HYBRID RECONSTRUCTION after ANTERIOR CERVICAL DECOMPRESSION in case of D.D.D.

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Première partie

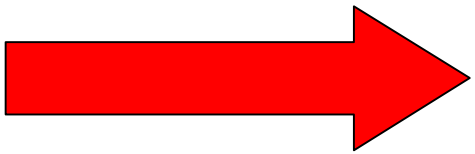
Summer University
Rome 2007

SEMANTIC

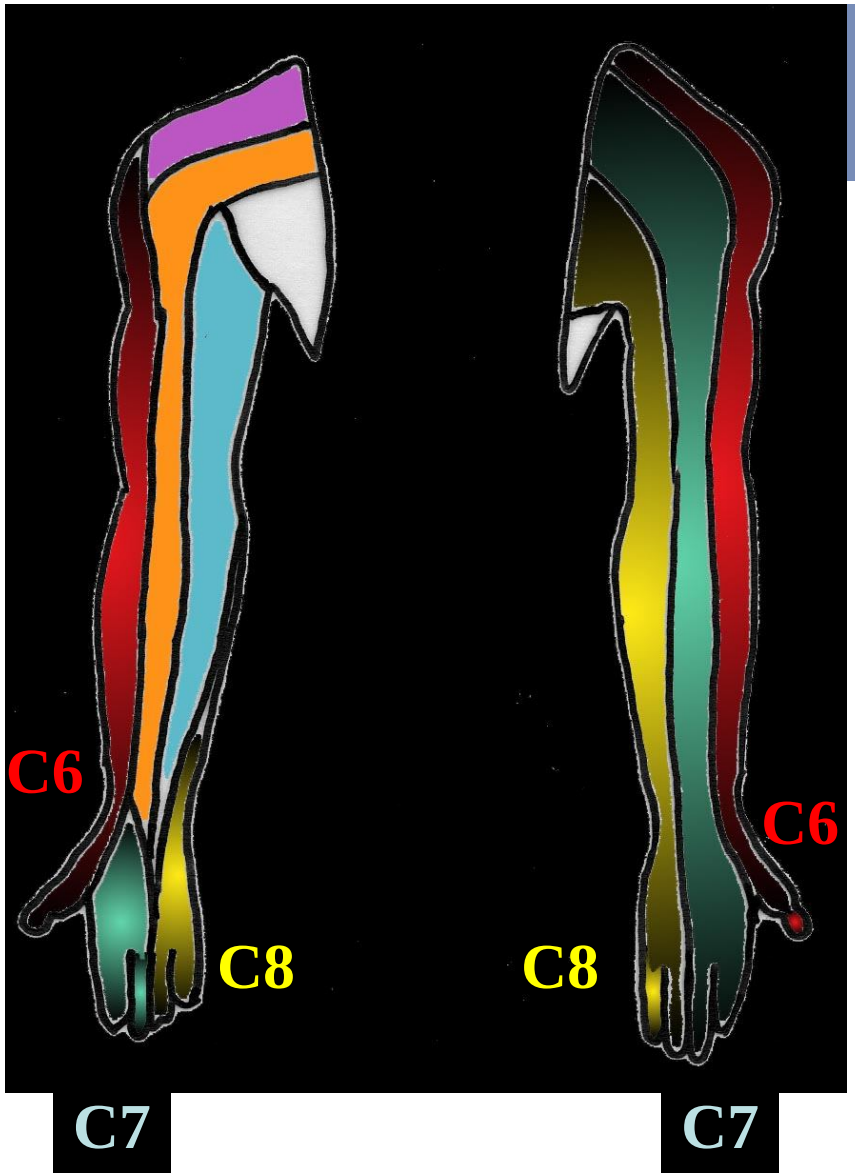
- **HYBRID : latin origin word**
- **= MIXED blood animal**
- **= COMPOSITE material**

ANATOPATHOLOGY

- **SOFT HERNIATION**
- **HARD HERNIATION**
- **RESPONSIBLE FOR C.B. &/or MYELOPATHY**

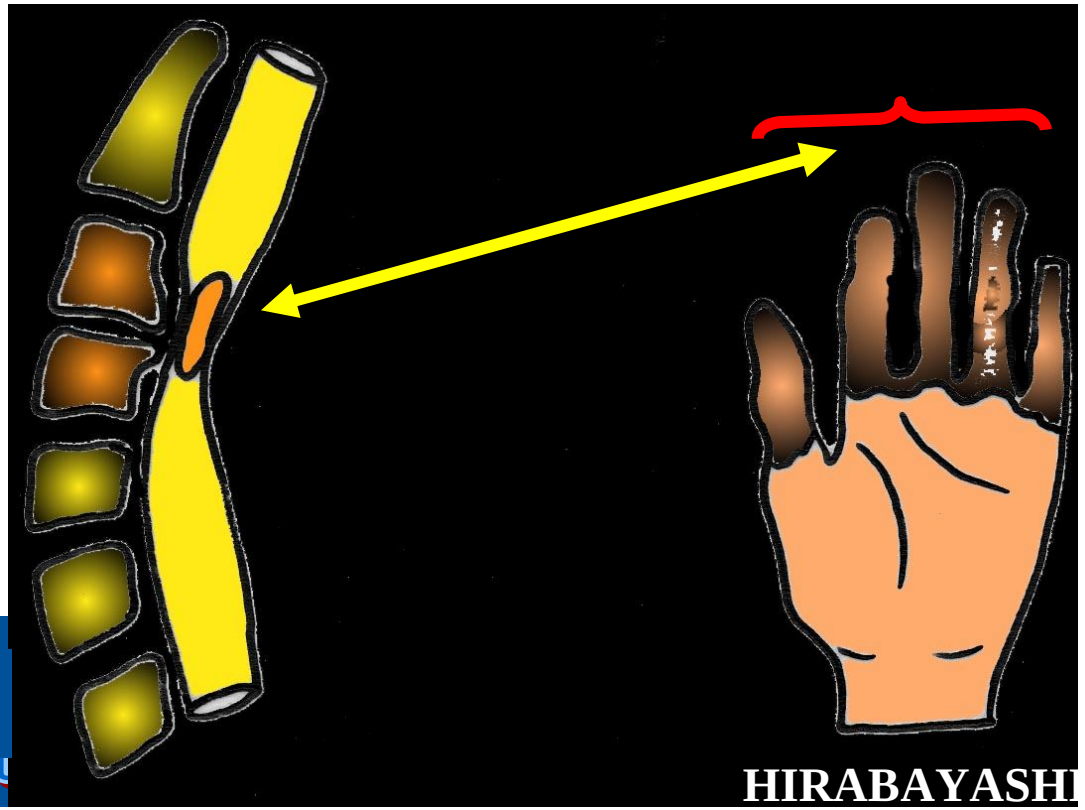


At more than one level



SHORT TRACT LESION

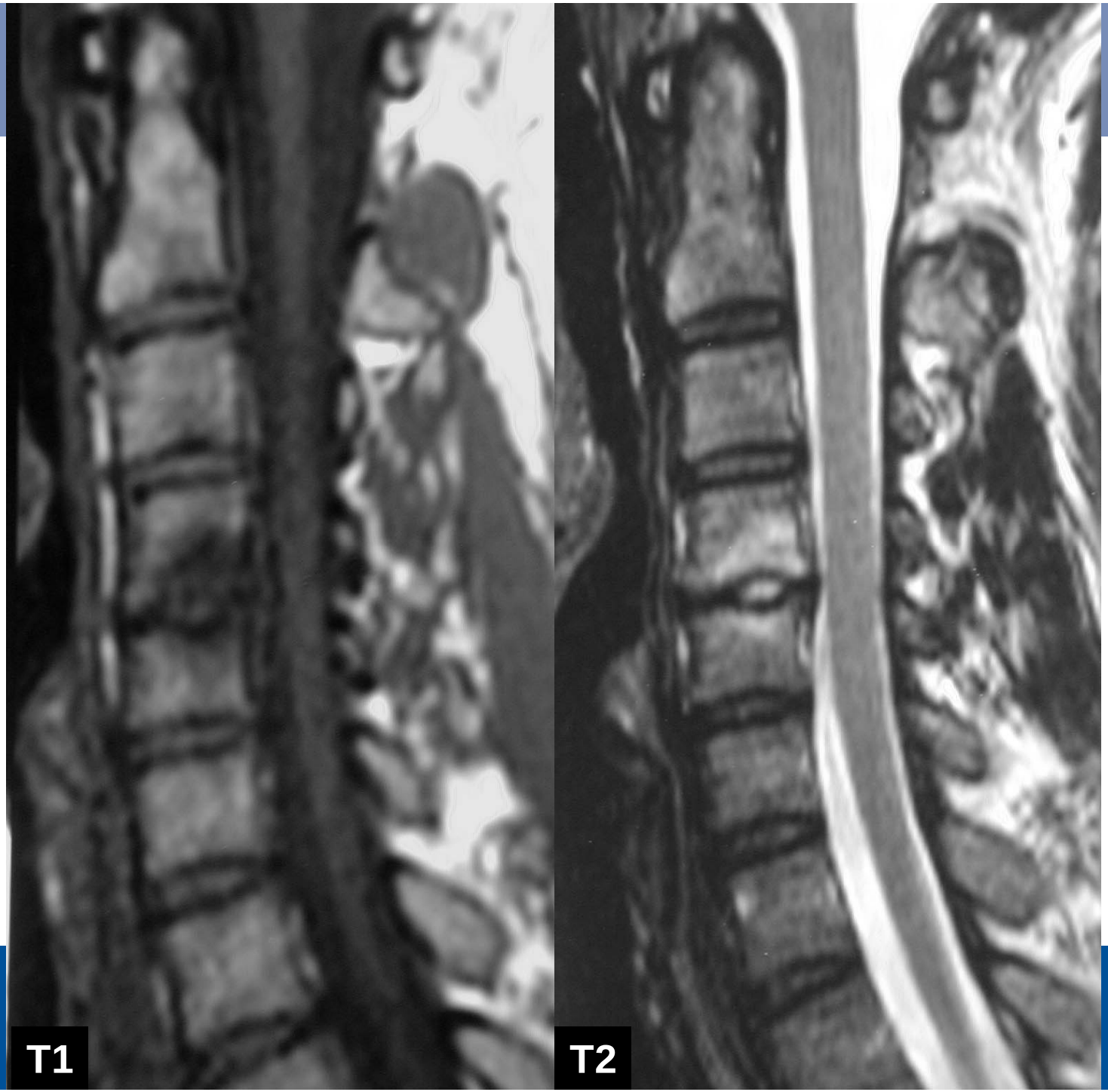
CERVICO BRACHIALGIA (C.B)

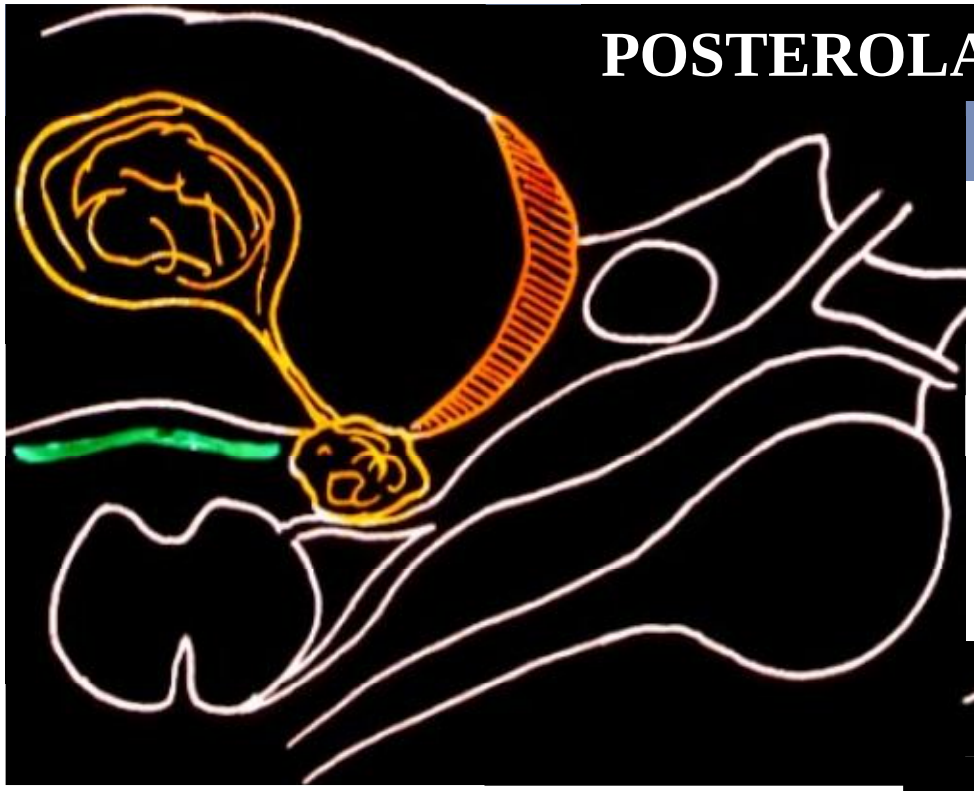


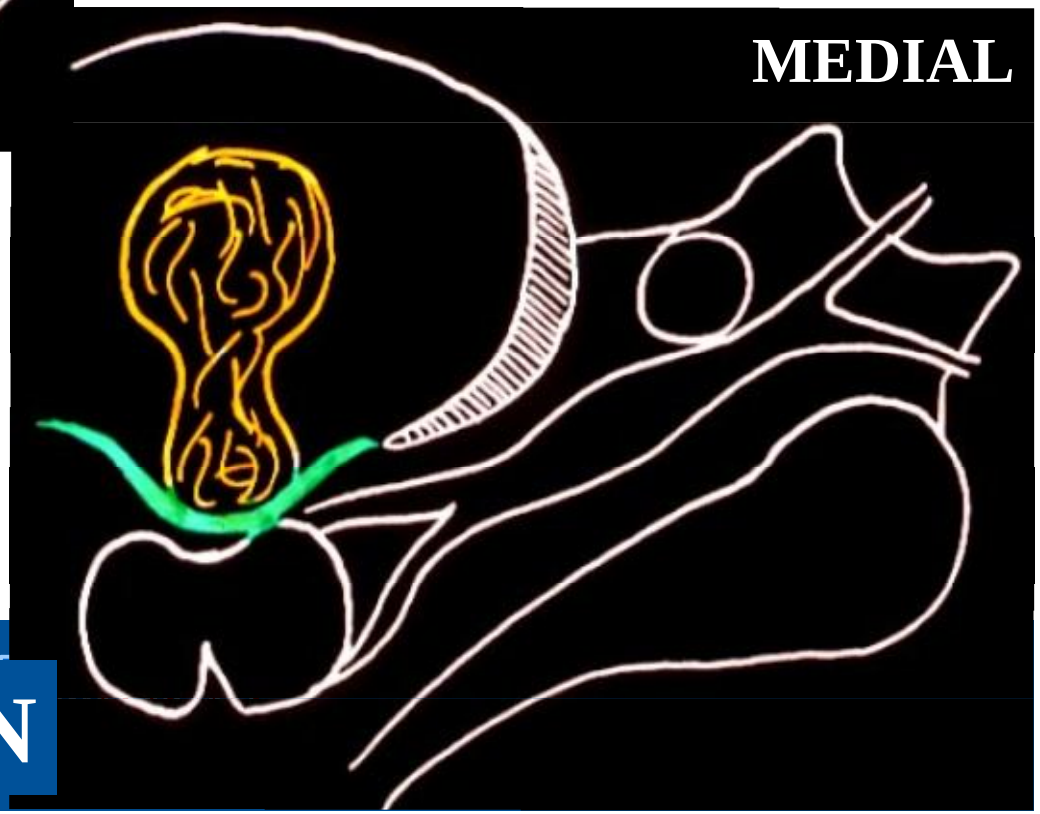
LONG TRACT LESION

NO INDICATION in case of ISOLATED CERVICALGIA

CERVICAL ISOLATED MODIC 1

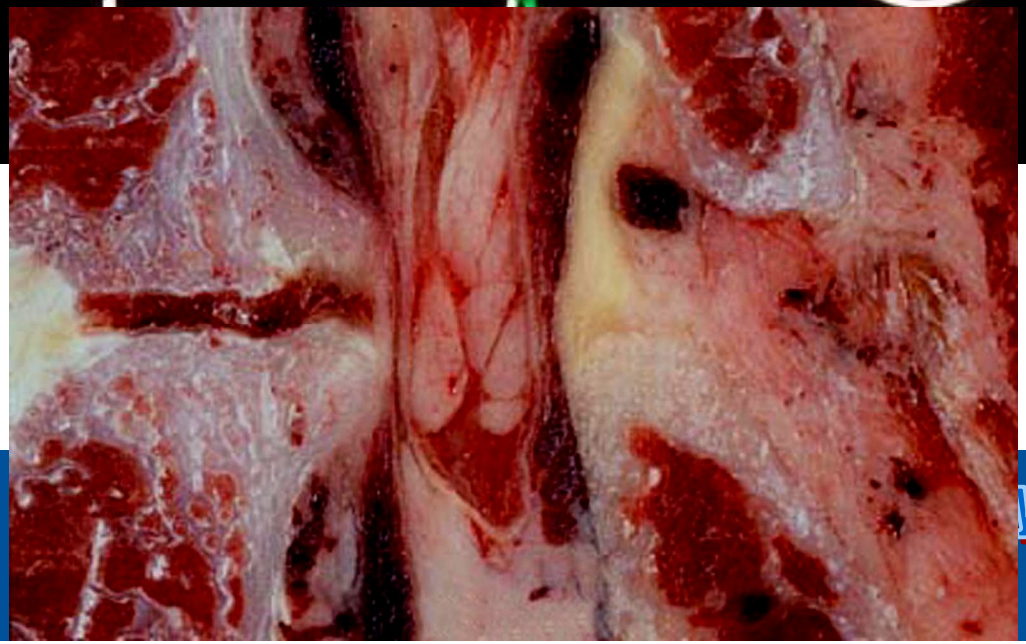

T1
T2

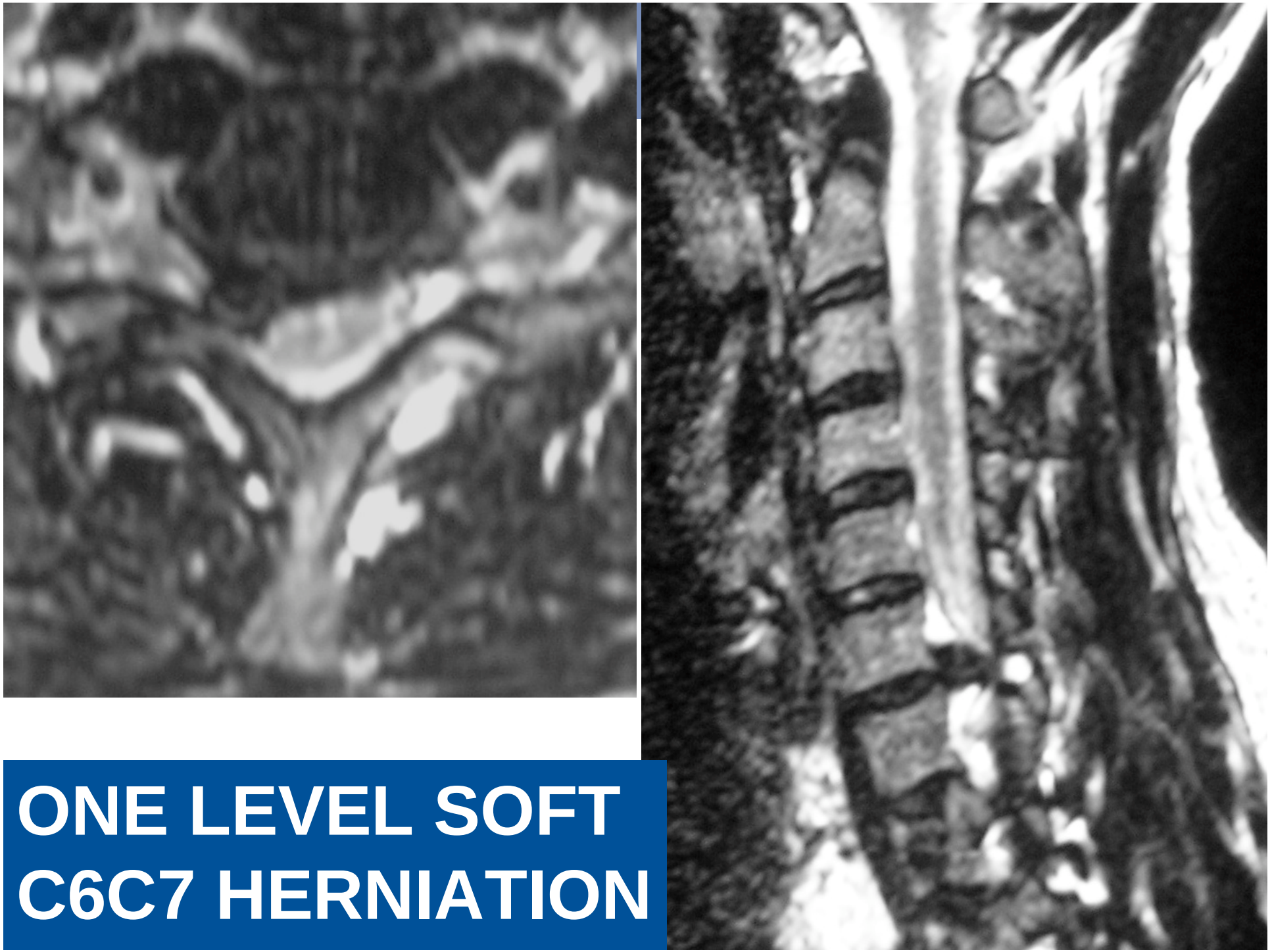




SOFT HERNIATION

HARD HERNIATION





ONE LEVEL SOFT C6C7 HERNIATION

OPTIONS

DISCECTOMY

FUSION SMITH & ROBINSON 1955

CLOWARD 1958

PROTHESIS

1-DISCECTOMY

LONG TERM RESULTS =
OTHER TECHNIQUES

WATTERS Spine 1994

POINTILLART

Anterior discectomy without interbody fusion for cervical disc herniation.Eur Spine J. 1995

KYPHOSIS : 6°

FUSION : 70%

BOHLMAN JBJS 1993 (A)

Increased Cervicalgias

2-FUSION

Fusion : 83 to 100%
Good results : 85 to 95%

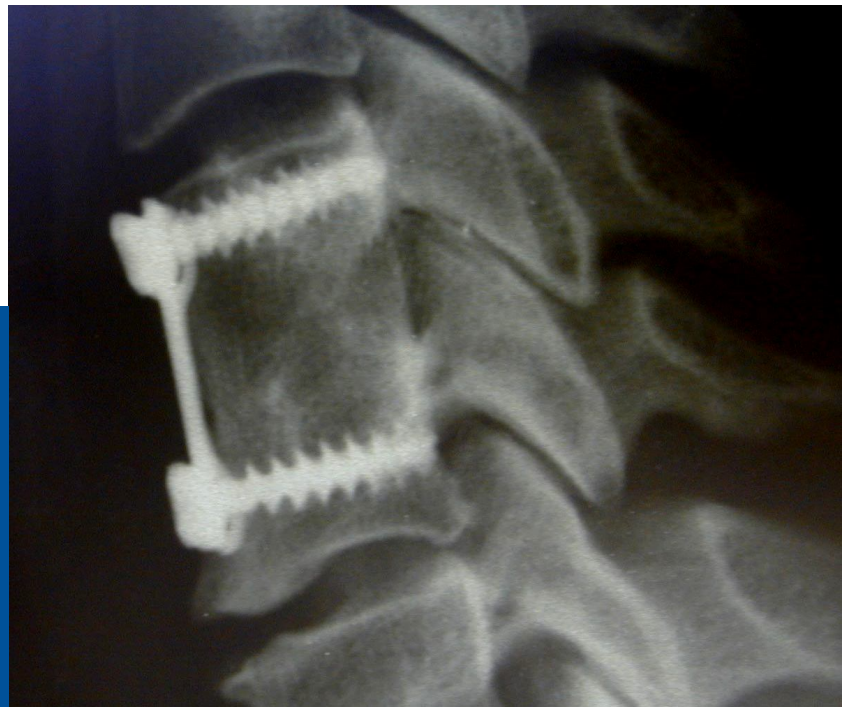
HACKER & al. Spine 2000

GOLD STANDARD

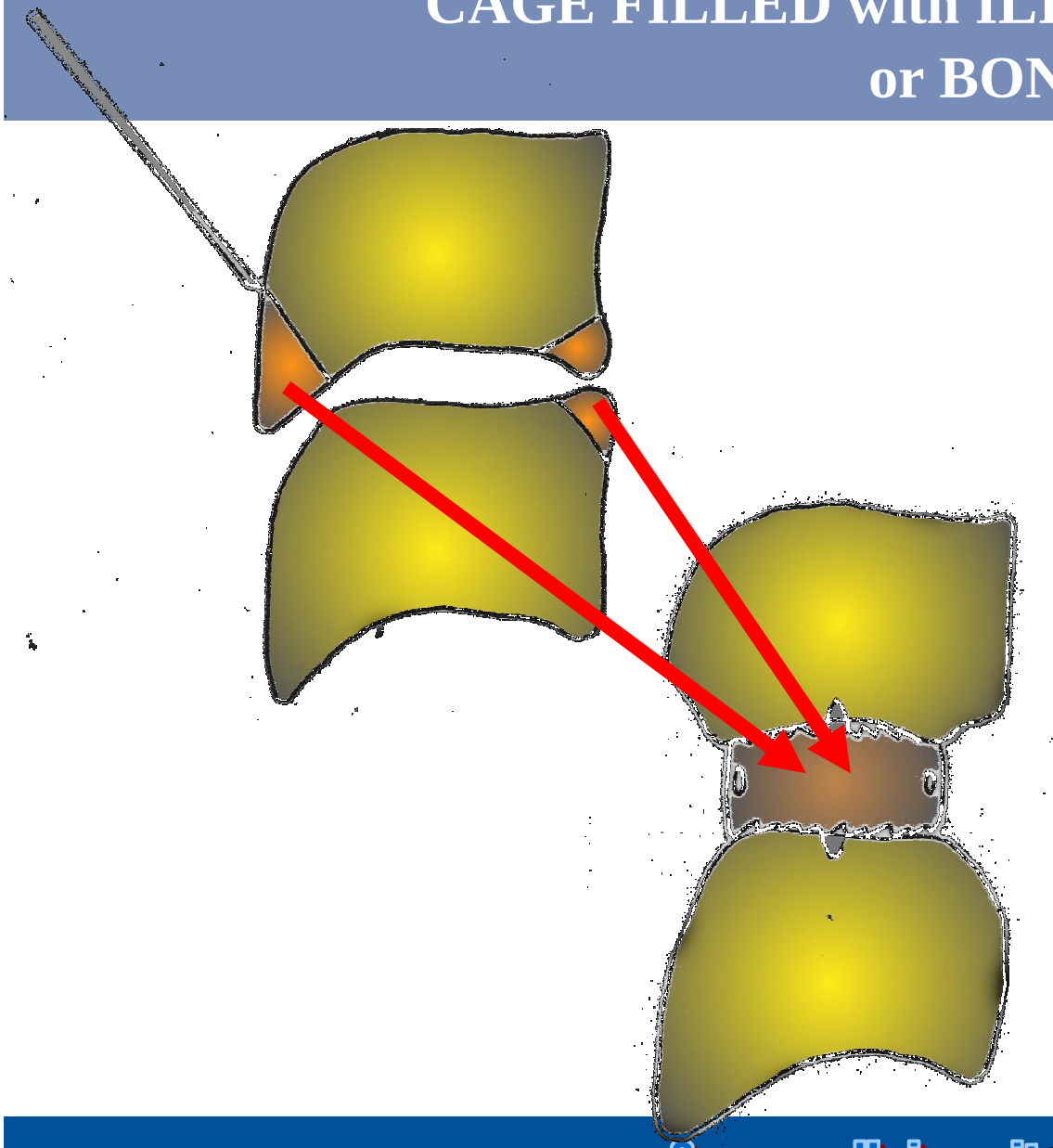
Complications : 10 to 20%

Discectomies in US
Fusion : 90% in 1999
Fusion : 70% in 1990

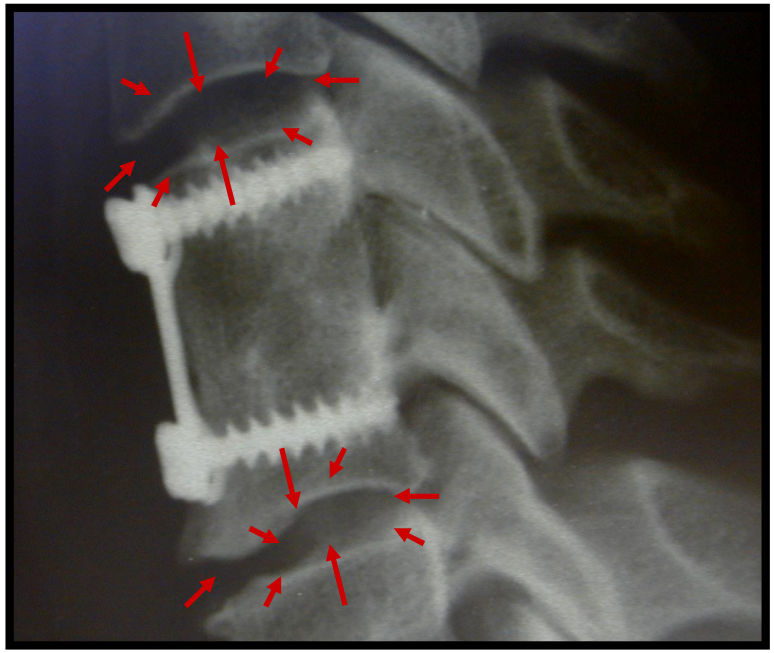
ANGEVINE & al. Spine 2003



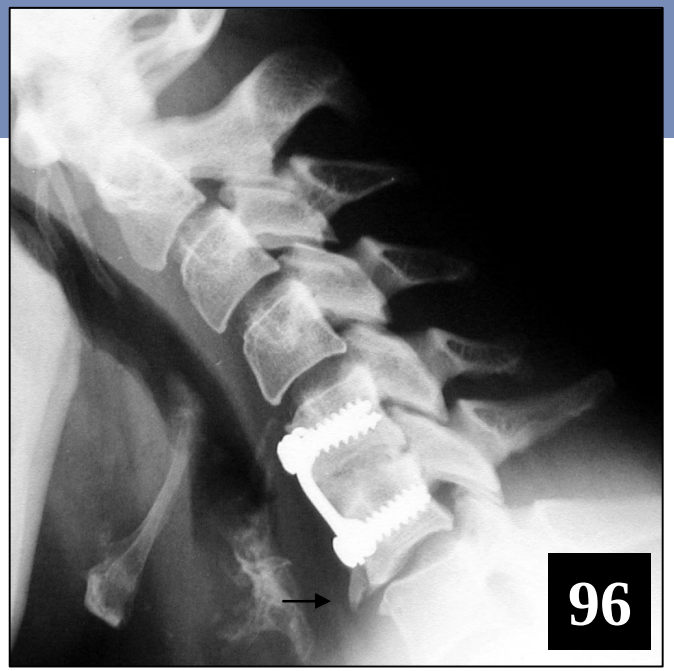
CAGE FILLED with ILIAC BONE , LOCAL BONE or BONE SUBSTITUTE



Symptomatic Adjacent Segment Degeneration
A. Hilibrand et al., JBJS 81-A, 1999



n = 374 Patients
2 – 21 yrs
2.9 % per year
worse at C5-6 C6-7



DDD

Natural progression of disc degeneration of course exists

- **Gore, Spine 2001**
  - **n = 159 initially asymptomatic people**
  - **radiographs at baseline and at 10 years follow-up**
  - **34% of subjects without initial degeneration developed degenerative radiographic features at 10 years**
  - **79% of subjects with evidence of initial degeneration had evidence of progression at 10 years**

Carlos Villas CSRS , Roma 2005

150 patients reviewed. Follow-up from 5 to 17 years.

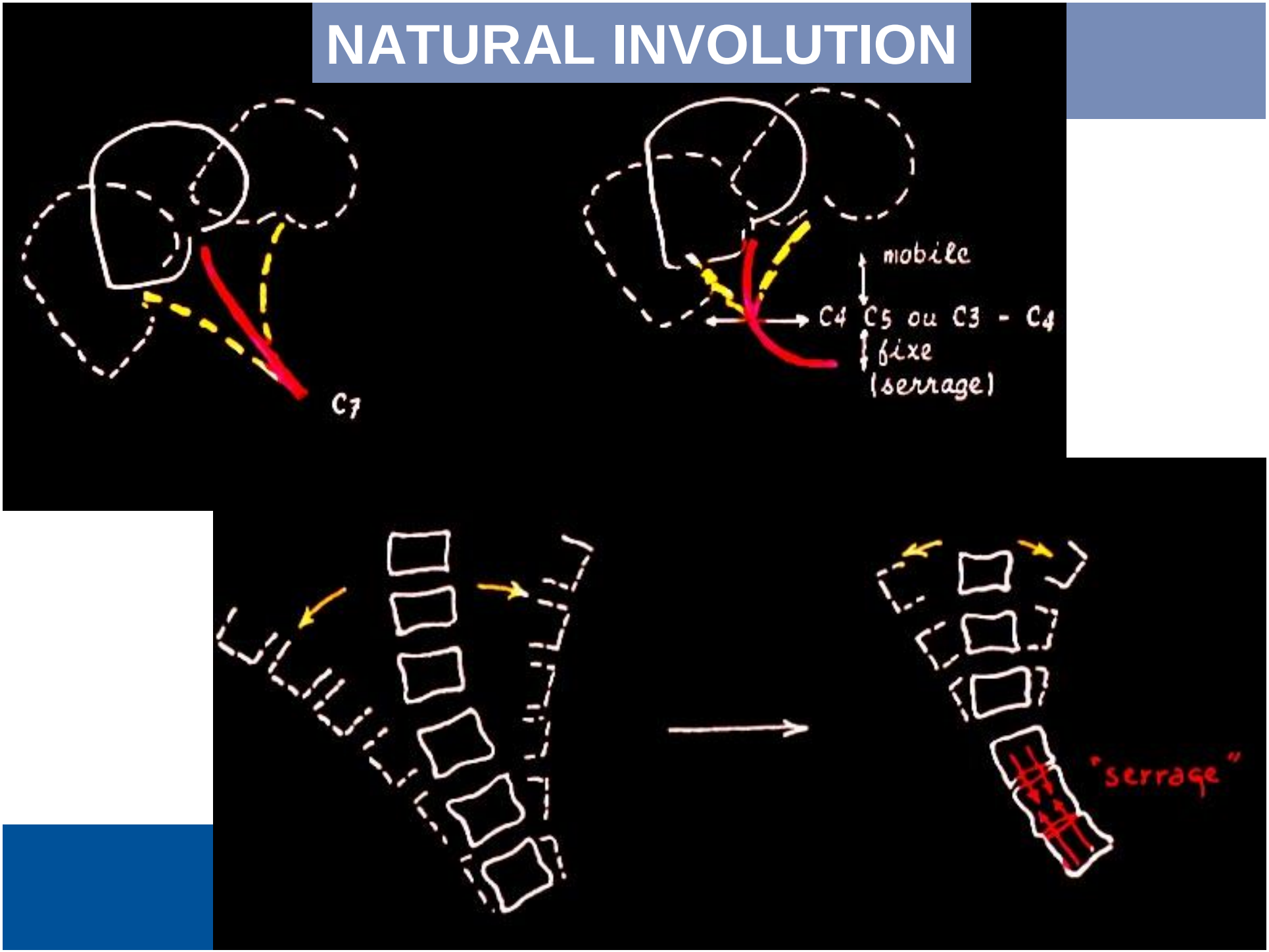
50 operated on (fusion of 1 to 5 segments)
100 consulted with neck pain showing or not degenerative changes at first X rays having ulterior X rays at 5 to 27 years

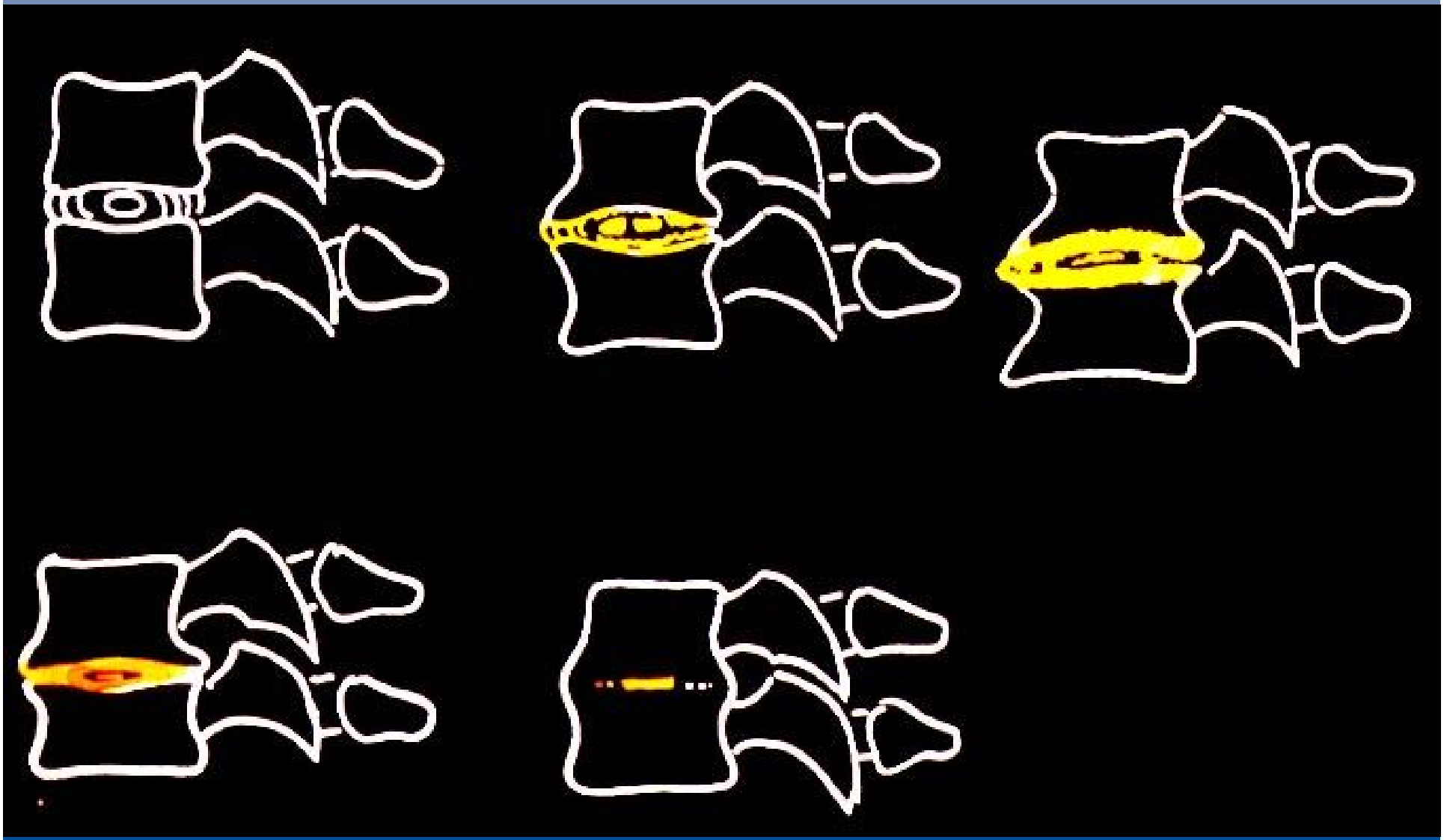
Results:
Operated group: 5 to 17 years of follow up
Adjacent new degenerative changes: 32%
Progression of degenerative changes : 51%

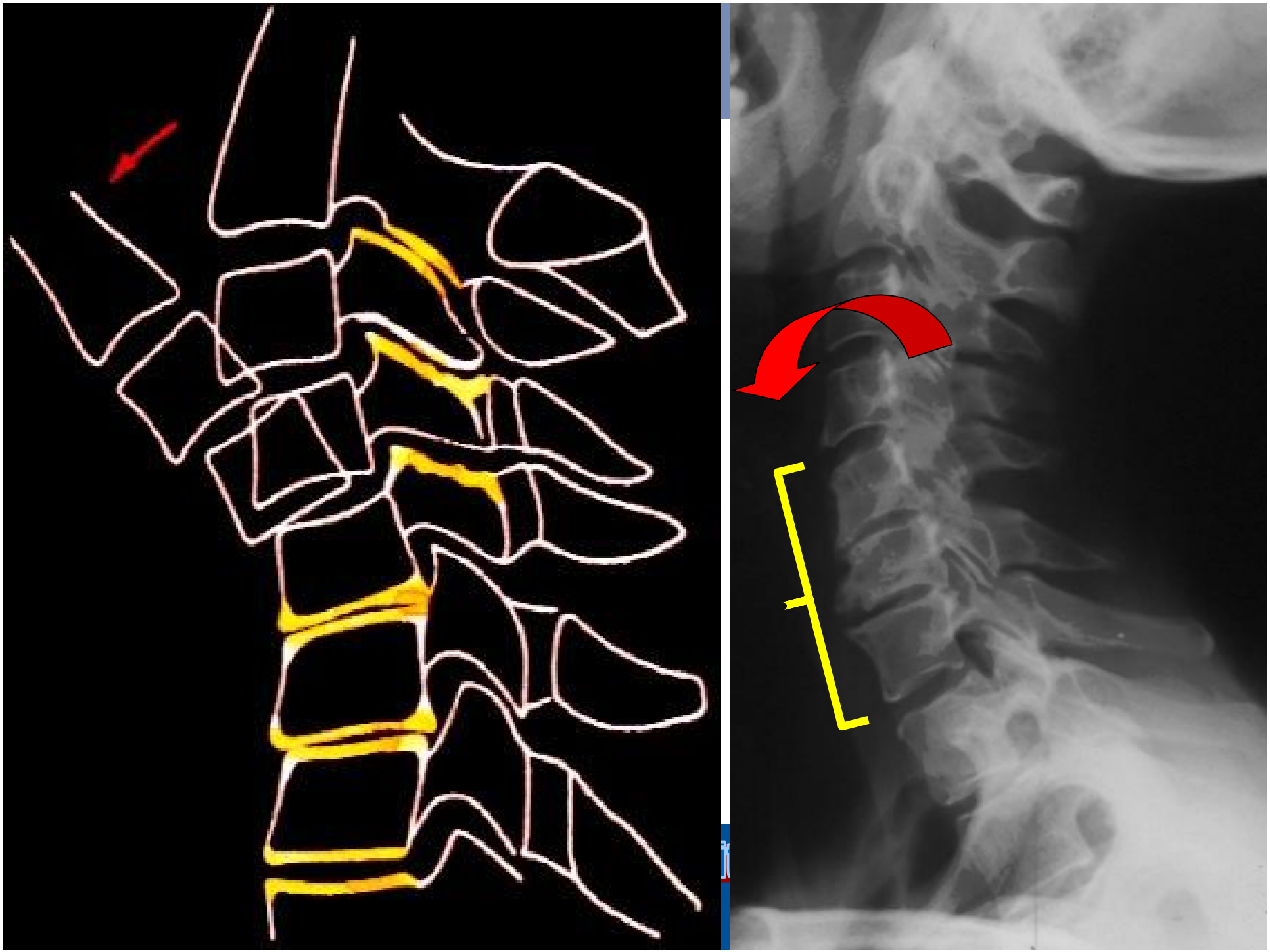
Non-operated patients changes were observed

36% of those with 5 to 9 years of follow-up,
64% of those with 10 to 15 years of follow-up
83% of those with more than 15 years of follow-up.

NATURAL INVOLUTION







Basic science papers

- **Brumley *et al*. (2000) Measured cervical motion using dynamic fluoroscopy and reported abnormal kinematic results at levels adjacent to fusions.**

- **Jason *et al.* (2001) showed a pressure increase in adjacent levels between 73 and 45 %.**

Long term follow up after interbody fusion of the cervical spine
GOFFIN , J Spinal Disorders 2004

5-15 years follow-up
mean: 8 years

n = 180 (trauma n=60, non-trauma n= 120)

additional X-ray degeneration at adjacent levels: 92 %
long-term clinical deterioration: 36 %

no correlation with age, nor with pathology
no difference between younger trauma cases (32.5 y) versus older non-trauma cases (48.8 y)
correlation additional arthrosis – clinical deterioration: p value = .06
reoperation rate: 7.2 %

3- CERVICAL PROTHESIS

- Similar approach

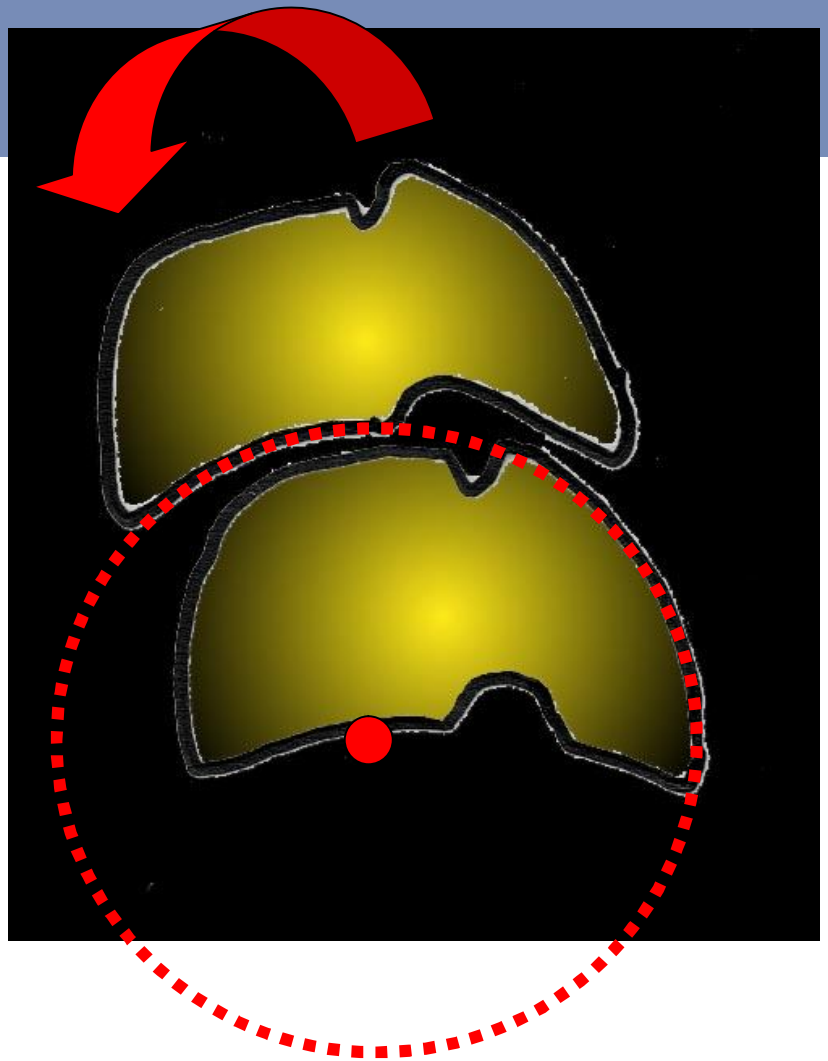
- Kyphosis and fusion prevention

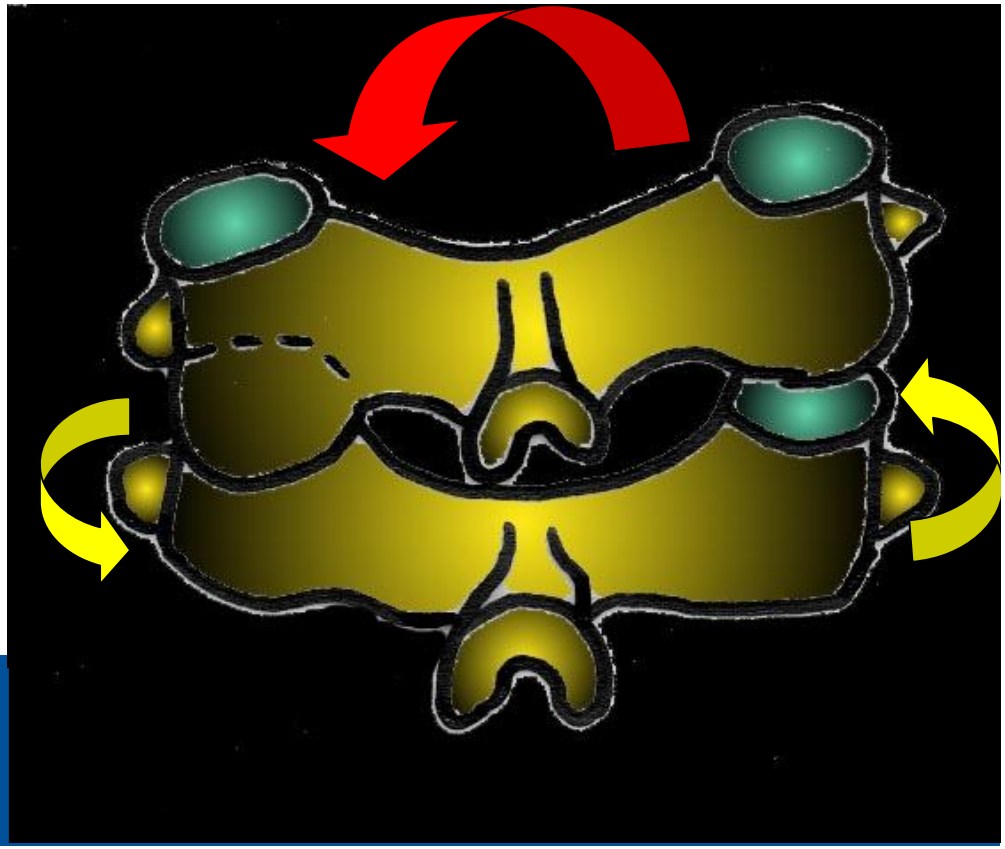
-Stability with time

Efficacy

- Short and mean term (2 years): DECOMPRESSION
- Long term: MOBILITY (reintervention rate)

MOBILITY

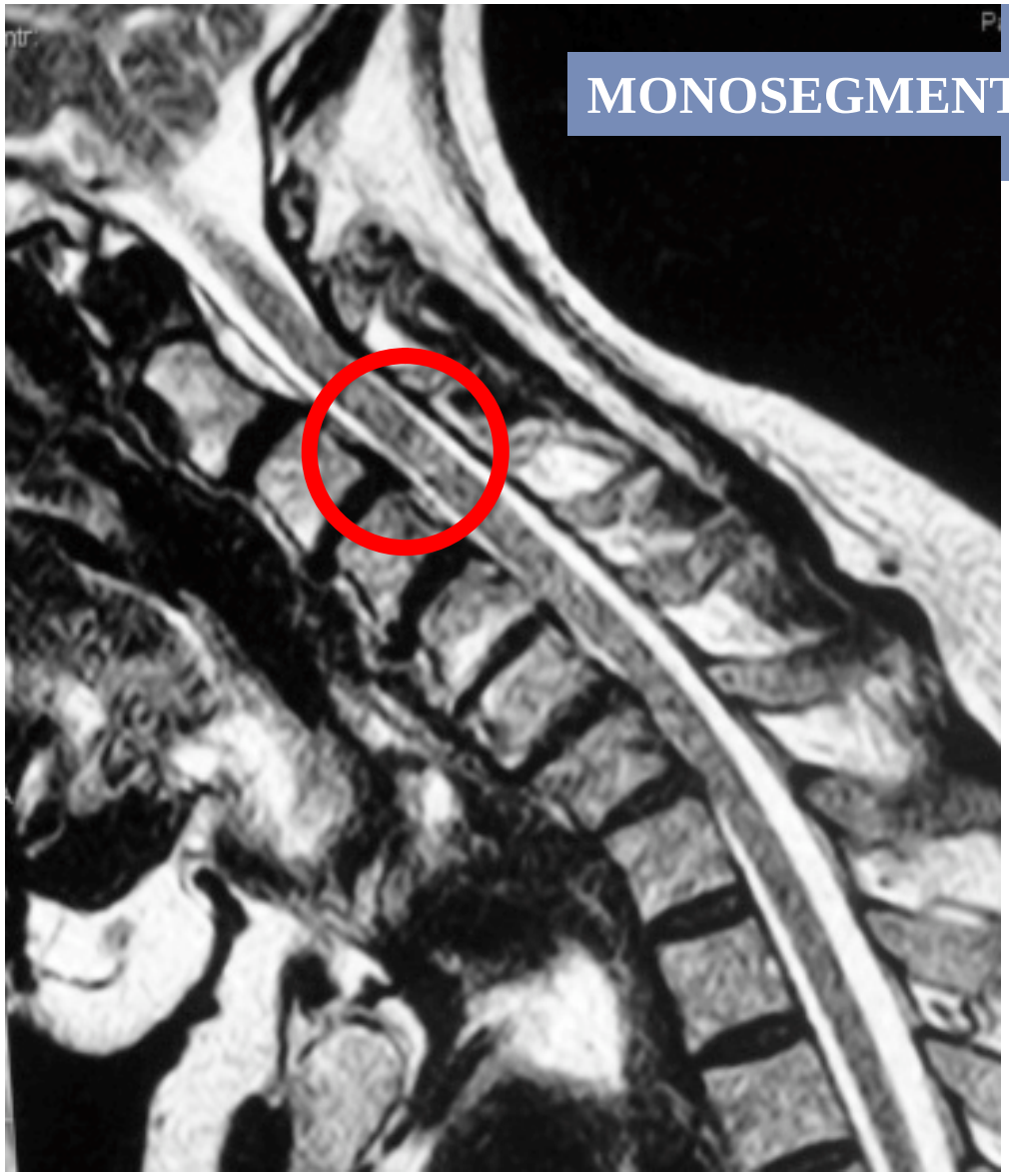




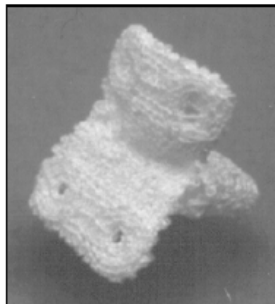
According WHITE & PANJABI

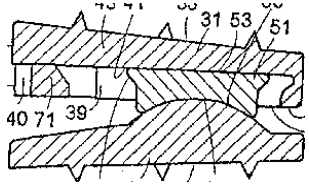
	FLEXION - EXTENSION	LATERALITE	ROTATION
C2-C3	8°	10°	9°
C3-C4	13°	11°	11°
C4-C5	12°	11°	12°
C5-C6	17°	8°	10°
C6-C7	16°	7°	9°
C7-D1	9°	4°	8°

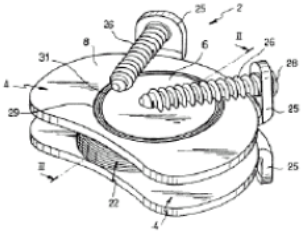
MONOSEGMENTAL COMPRESSIVE MYELOPATHY

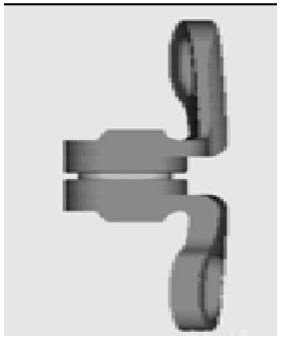


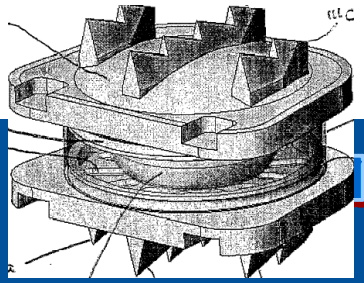
DYNAMIC COMPRESSION

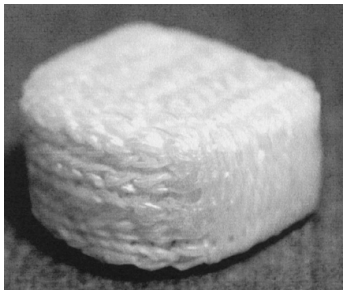



31 53 51
40 71 39









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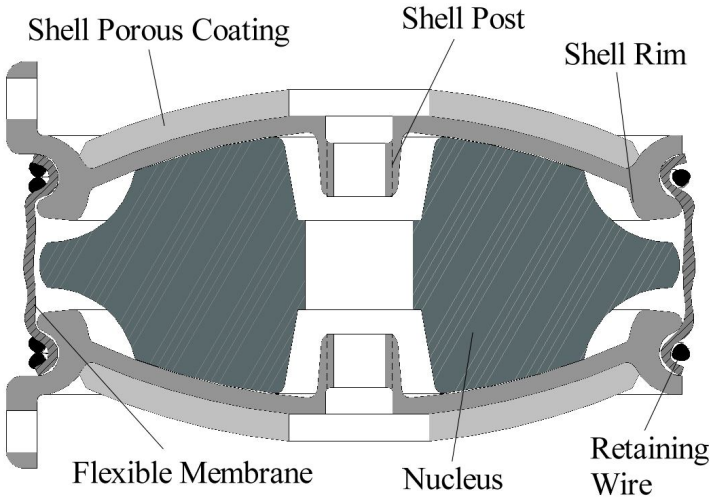
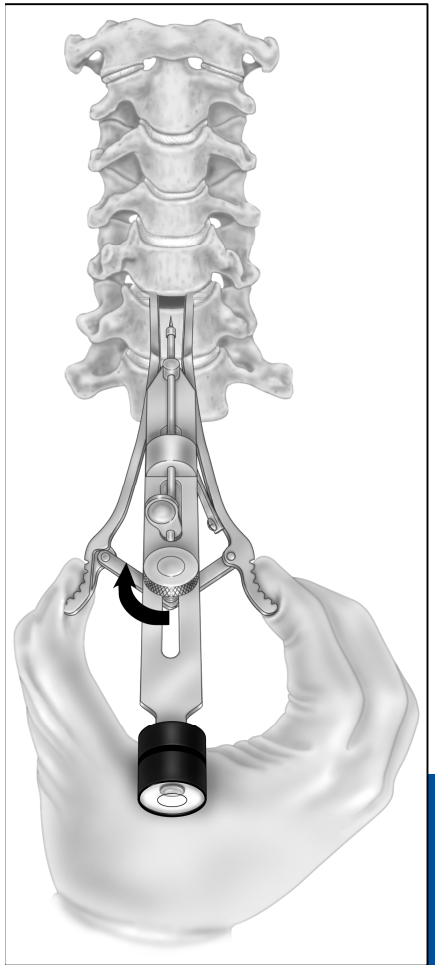
Bryan

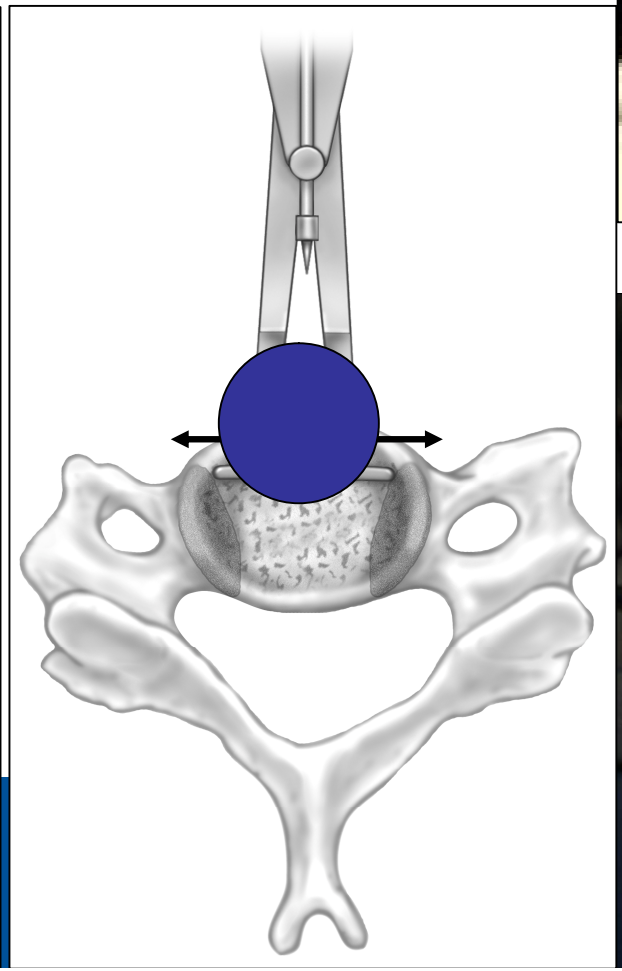
Two concave plates + polyurethane nucleus

- **Unconstrained**
- **F/E and inclination : 11°**
- **Translation : 2 mm**
- **Immediate stability**

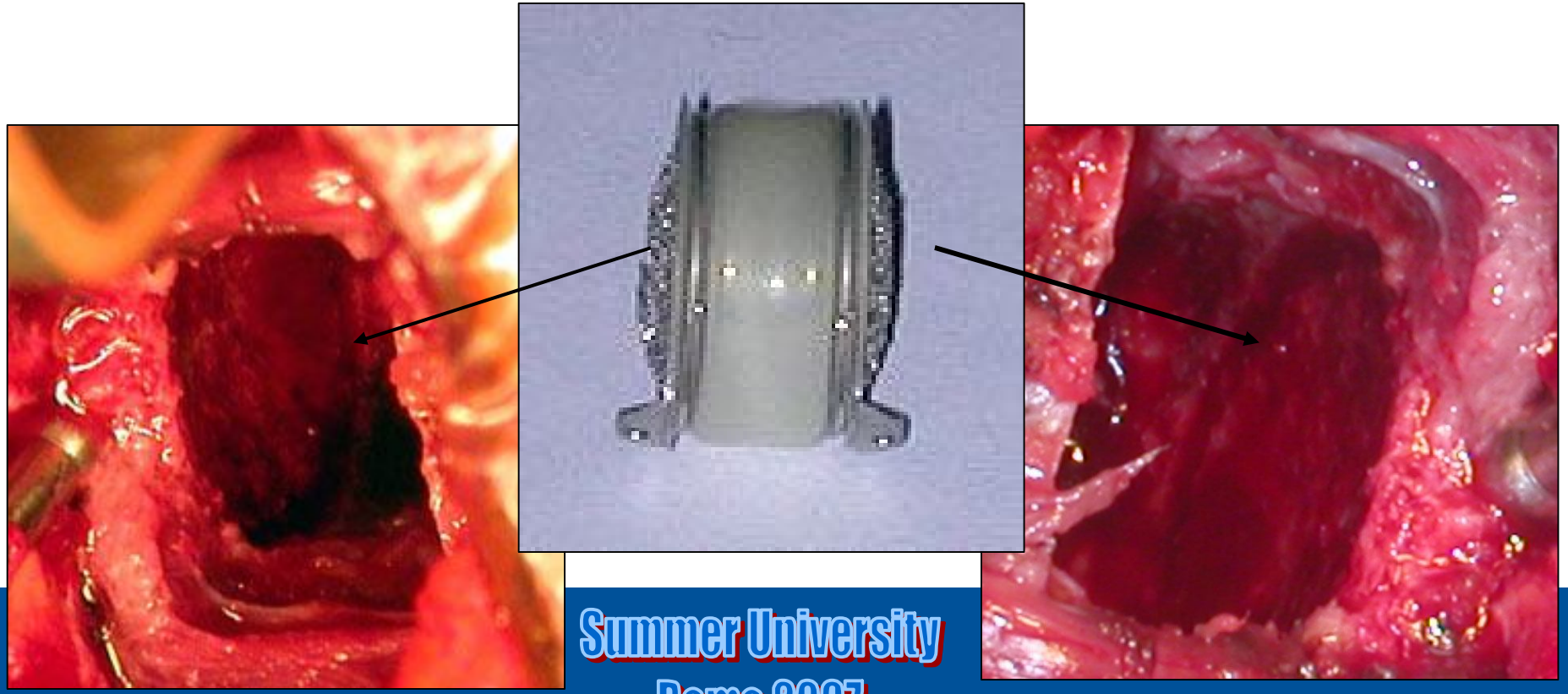


Prothesis strictly in the middle of intervertebral space

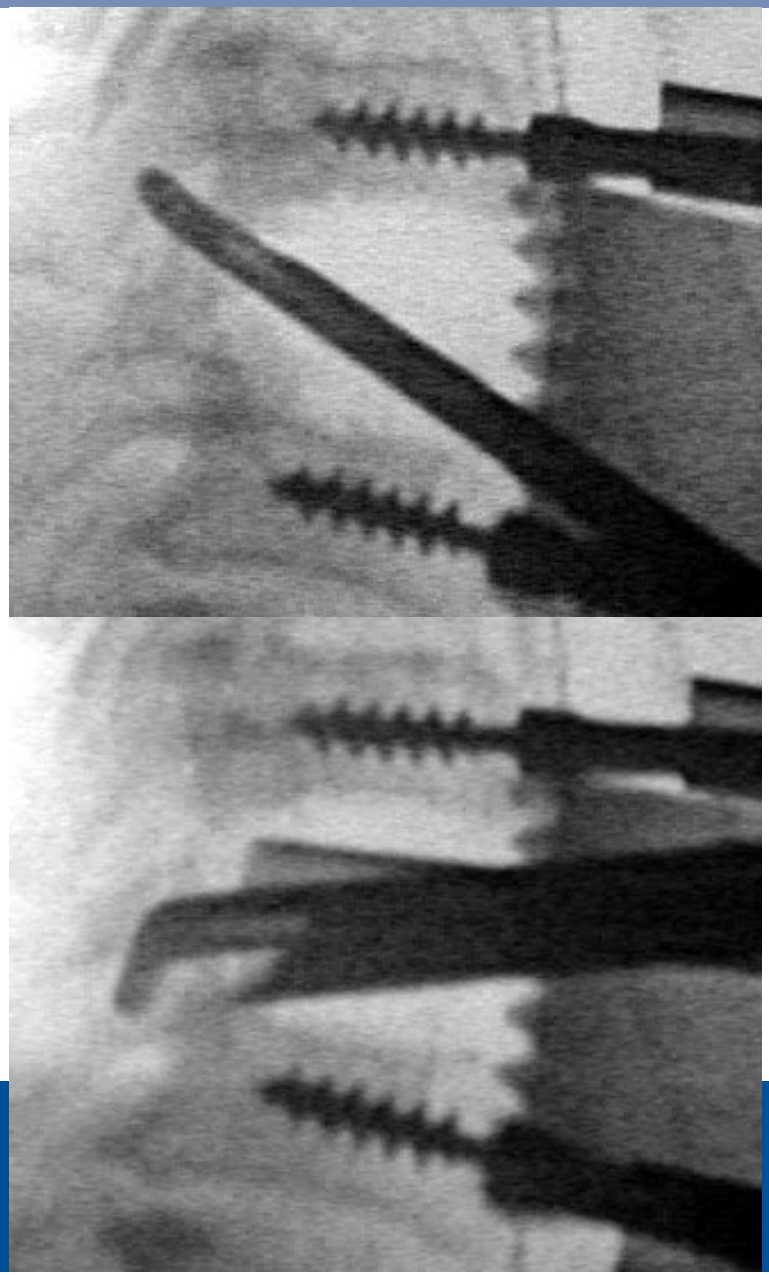


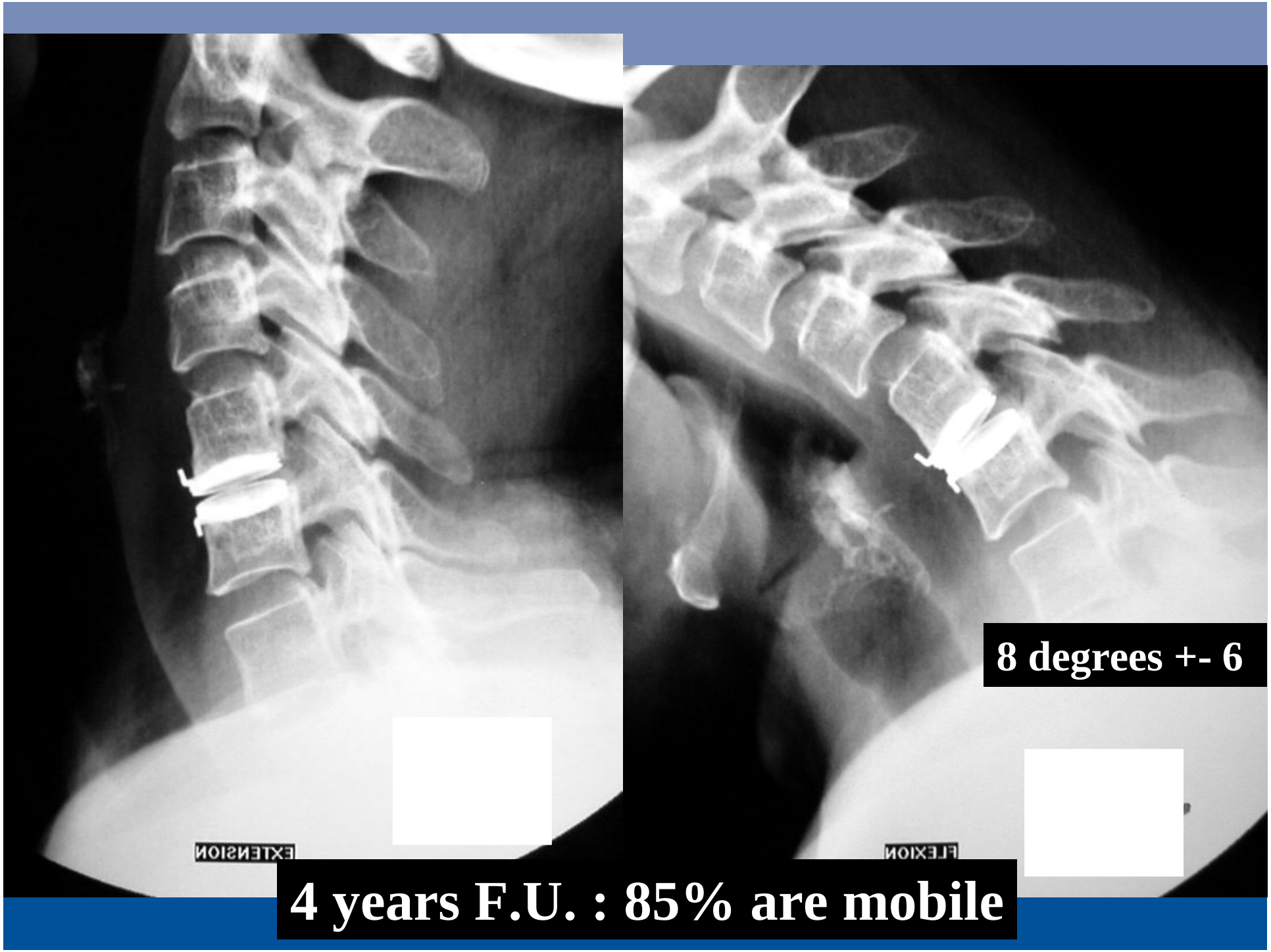


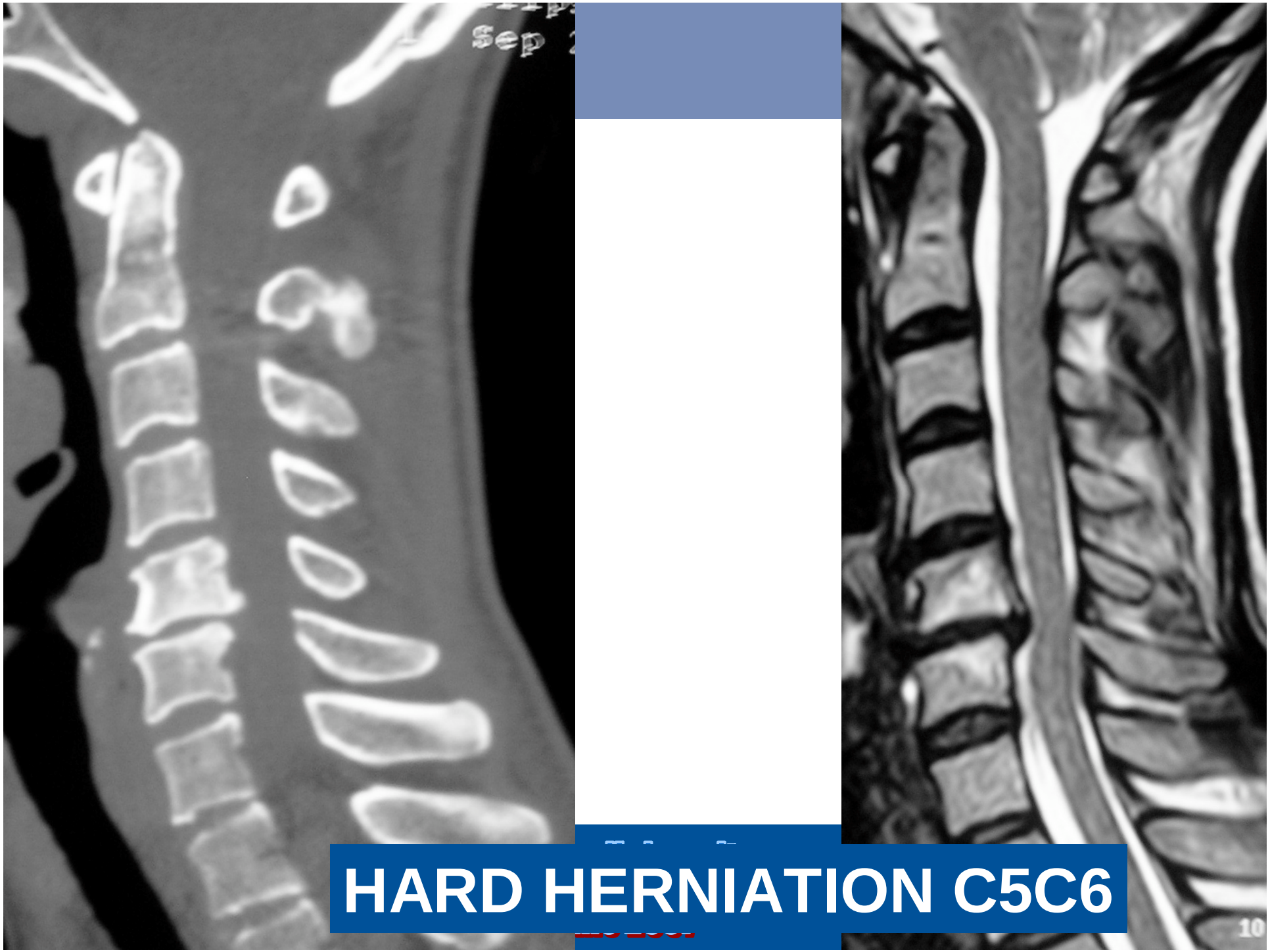
End plates hollowing



Decompression

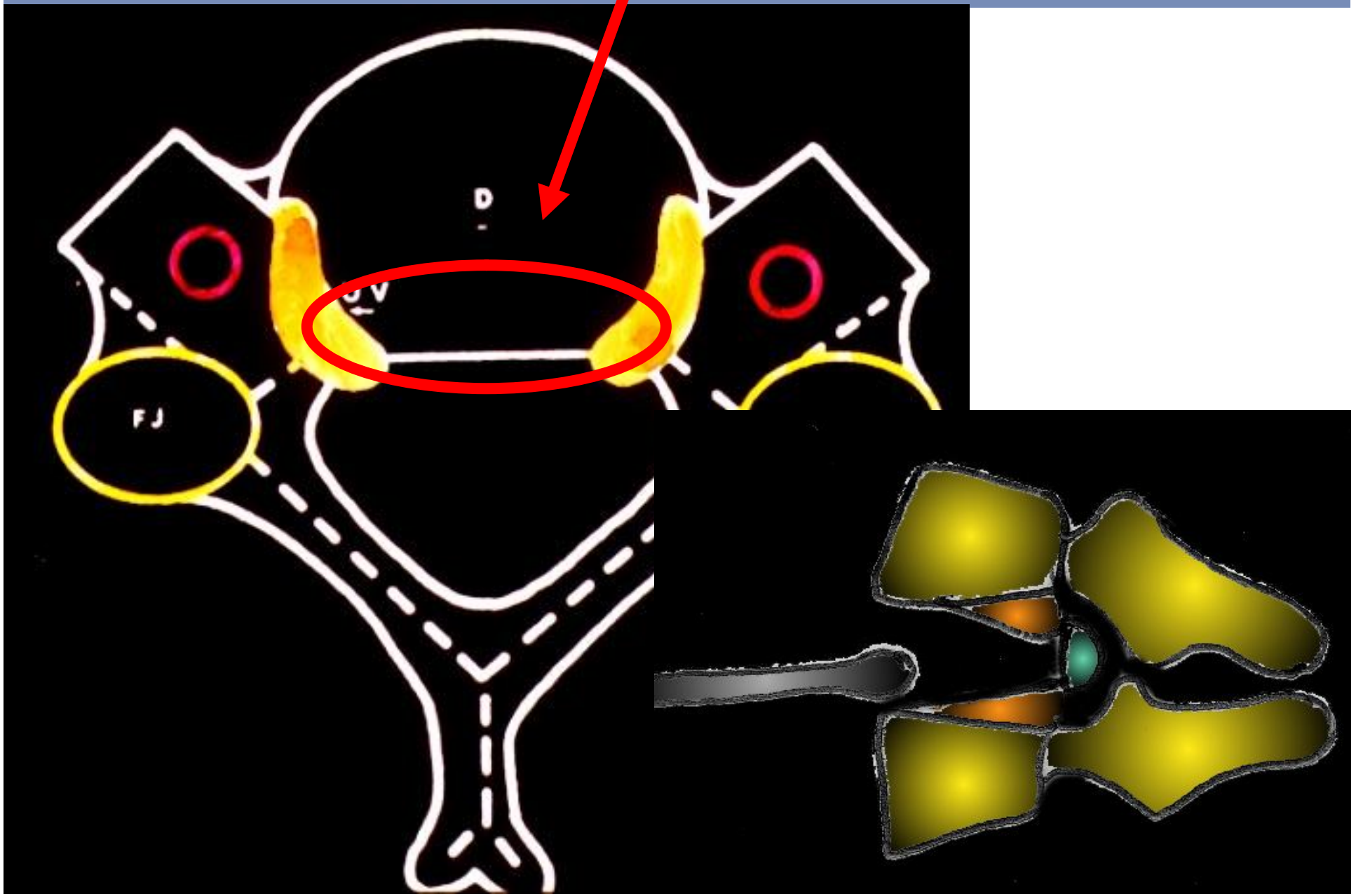



8 degrees +- 6
4 years F.U. : 85% are mobile

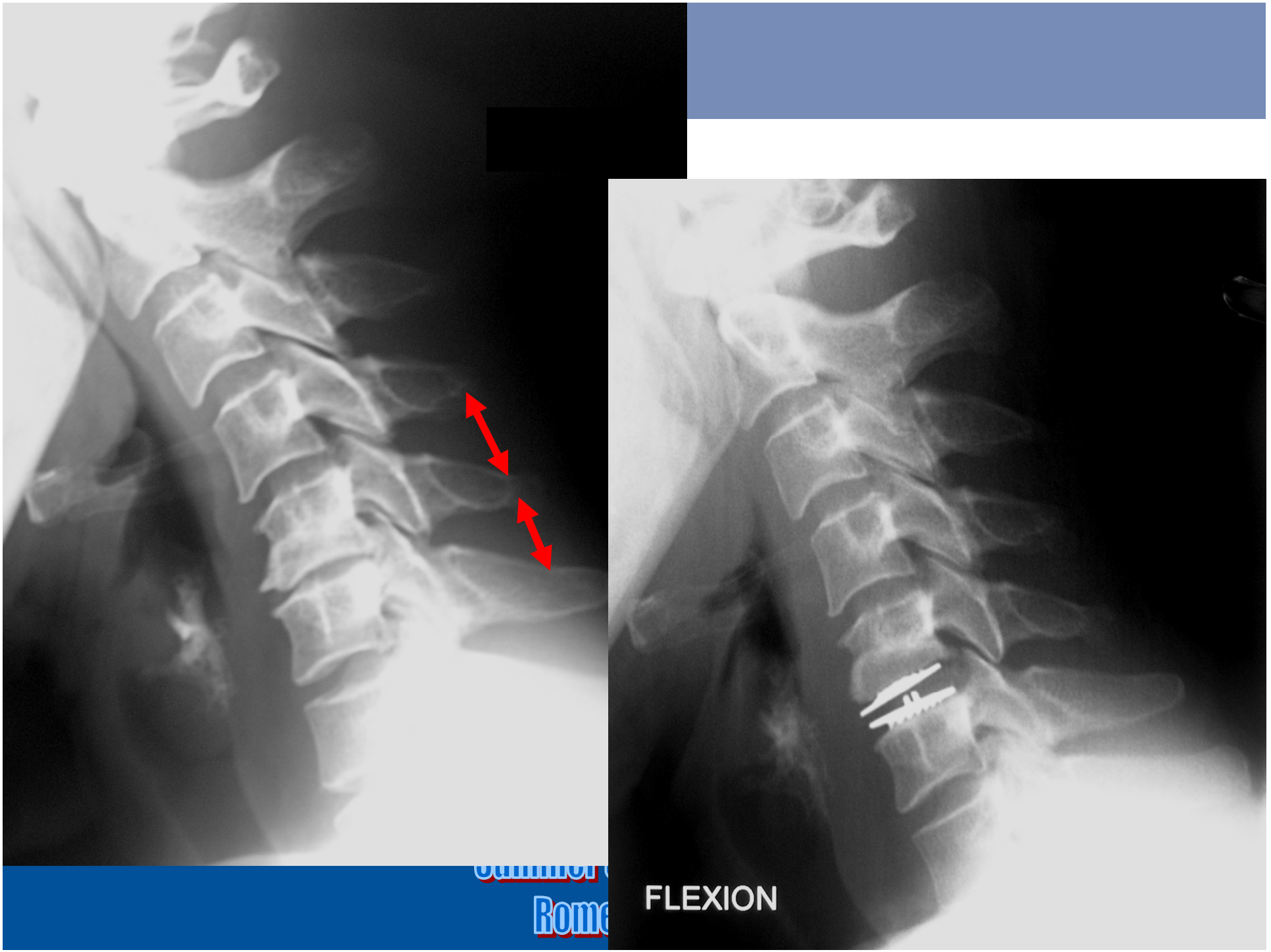


HARD HERNIATION C5C6

POSTERIOR RELEASE



- **POST RELEASE C ARM CONTROL (Barbagallo)**


FLEXION


EXTENSION

AUROUER N. , POINTILLART V. (Thesis 2006)

- **160 patients operated between 7/2000 to 4/2005**
- **Mean F.U. : 2 years**

- **Mean mobility : 9°**
- **Mobility < 2° : 8% (calcifications)**

- **Radiologic adjacent syndroms : 23%**
- **Clinical adjacent syndroms : 0**

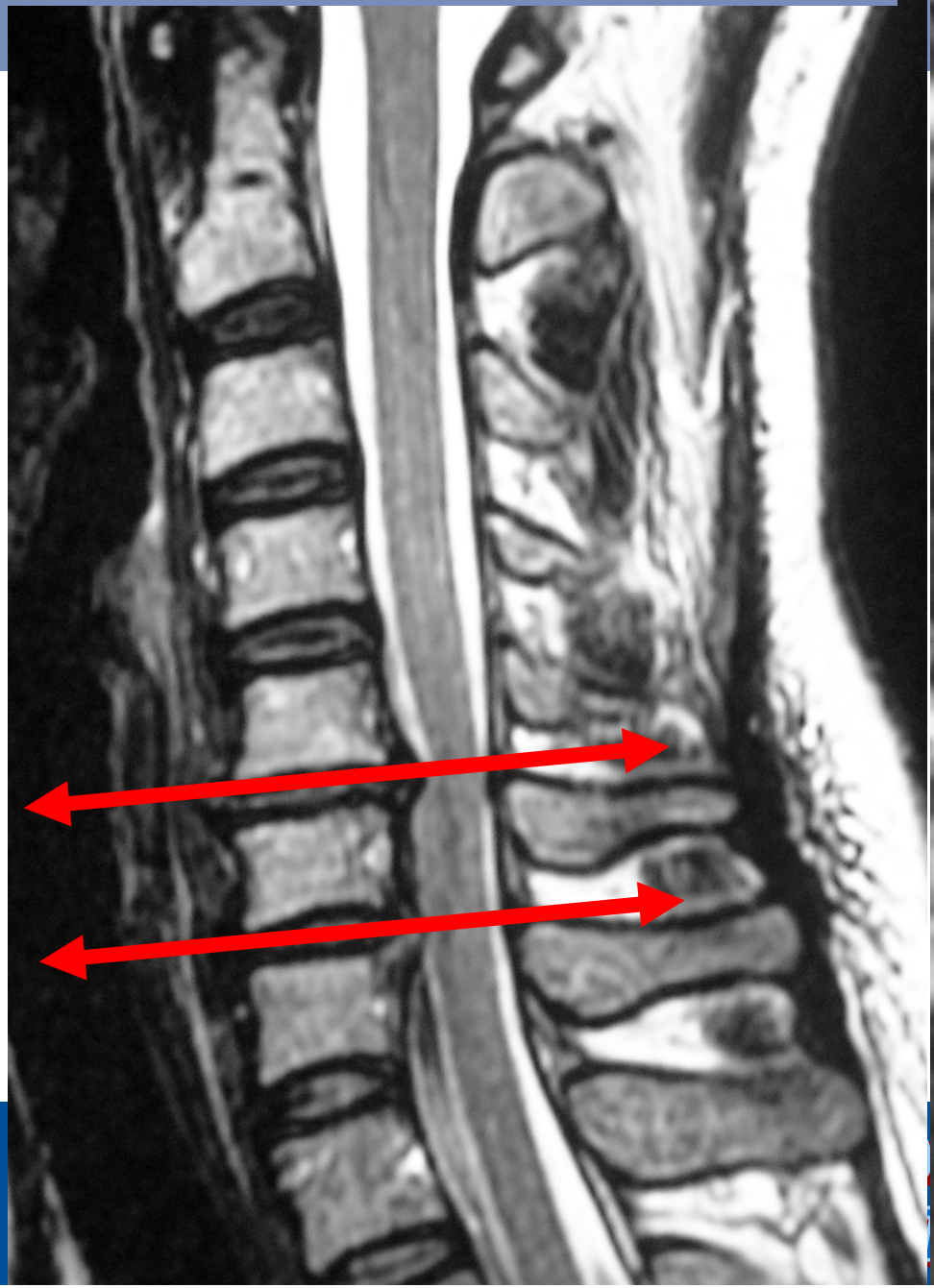
MULTILEVEL LESIONS

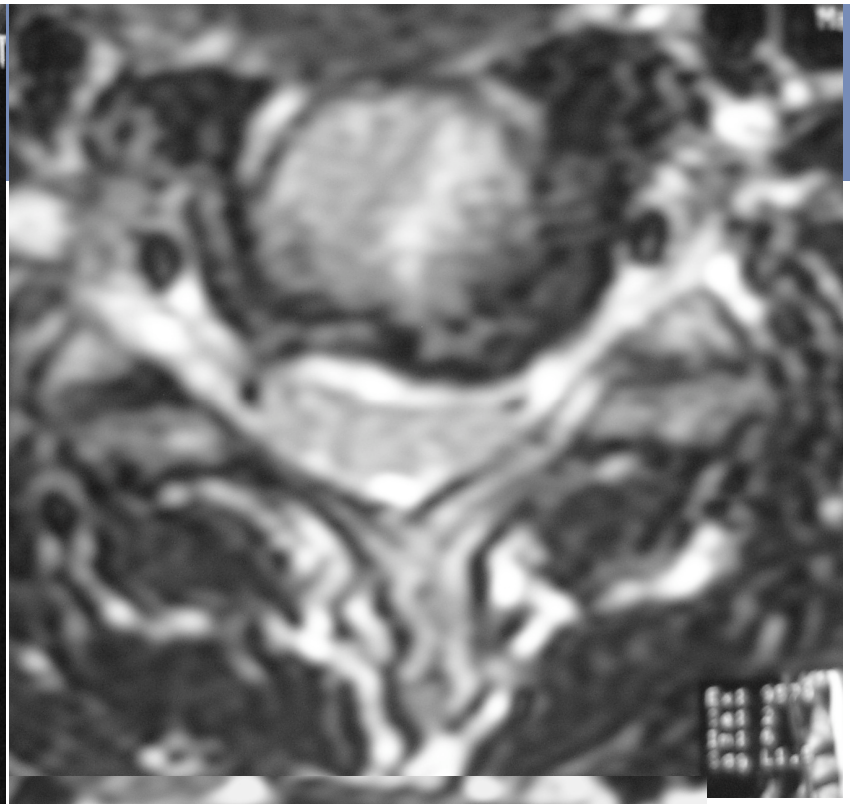
- **SOFT , HARD HERNIATIONS**
- **SURGICAL TT on SUCCESSIVE TIMES**
- **SURGICAL TT on SAME TIME**

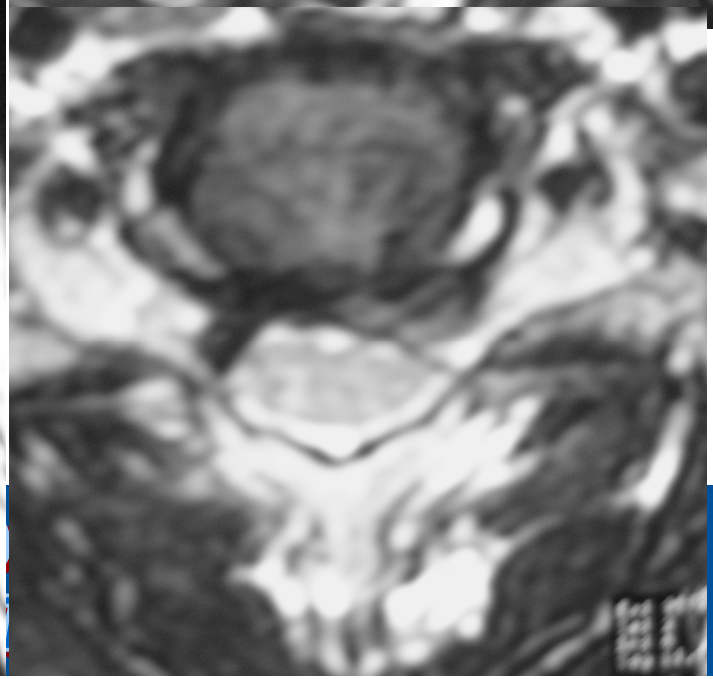
- **TWO or MORE PROTHESIS**

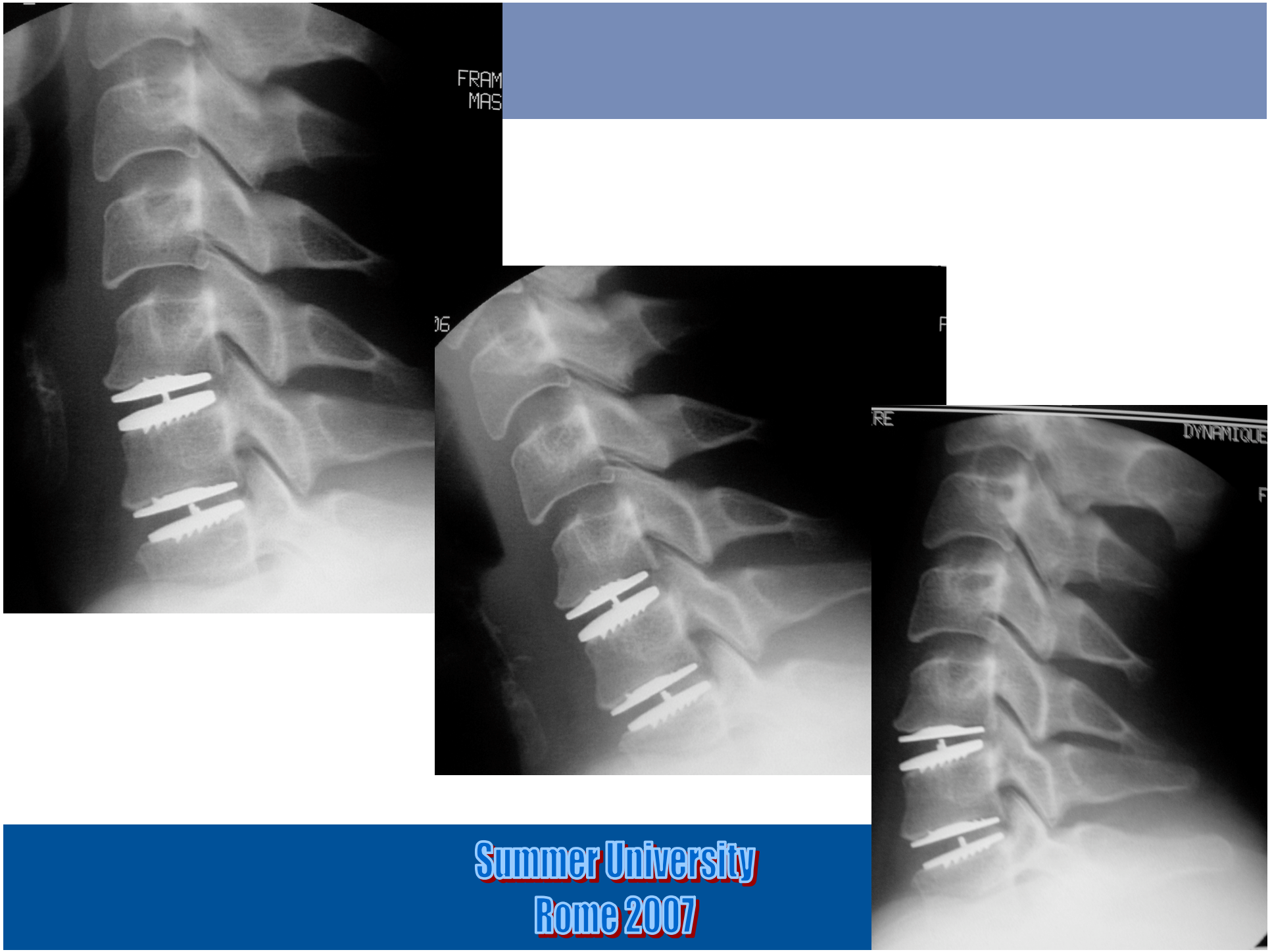
- **TWO HERNIATIONS on the SAME SIDE with CONCORDANT C.B.**

C.B. C6 &C7 on LEFT SIDE





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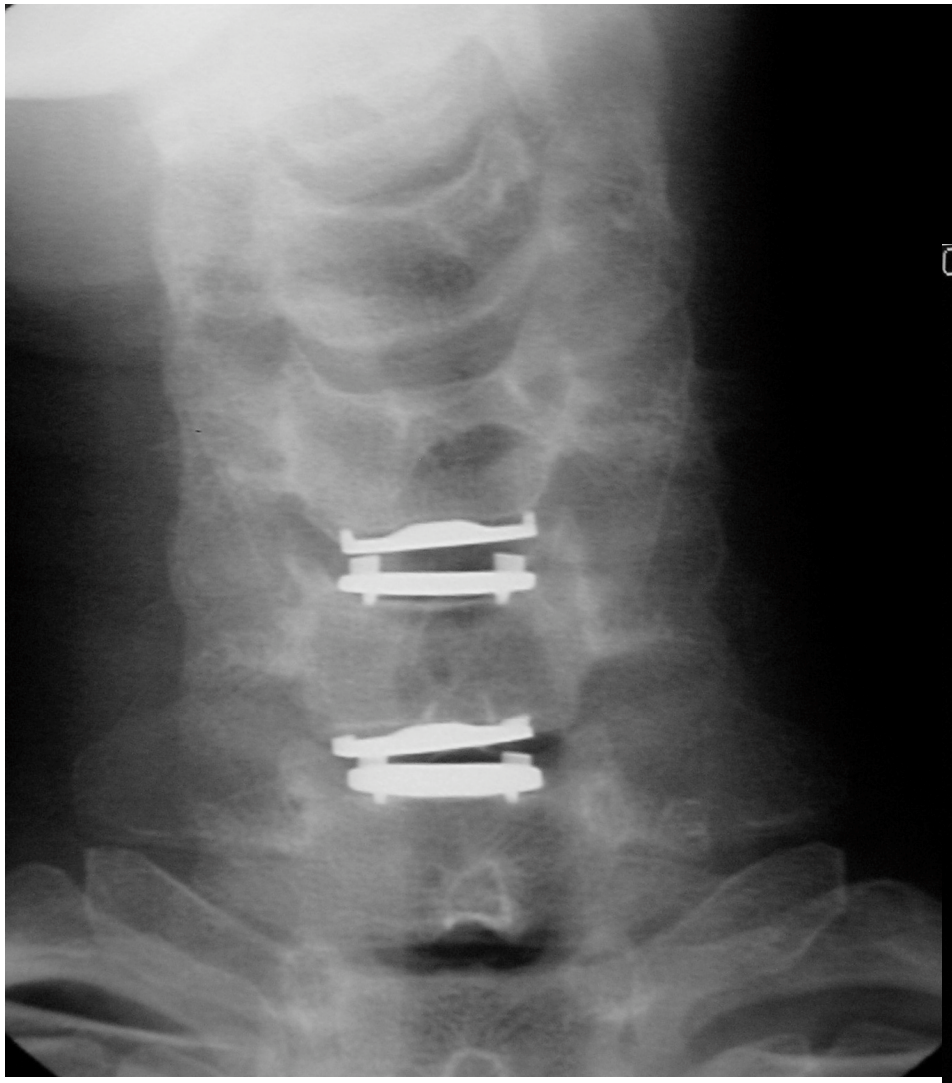
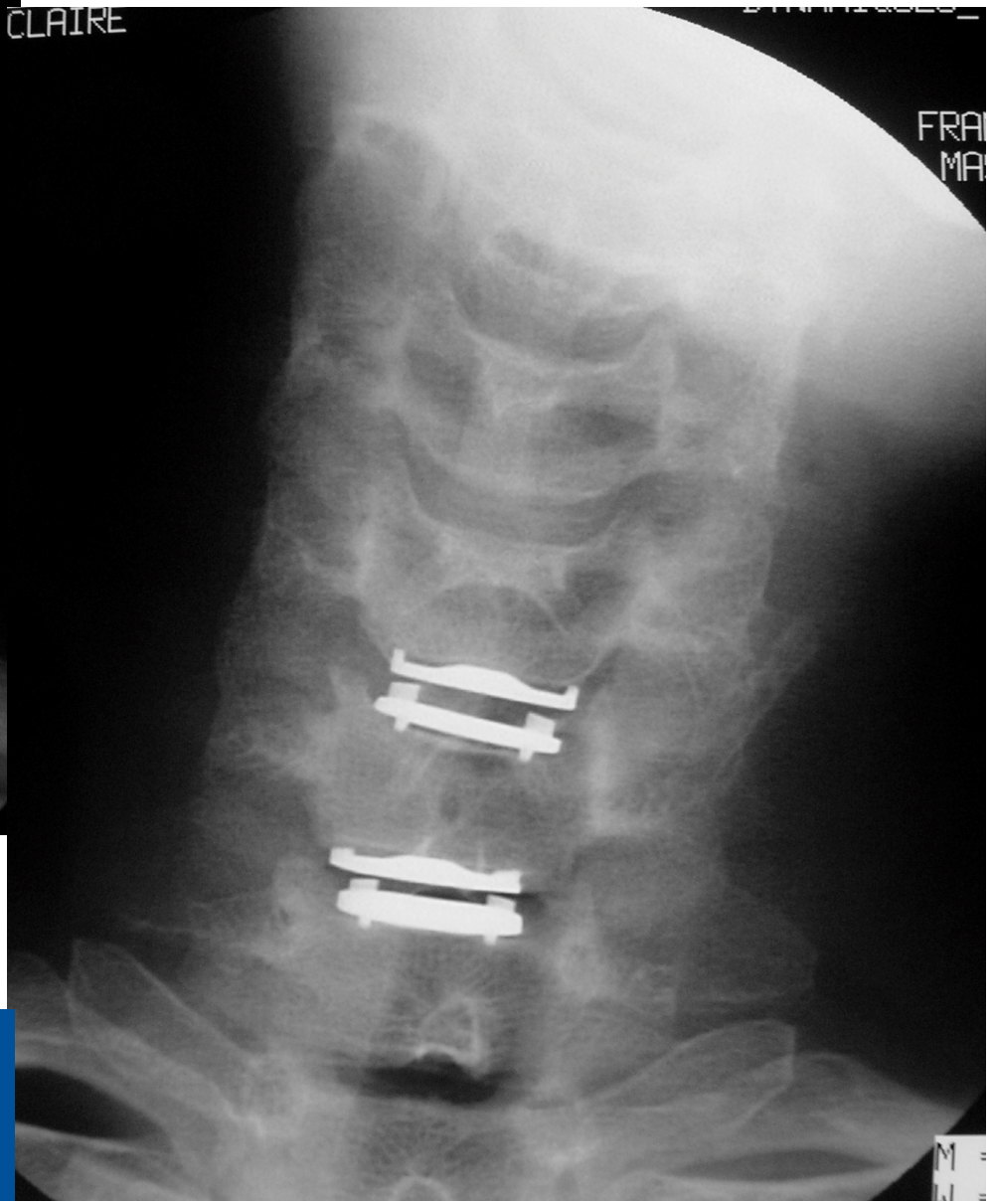
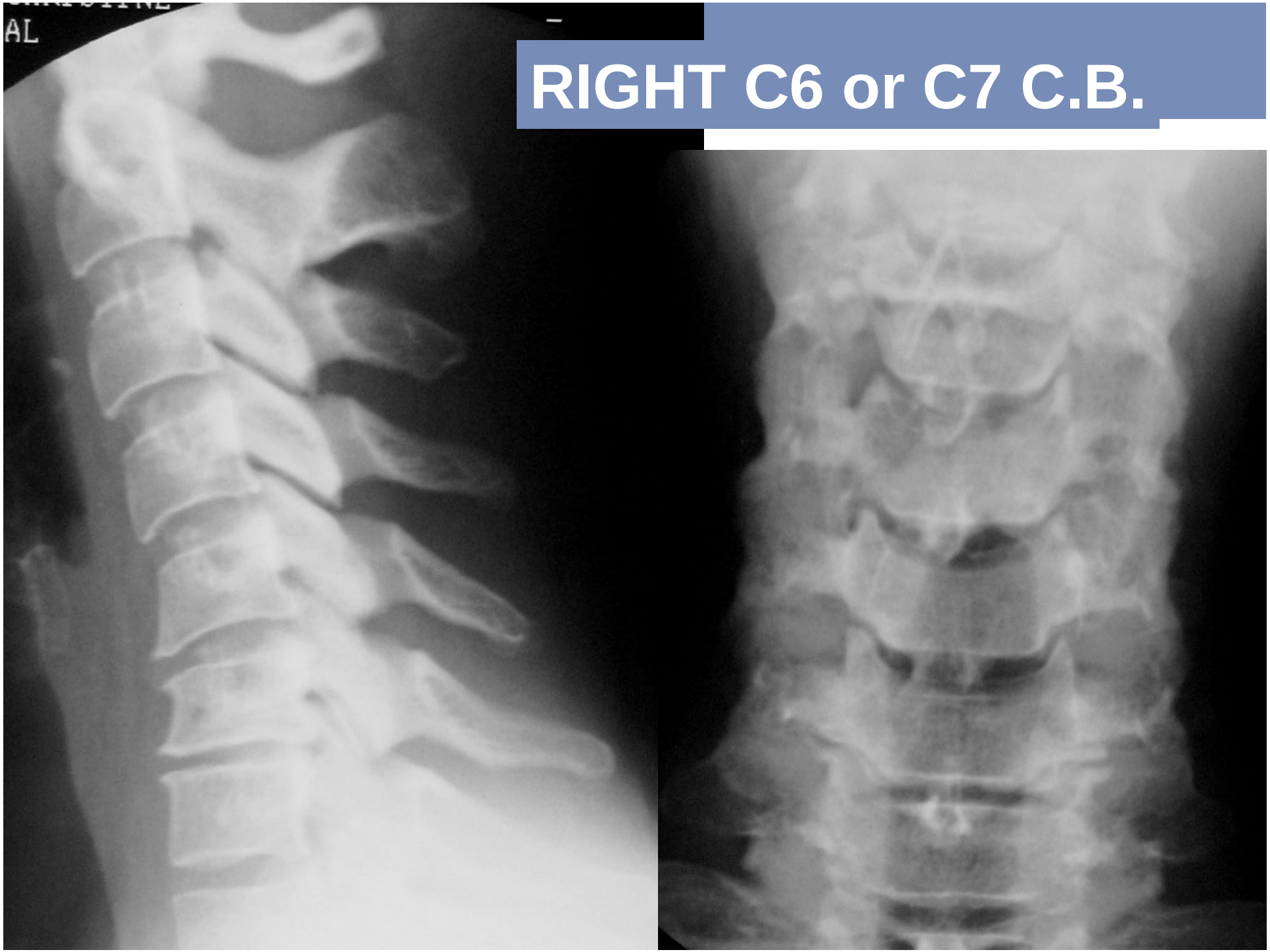



CLAIRE

TWO ADJACENT HERNIATIONS but only ONE SYMPTOMATIC

RIGHT C6 or C7 C.B.



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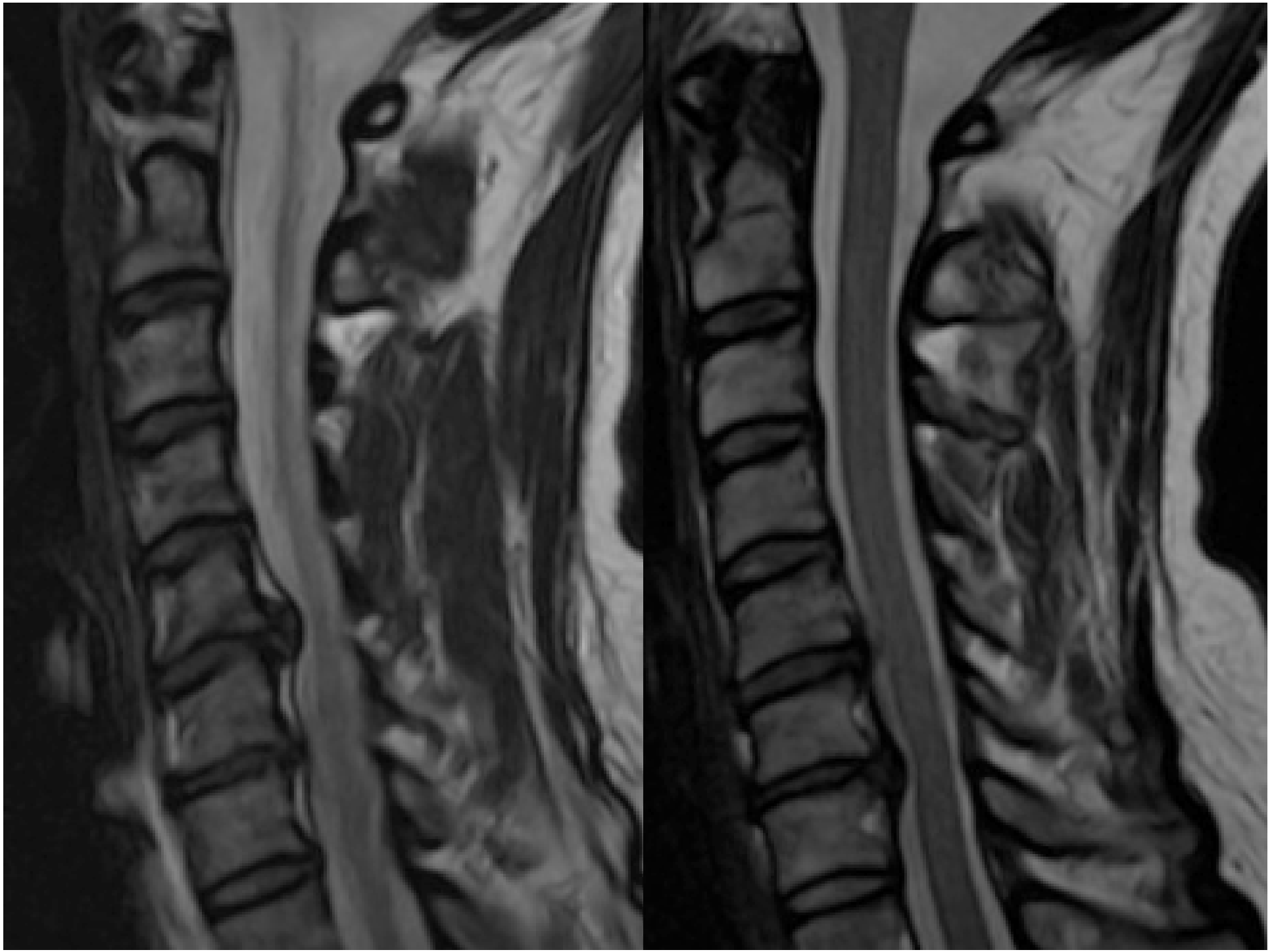
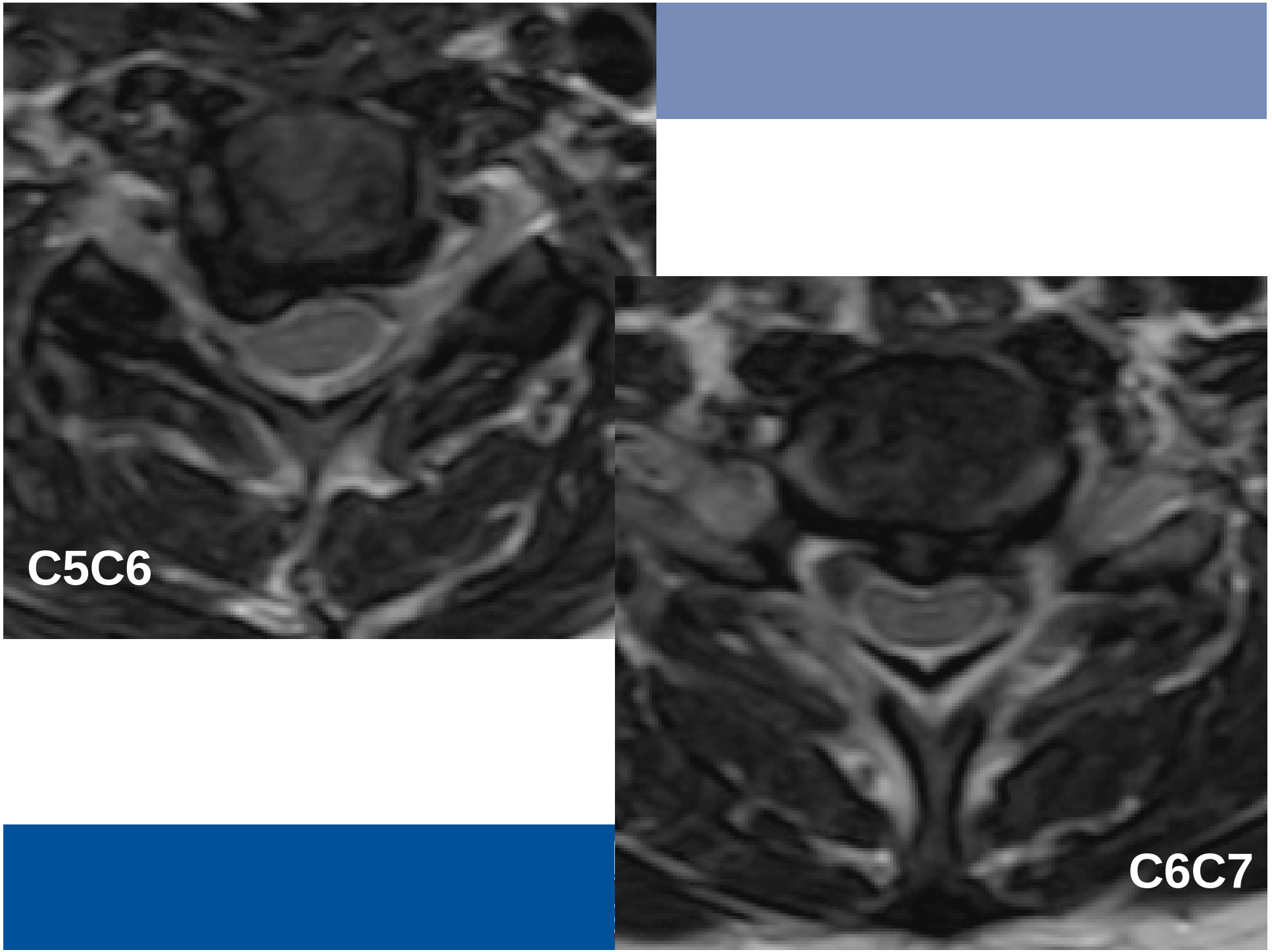
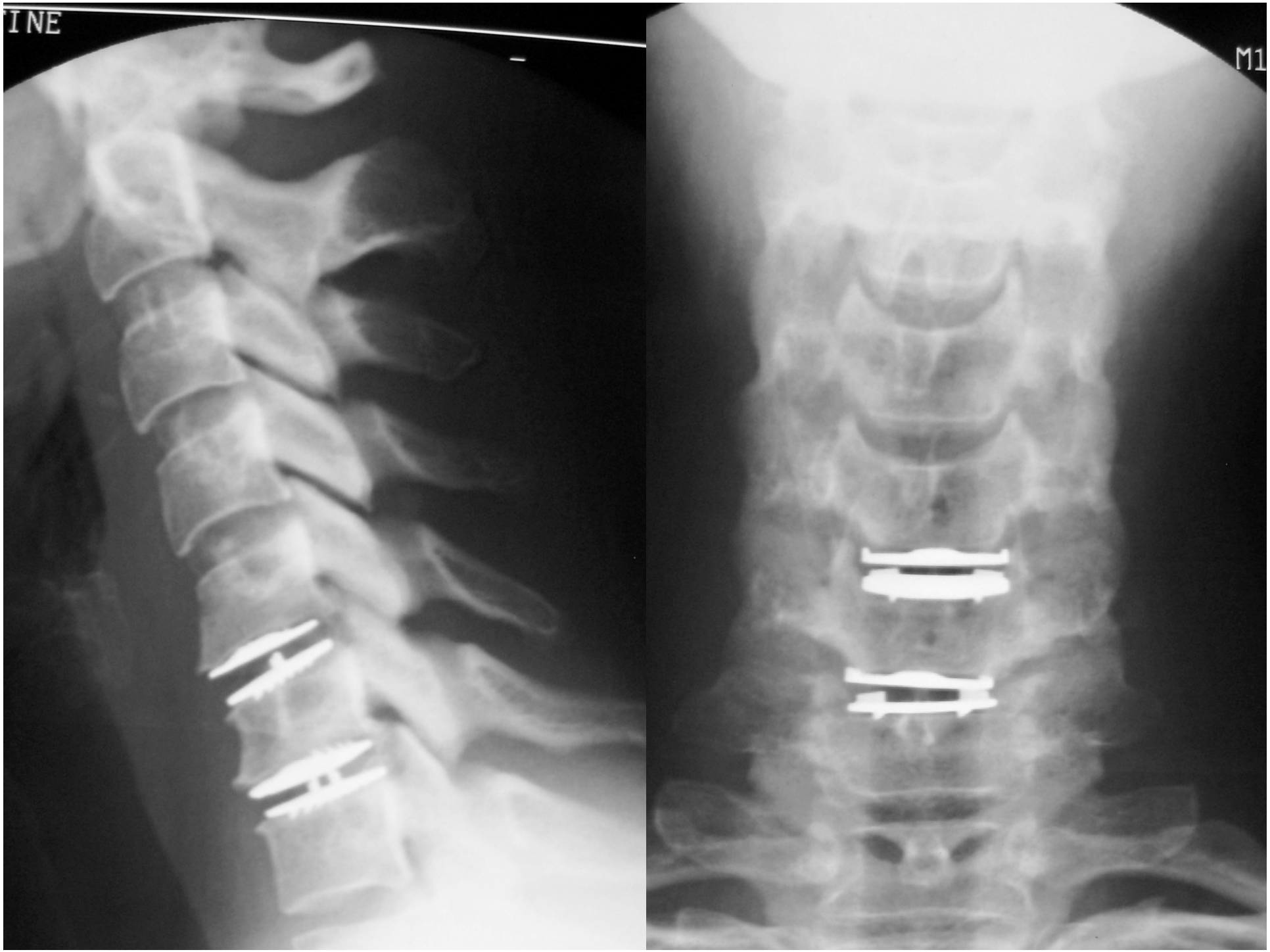
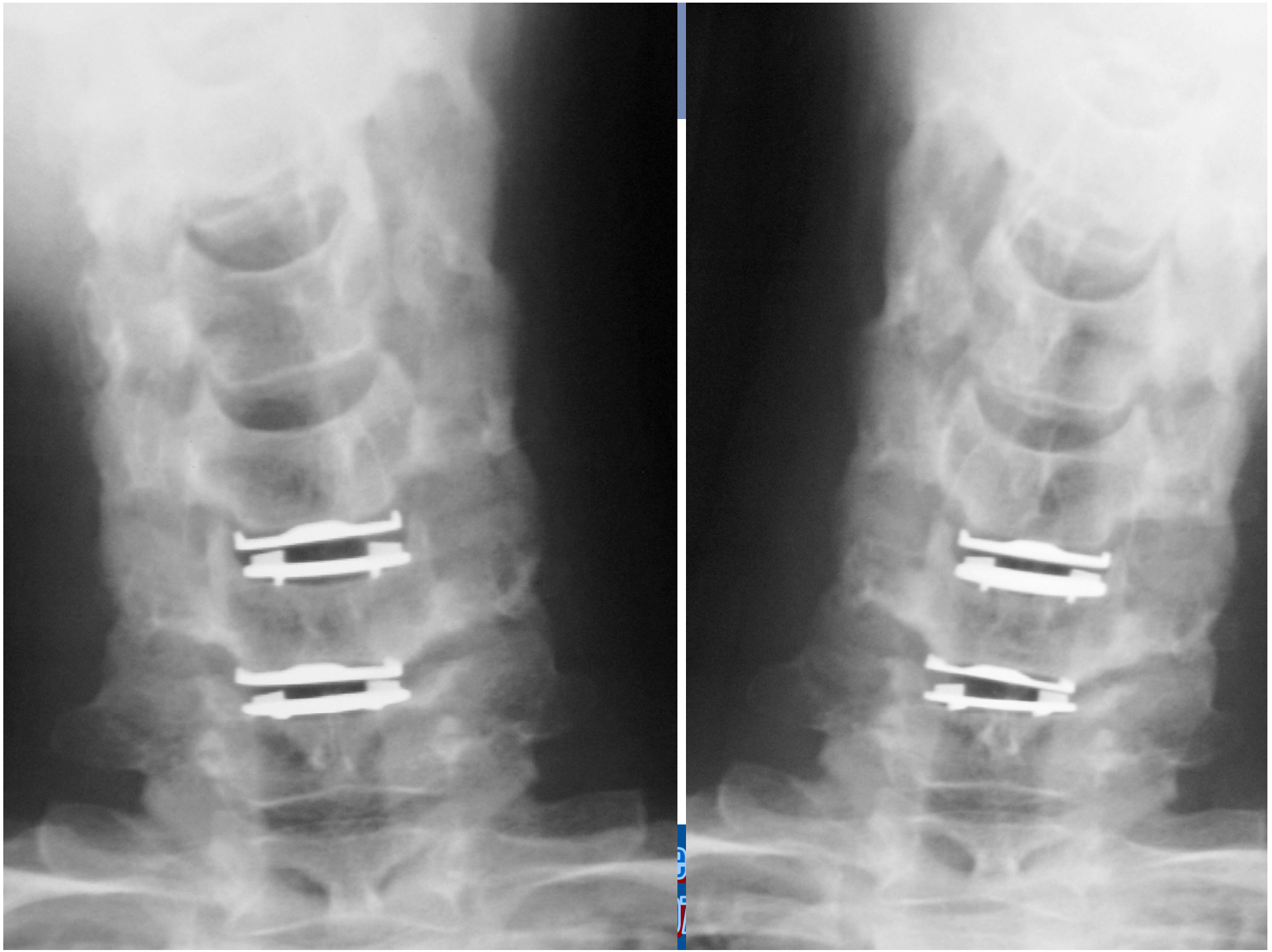



C5C6
C6C7


INE
M1


M1
M1



TWO NON ADJACENT & SYMPTOMATIC HERNIATIONS

Male,35 Y, right C4, left C7 radiculalgia