertebral body 訊號變暗，這是急性骨折、T12 vertebral body 訊號不變，這是舊骨折。

所以vertebroplasty 只須做L1。

(C) 3年之後，又另一次跌倒，X-ray: T12仍是舊骨折，L1有上次做vertebroplasty留下的骨泥，L2變矮，是新骨折。

(D) 同時 MRI, T1WI: L2 vertebral body變暗，證實這是新的急性骨折。L1也是暗的，因為脊椎體有骨泥。

X-ray lateral



F/87 骨質疏鬆，一再骨折 (osteoporosis, repeat fractures)

(A) 因跌倒引起厲害背痛，X-ray: T12, L1 vertebral bodies 變矮而且形成楔狀形(wedge shape)，表示有compression fractures, 無法分辨新舊。

(B) 同時間做了MRI, T1WI: L1 vertebral body 訊號變暗，這是急性骨折、T12 vertebral body 訊號不變，這是舊骨折。

所以vertebroplasty 只須做L1。

(C) 3年之後，又另一次跌倒，X-ray: T12仍是舊骨折，L1有上次做vertebroplasty留下的骨泥，L2變矮，是新骨折。

(D) 同時間 MRI, T1WI: L2 vertebral body變暗，證實這是新的急性骨折。L1 也是暗的，因為脊椎體有骨泥。

(E) 術後 X-ray: L1, L2 都做過vertebroplasty，有骨泥。



T1WI



T2WI



Post vertebroplasty

F/83
Severe back pain after fell down

Acute compression fracture , vertebral body 變矮不明顯 ,
MRI TWI: signal loss, T2WI: increasing signal

重點：

- Burst fracture of vertebral body
- Subdural and epidural hematoma in spinal canal
- Spinal cord contusion edema

- Osteoporosis associated with compression fracture
- MRI images of acute and old compression fractures.

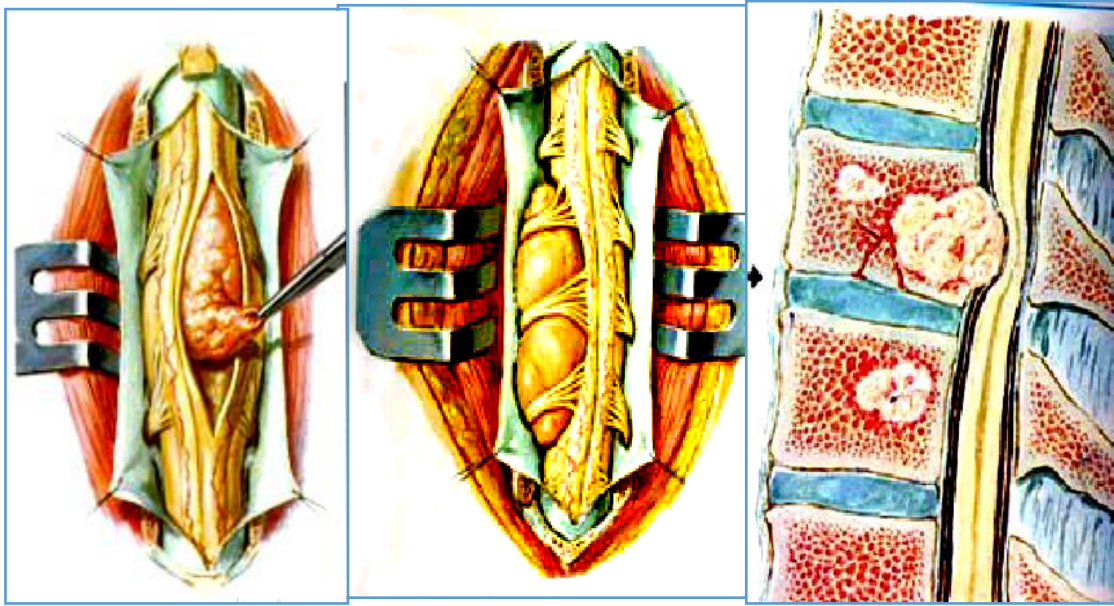
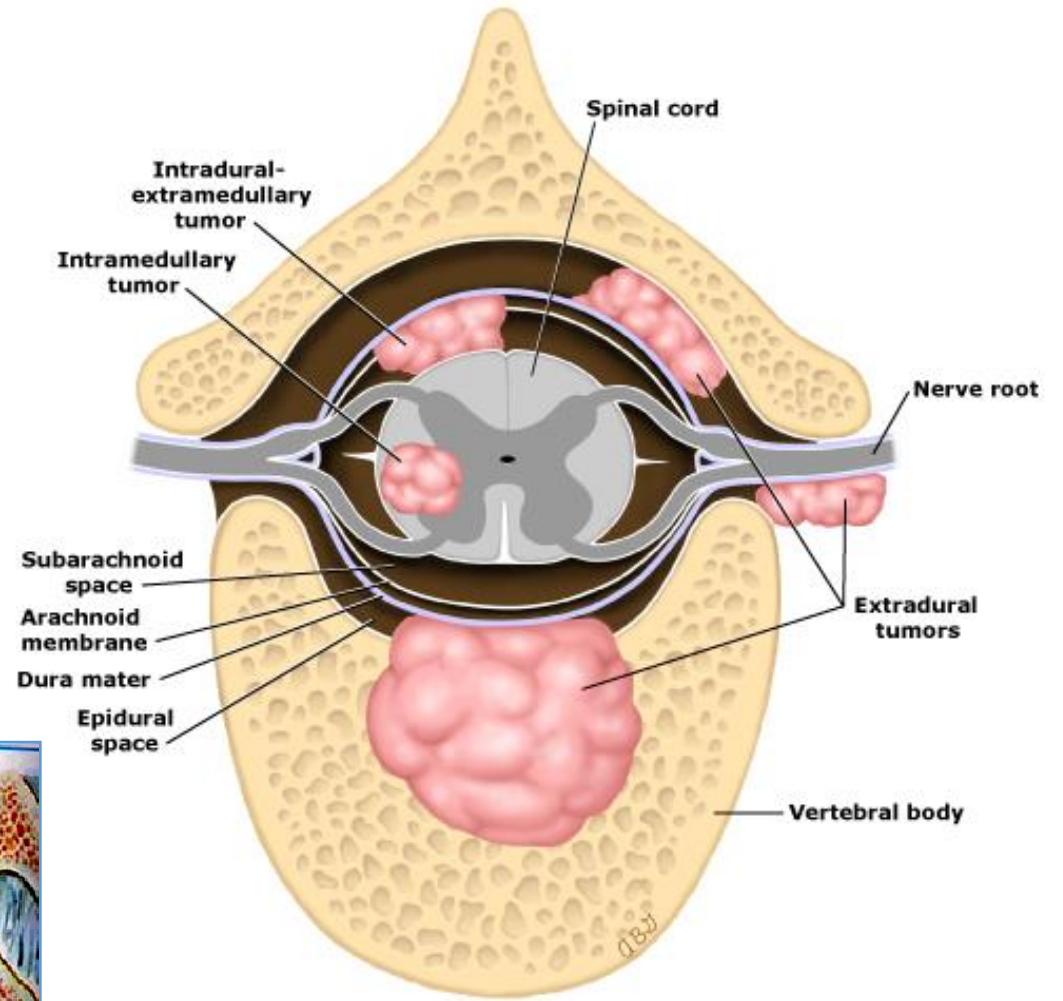


4. Spinal tumors



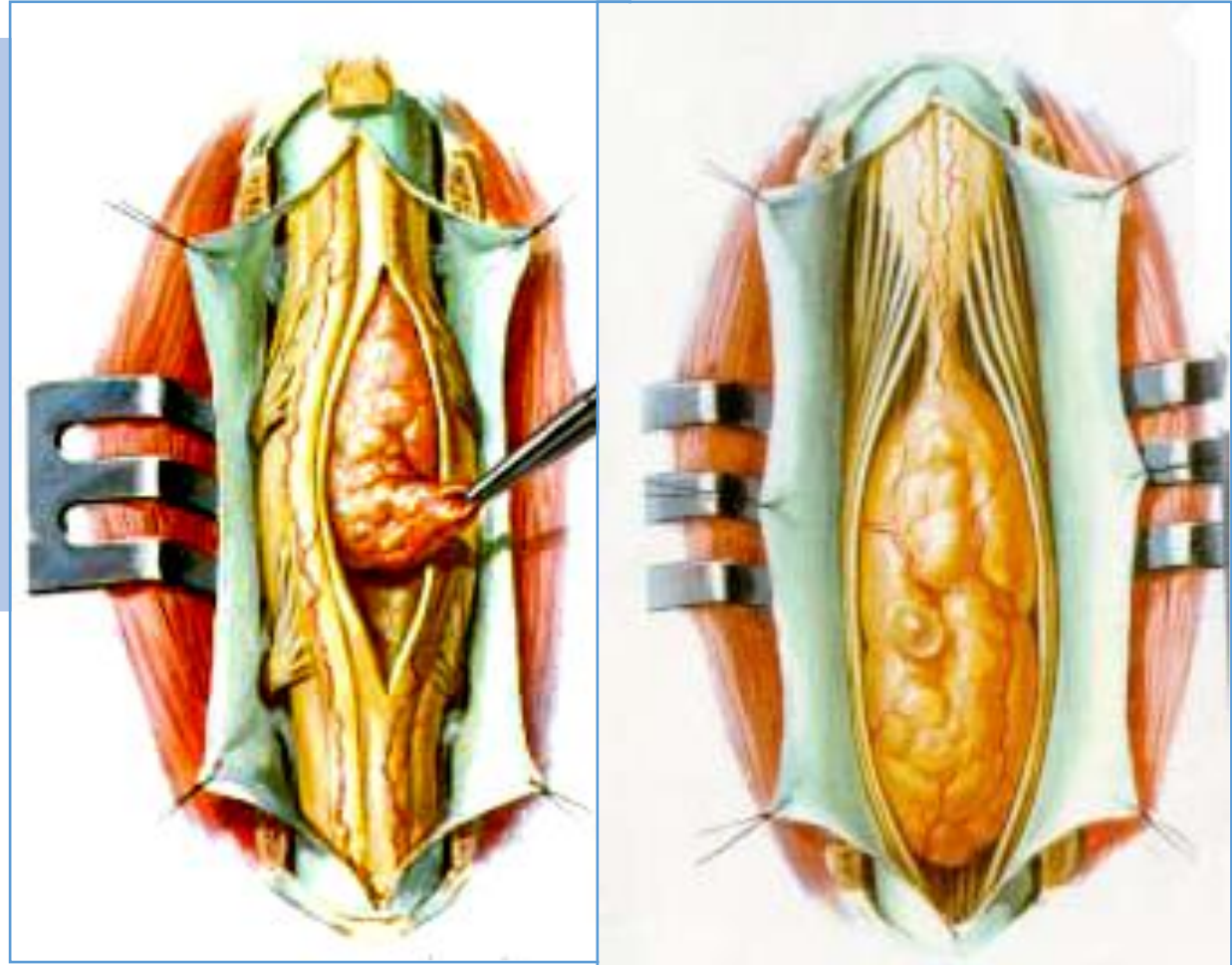
Spinal Tumors

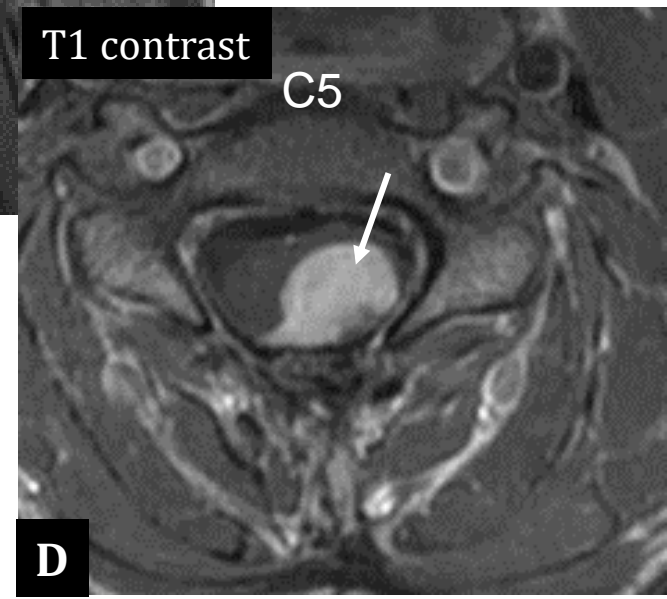
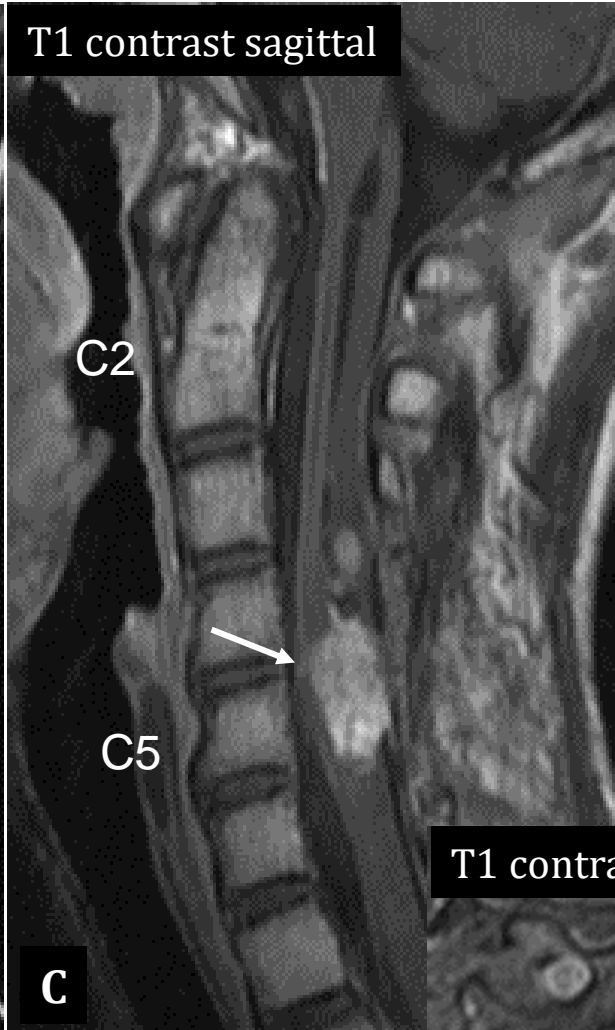
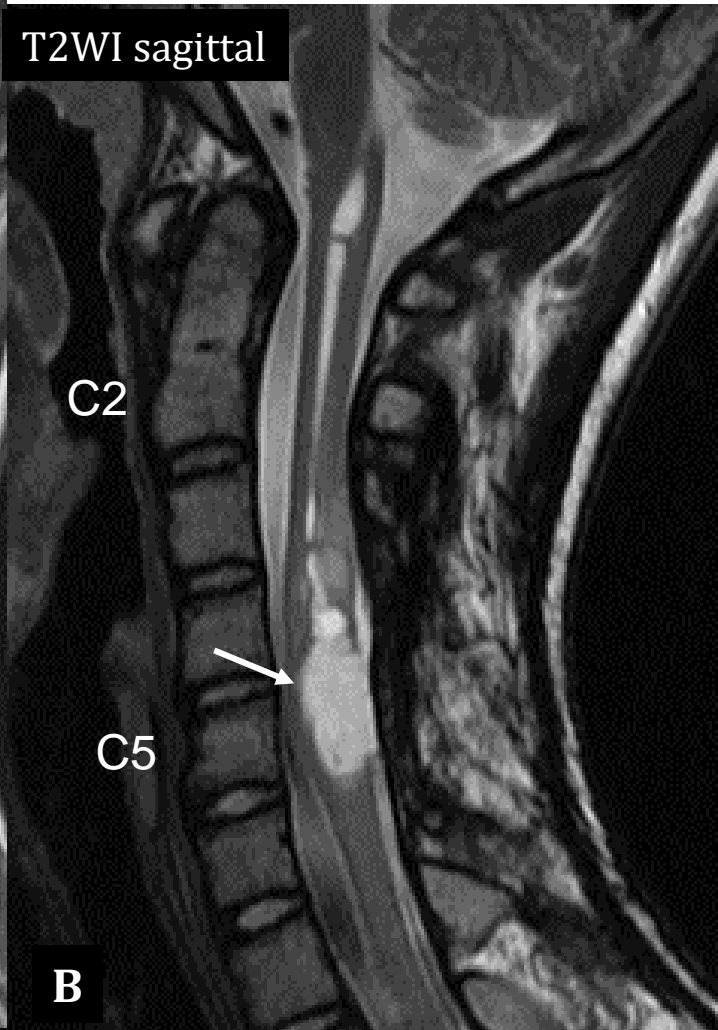
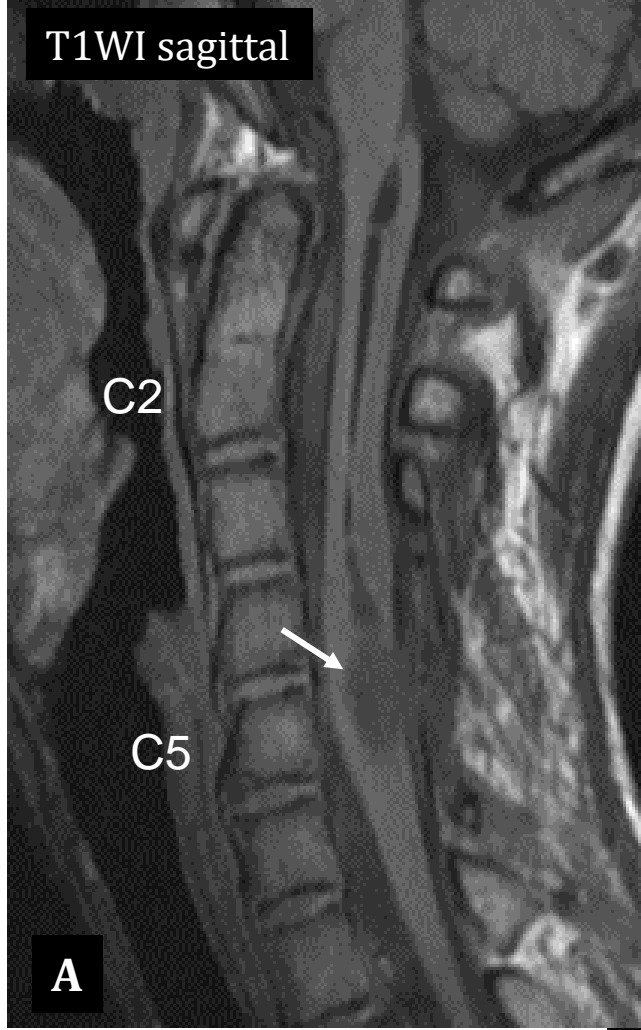
- Intramedullary tumors.
- Intradural extramedullary tumors.
- Extradural tumors.



Intramedullary tumors:

- Astrocytoma.
- Ependymoma.
- Hemangioblastoma.
- Others are very rare.





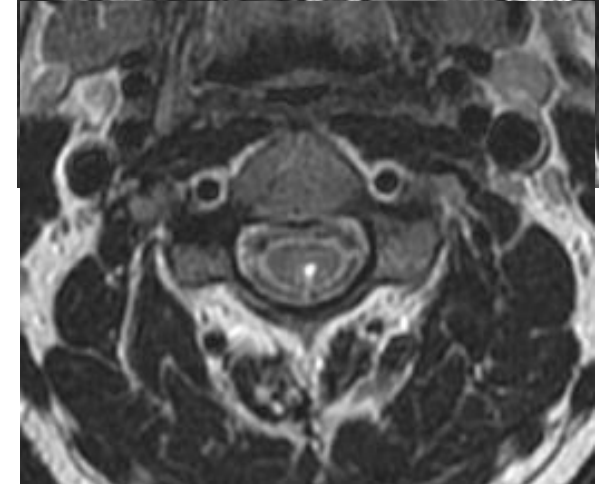
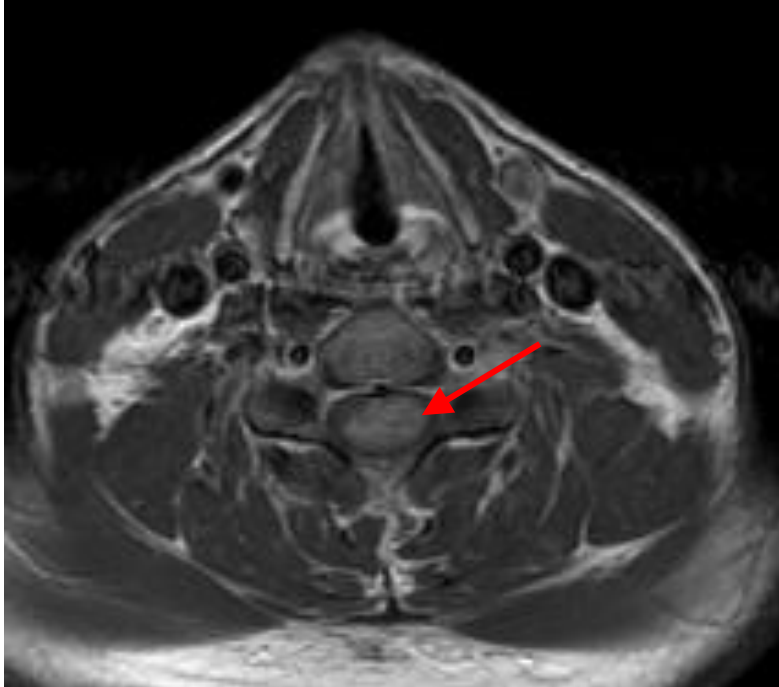
男/13，Spinal cord astrocytoma

主訴四肢痠麻無力

(A,B) MRI可見脊髓在C4-5腫大，內含T1WI暗，T2WI高之病灶(arrow)，往上脊髓至延腦之內有長長含液體之脊髓空洞(syringomyelia)。

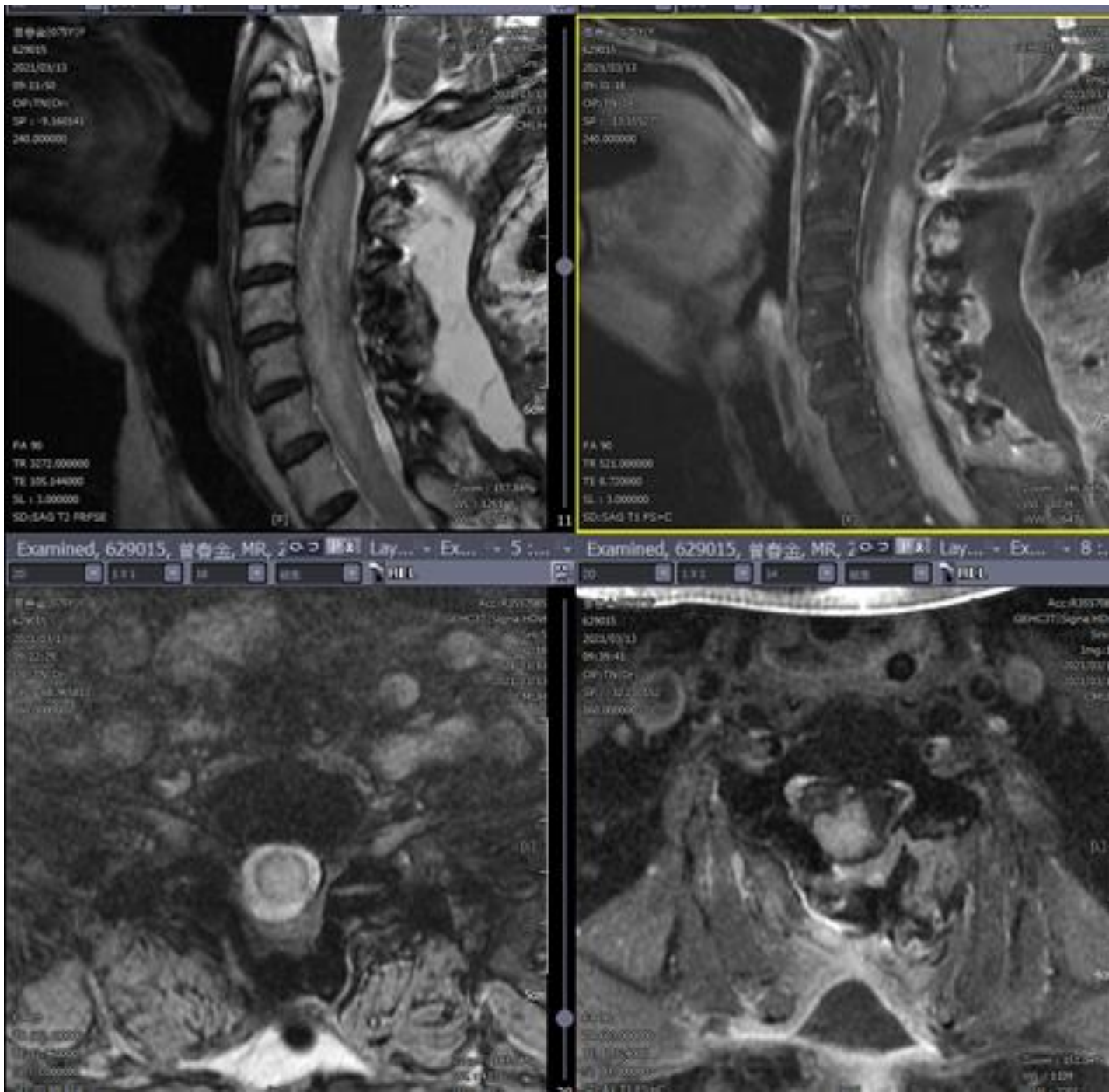
(C,D)注射顯影劑之後，C4-5病灶均勻強化，這是脊髓內腫瘤(arrow)，要想到是astrocytoma或ependymoma，因為是小孩，astrocytoma比較可能。

手術取出腫瘤，病理證實是 low grade fibrillary diffuse astrocytoma (WHO grade II).



M/43 OP & pathology: ependymoma
94,6,7 MRI: intramedullary tumor C4-5

96,112,14 MRI: intramedullary tumor
Focal spinal cord atrophy in the original
area, no recurrent tumor.



F75

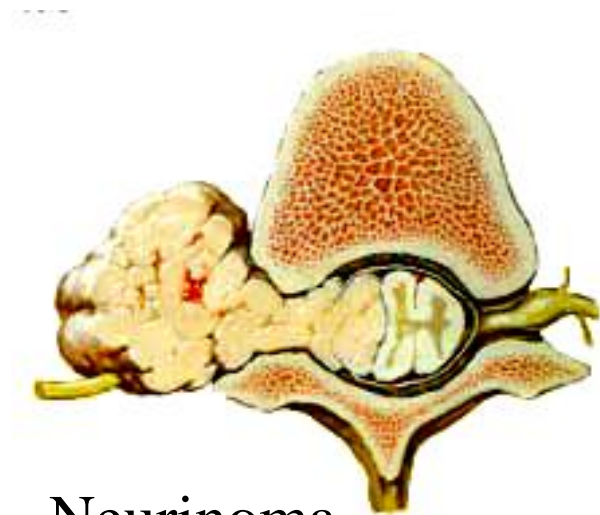
2021,3,13 MRI:

A well-defined, strong enhanced soft tissue mass in the spinal cord, C1 to T1 level.

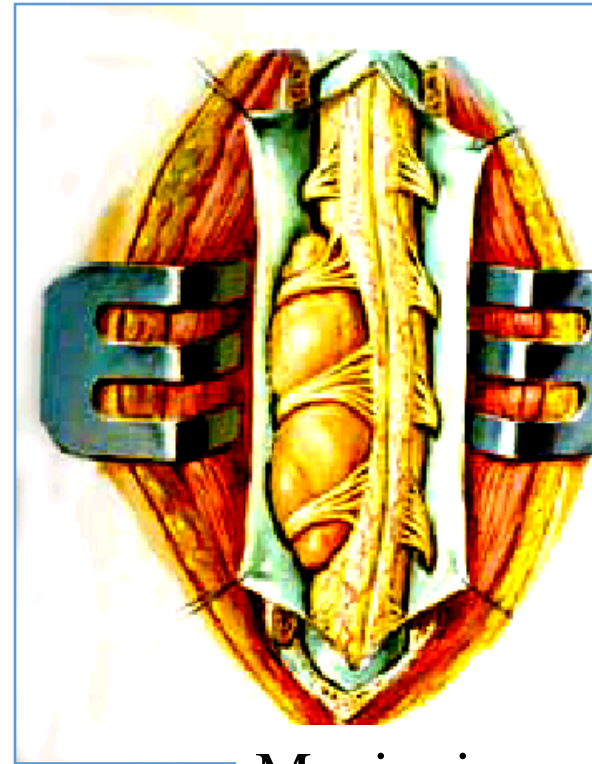
Pathology: diffuse large B cell lymphoma.

Intradural extramedullary tumors:

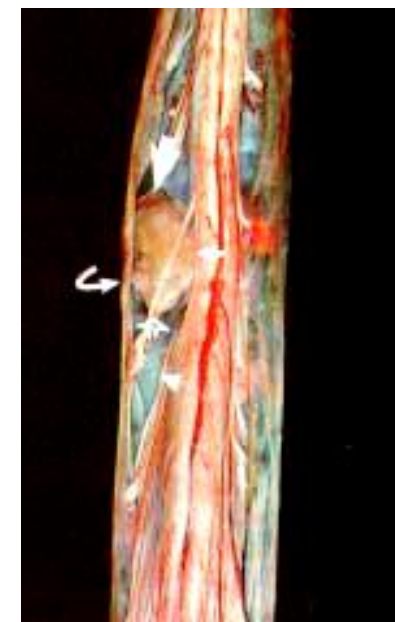
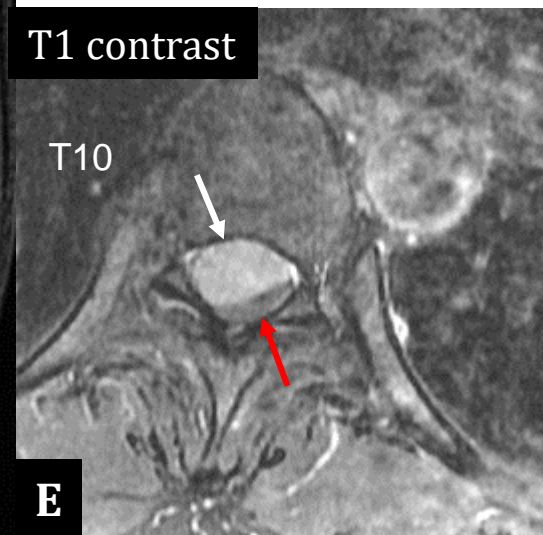
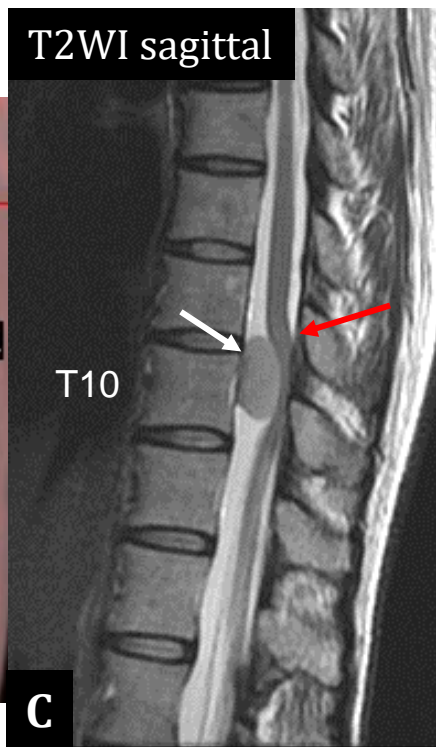
- Meningioma.
- NE urinoma.
- Others are very rare.



Neurinoma



Meningioma



女/44，胸椎meningioma

嚴重的下背痛

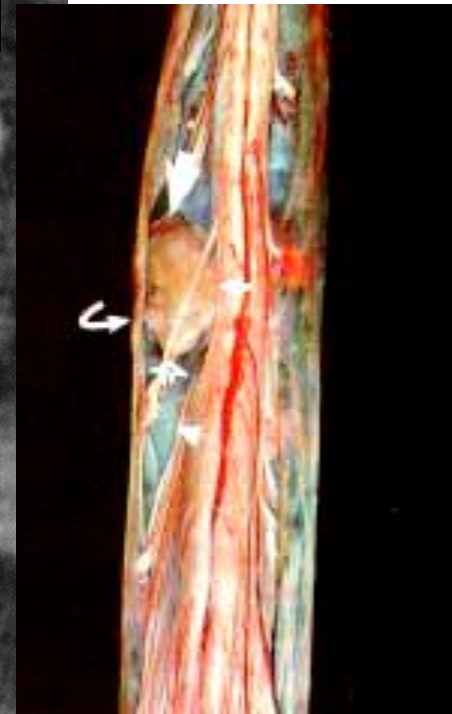
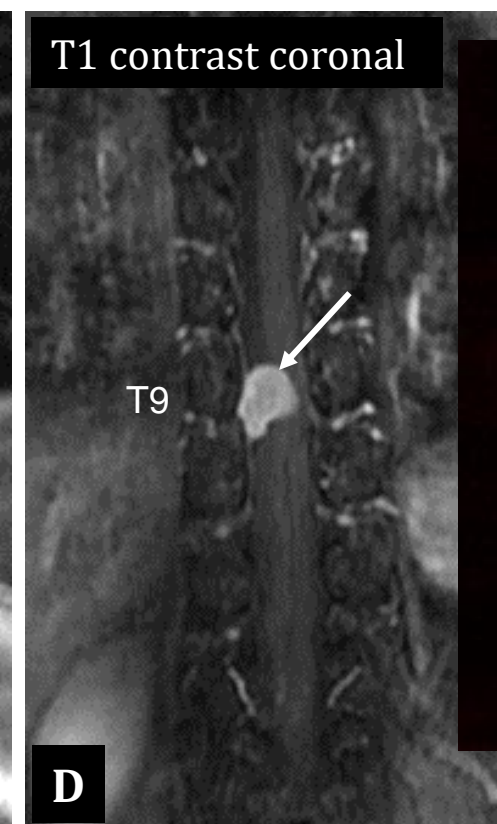
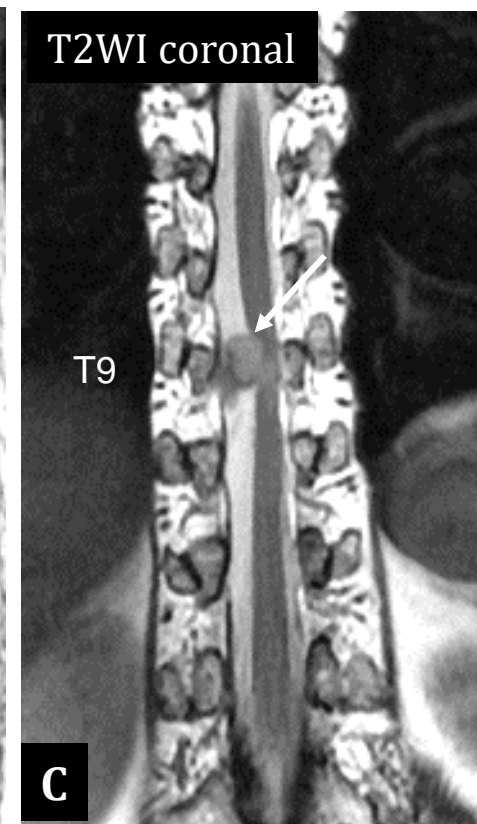
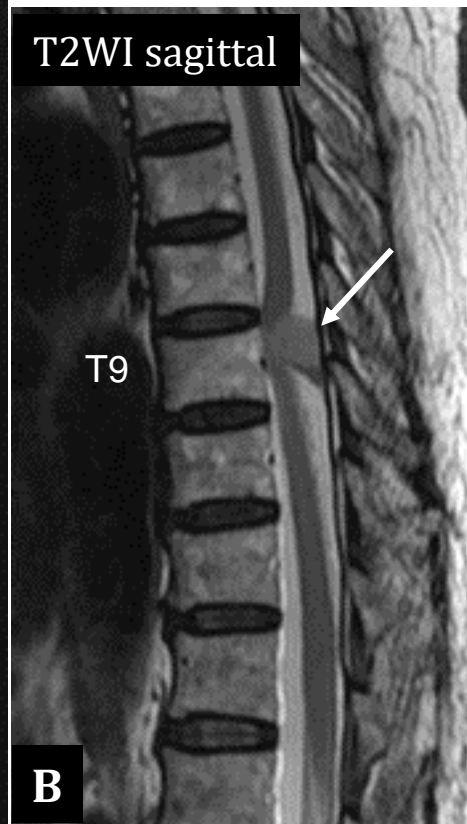
(A) 臨床醫師認為是腰椎退化問題，做了MRI，看起來正常。

(B) 然後做了PET-CT，發現在T10有一高訊號病灶(arrow)，PET對需氧量大的腫瘤很敏感，但病灶外形模糊且周圍解剖構造不清楚，須再做MRI。

(C-E) 再做MRI，發現T10有一個腫瘤(white arrow)，腫瘤上下之CSF space 變寬 (CSF space widening sign)，所以這是典型的intradural extramedullary tumor，腫瘤顯影良好，脊髓被嚴重壓迫且往後移位(red arrow)。

女性、胸椎長 intradural extramedullary tumor，要想到是meningioma。

手術及病理證實是meningioma。



女/73

嚴重下背痛，臨床醫師原以為是腰椎退化問題，做了MRI。

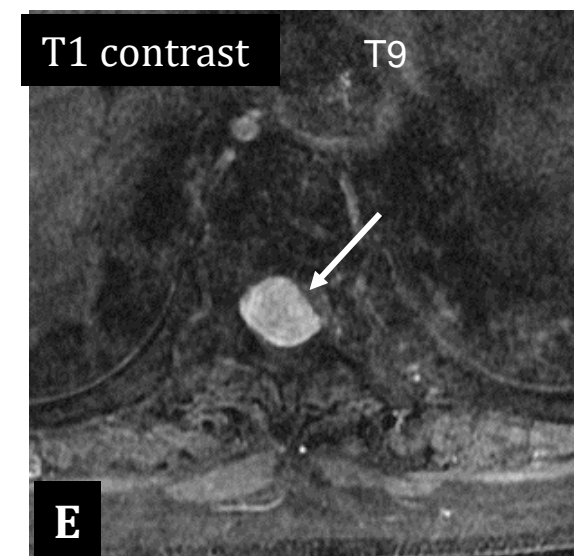
(A) 可見L5-S1滑脫，但放射科醫師有警覺到T9脊椎腔內好像有病灶(arrow)。

(B-E) 重做胸椎MRI，發現一個典型的intradural extramedullary tumor (arrow)。

顯影良好，脊髓被嚴重壓迫且往前往左移位。

女性、胸椎intradural extramedullary tumor，要想到是meningioma。

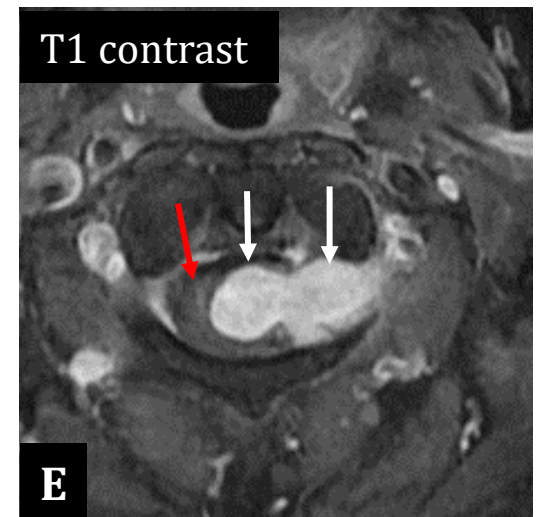
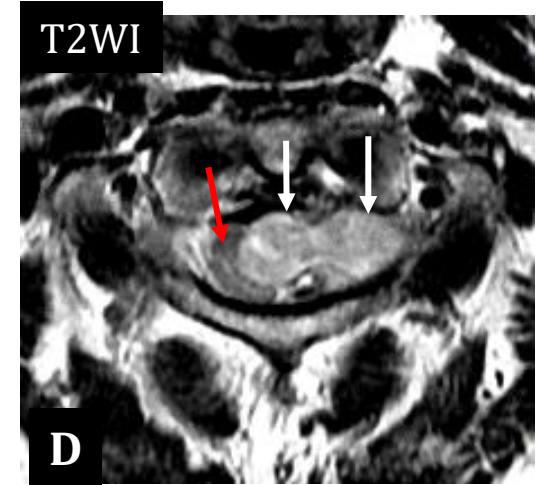
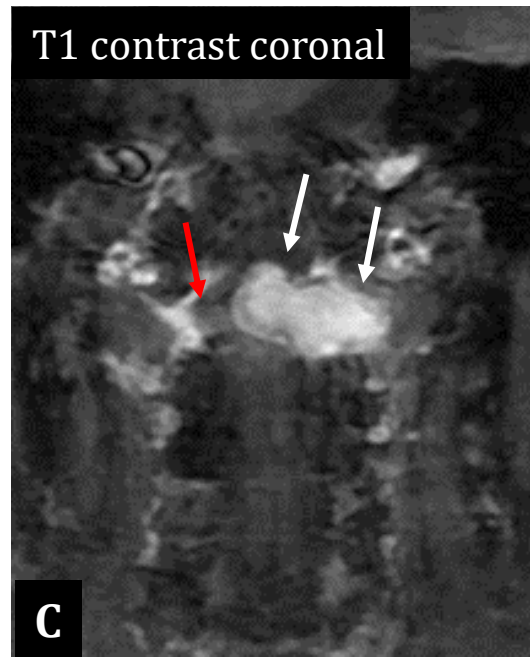
手術及病理證實是meningioma。



Neurinoma:

- Neurilemmoma or schwannoma.
- May has extradural extension via the neuroforamen, and forming as "dumbbell " shape.



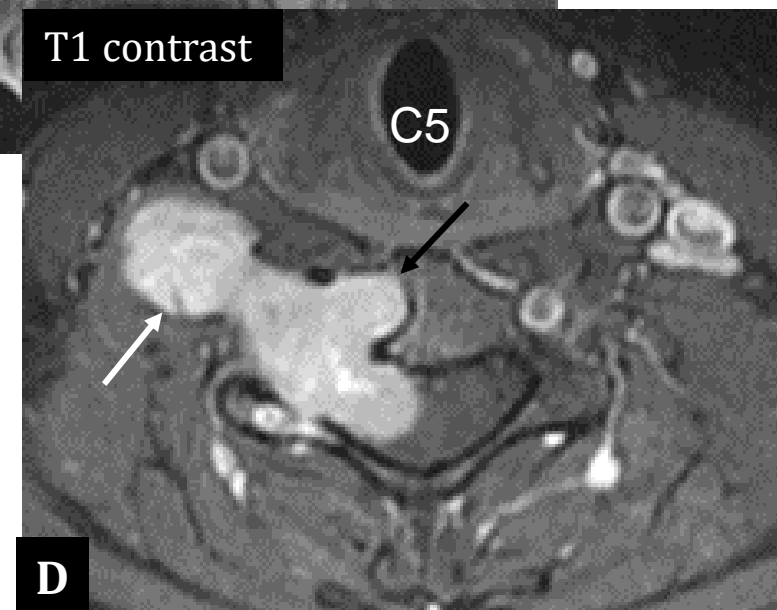
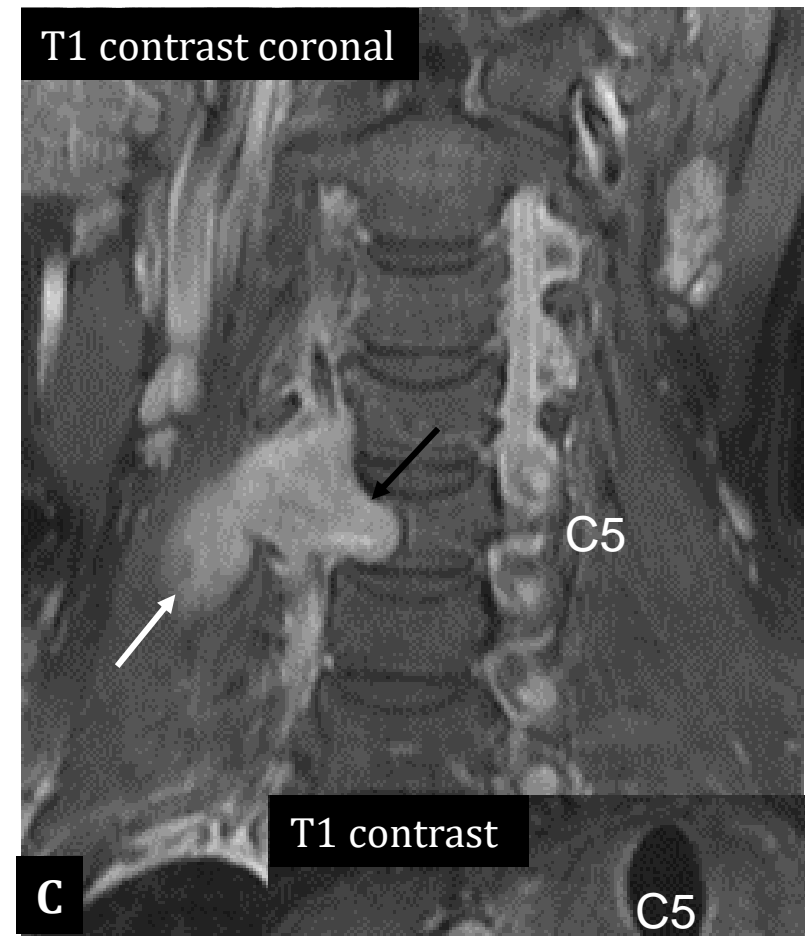
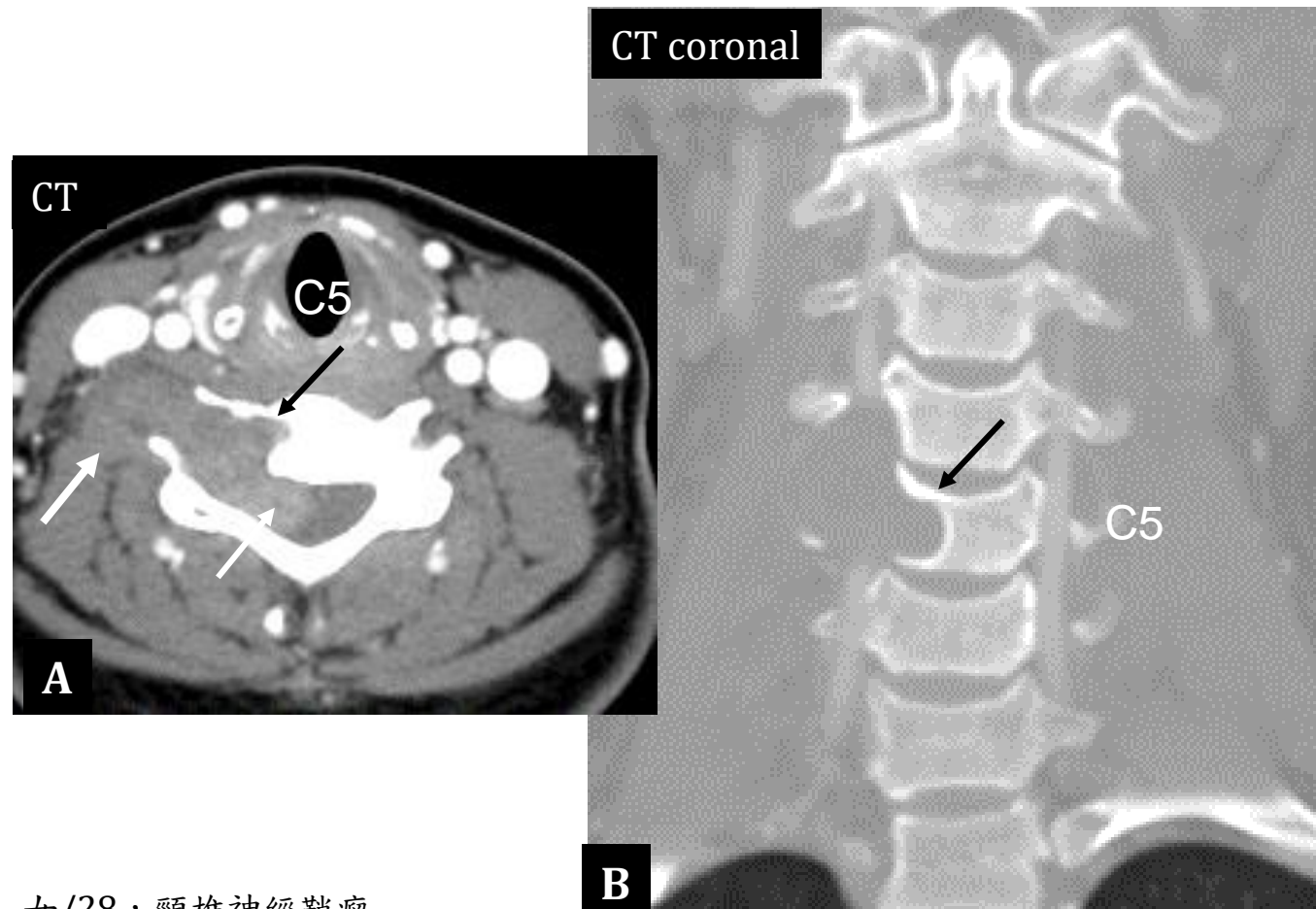


女/73，頸椎神經鞘瘤(schwannoma)

主訴脖子酸痛，下肢逐漸無力

(A-E) MRI: 可見C1-2有一腫瘤，此腫瘤一半在脊椎腔內，一半往外擴展，形成啞鈴型(white arrows)，這是典型的神經鞘瘤(schwannoma)。脊髓被嚴重壓迫且往右移位(red arrow)。

手術取出腫瘤，病理證實是schwannoma。



女/28，頸椎神經鞘瘤

病患因自己摸到右頸部有腫塊，去看耳鼻喉科醫師，做CT檢查。

(A) Contrast CT：右頸部有一軟組織腫瘤(thick arrow)，顯影劑稍微顯影。可見C5神經孔變寬，周圍骨頭侵蝕(black arrow)，隱約可見此軟組織腫瘤由脊椎腔內長出(white arrow)，沿著神經孔往外擴展。

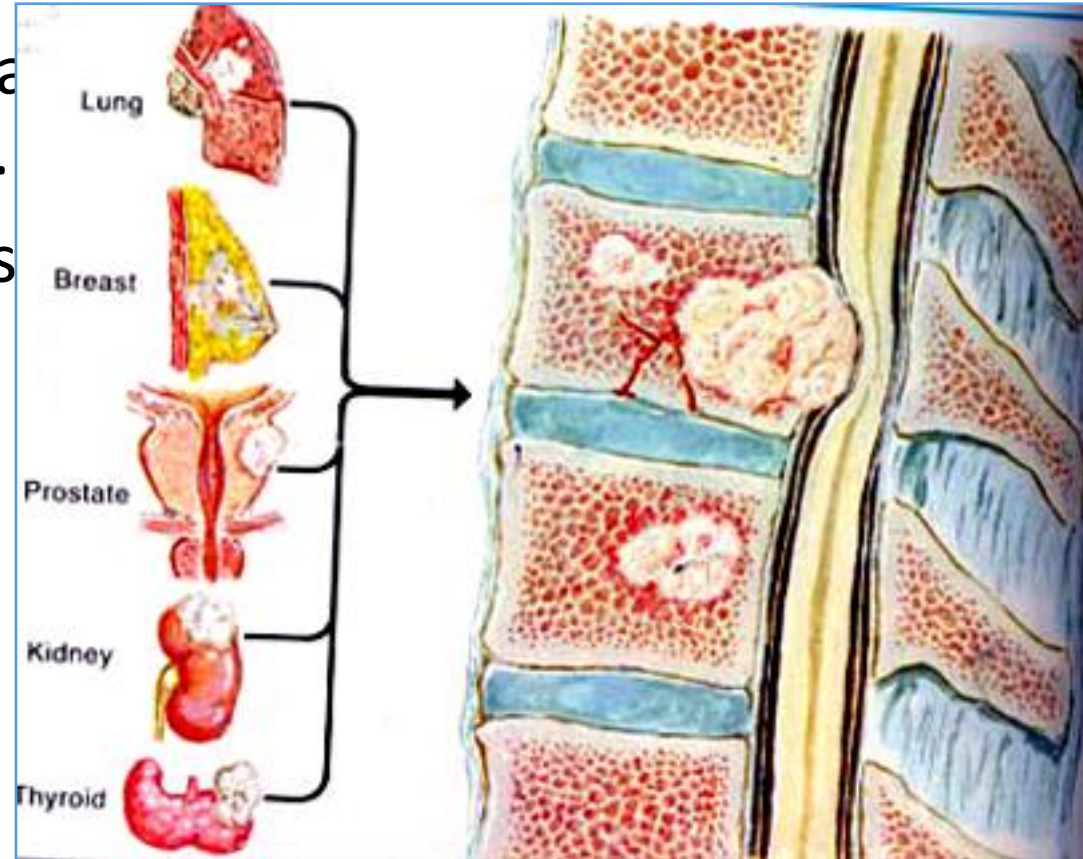
(B) CT, coronal reconstruction, bone window：可見C5骨頭被侵蝕之邊緣整齊平順(black arrow)，表示這是被成長緩慢的腫瘤侵蝕。

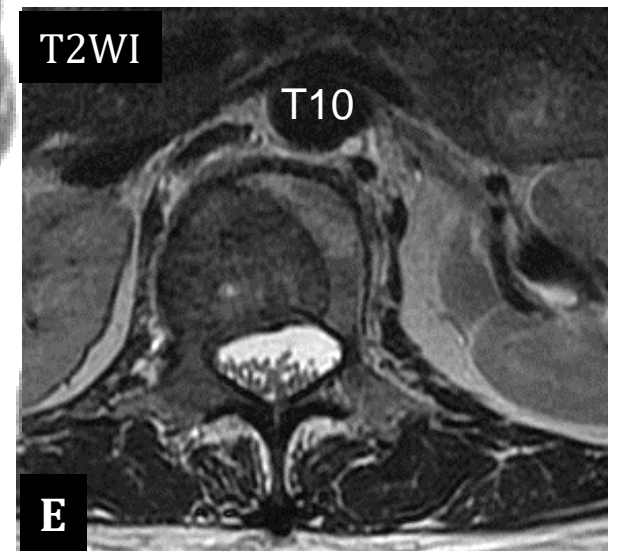
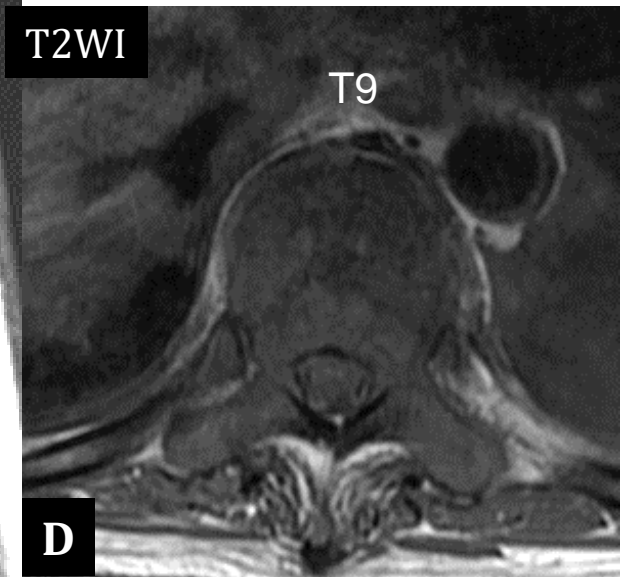
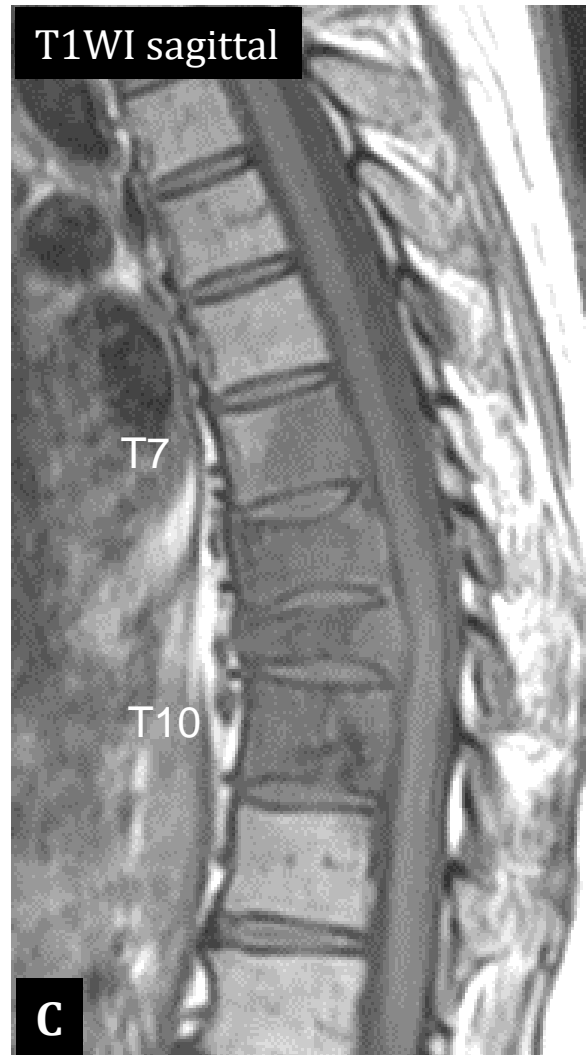
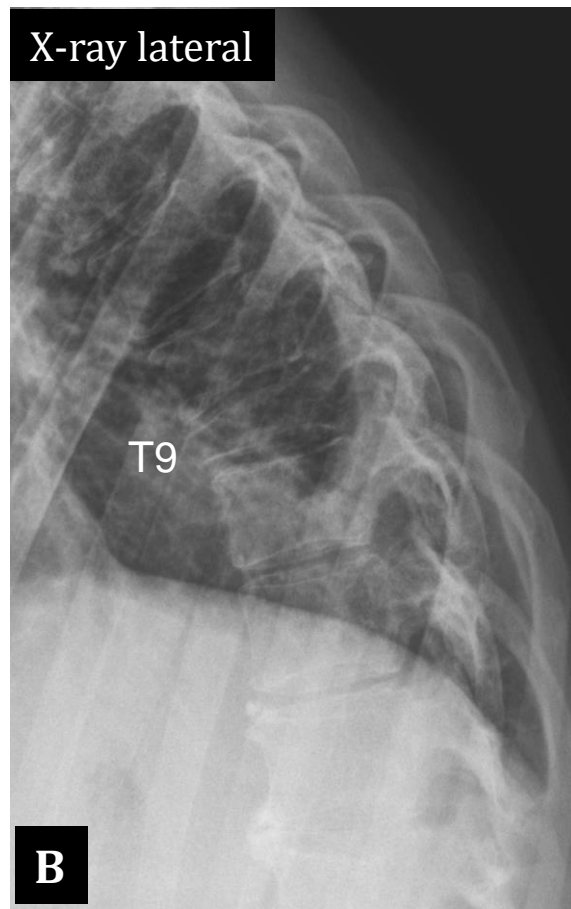
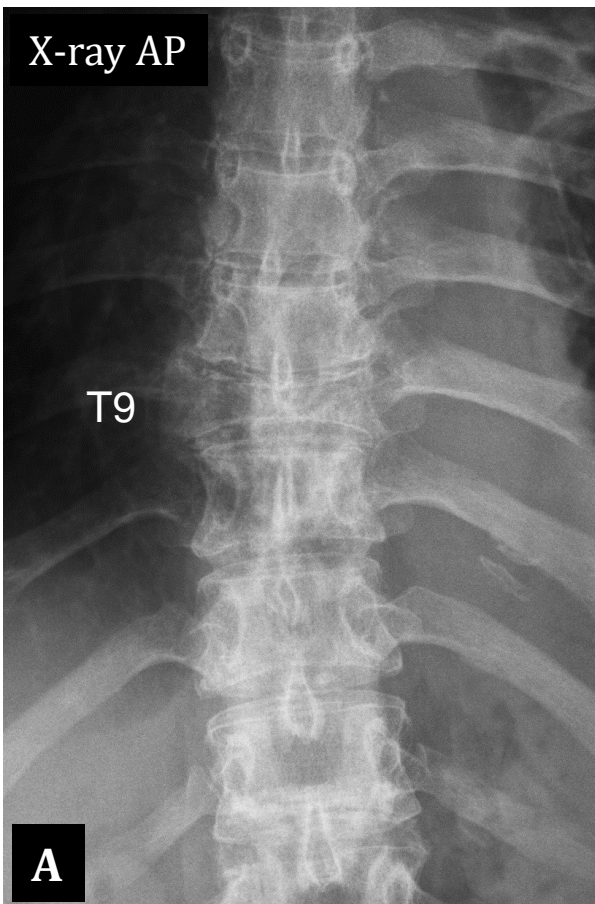
(C, D)MRI、contrast T1WI：此腫瘤顯影良好，是由脊椎腔內長出，沿著神經孔往外擴展到頸部，形成啞鈴型(arrows)，這是典型的神經鞘瘤。

手術取出腫瘤，病理證實是schwannoma。

Extradural tumors:

- Intraspinal canal: Lymphoma, hemangioma, metastasis.....
- Vertebral bodies: metastasis, bony tumor from the vertebral body
- Paravertebral space: metastasis





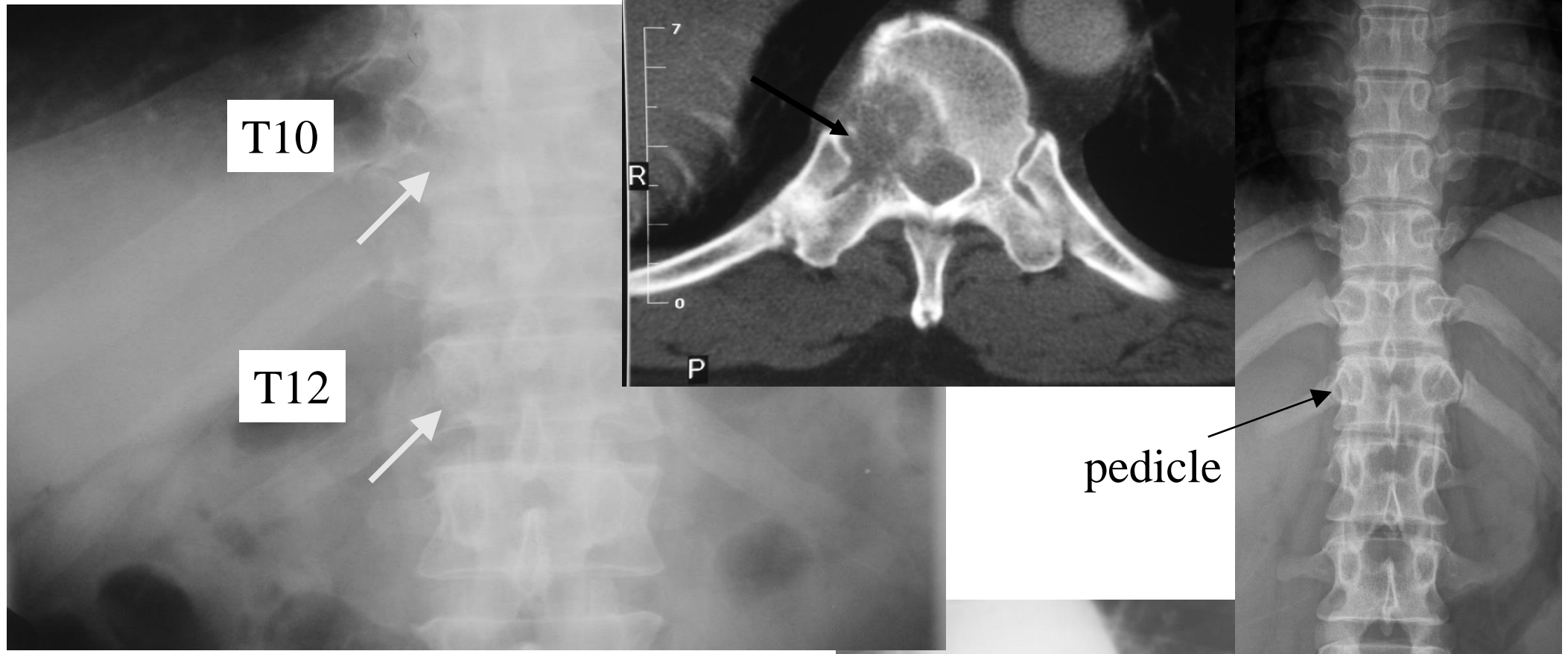
女/41，肺癌胸椎轉移

(A,B)X-ray、T9壓迫性骨折，且左右側pedicles消失，疑是轉移。

(C)MRI, T1WI: T9變矮，且訊號變暗，是pathologic fracture，往後稍微壓迫spinal cord，另外，T7、8、10也都訊號變暗，表示都是osteolytic metastases。T8也稍微變矮，也是pathologic fracture。每一個disc都完整。

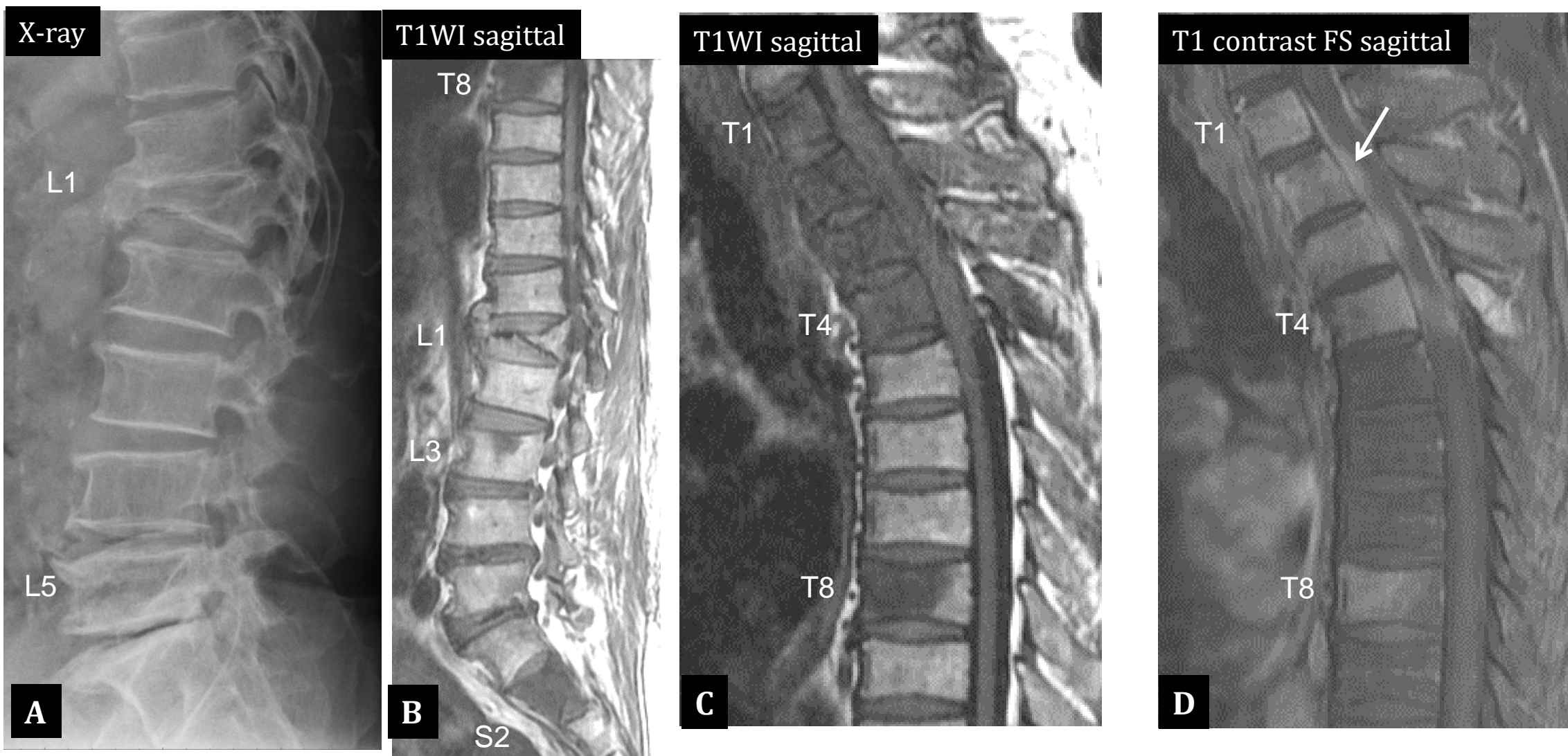
(D,E) T2WI, axial: 沒有明顯被軟組織腫瘤取代。

手術及病理切片證實是肺癌轉移。



Lung cancer with spinal metastases

Loss right pedicles of T10,12,
Mild compression fracture of T10



男/71，胸椎、腰椎轉移病患逐漸雙腿無力，跌倒後完全無法走路

(A) X光，L1嚴重壓迫性骨折，脊椎體退化長骨刺，但這些看起來是慢性的，無法解釋跌倒後完全無法走路。

(B) MRI, T1WI: 可見L1骨折是舊的，另外發現S2、L3、T8都有低訊號，表示osteolysis。

(C)再往胸椎做MRI, T1WI: 可見T8及T1-4都是低訊號。

ne marrow訊號被壓掉，有顯影的變白，確認T8、T1-4有osteolyses，並且有一些軟組織(arrow)侵入脊椎腔內壓迫脊髓。

手術及病理切片報告: poorly differentiated carcinoma, metastatic，來源不明。

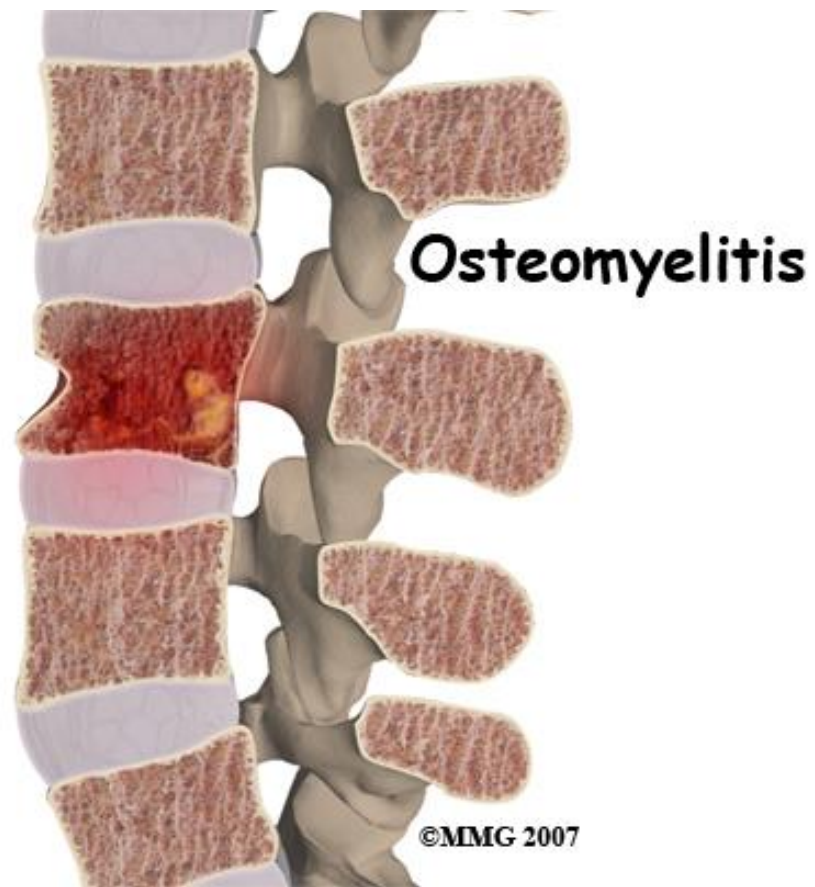
重點：

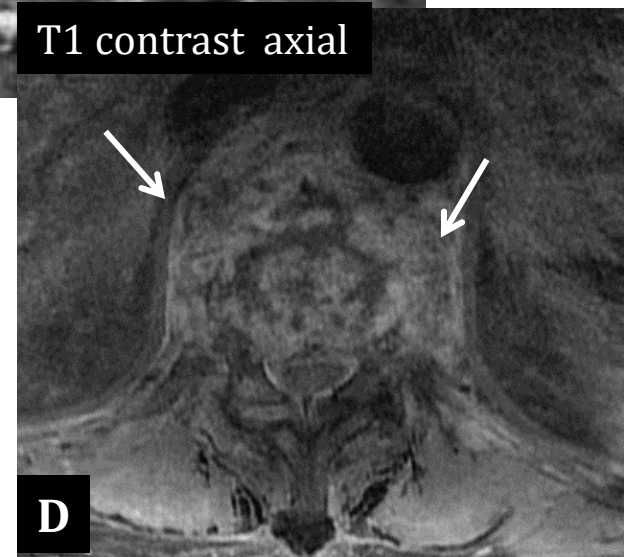
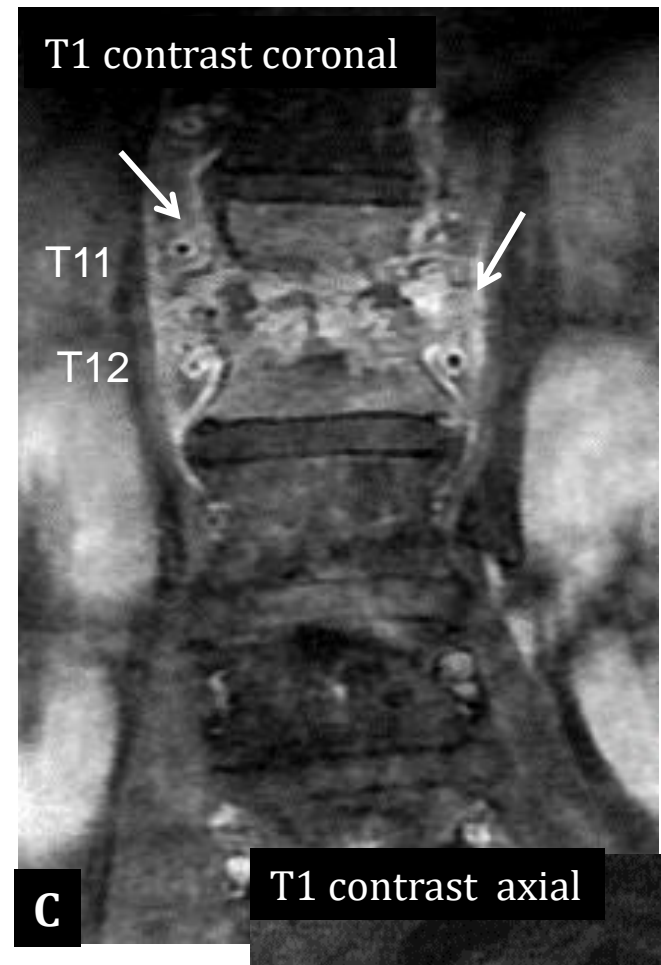
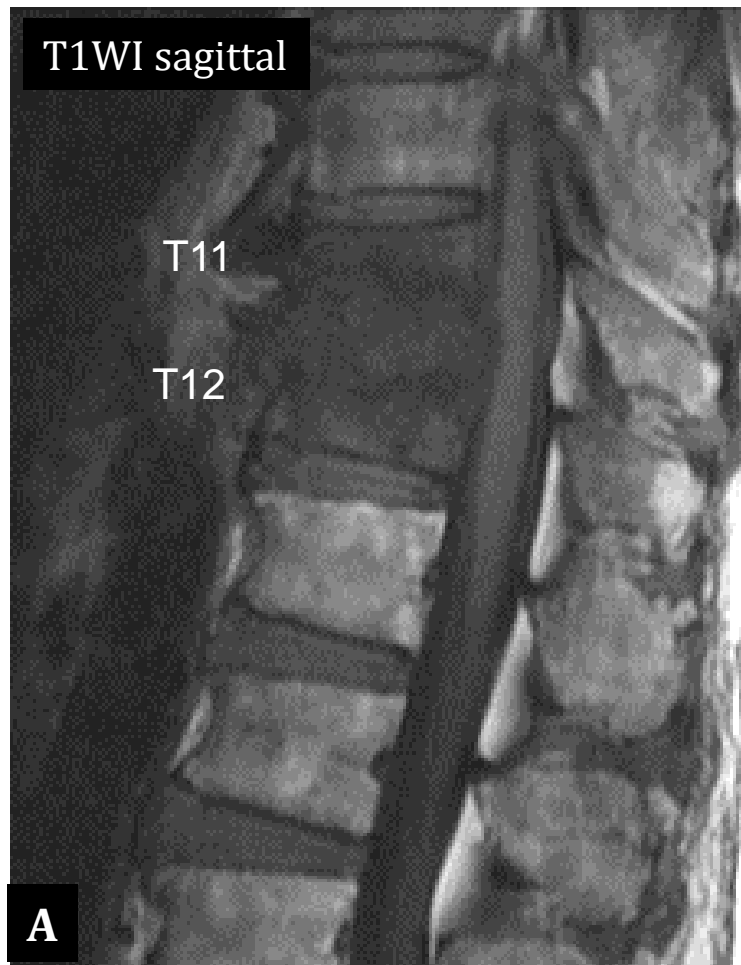
- Spinal tumors 依 location 之分類
Intramedullary, Intradural-extramedullary, Extradural
- Intramedullary tumors 之種類及MRI images.
- Intradural-extramedullary tumors 之種類及MRI images.
- Extradural tumors 之種類及MRI images.
- What is pathological fracture?



5. Spinal infectious diseases and spinal cord inflammatory diseases





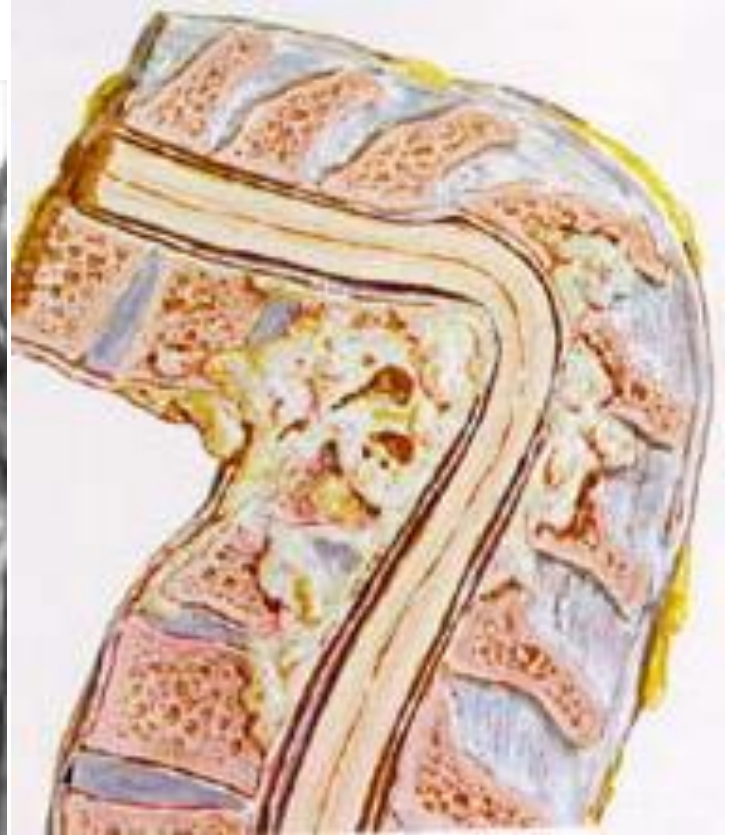


男/75，T11、12 osteomyelitis, discitis (spondylodiscitis)

主訴嚴重腰痛、發燒

(A, B)MRI：T11、12脊椎體在T1WI變暗，T2WI變亮，中間的disc也變亮。

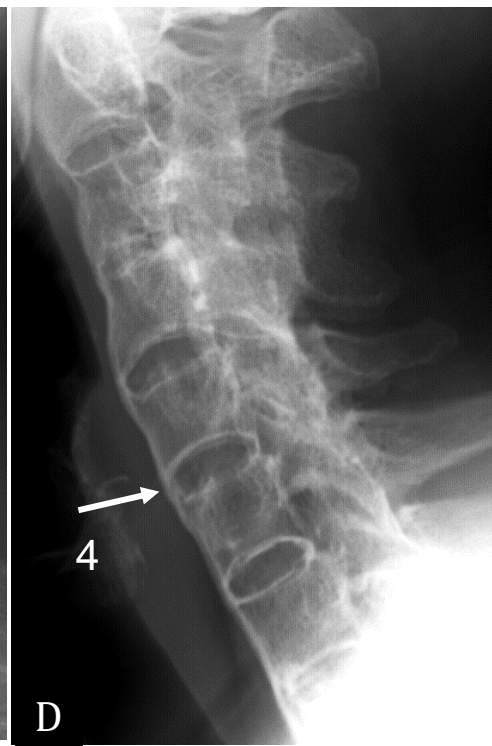
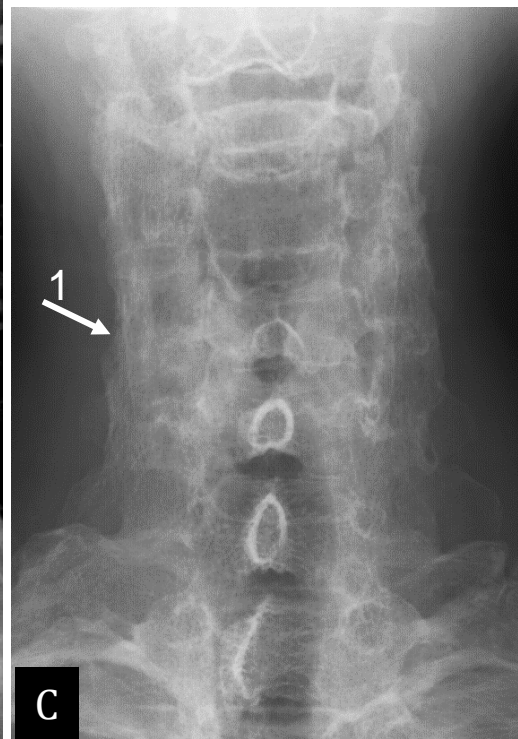
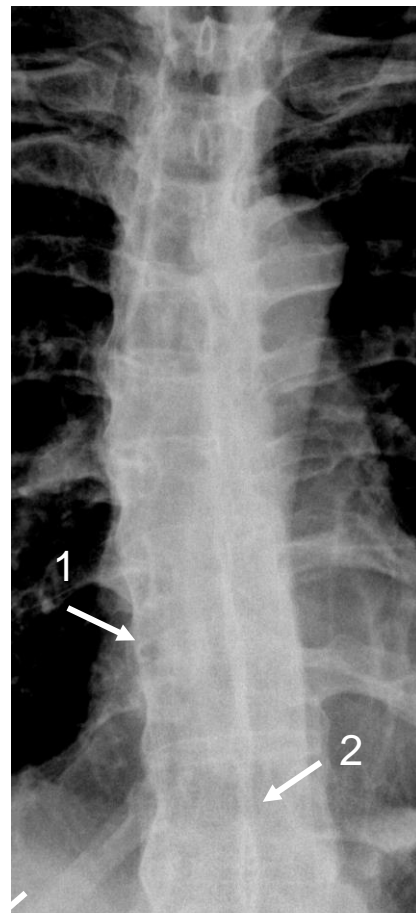
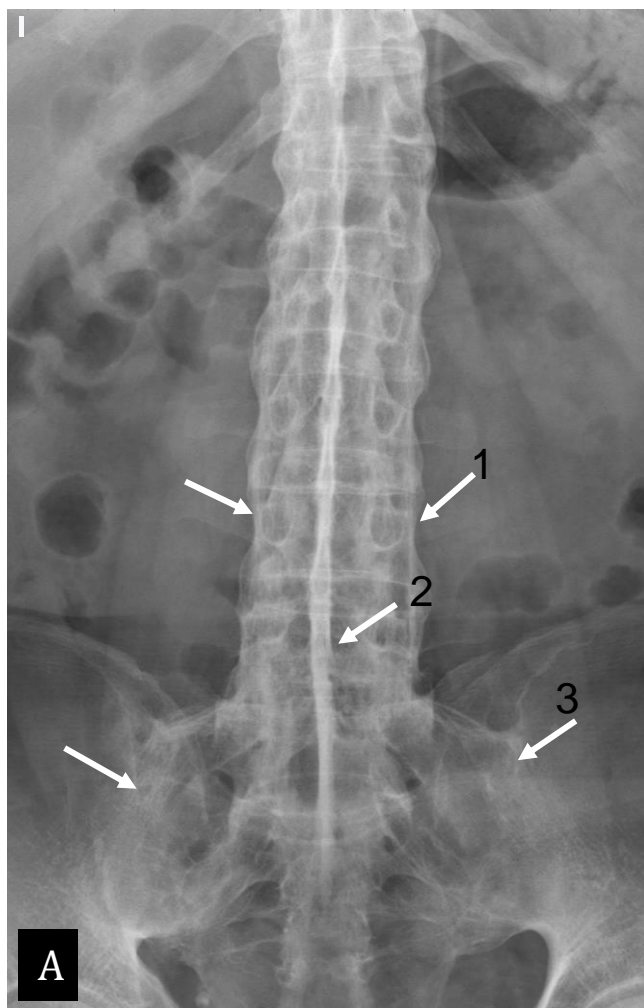
(C, D)注射顯影劑之後，T11、12脊椎體及disc都被強化，脊椎體周邊也有軟組織發炎(arrows)，這像osteomyelitis合併discitis (spondylodiscitis)，因為disc也有，所以不像osteolytic metastasis。



F/66
TB spine

泰迪羅賓





男/60 僵直性脊椎炎 (ankylosing spondylitis)

(A) X-ray，腰椎: 可見腰椎被雙側邊緣韌帶骨贅連結 (syndesmophyte) (1)，使脊柱像竹子 (bamboo spine)。中間有 dagger sign (2)，此乃因 spinous process 之韌帶骨贅所造成。雙側 SI joints 也失去關節空間，融合在一起 (3)。

(B) X-ray，胸椎: 胸椎也可看到雙側邊緣韌帶 syndesmophyte (1) 及 dagger sign (2)，但比較不清楚。

(C, D) X-ray，頸椎; 雙側邊緣韌帶 (syndesmophyte) (1) 較不清楚，沒有 dagger sign; lateral view 可清楚看到 anterior syndesmophyte (4)。



M37

僵直性脊椎炎 (ankylosing
spondylitis)

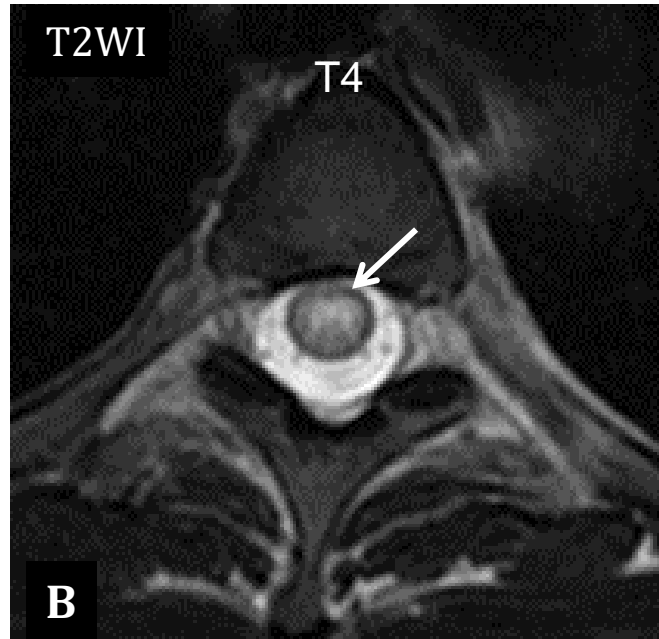
Chest X-ray and CT:
Ankylosing spondylitis.

Inflammations of Spinal Cord

- Myelitis
- Radiation myelitis
- Polio-like myelitis
- Enterovirus myelitis

Diagnostic tools:

- MRI



女/27，橫貫性脊髓炎(transverse myelitis)
SLE患者，突然雙腿無力，下肢失去感覺。

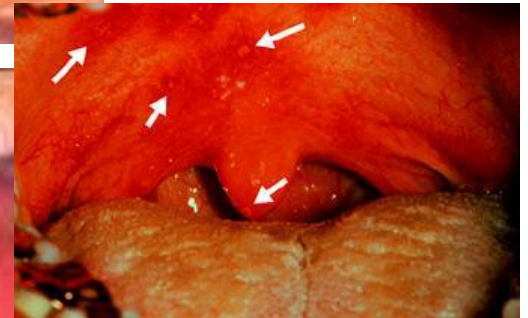
(A)MRI, T2WI: 可見胸椎spinal cord長條形高訊號病灶(arrow)。

(B) 橫切面可見spinal中間大部分區域變亮，這是myelitis的徵象。

對SLE患者，這是一種transverse myelitis。



手足口症



herpangina

**Hand foot mouth disease (HFMD)--
vesicles & ulcerations on the hands, feet, lips**

HFMD is caused by viruses that belong to the enterovirus genus (group). This group of viruses includes

Polioviruses

Coxsackie viruses

Echoviruses

Enteroviruses.

Coxsackievirus A16 is the most common cause of HFMD, but other coxsackie viruses have been associated with the illness. Enteroviruses, including enterovirus 71, have also been associated with HFMD and with outbreaks of the disease.

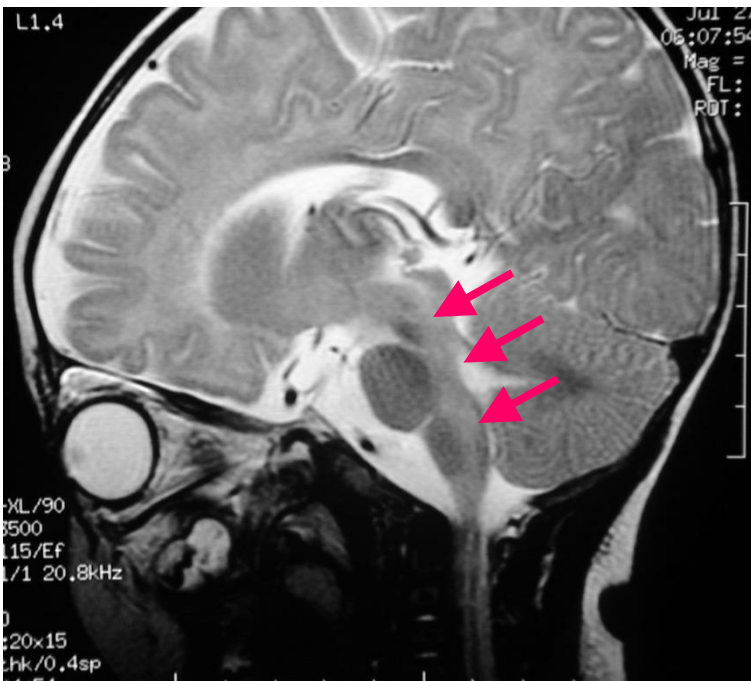
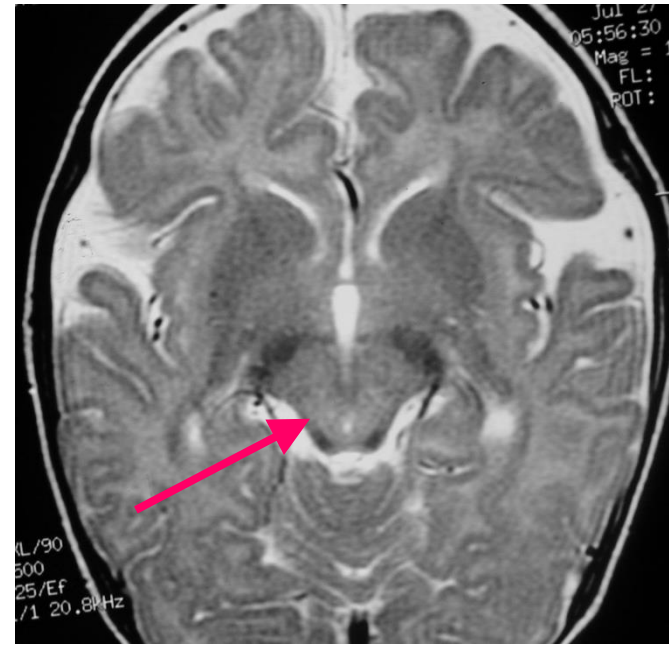
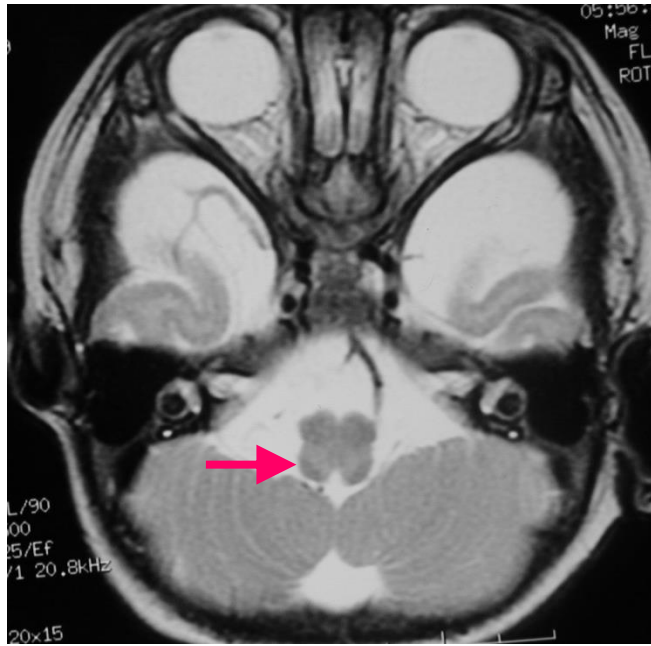
疫情資訊 - 腸病毒又1死3歲男童4天不治 2012-08-08
中國時報

衛生署疾病管制局公布今年第2例腸病毒71型死亡個案，一名桃園3歲男童感染腸病毒後病情迅速惡化，發病4天即死亡，曾與他接觸的4名幼童也感染腸病毒。



上周 3萬幼兒染腸病毒 1020606

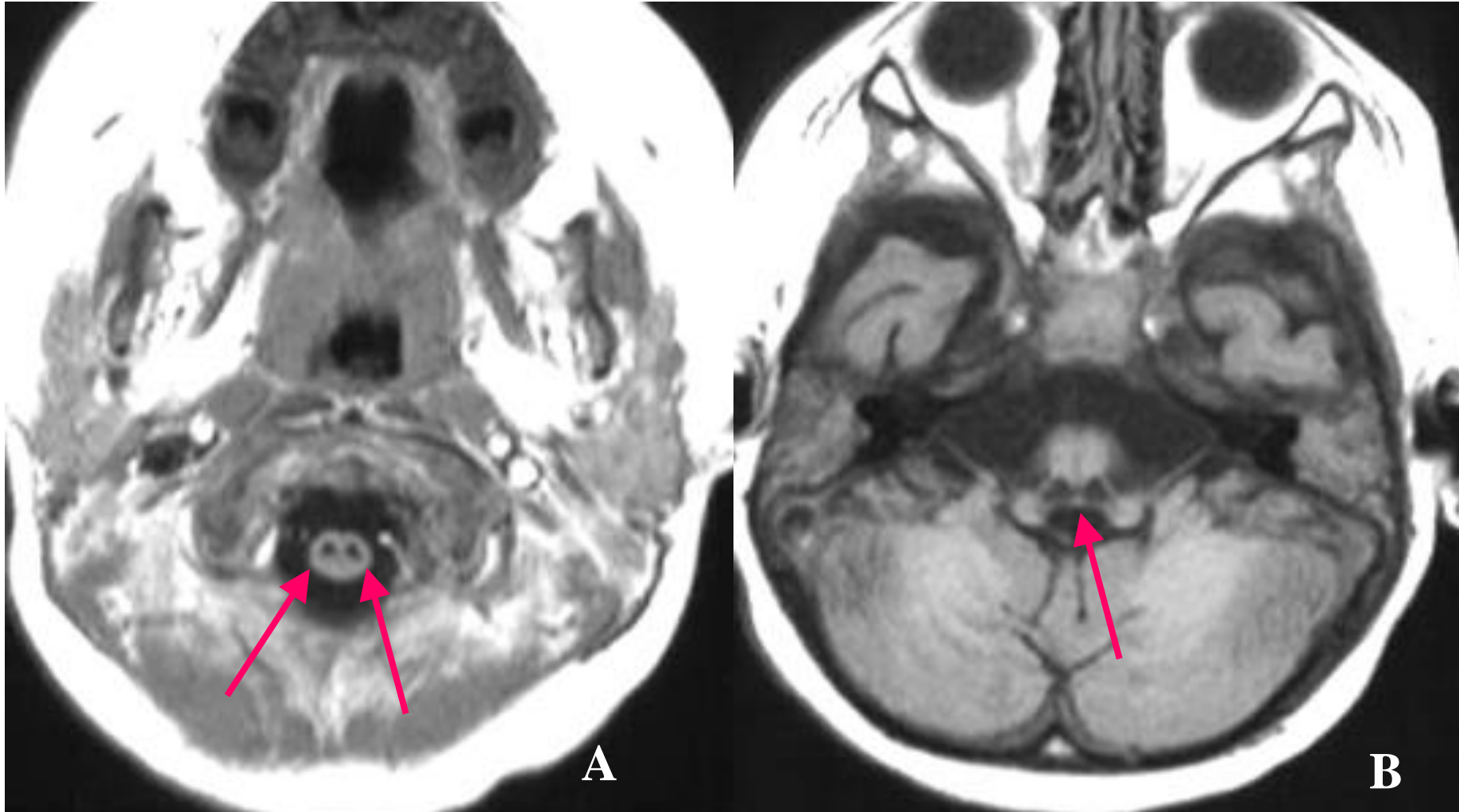
腸病毒克沙奇A6型病童除了全身，連臉上都常滿布水泡，家長想忽略也難，研判應是今年急診就診率創近年同期新高的原因。(林口長庚醫院兒童感染科主任黃玉成、讀者提供)



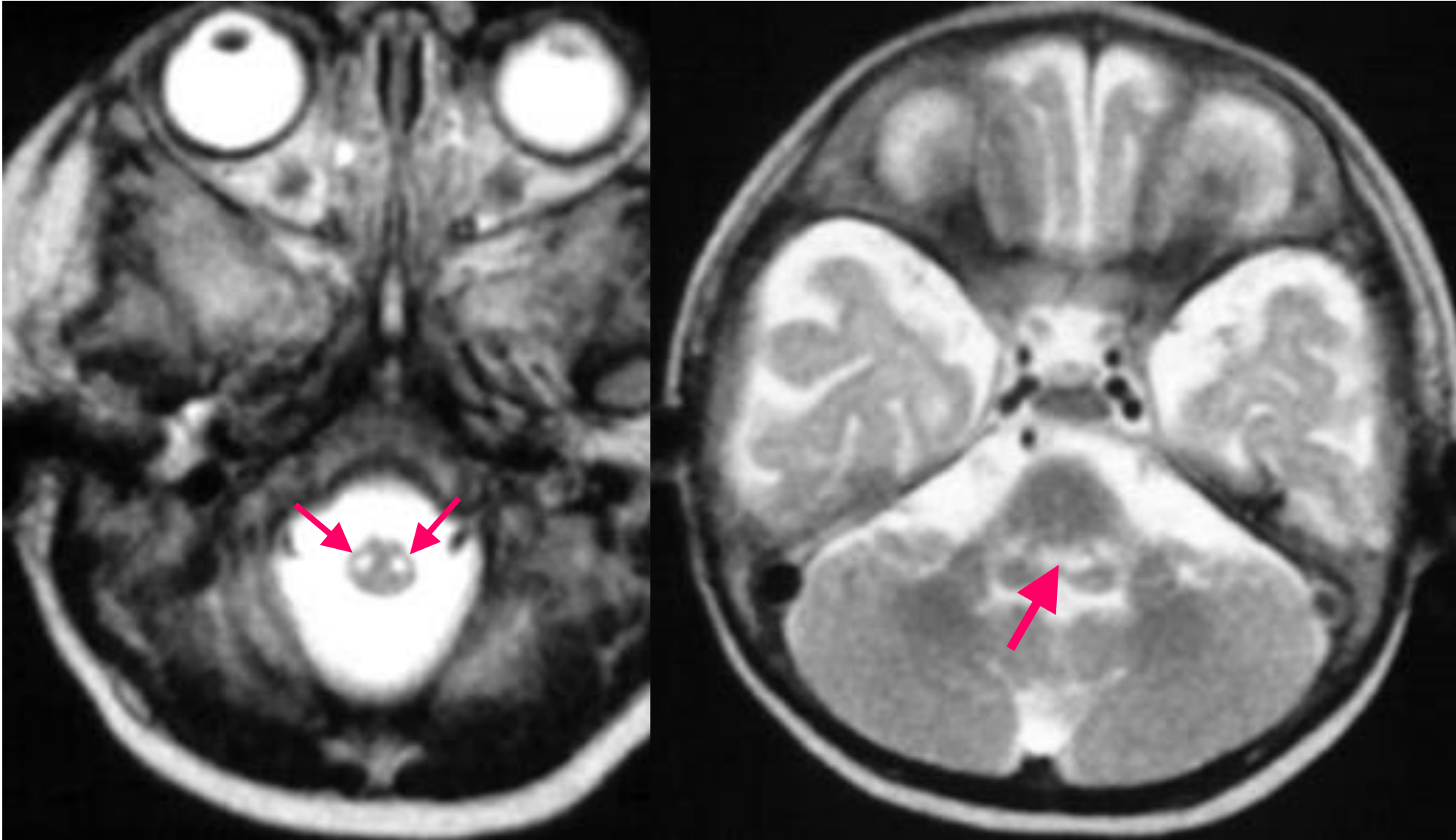
HFM disease, left upper limb paralysis,
with myoclonic jerk.

90,7,27 MRI:

Hyperintensity in the posterior aspects of pons,
medulla oblongata and central portion of midbrain

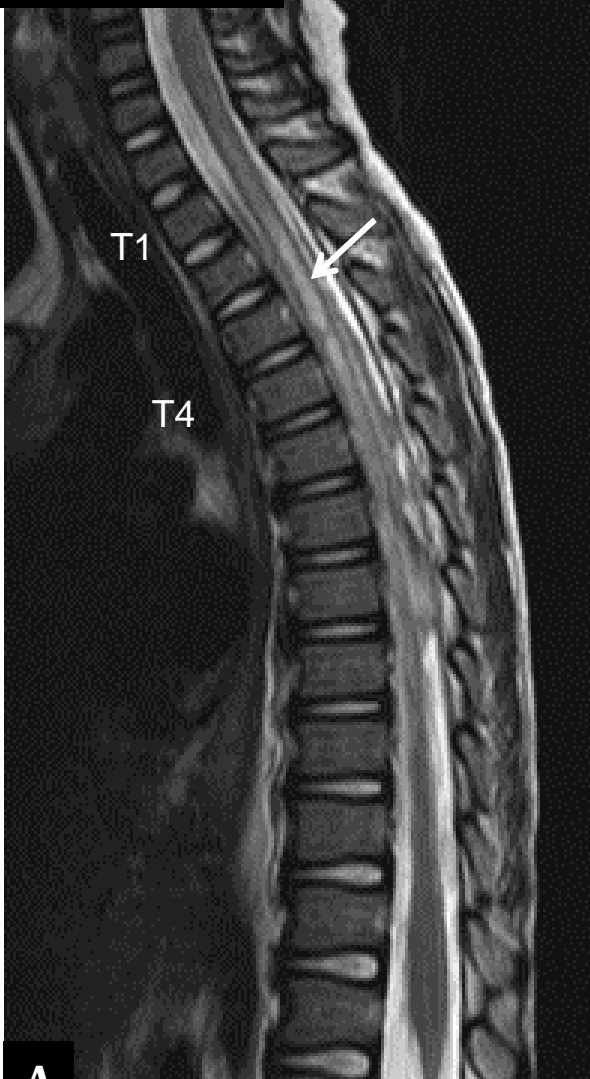


Female, 2 y/o
Patient was admitted at July 10
MRI was performed at Oct 16
patient was in vegetate state, and was on respirator



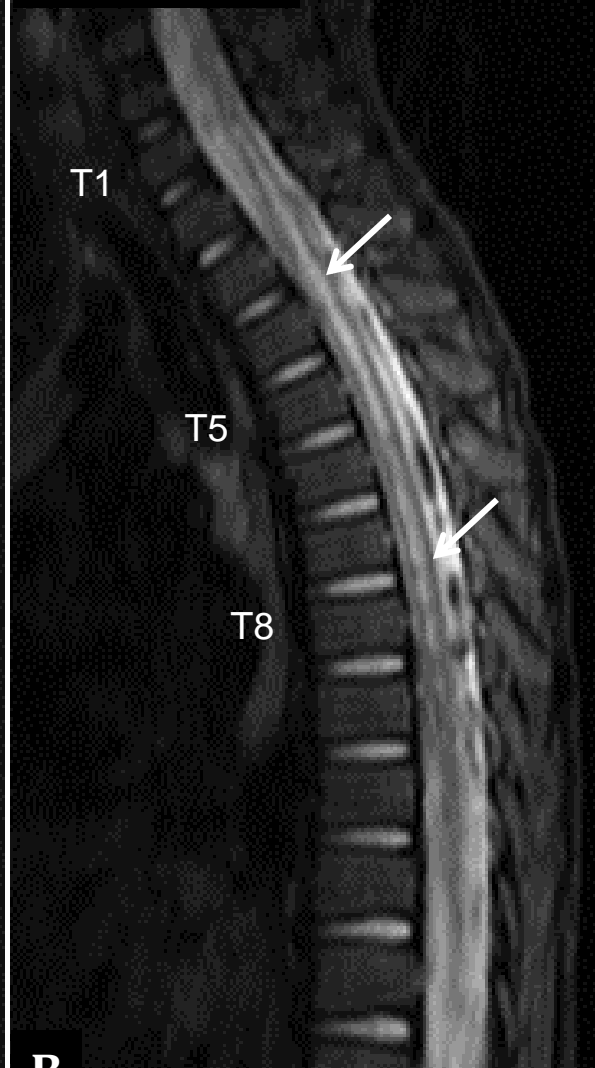
Old brain tissue damages in the bilateral dentate nuclei of cervical spinal cord, and in the posterior portion of the medulla

T2WI sagittal



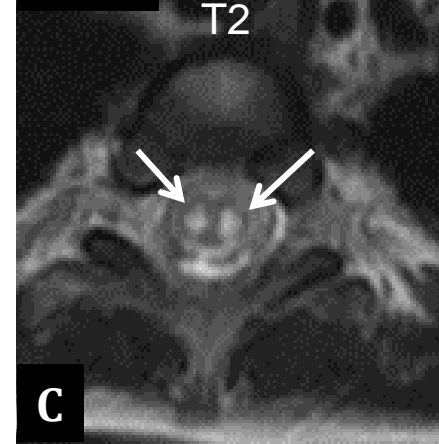
A

T2WI sagittal



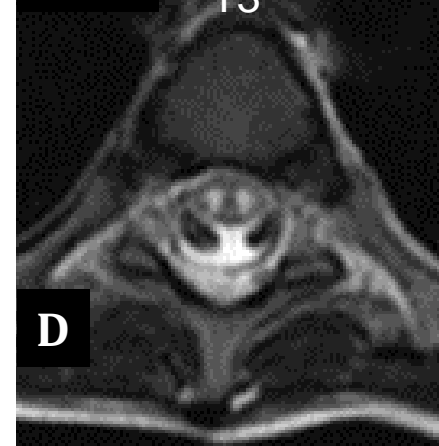
B

T2WI



C

T2WI

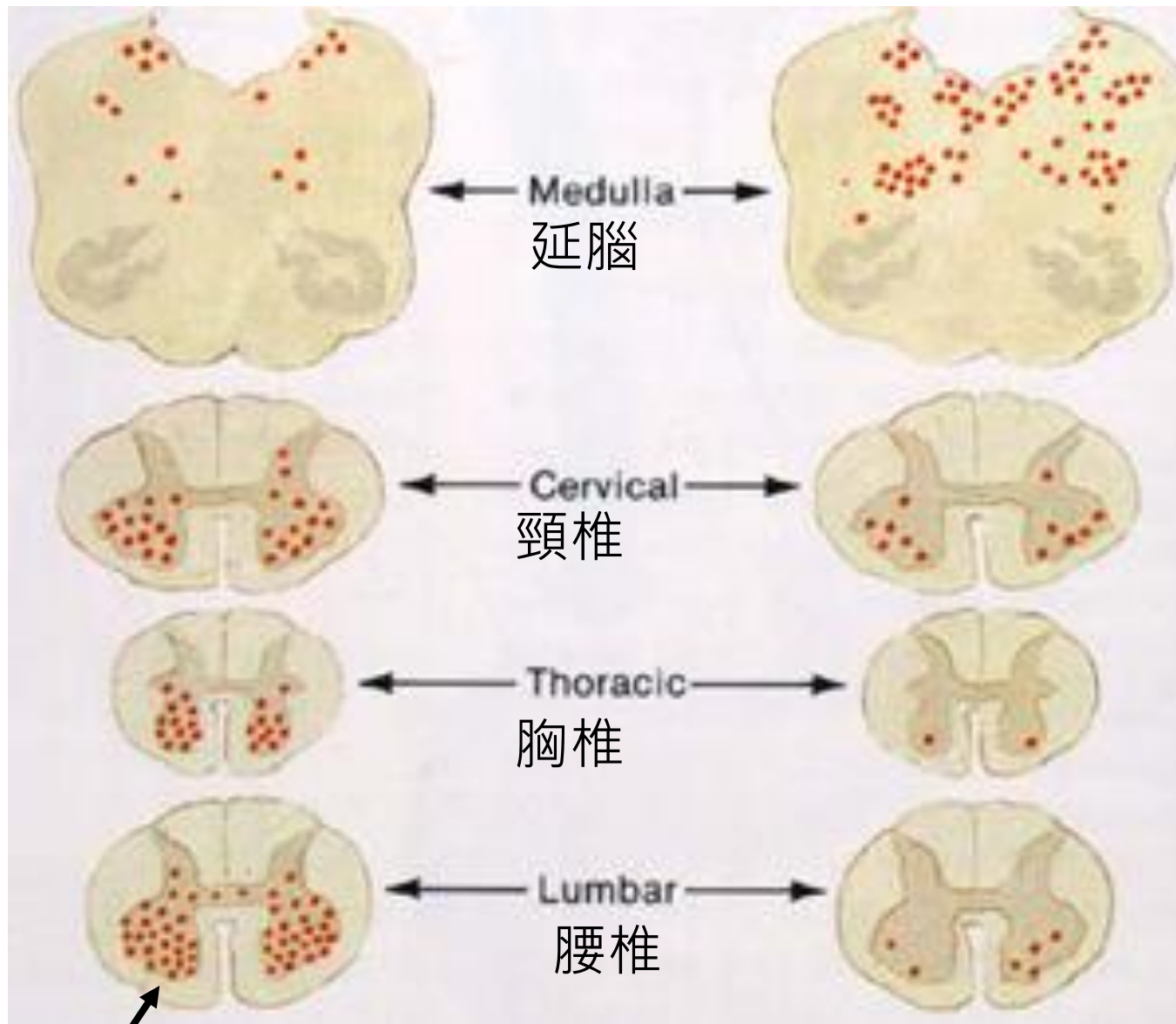


D

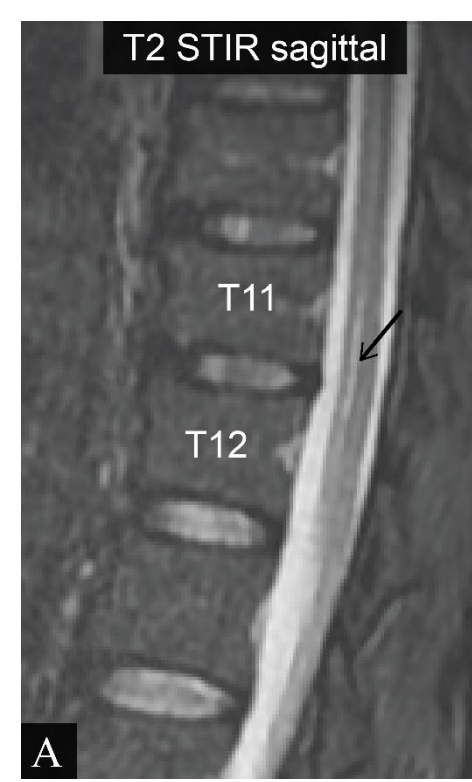
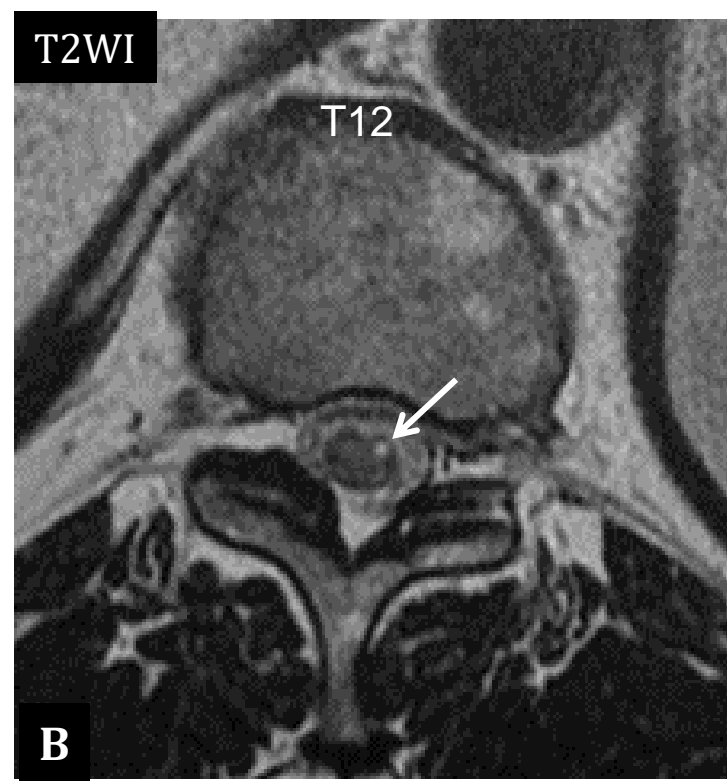
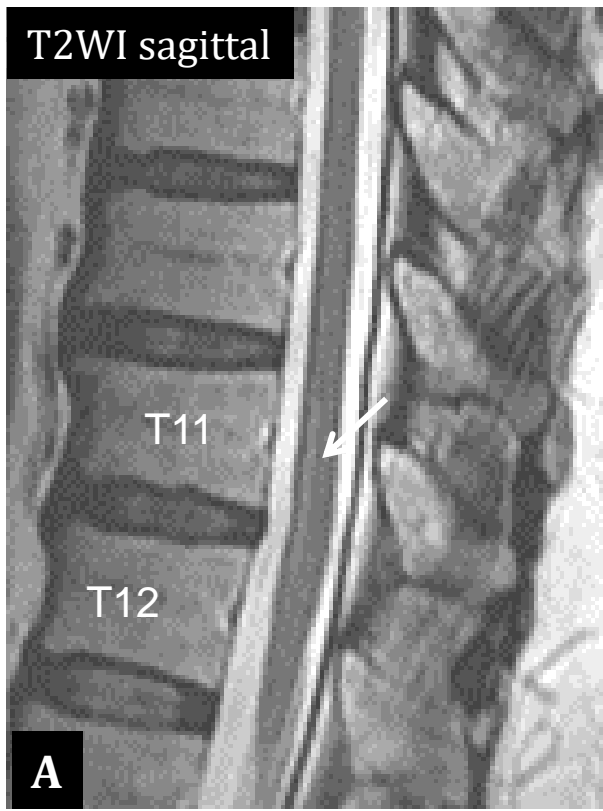
女/4，腸病毒脊髓炎(enteroviral myelitis)

發燒、手足口症(hand-foot-mouth disease)，突然雙腿無力。

(A-D)MRI, T2WI: 脊髓在T1-8有一長條型高訊號病灶(arrow)，是脊髓炎myelitis徵象。橫切面可見這是雙側ventral horns高訊號(arrows)，是典型的 enterovirus71型引起的myelitis。



Ventral horns 小兒痲痺



男/62，poliomyelitis後遺症

病人自幼時感染小兒麻痺症，之後就一直左側下肢萎縮無力，

(A,B) MRI, T2WI: 這是62歲時做健康檢查，發現脊髓在T11-12有一條白線。 Axial section可見脊髓左側萎縮，中間ventral horn有一小白點，這是典型的poliomyelitis後遺症。

重點：

- Osteomyelitis and diskitis CT, MRI images
- Enteroviral encephalitis and myelitis, MRI images