CERVICAL & LUMBAR ARTHROPLASTY : REAL PROGRESS in DEGENERATIVE DISEASE ?

J.M.VITAL , V. POINTILLART ,

M. PEDRAM , N. AUROUER

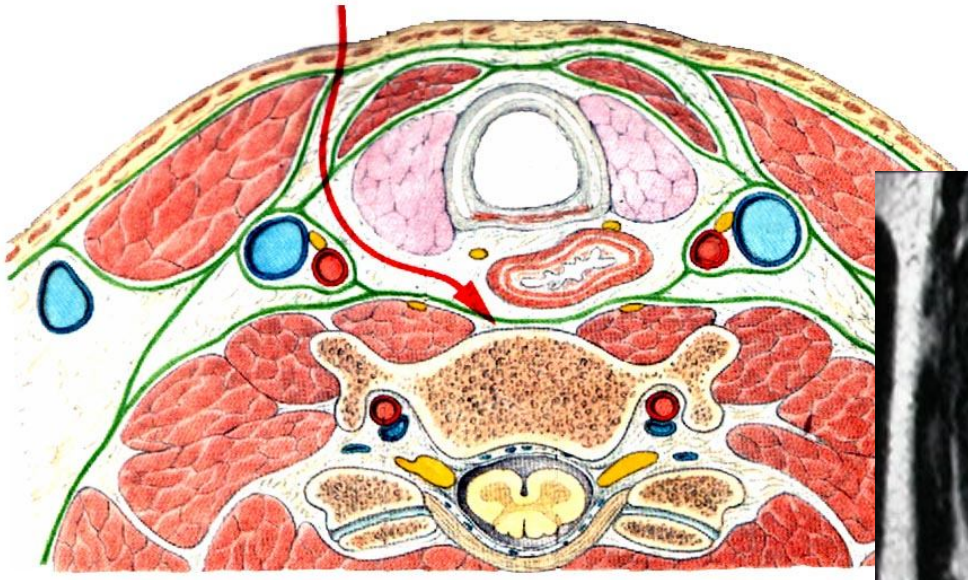
J.C. CURSOLLE

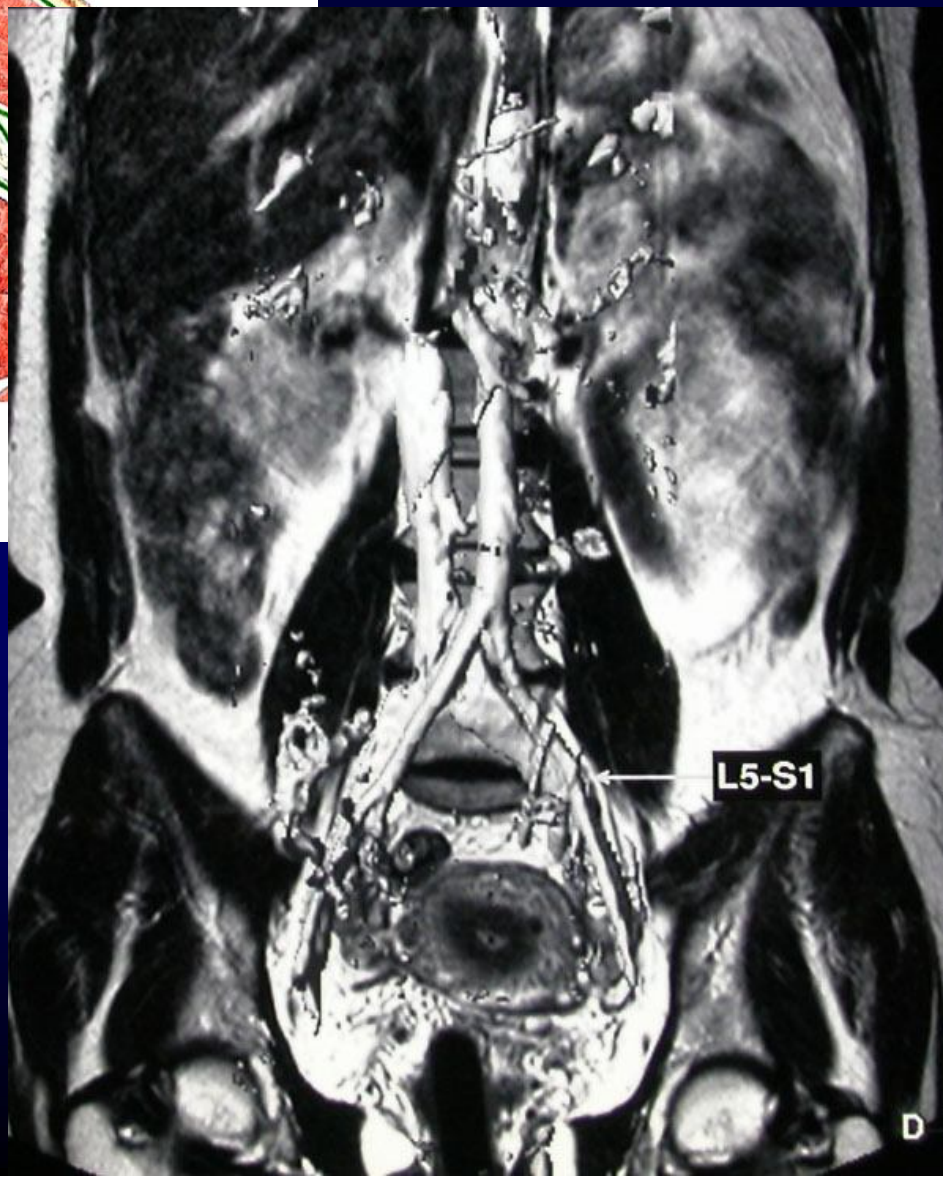
Spinal Unit , University Hospital , Bordeaux , FRANCE

DISCOPATHY

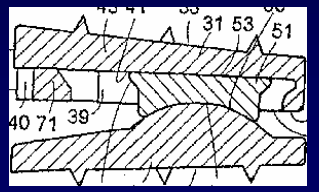
LOW BACK PAIN

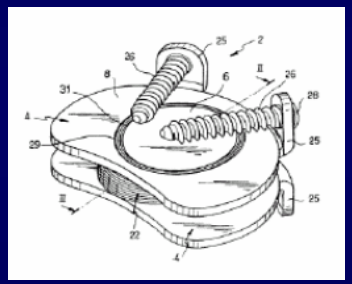
C6C7 HERNIATION

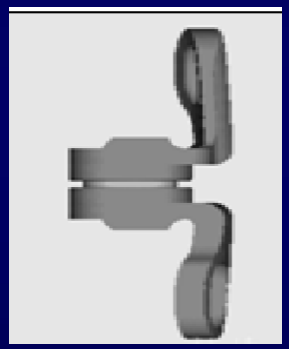


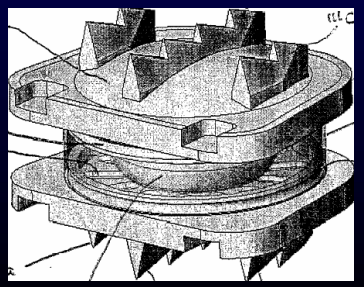

L5-S1
D

PROTHESES CERVICALES

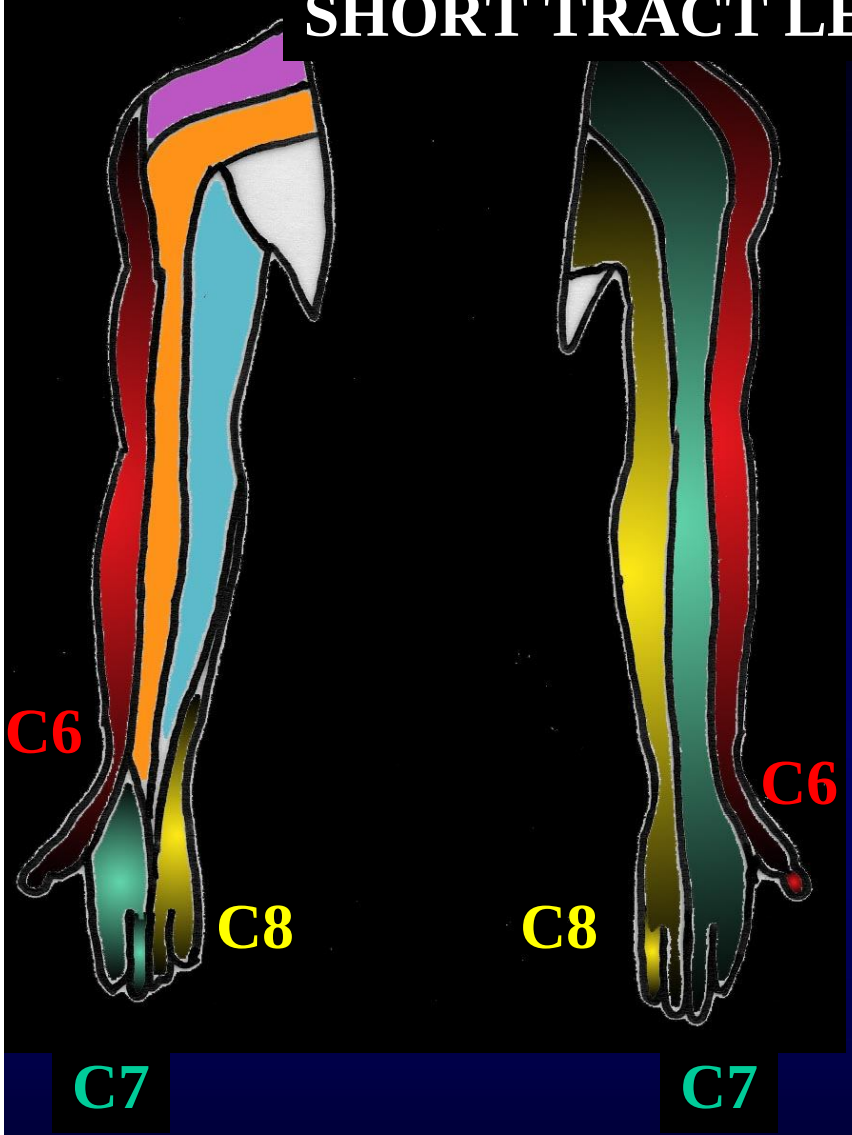




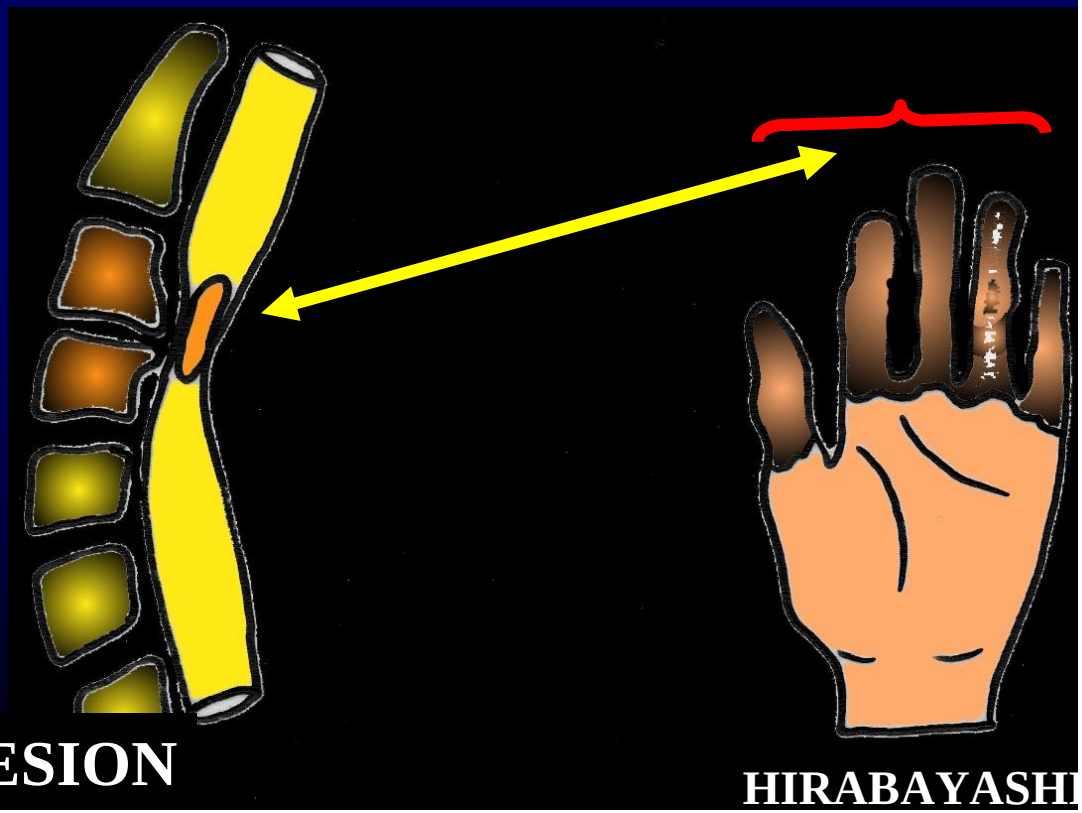




SHORT TRACT LESION



CERVICO BRACHIO NEVRALGIA (C.B.N.)



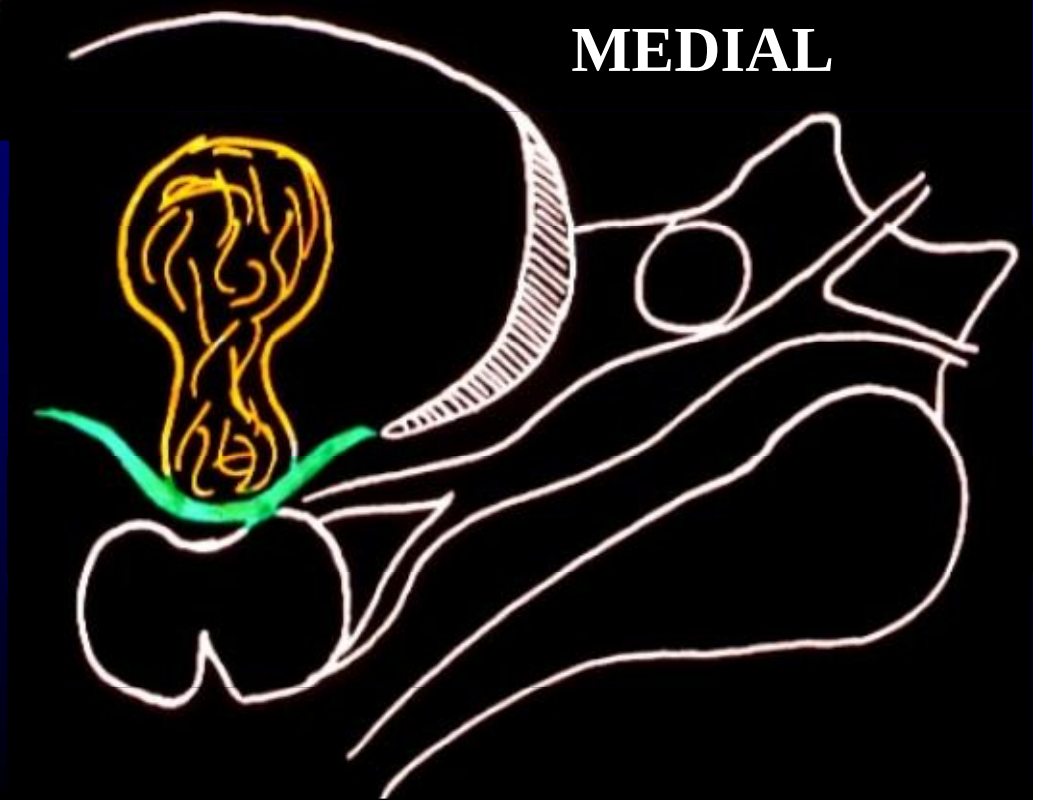
LONG TRACT LESION

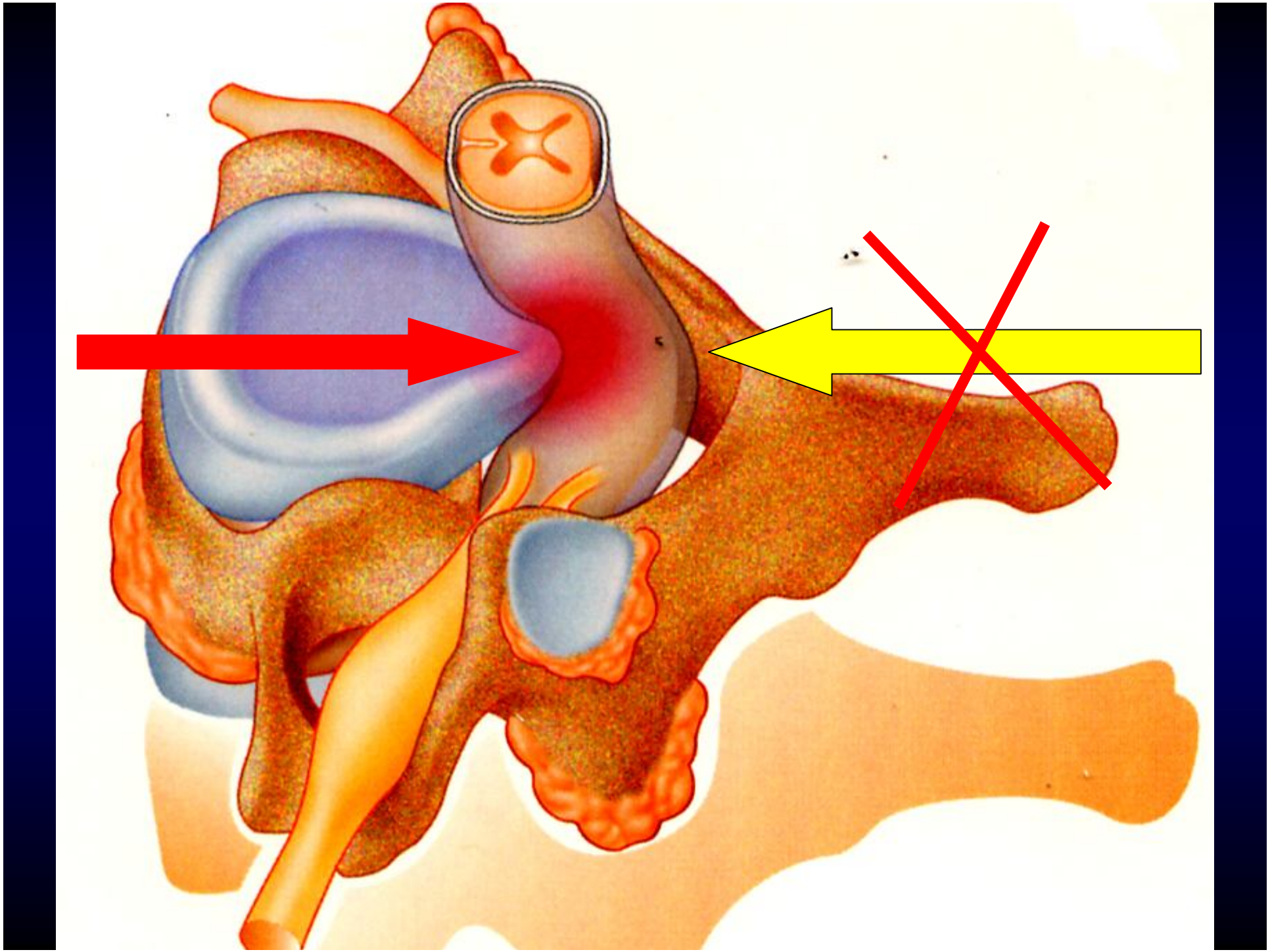
HIRABAYASHI

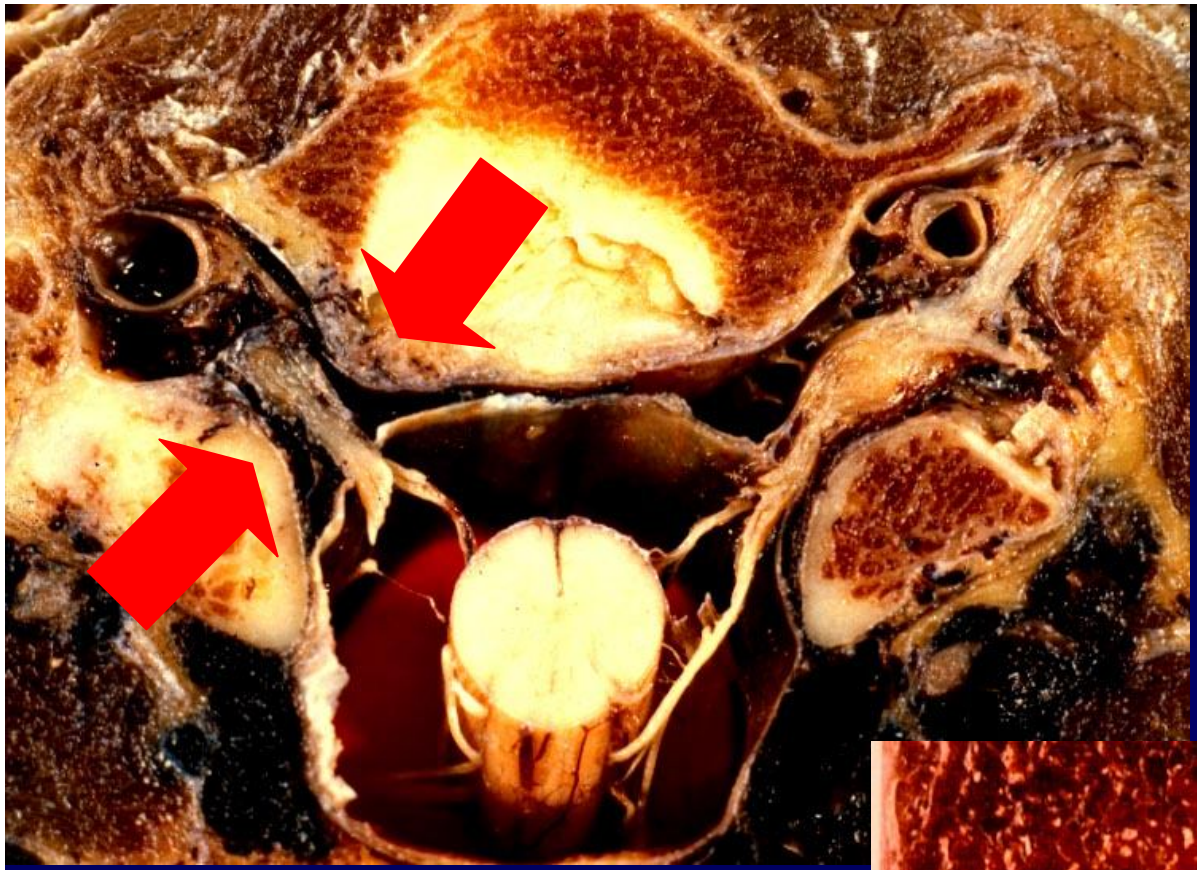
SOFT HERNIATION

POSTEROLATERAL

MEDIAL

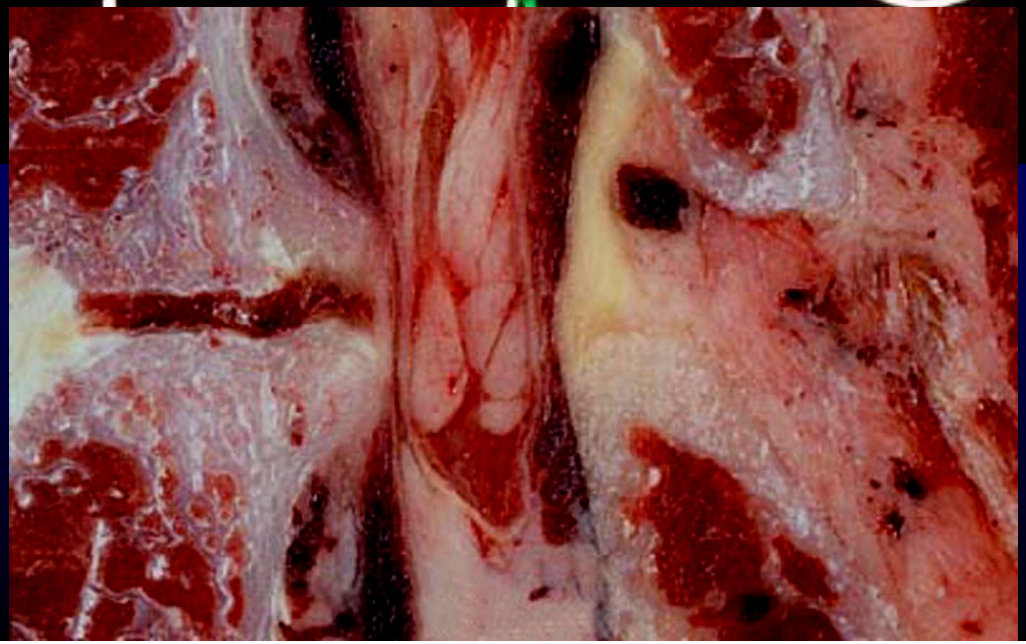






8/10

HARD HERNIATION



OPTIONS

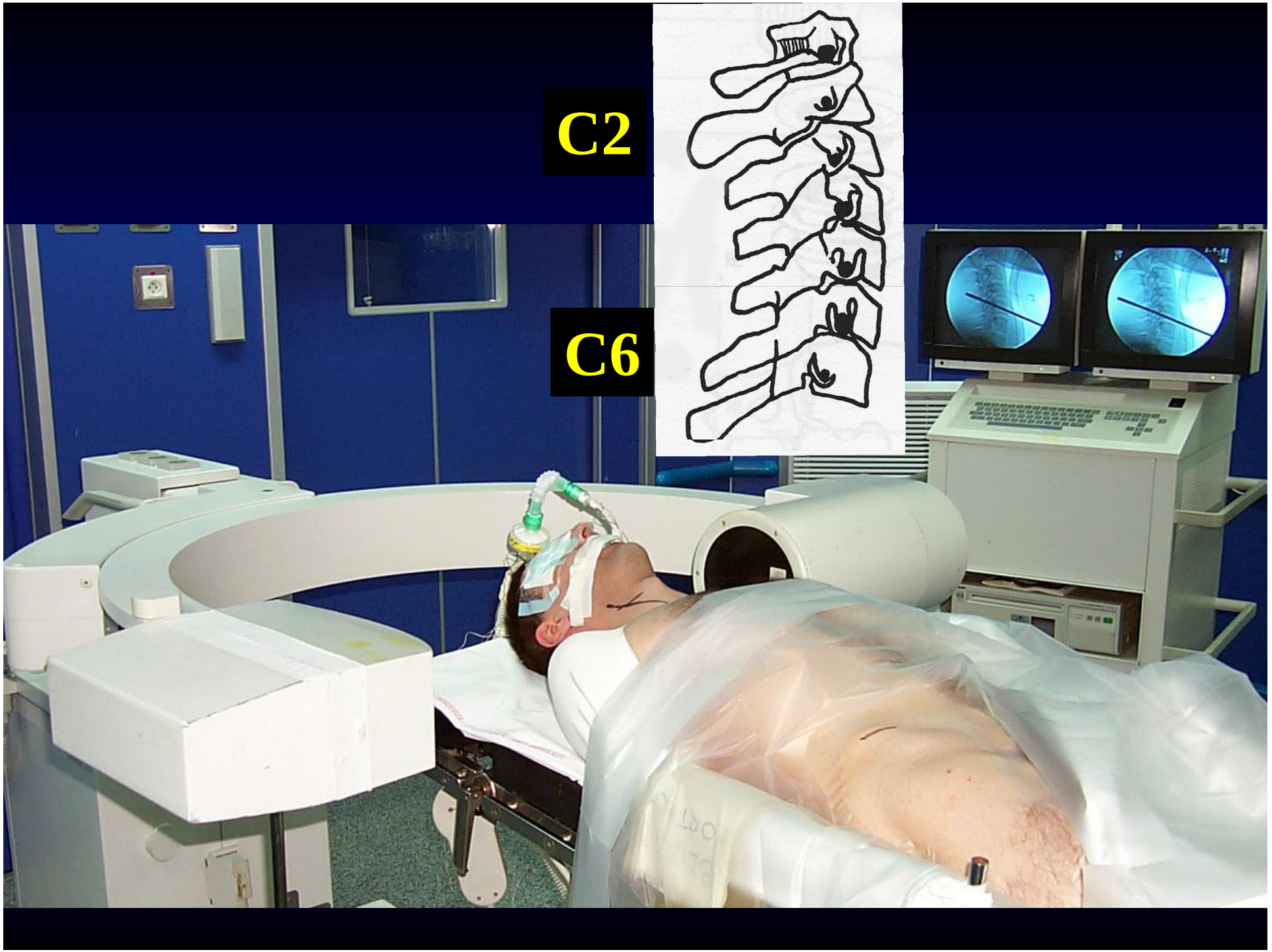
DISCECTOMY

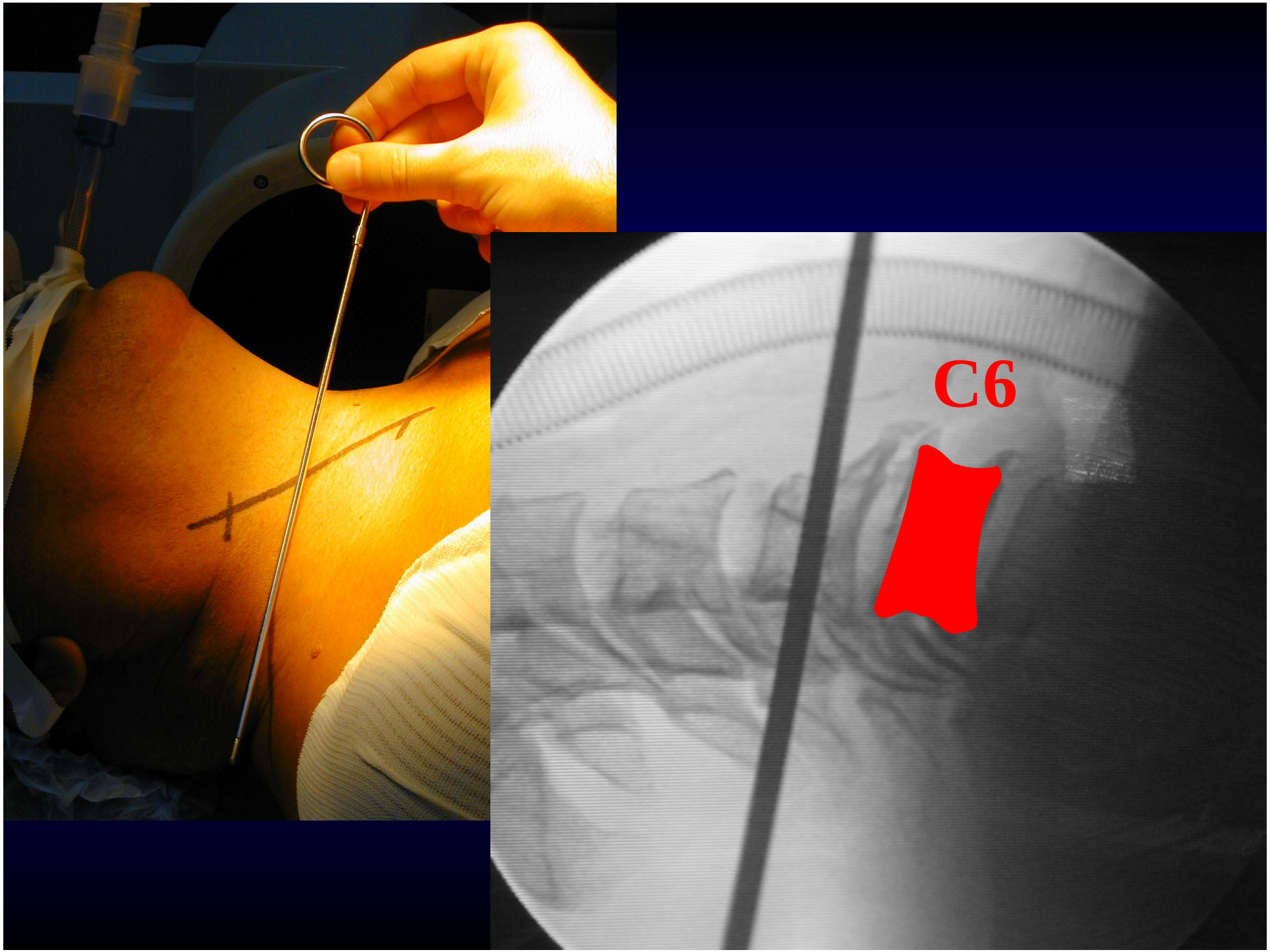
FUSION

SMITH & ROBINSON 1955

CLOWARD 1958

PROTHESIS (?)


C2
C6


C6

1-DISCECTOMY

- **ECONOMIC**
- **FAST**
- **SAFE**

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

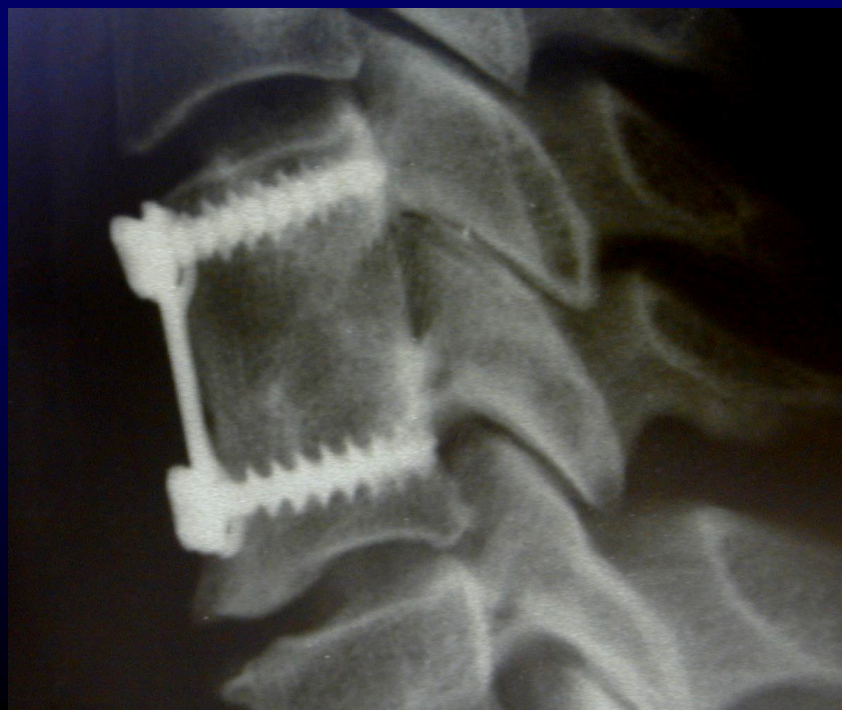
2-FUSION

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

GOLD STANDARD

HACKER & al. A prospective randomized multicenter clinical evaluation of an anterior cervical fusion cage. Spine 2000

Complications : 10 to 20%



Discectomies in US

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

ANGEVINE & al Spine 2003

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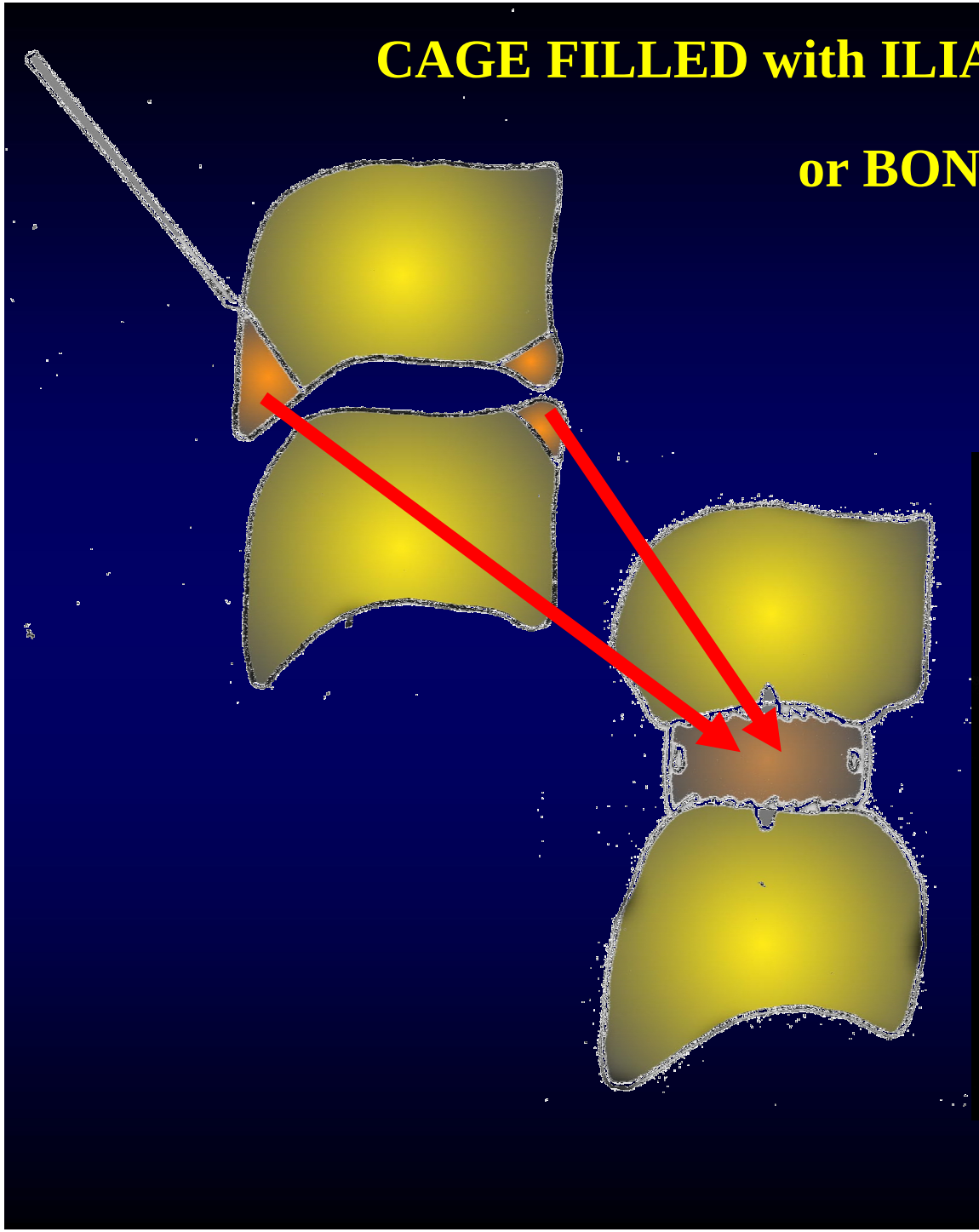
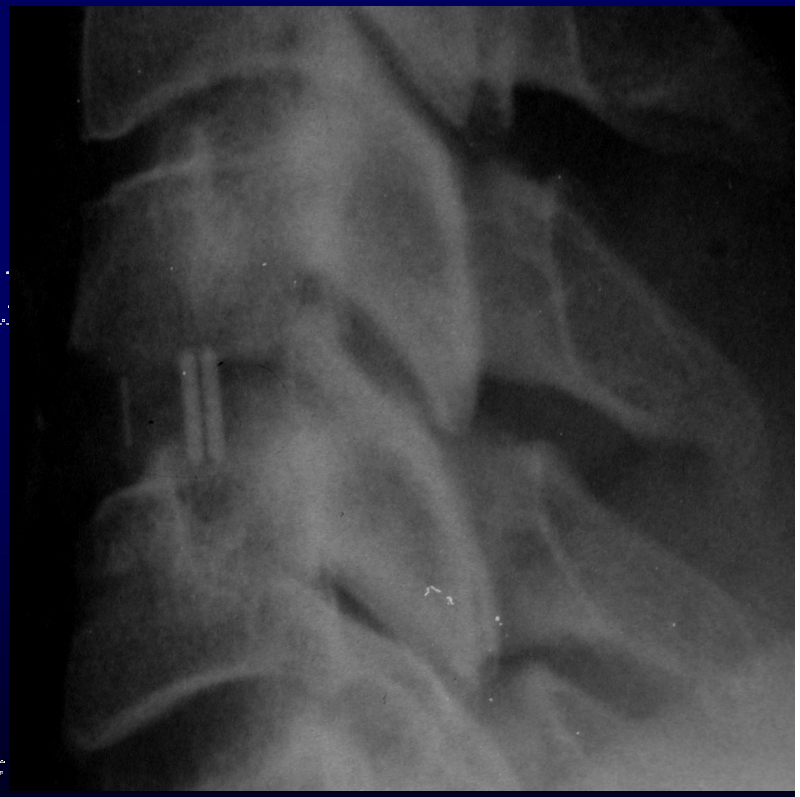
CAGE FILLED with ILIAC BONE , LOCAL BONE

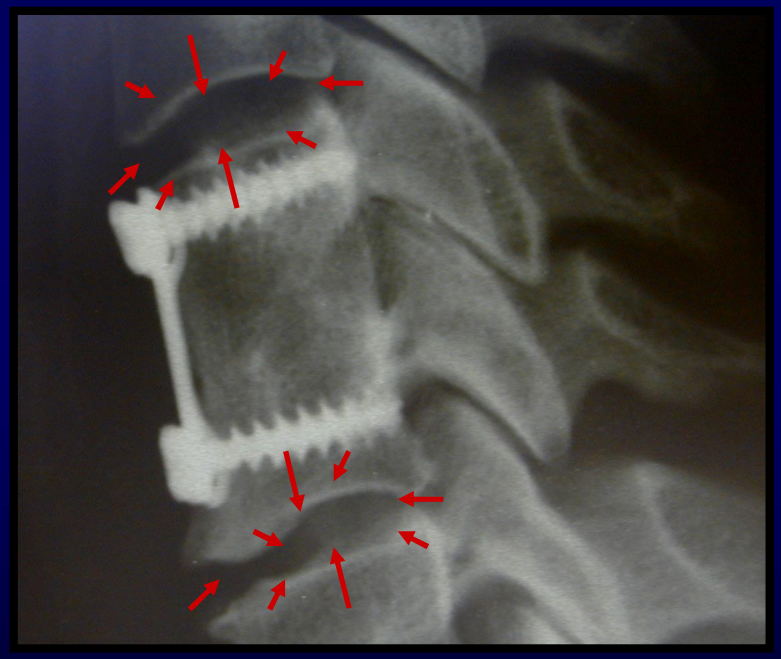
or BONE SUBSTITUTE





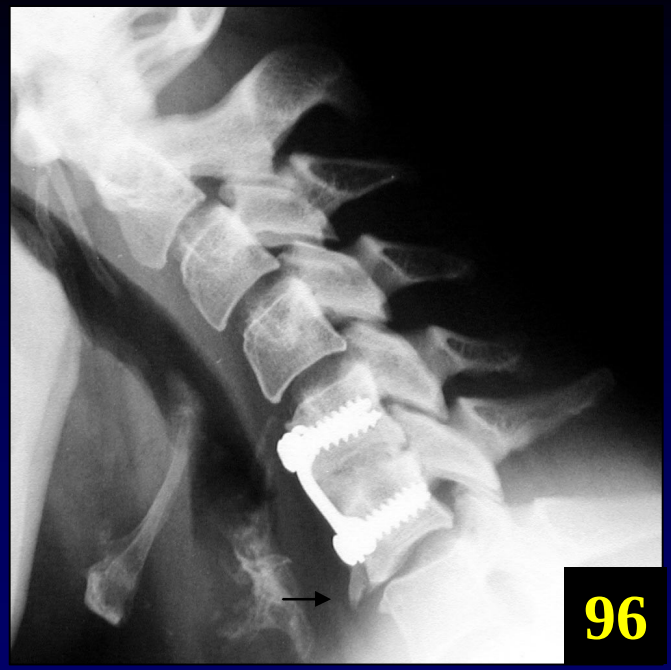
SYMPTOMATC ADJACENT SEGMENT S.

A. HILIBRAND , JBJS 81-A, 1999



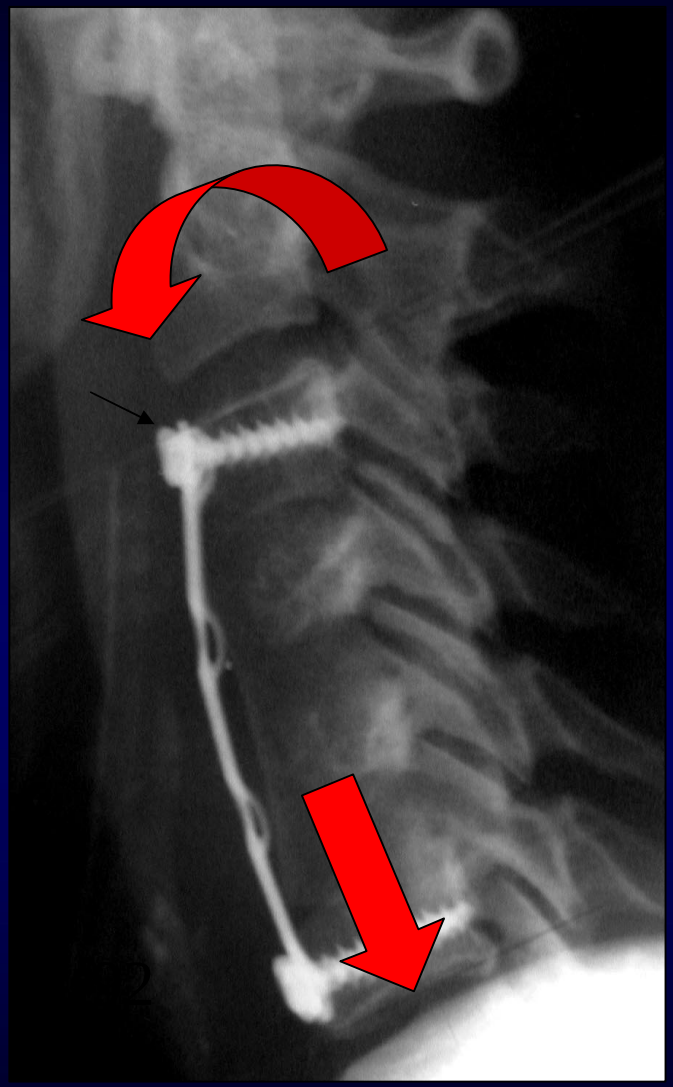
n = 374 Patients
2 – 21 yrs
2.9 % per year
worse at C5-6 C6-7

- **symptom-free survivorship 75.6% at 10 years**



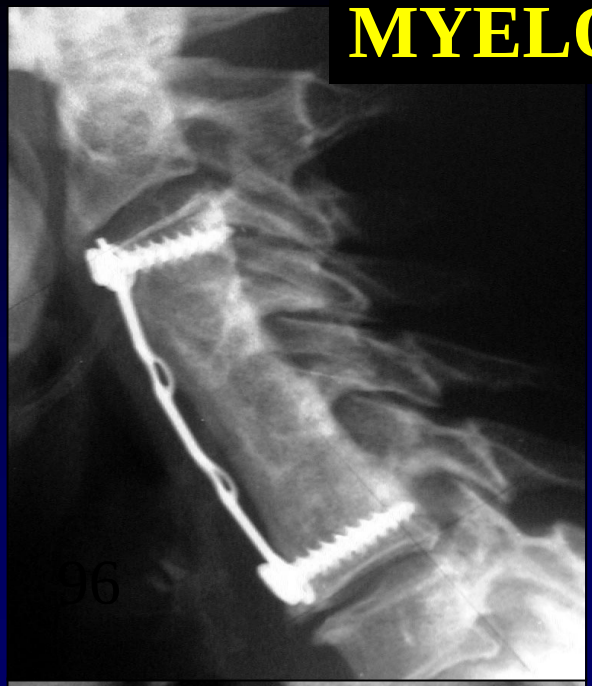
SOFT HERNIATION

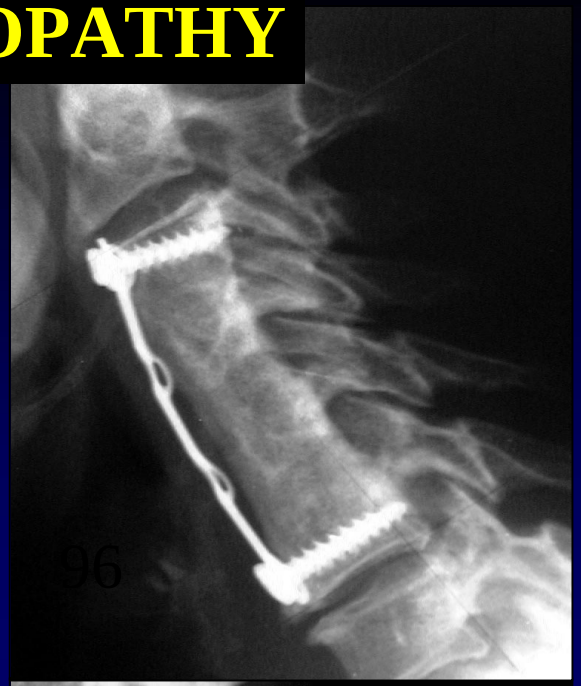
MOBILITY



RIGIDITY

MYELOPATHY





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**

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

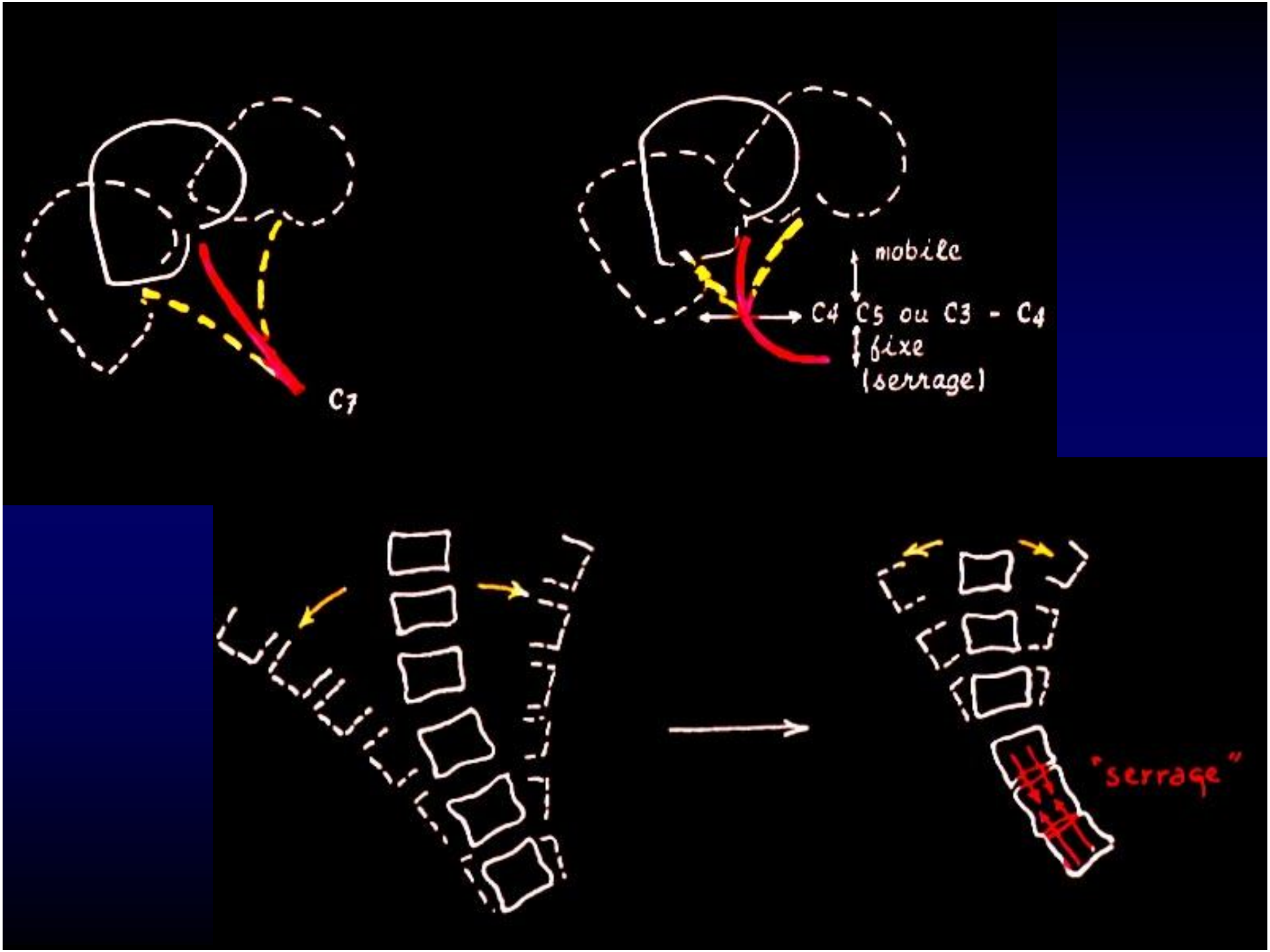
50 operated on (fusion of 1 to 5 segments)
100 consulted with neck pain showing or not degenerative changes at first X rays having ulterior X rays at 5 to 27 years

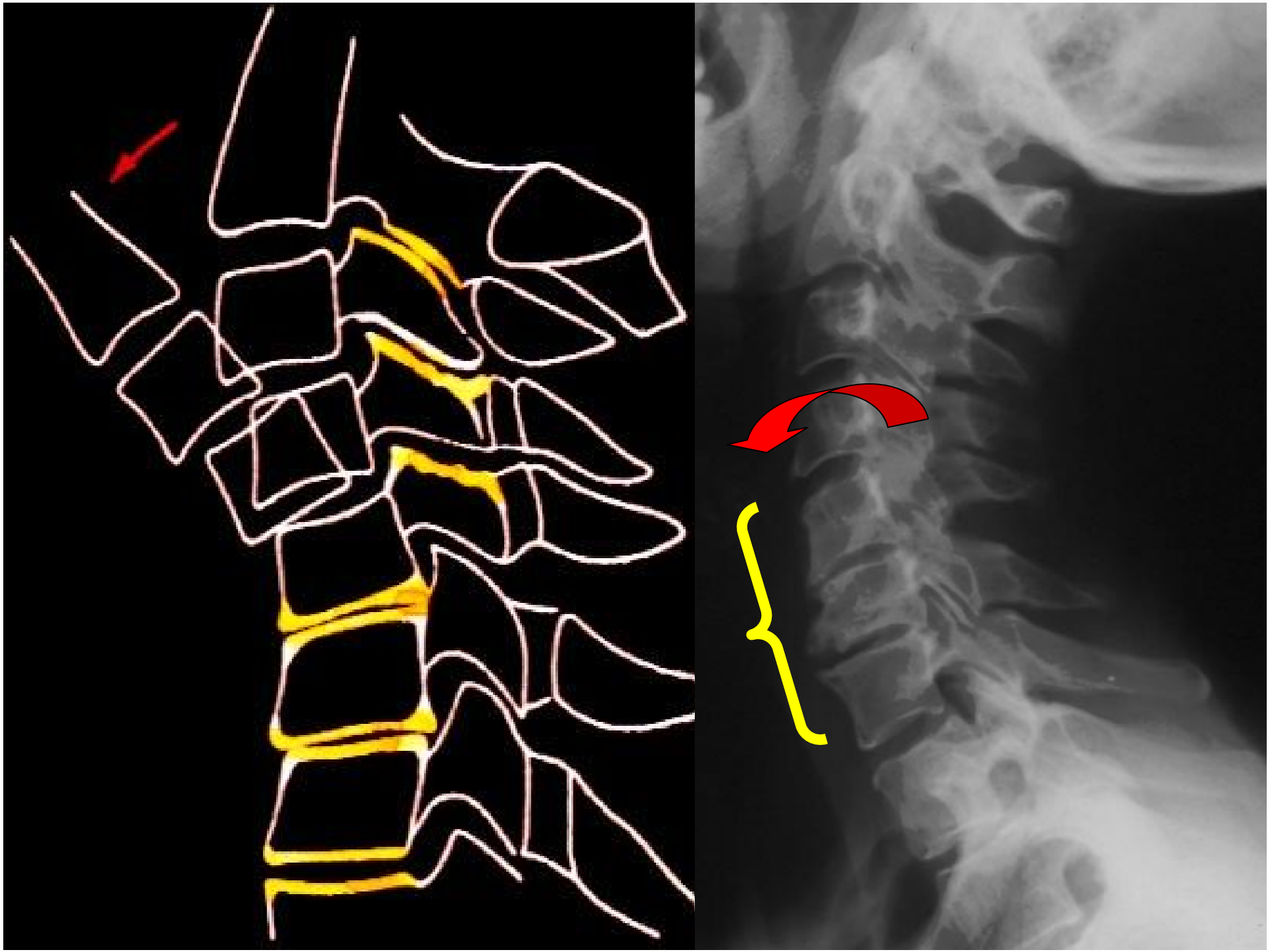
Operated group: 5 to 17 years of follow up
Adjacent new degenerative changes: 32%
Progression of degenerative changes : 51%

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.

VILLAS , CSRS , Roma 2005


C7
mobile
C4
C5 ou C3 - C4
fixe
(serrage)
"serrage"



Basic science papers

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

- **JASON (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

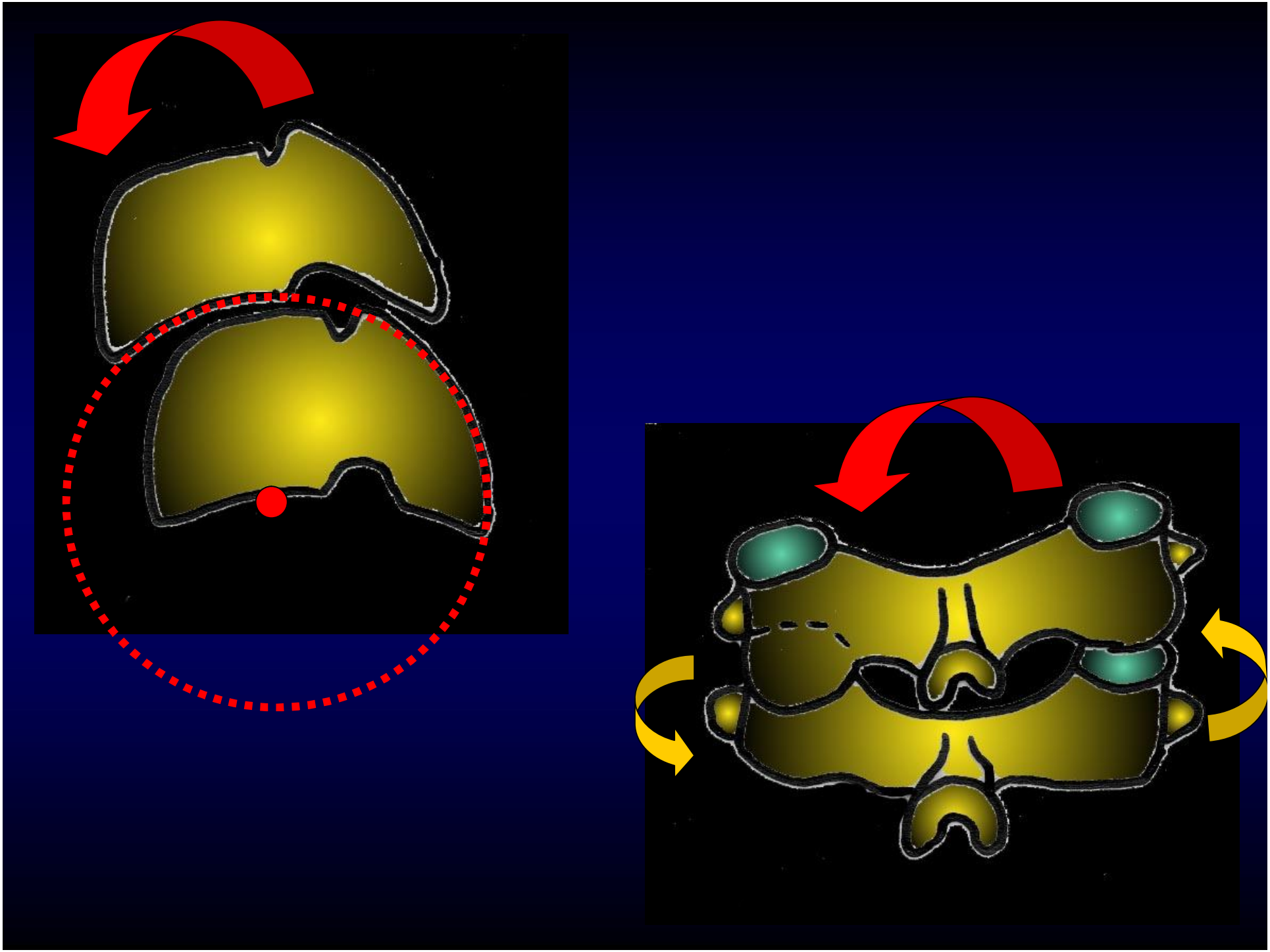
- Similar approach

- Kyphosis and fusion prevention

-Stability with time

Efficacy

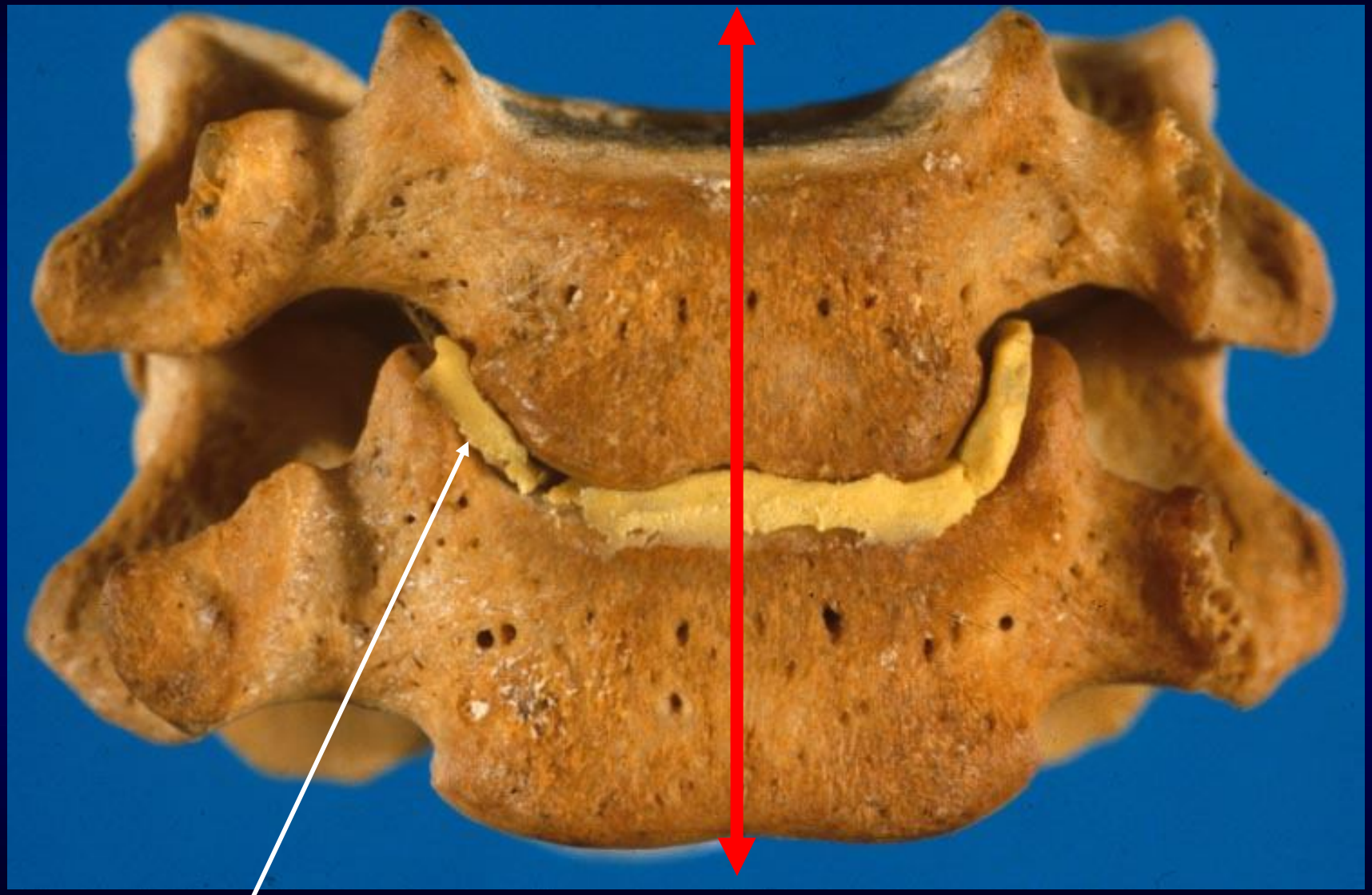
- Short and mean term (2 years): DECOMPRESSION
- Long term: MOBILITY (reintervention rate)



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°

MIDDLE POINT

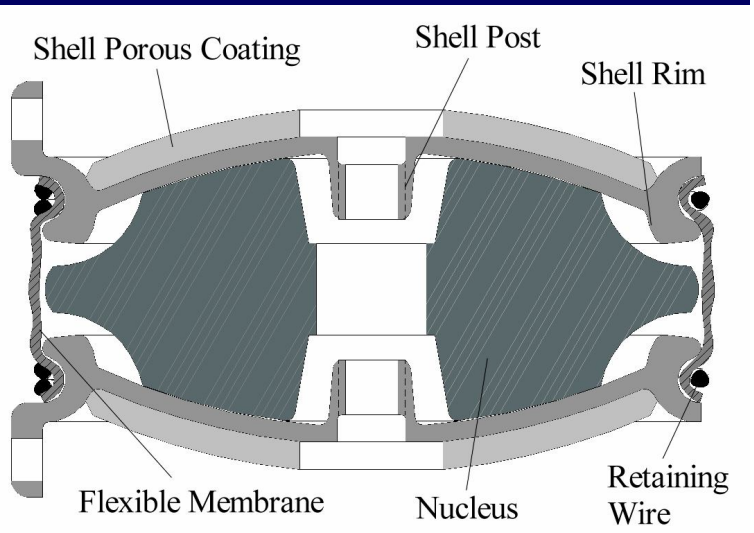


UNCUS

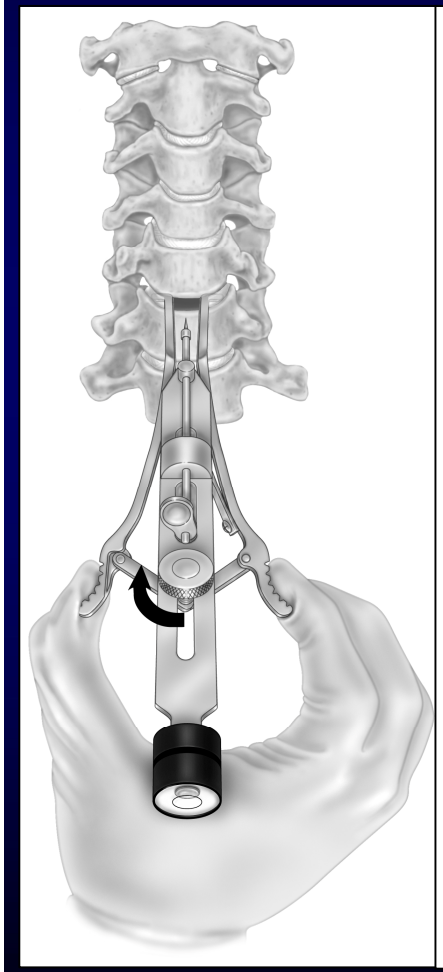
BRYAN (1990)

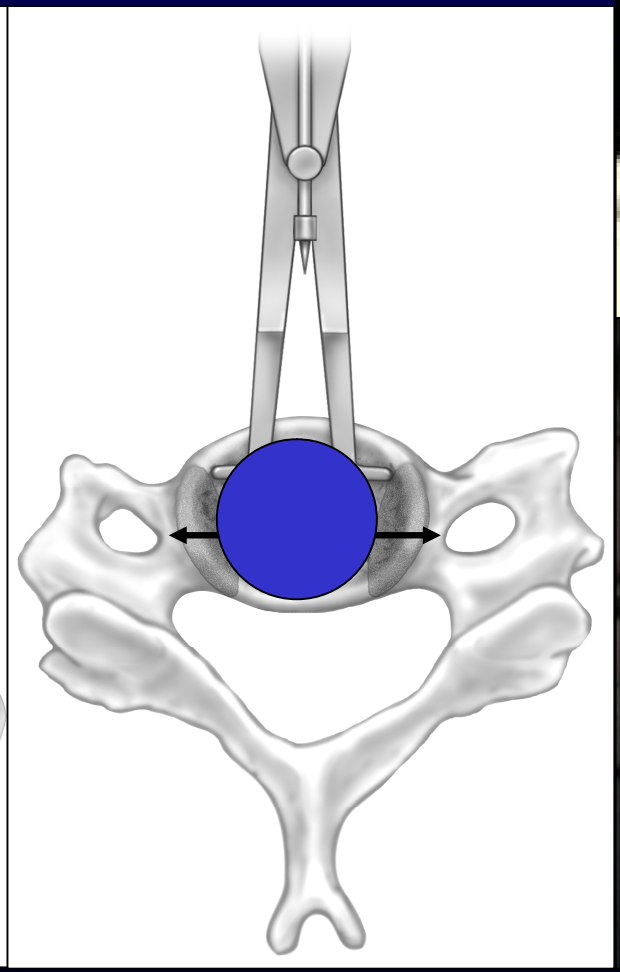
Two concave plates + polyurethane nucleus

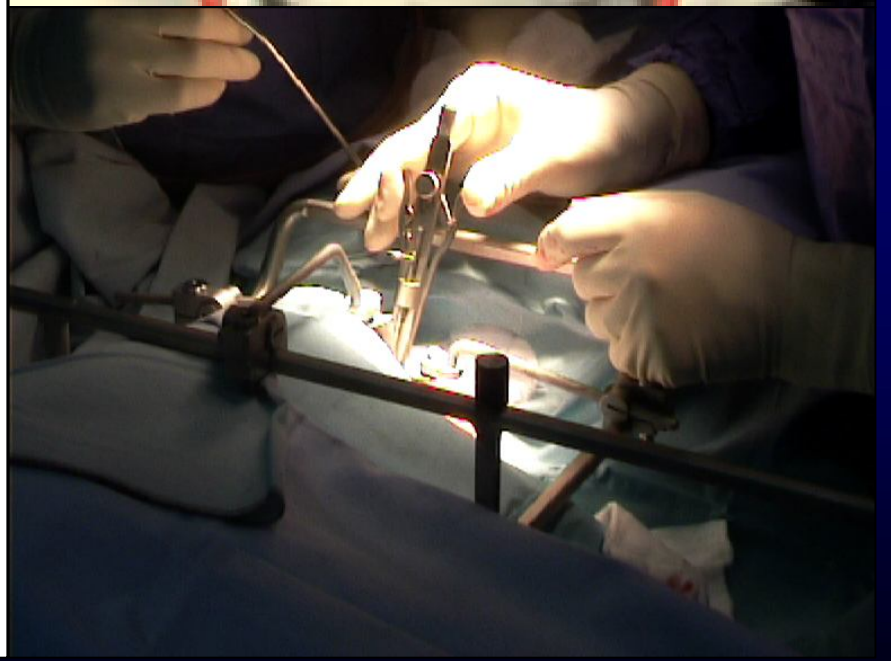
- Unconstrained
- F/E and inclination : 11°
- Translation : 2 mm
- Immediate stability



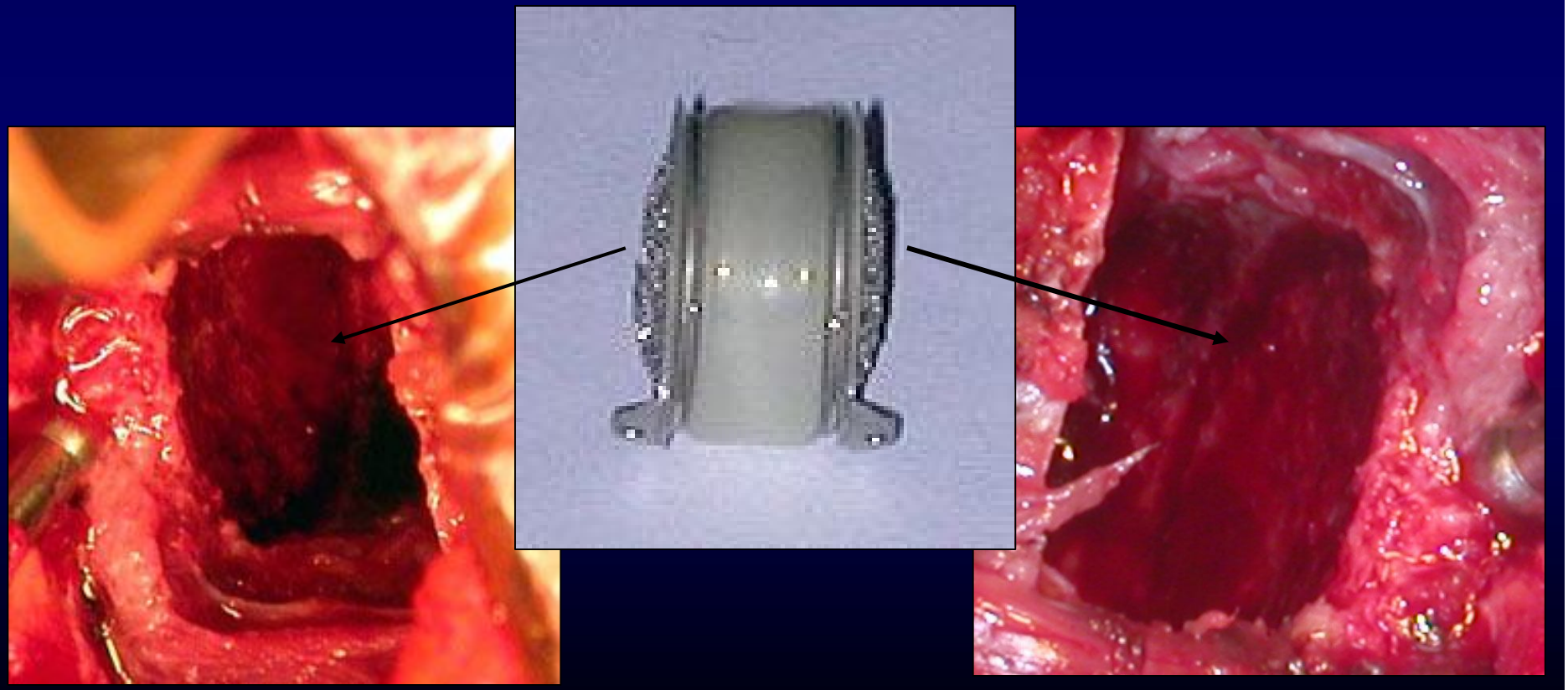
Prothesis strictly in the middle of intervertebral space



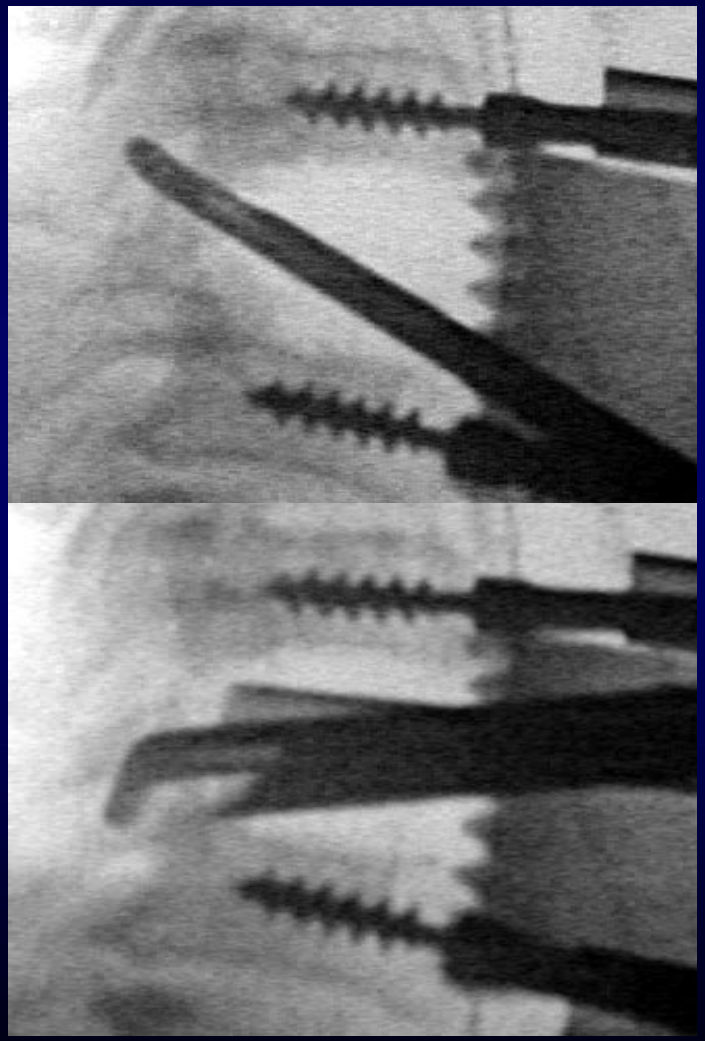


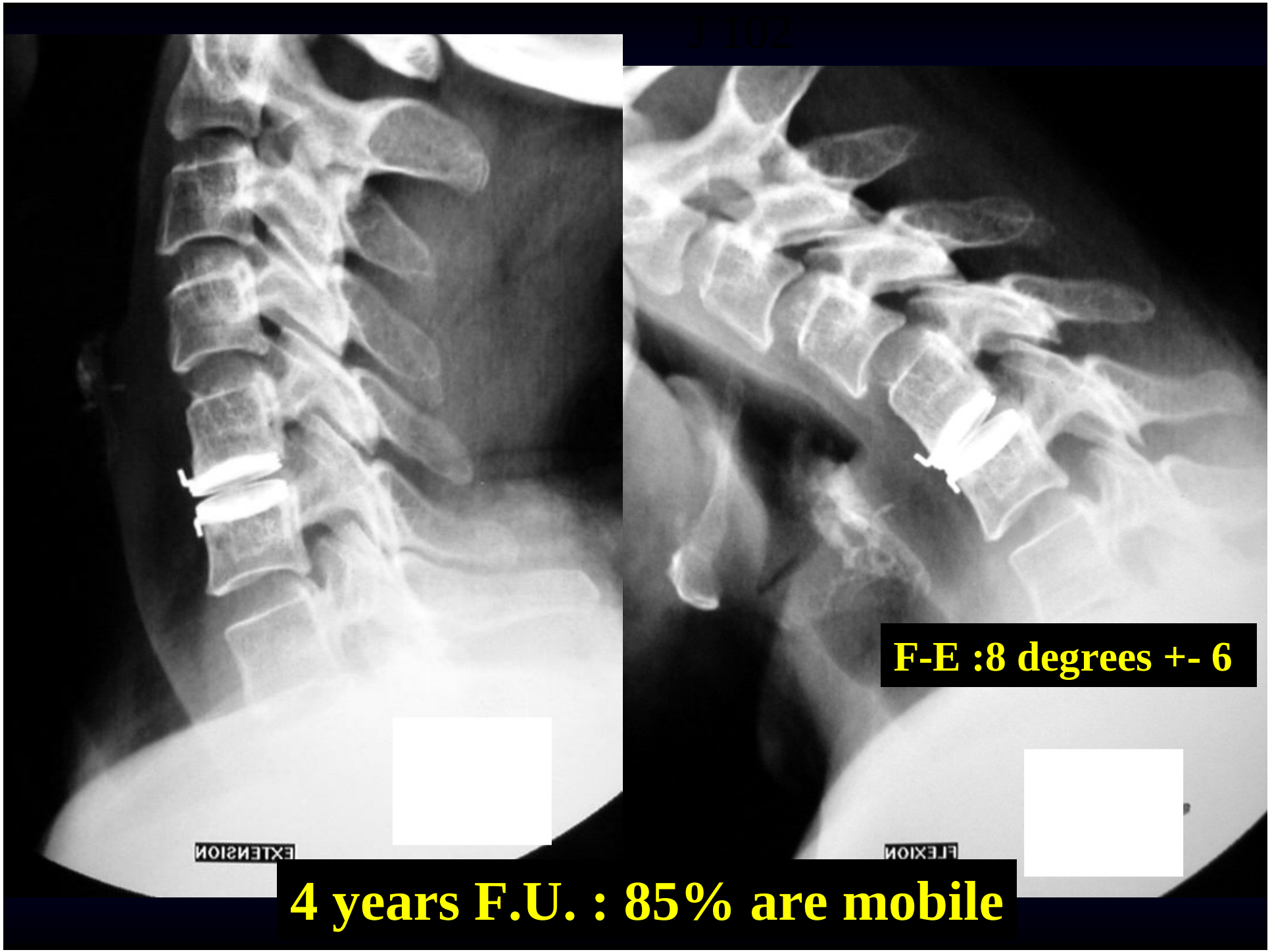


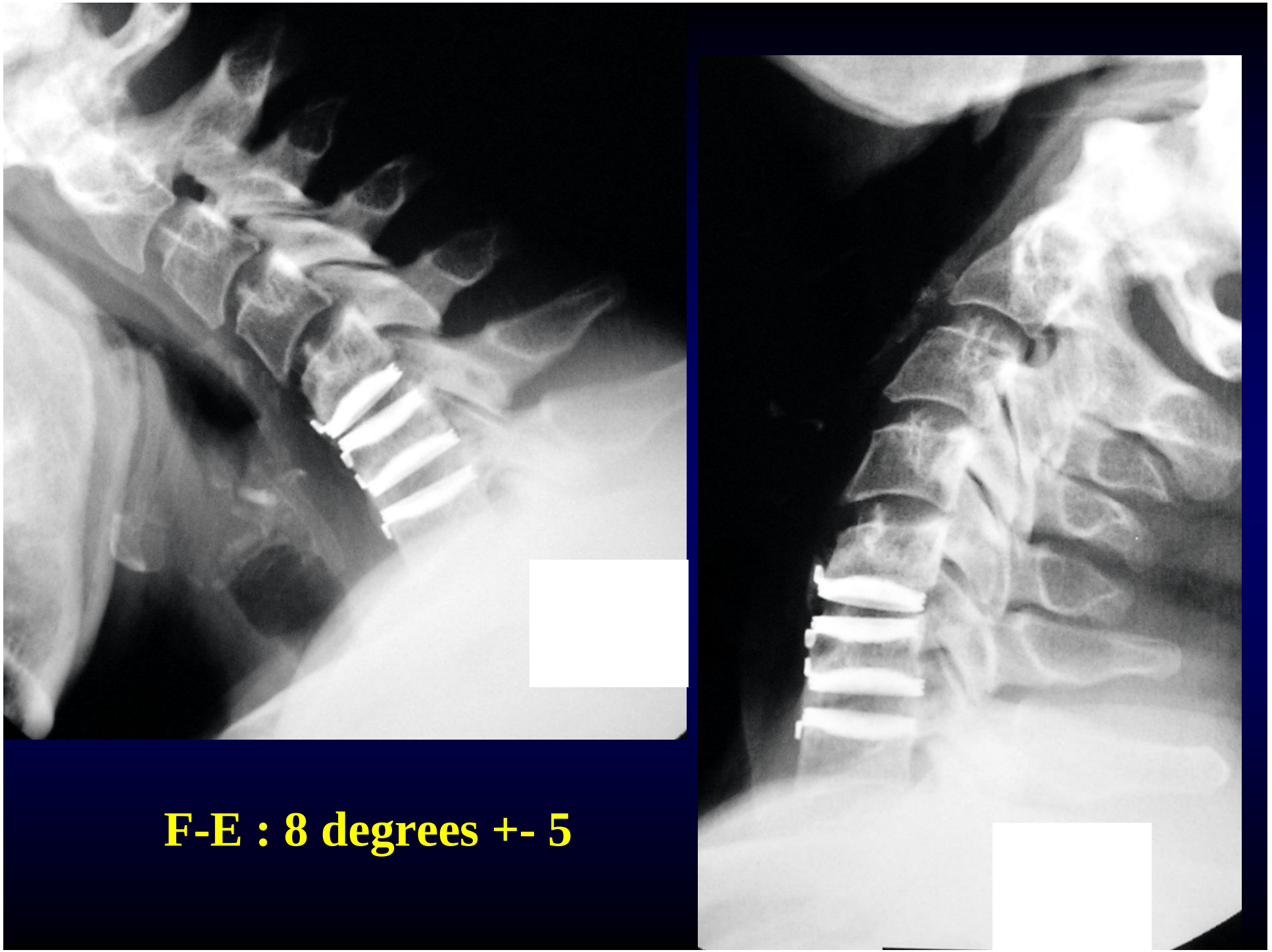
End plates hollowing



Decompression

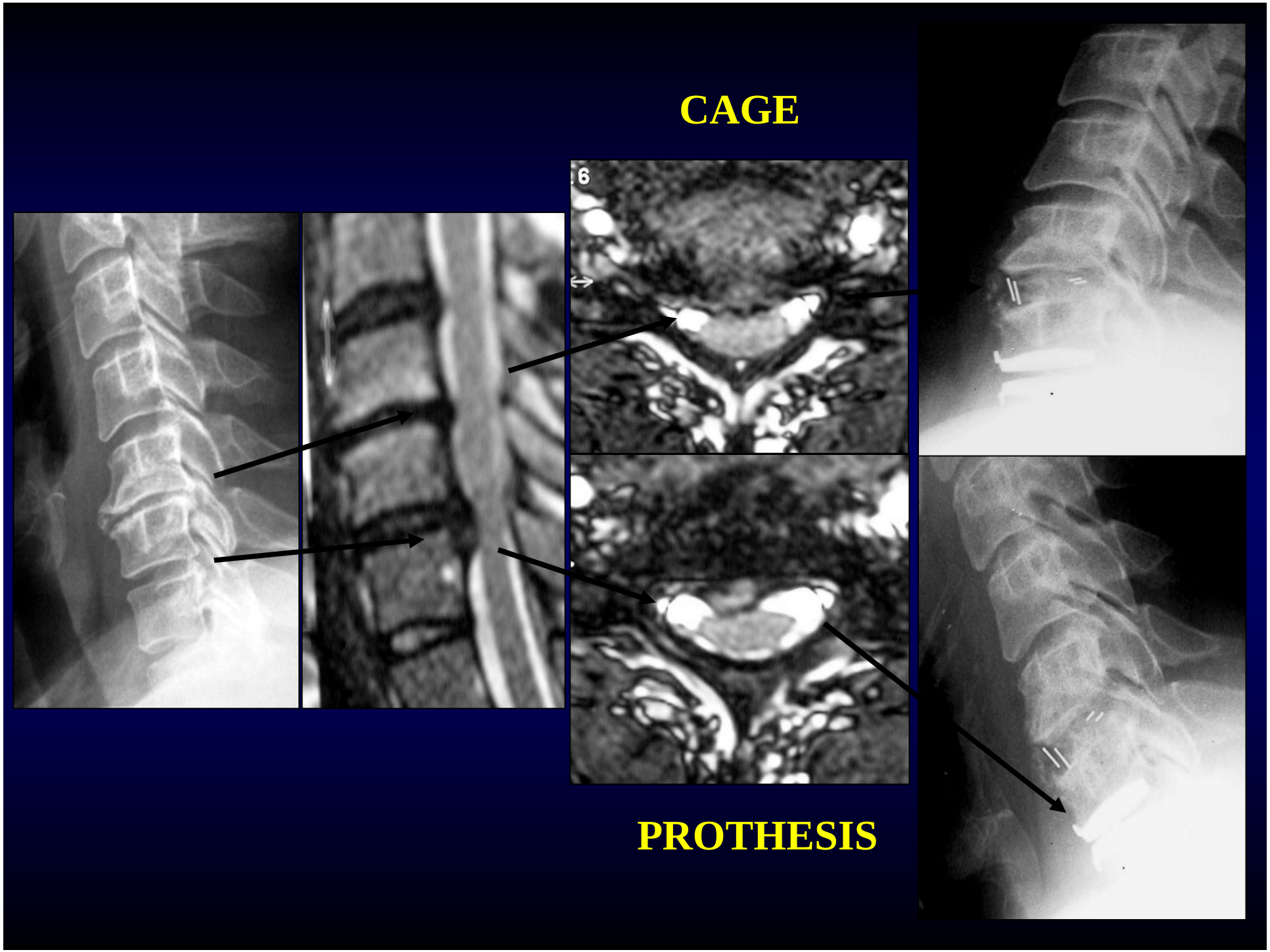



F-E :8 degrees +- 6
4 years F.U. : 85% are mobile



F-E : 8 degrees +- 5

Fusion C6C7
1996
Fusion C3C4
1999
DDD C5C6
2003

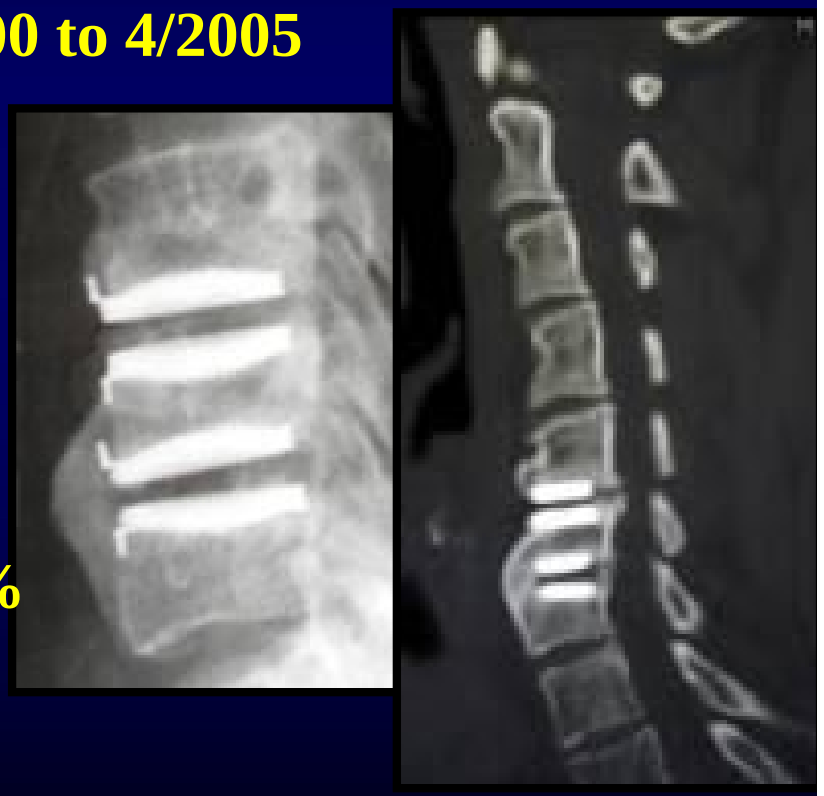

CAGE
PROTHESIS

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



MOBI-C (2004)(semiconstrained))

8 centers in France

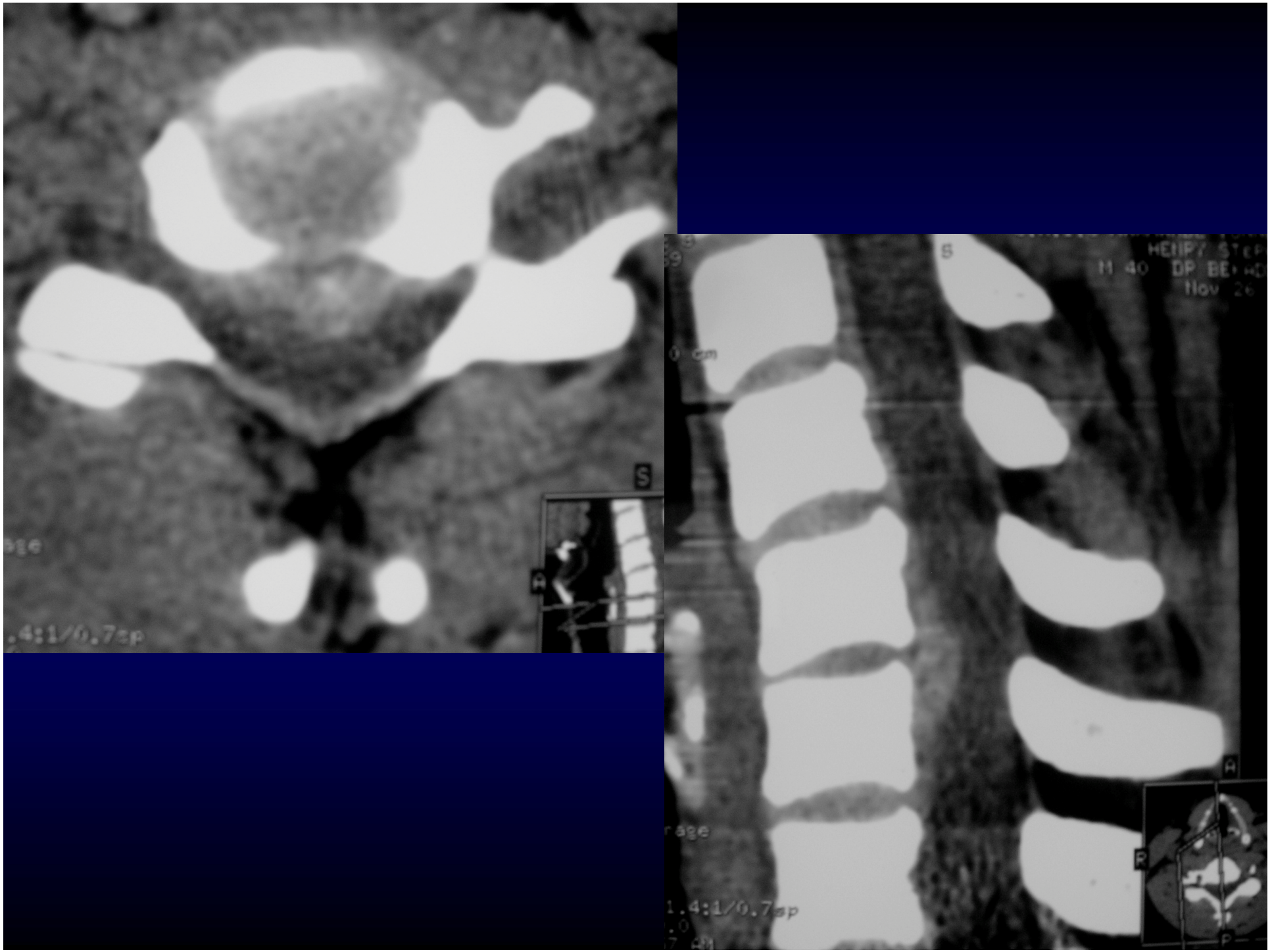
161 patients

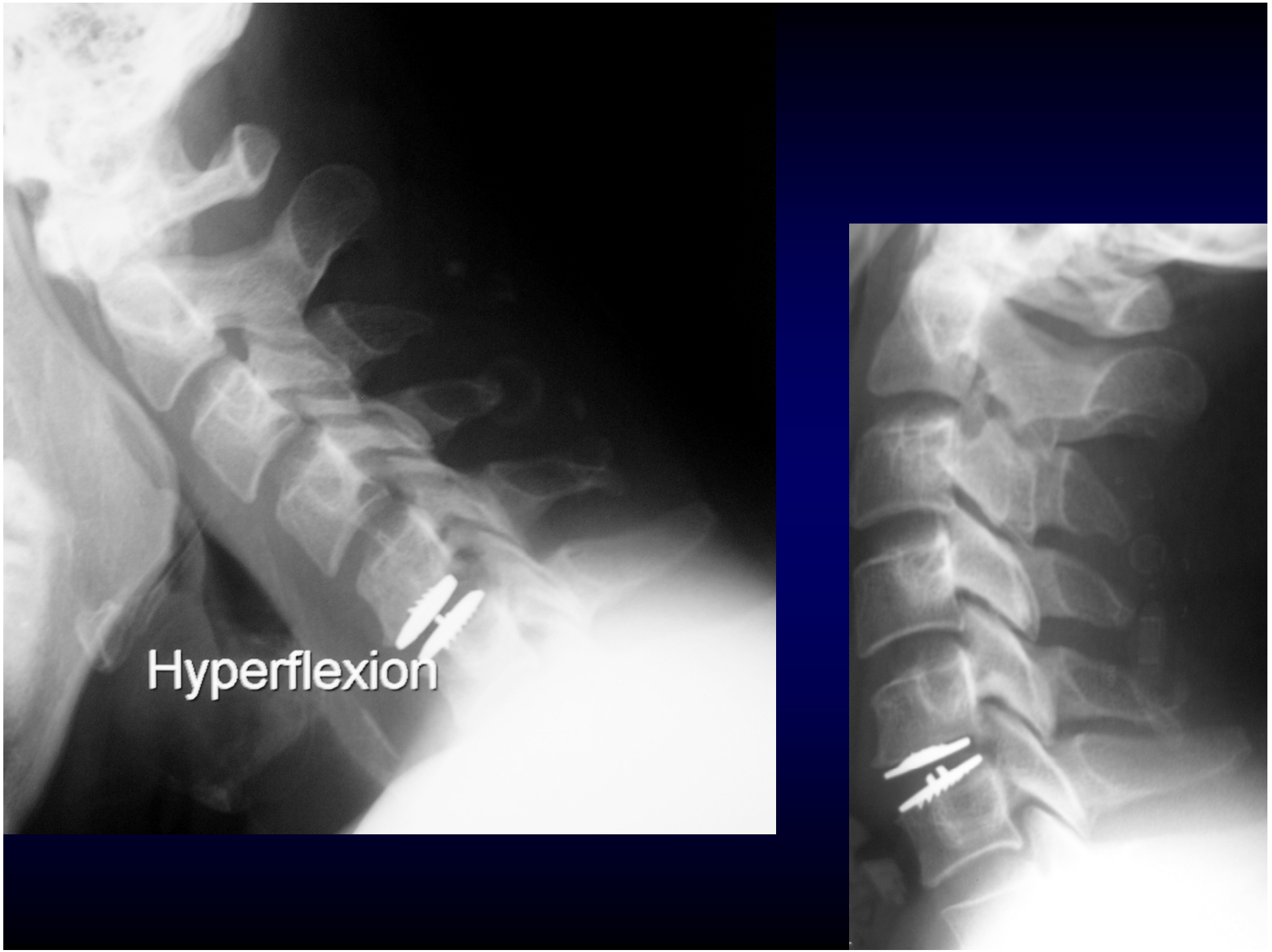
46% males and 54% females

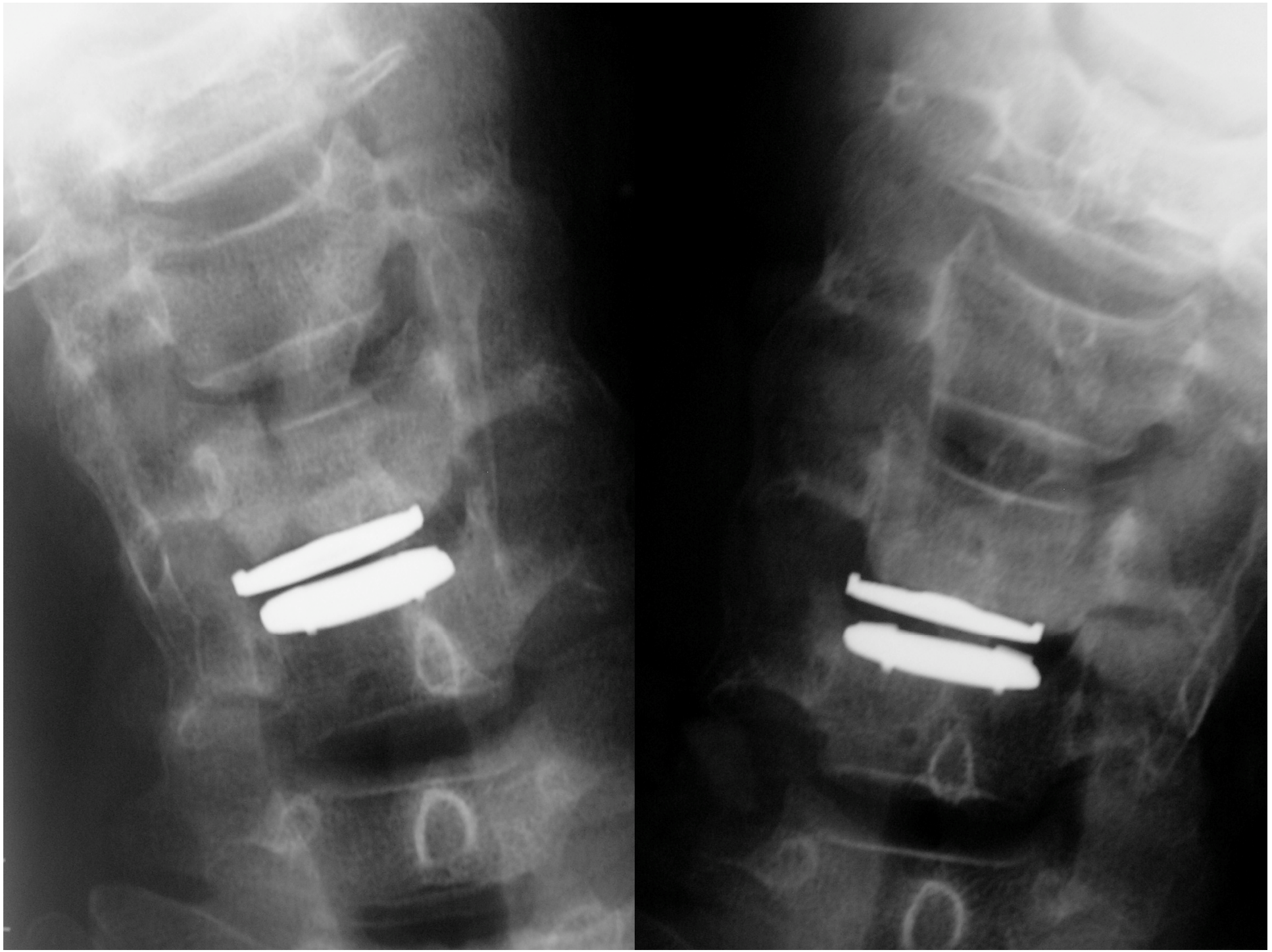
Mean age : 43.6 years (25-65)

Mean F.U. : 11.7 months (1-24)

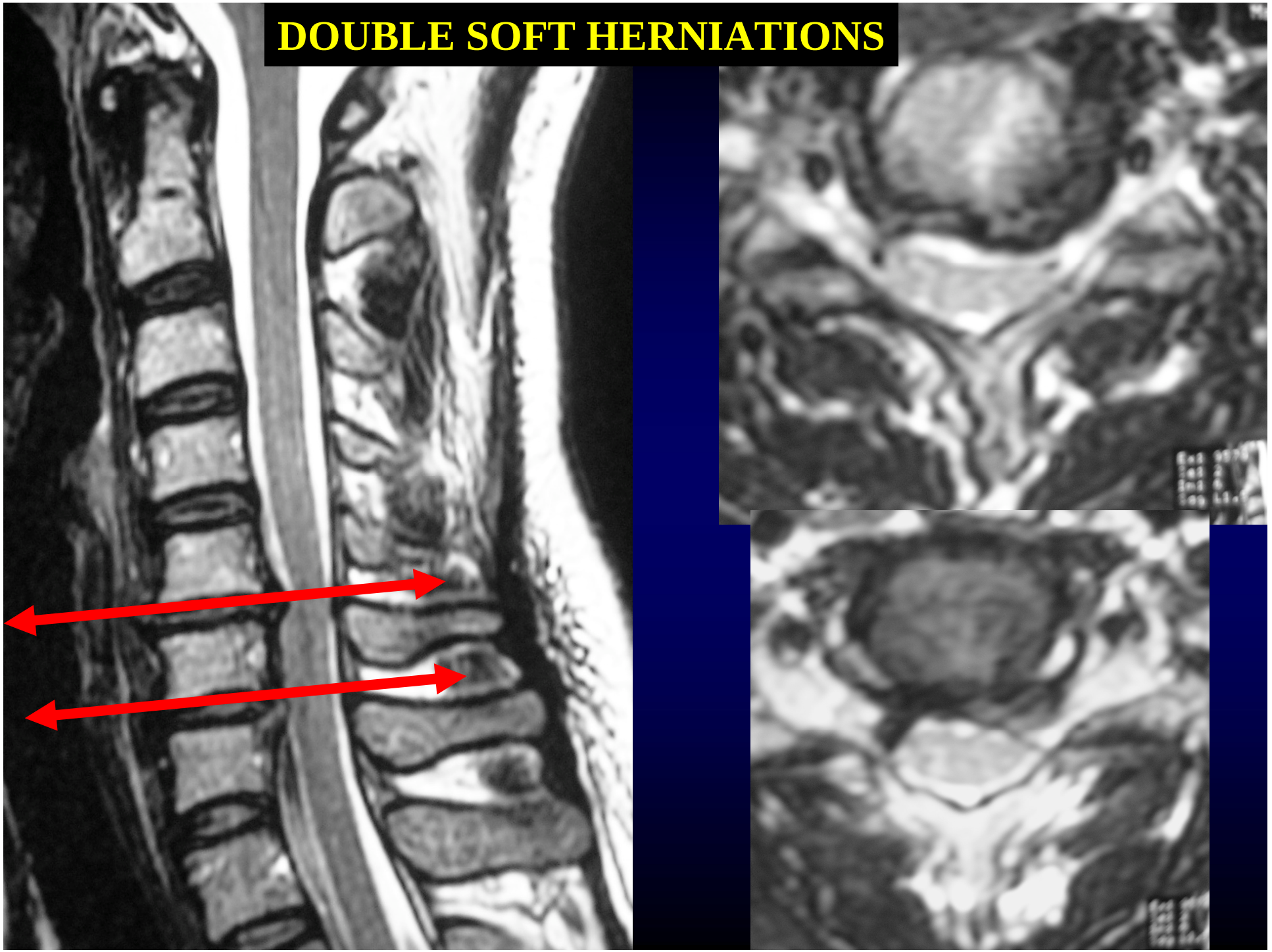
F.U. ≥ 6months : 129 patients
F.U. ≥ 12 months : 73 patients

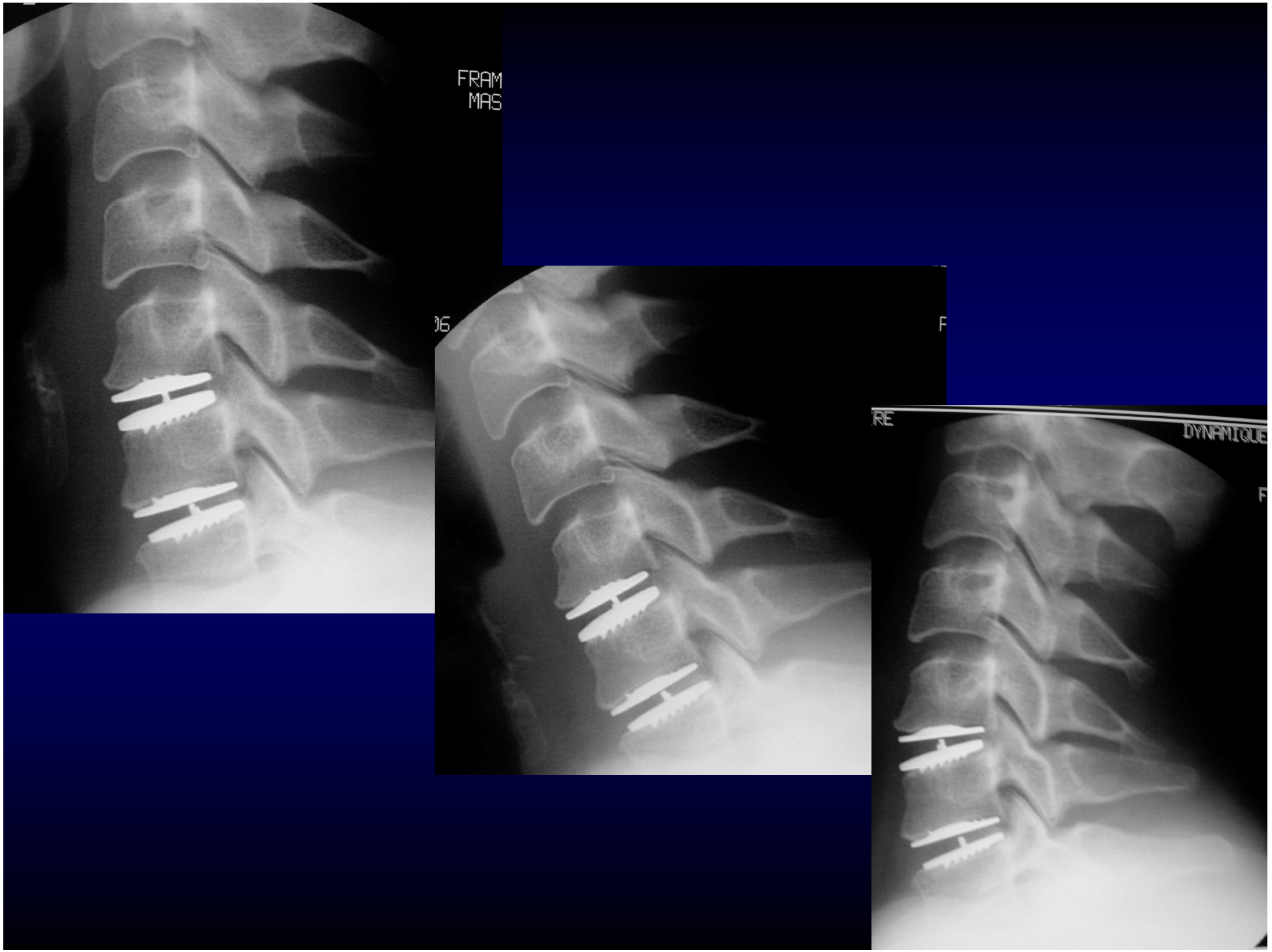


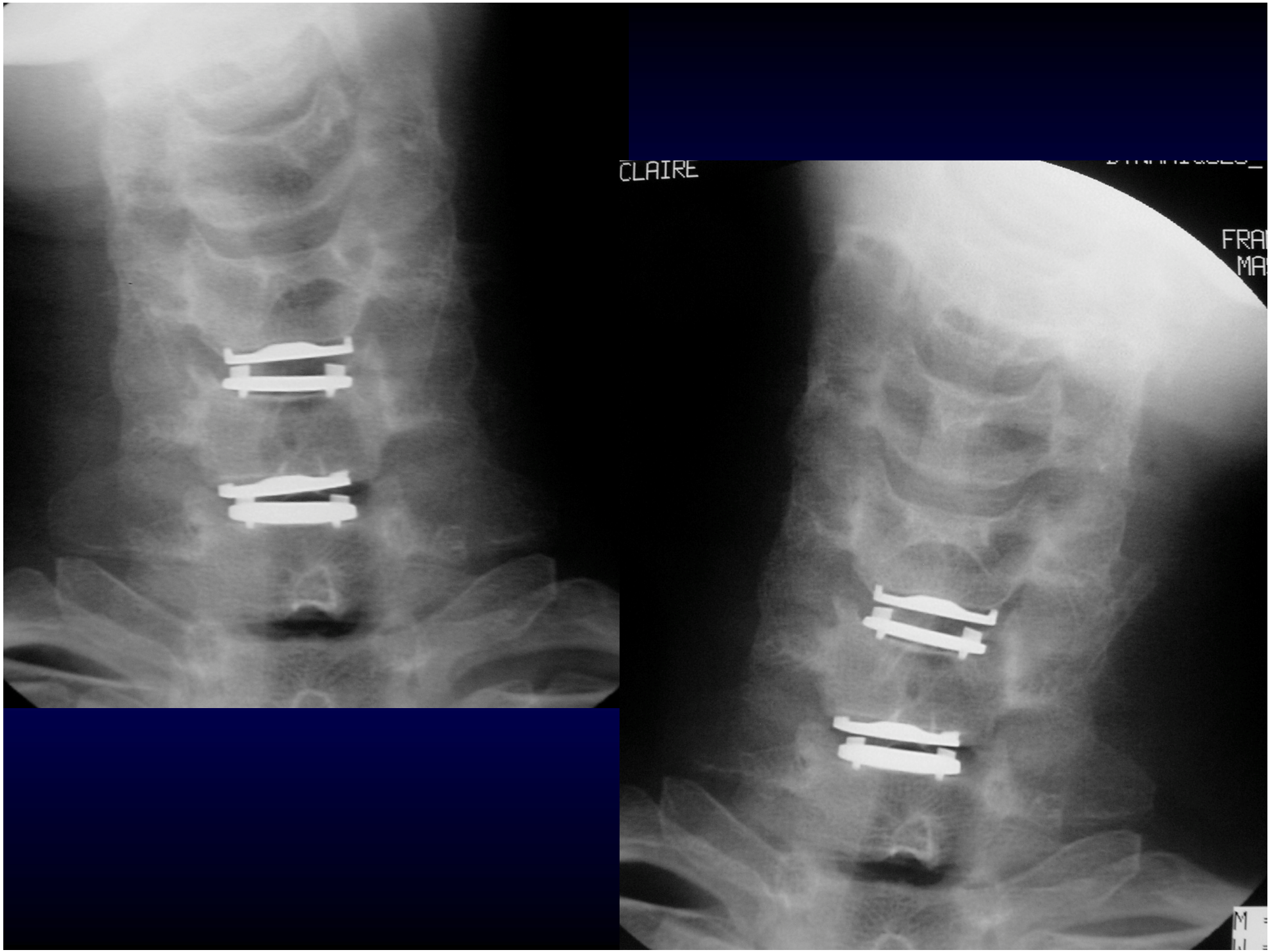

Hyperflexion



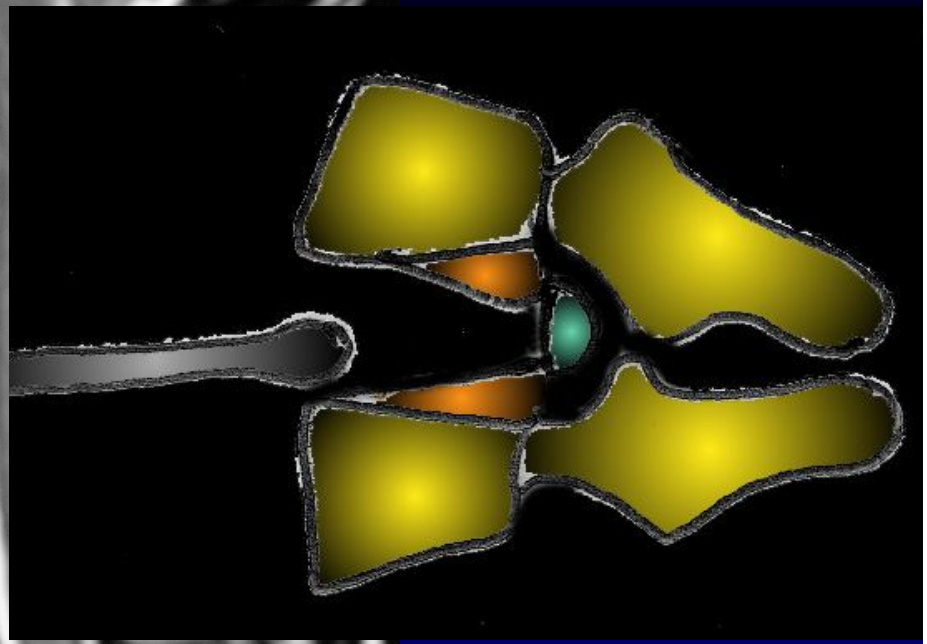
DOUBLE SOFT HERNIATIONS




FRAM
MAS
DYNAMIQUE


CLAIRE

C5C6 HARD HERNIATION




FLEXION


EXTENSION

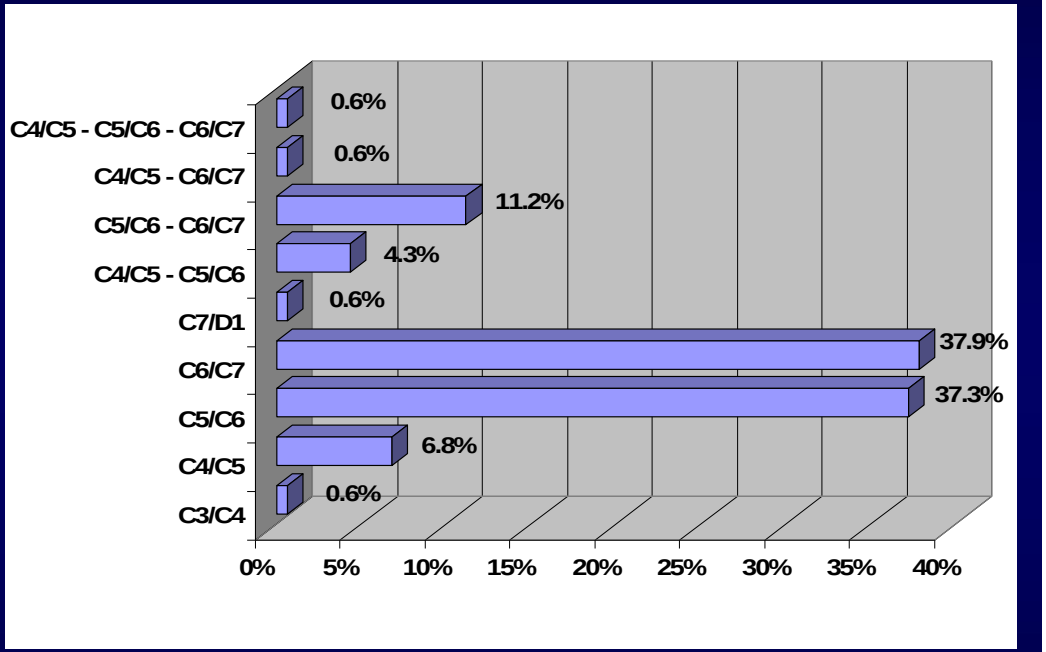
Multicentric series

161 patients, 189 prothesis

1 level : 134 patients (83.2%)

2 levels : 26 patients (16.1%)

3 levels : 1 patient (0.6%)



5 patients : Mobi C + adjacent arthrodesis

Mean hospitalisation duration : 3 days (1-6)

Complications

Clinical complications :

2 patients : post.art.syndrom during 1 months ; 1 treated with infiltration.

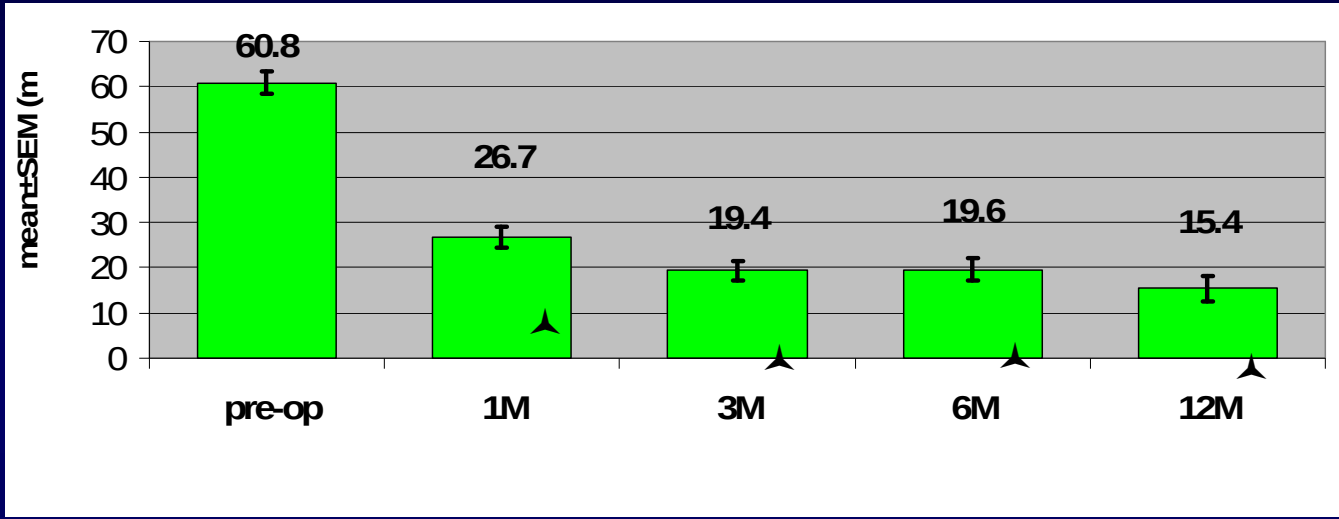
10 patients : peri scapular pains

7 patients : cervicalgias/CBN, resolved in 1-3 months

Reoperation :

1 explanted prothesis at 3 months + arthrodesis.

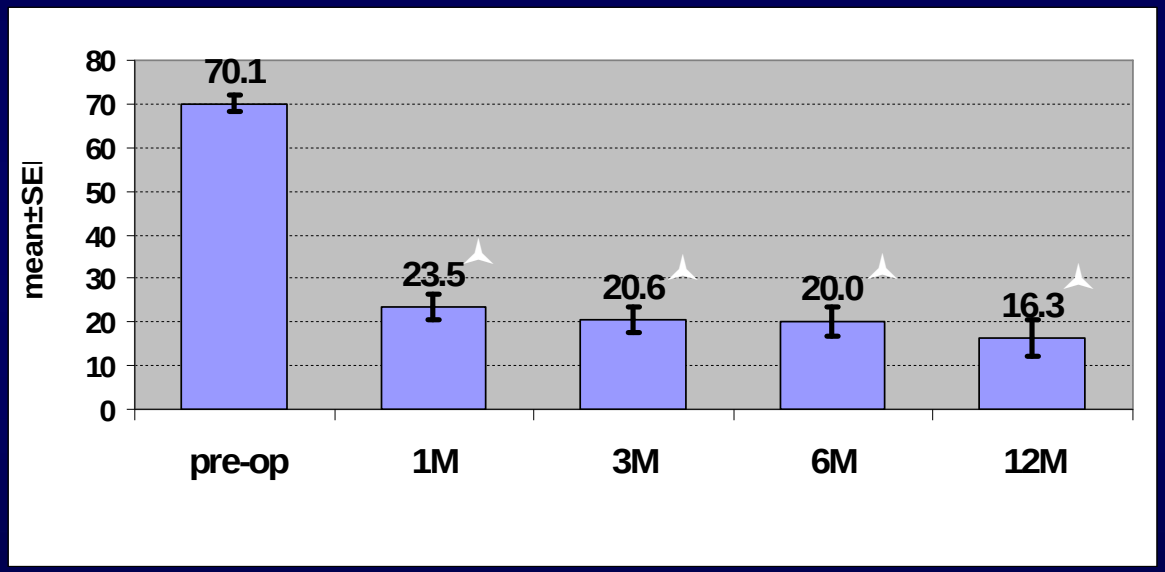
Cervical VAS



n =	118	73	51	59	26

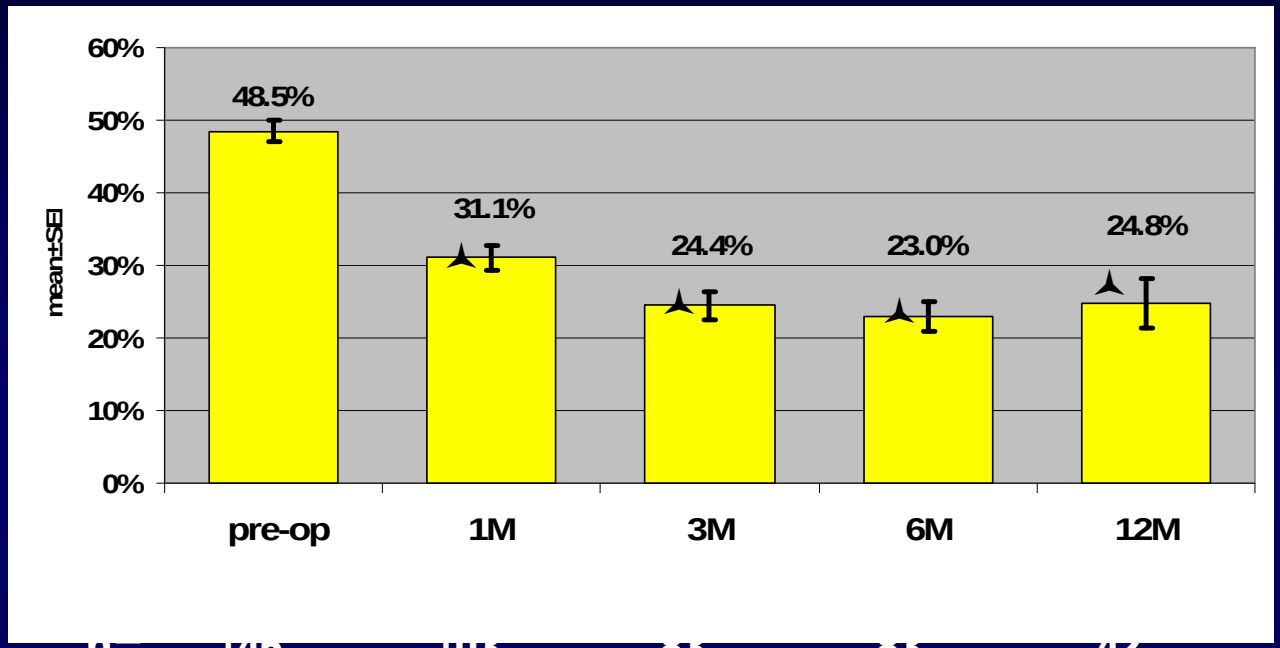
Mean decrease at 1 year :
45.4mm

Brachialgia VAS



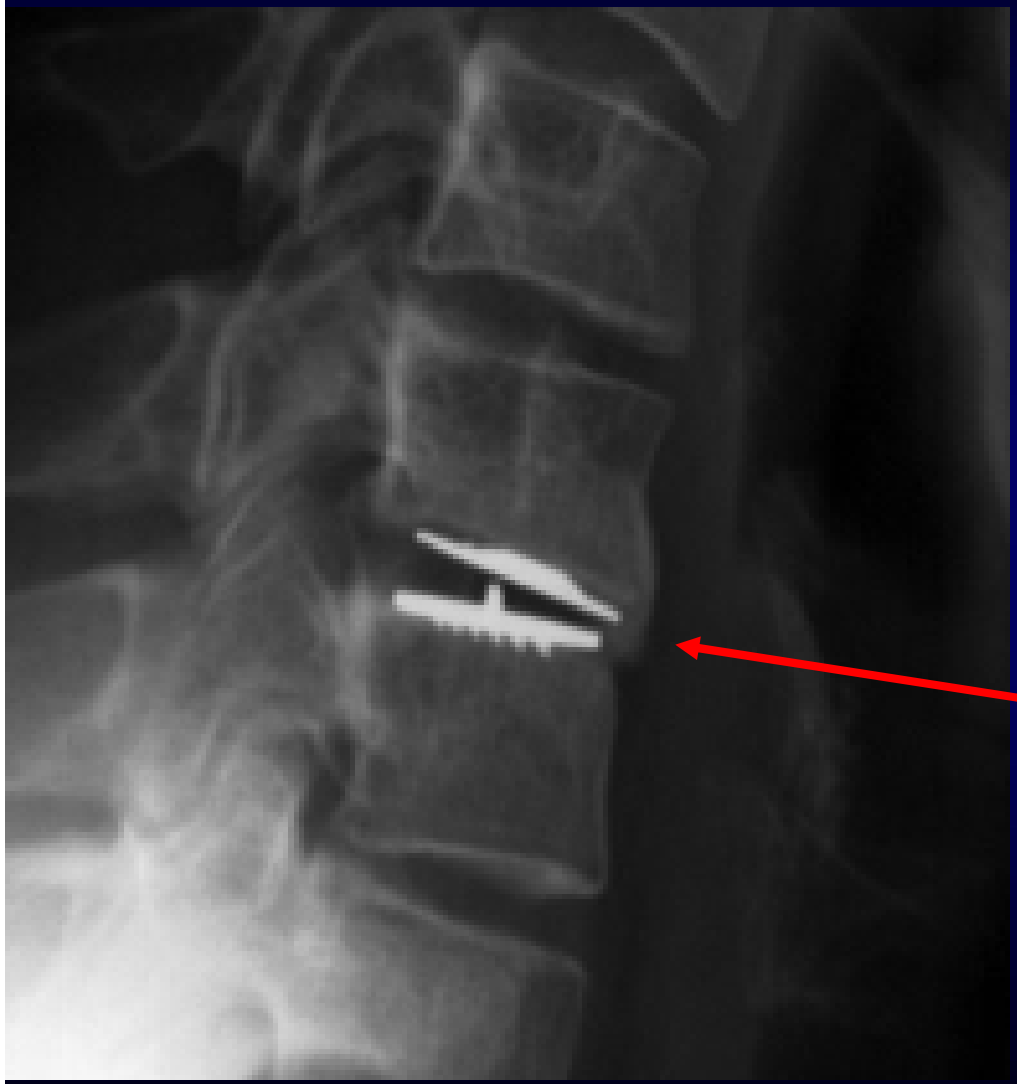
Mean decrease at 1 year : 53.7mm

Neck Disability Index Score



mean decrease : 23.7pts at 1 year

Radiologic evaluation



No sub-luxation

No migration

3 ossifications :

Mobility

Mean ROM = 9.7° at 1 year (range 0-21° ; n=31)

Mean ROM = 8.9° at last F.U. (range 0-25° ; n=84)

At maximum F.U.
91.7% of prothesis : ROM ≥2°.
78.6% of prothesis : ROM ≥5°.

CONCLUSIONS

- Approach is the same as usual
- Simplified instrumentation
- Simple and safe as a cage

- Post operative course very single

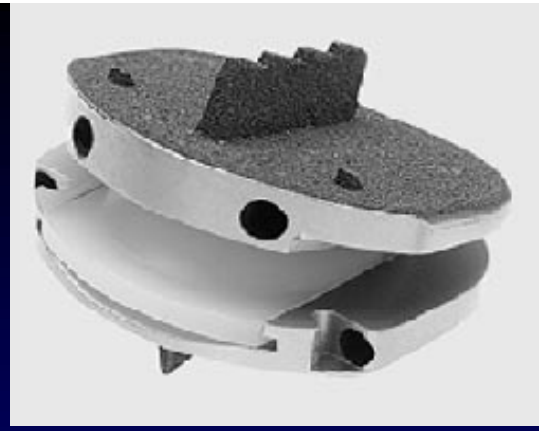
- Indications : C.B.N. due to soft or hard herniation
  Myelopathy ?

- Prevention of kyphosis and fusion
- Prevention of adjacent syndrom

PROTHESES LOMBAIRES

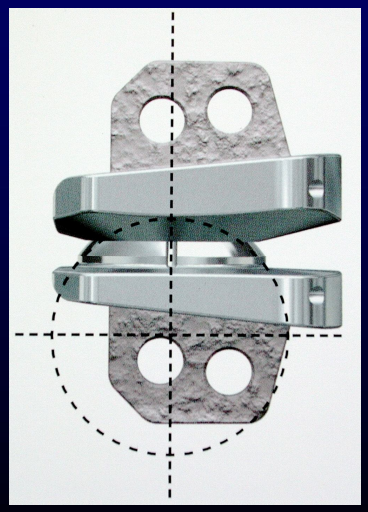
SB Charité

108 patients



Prodisc

22 patients



Maverick

15 patients

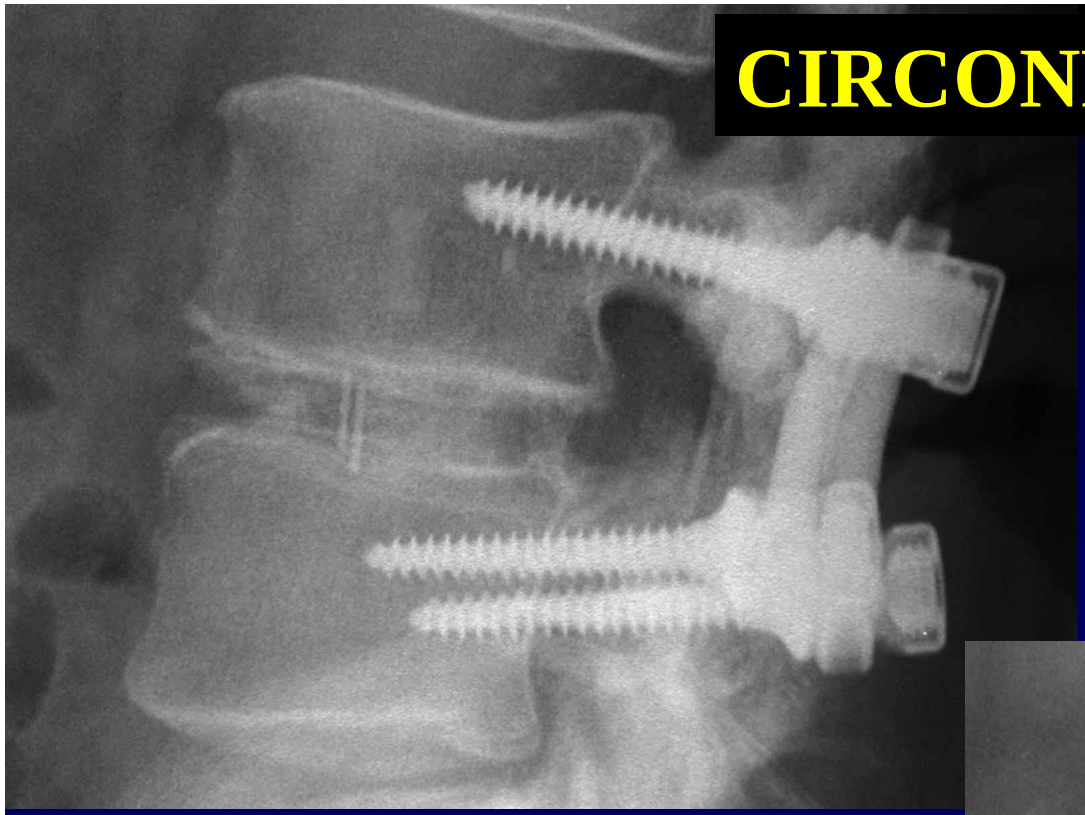
Mobidisc

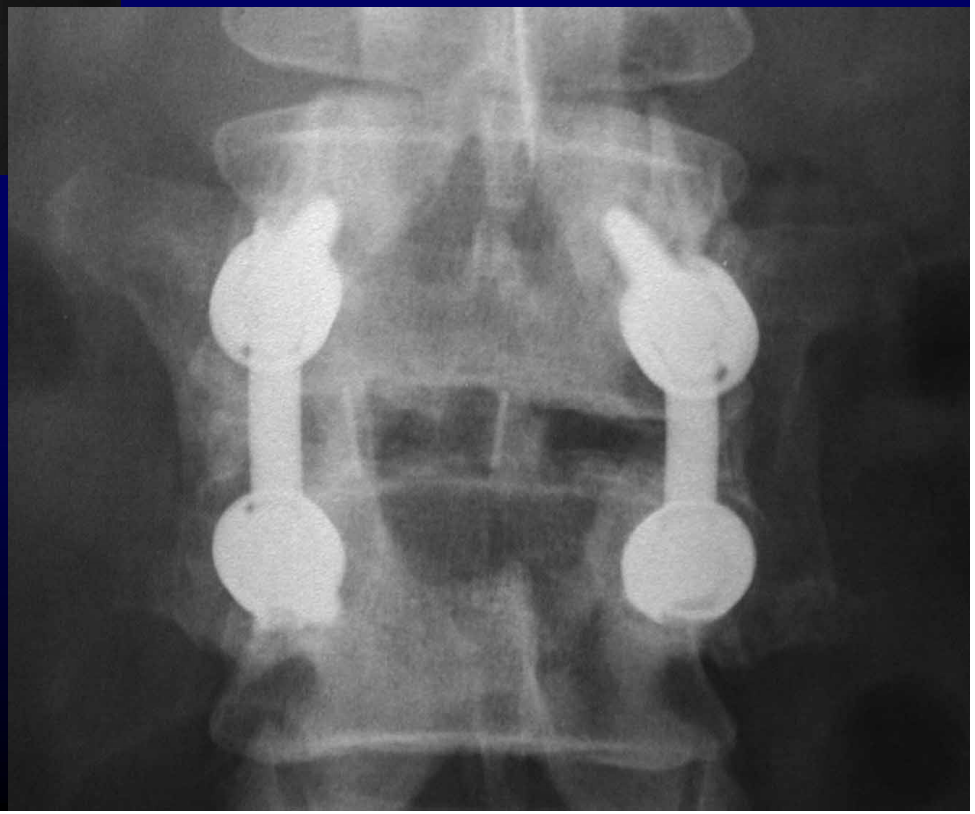
1 patient

Flexicore

1 patient

CIRCONFERENTIAL FUSION



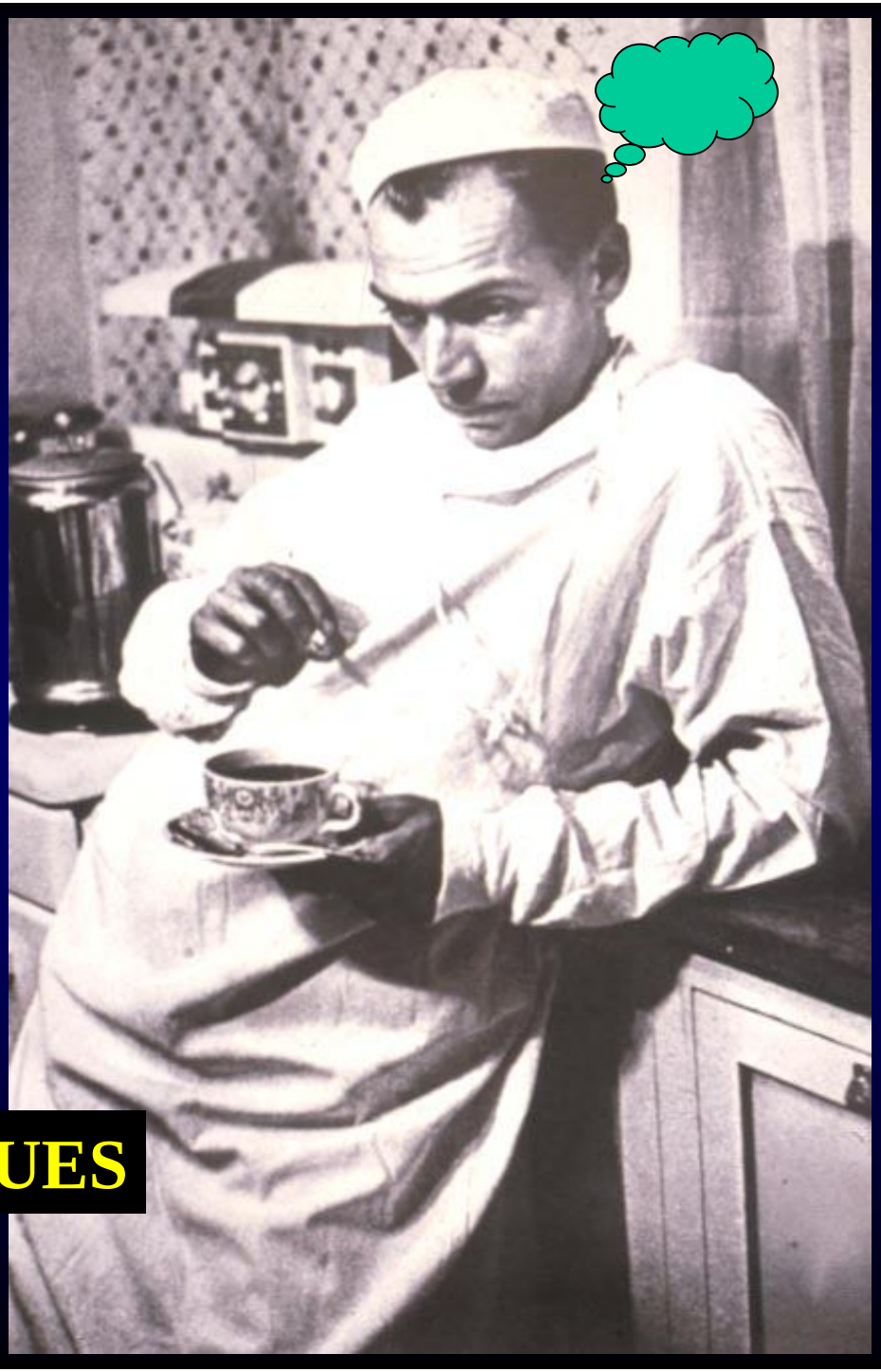


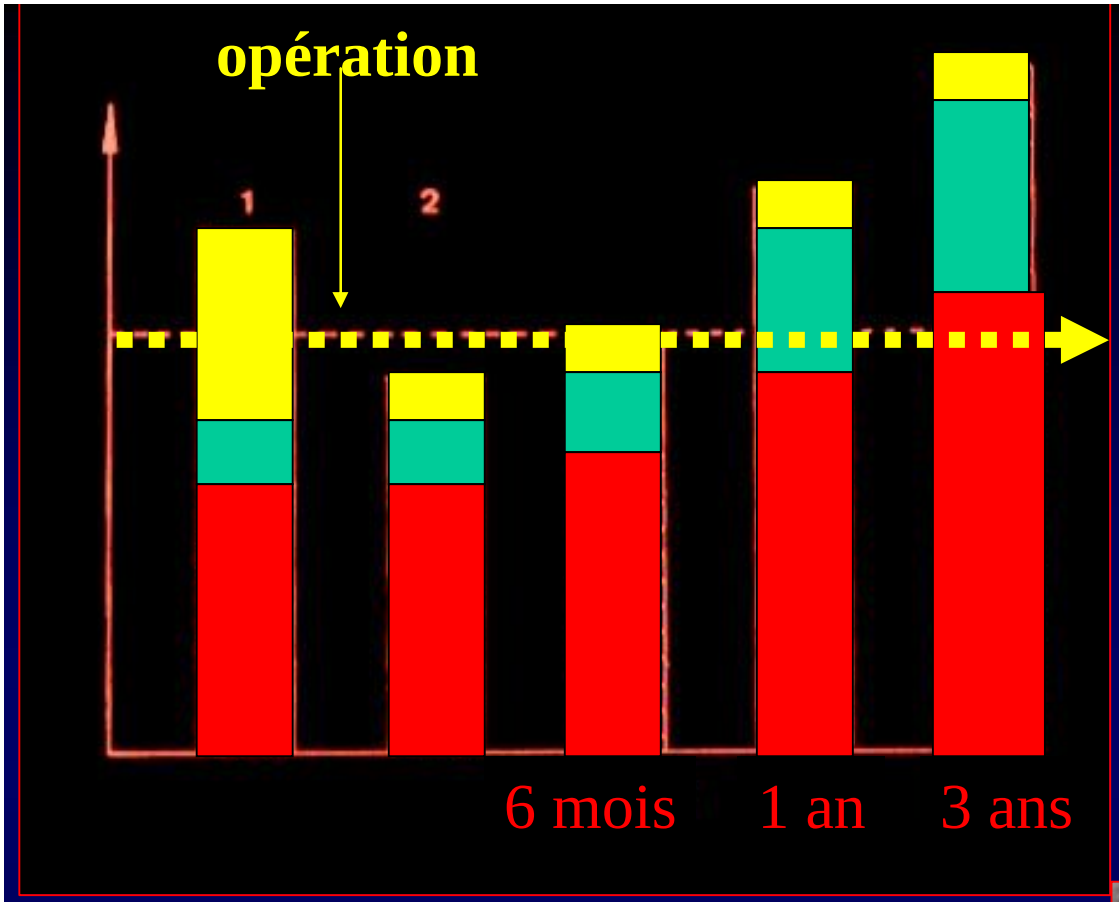
CONGENITAL CASES

VERTEBRAL BLOC

CHIRURGIE et

LOMBALGIES CHRONIQUES



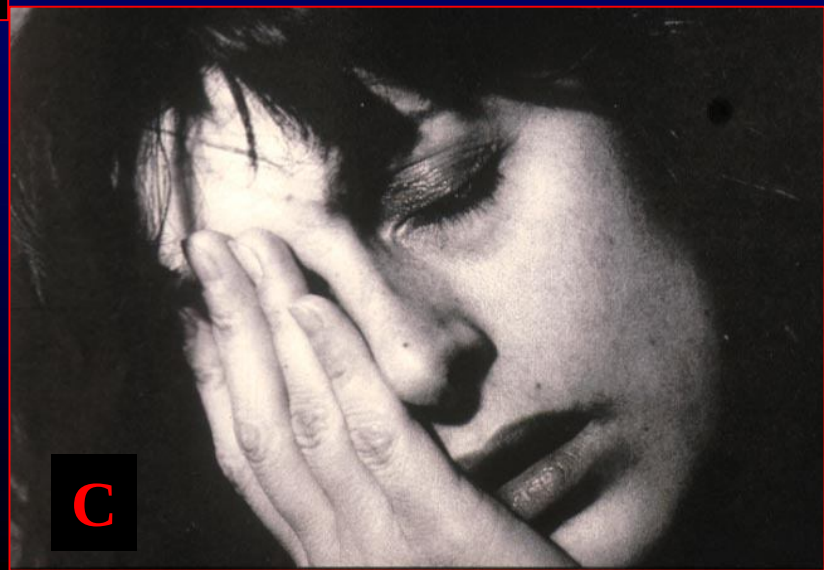


SEUIL DE TOLERABILITE

A:PROBLEMES ORGANIQUES

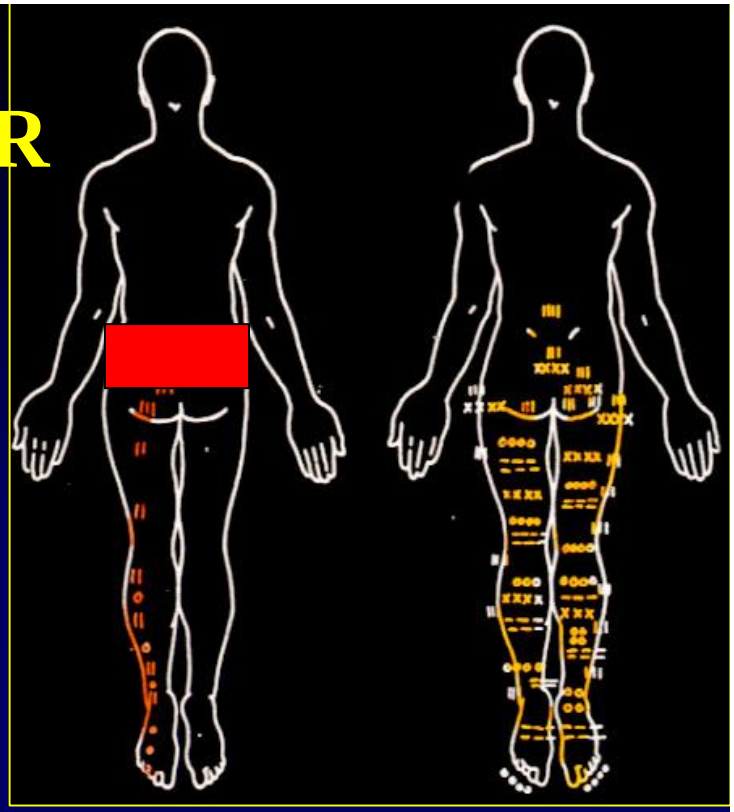
B:PROBLEMES PROFESIONNELS

C:PROBLEMES PSYCHOLOGIQUES



EVALUATION de la DOULEUR

- EVA
- PAIN DRAWING



TESTS PSYCHOMETRIQUES

- ANXIETE d' HAMILTON
- DEPRESSION d' HAMILTON
- de BECK

SCORES FONCTIONNELS

ECHELLE d' INCAPACITE FONCTIONNELLE pour l' EVALUATION des LOMBALGIQUES

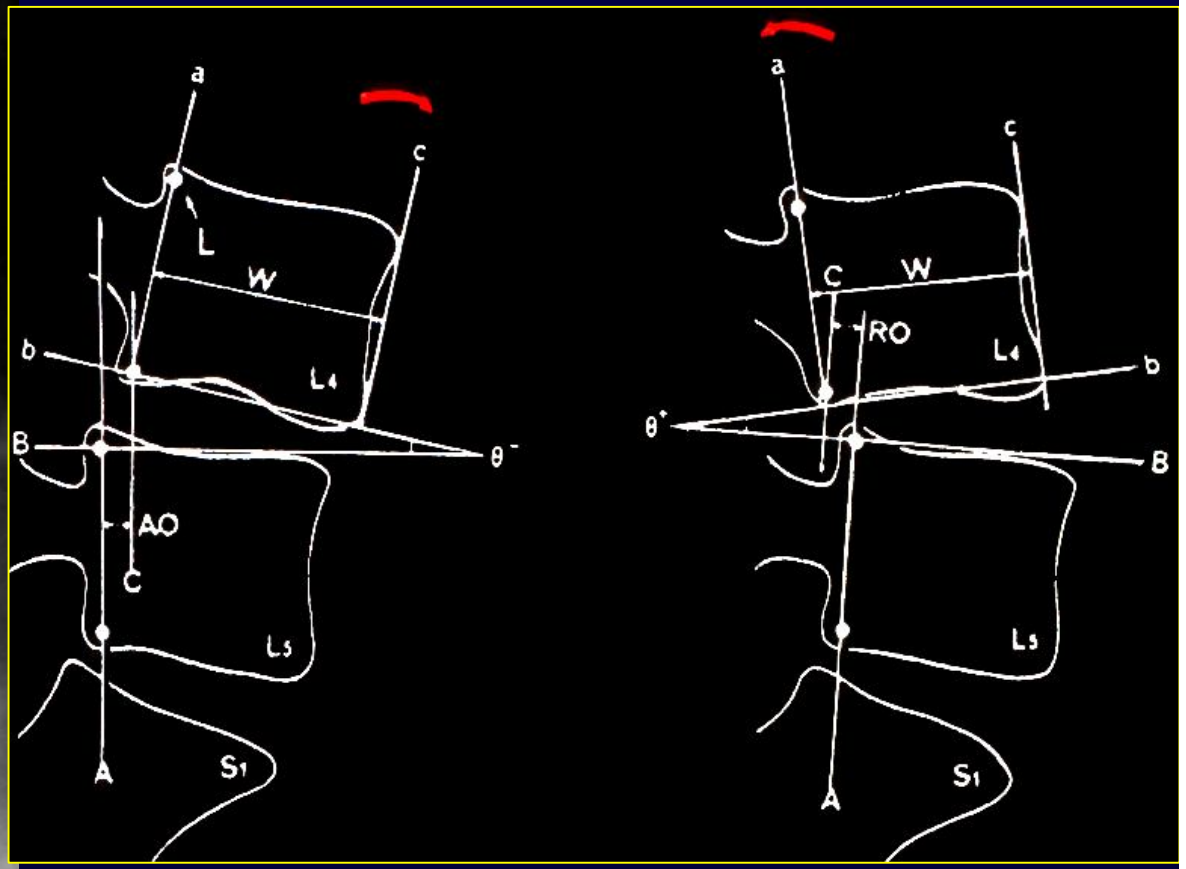
EIFEL : 24 questions (SFR)

ECHELLE d' IMPOTENCE FONCTIONNELLE de la LOMBALGIE de QUEBEC

20 questions (SOFMER)

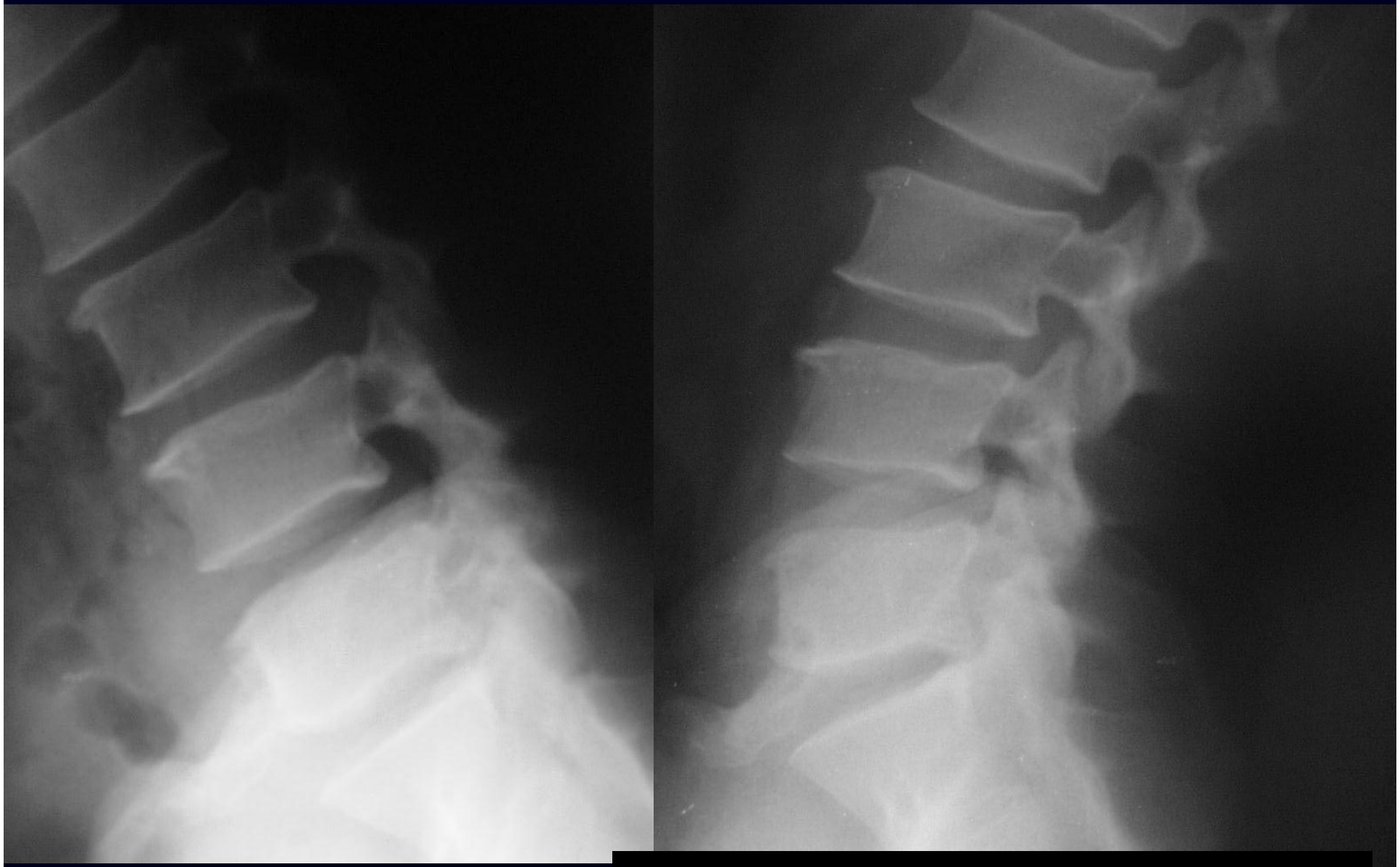
PARALLELISME ANATOMOCLINIQUE

RETROLISTHESIS

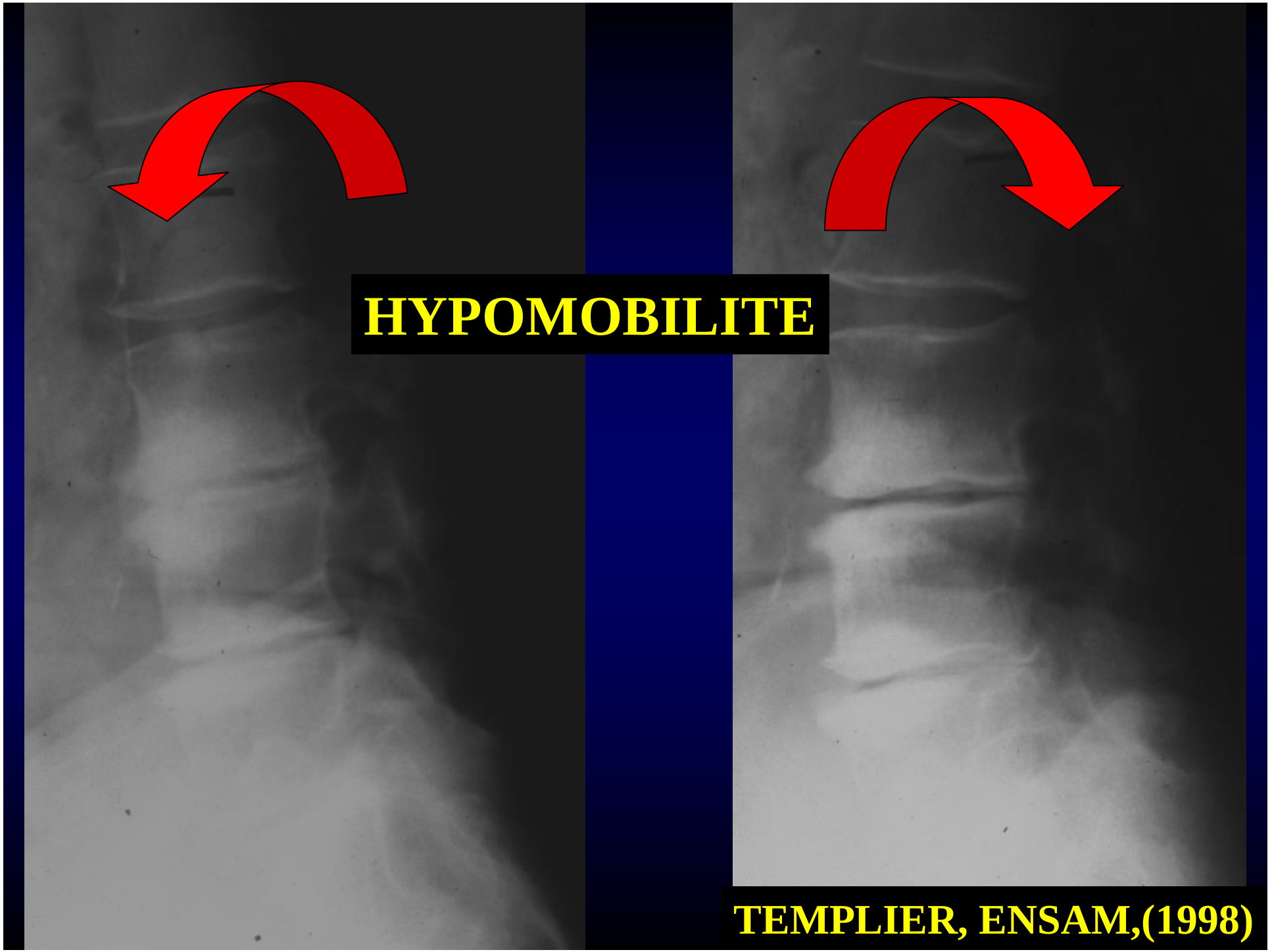


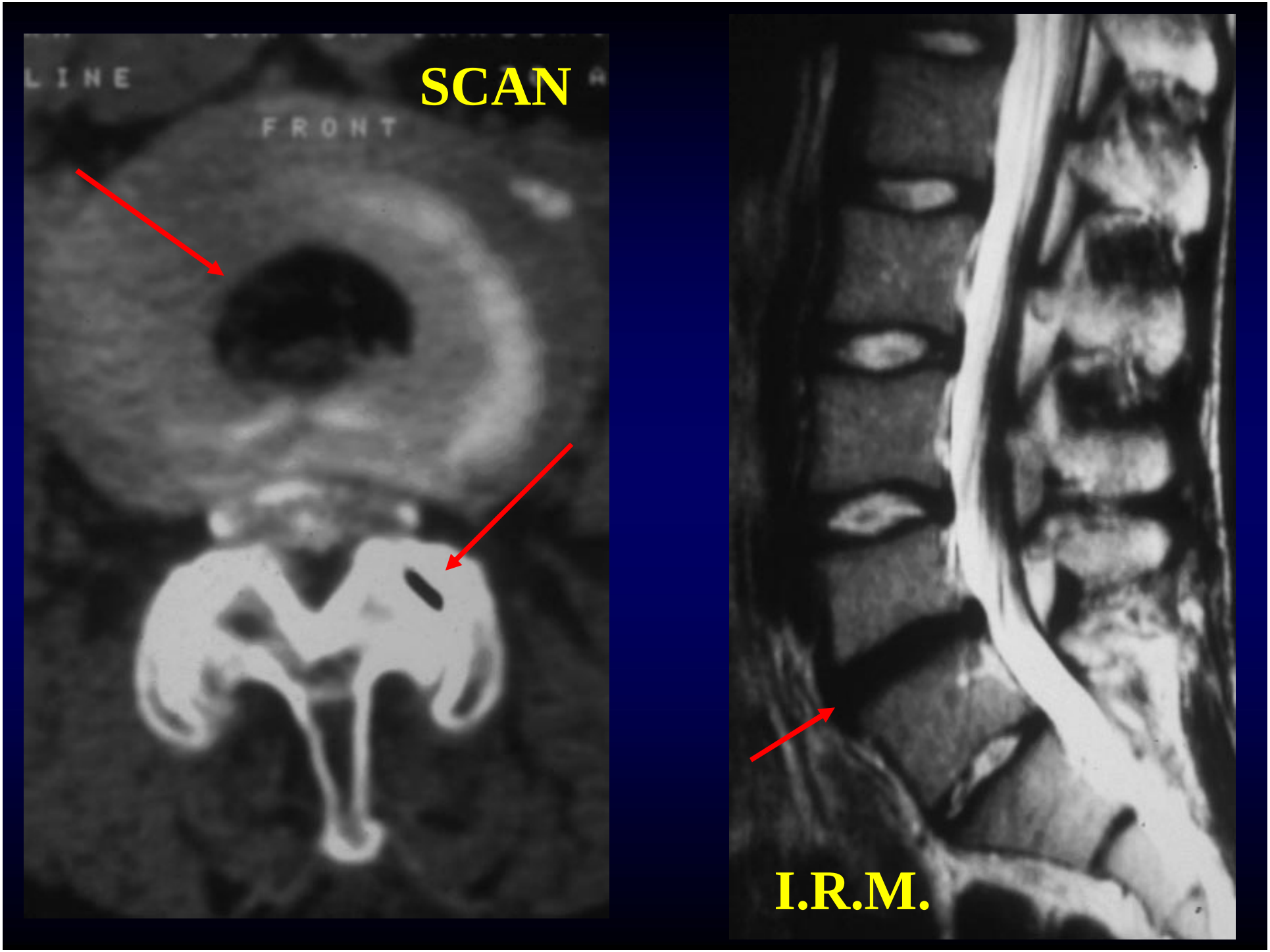
RADIOGRAPHIES DYNAMIQUES

MOBILITE ACTIVE

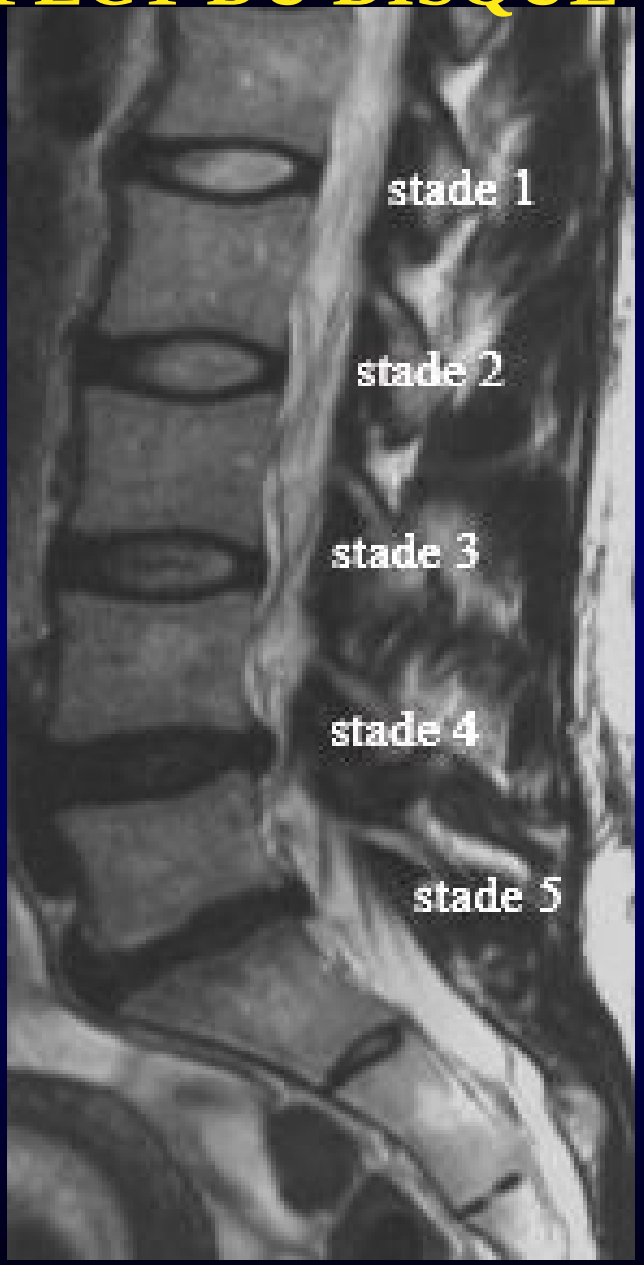


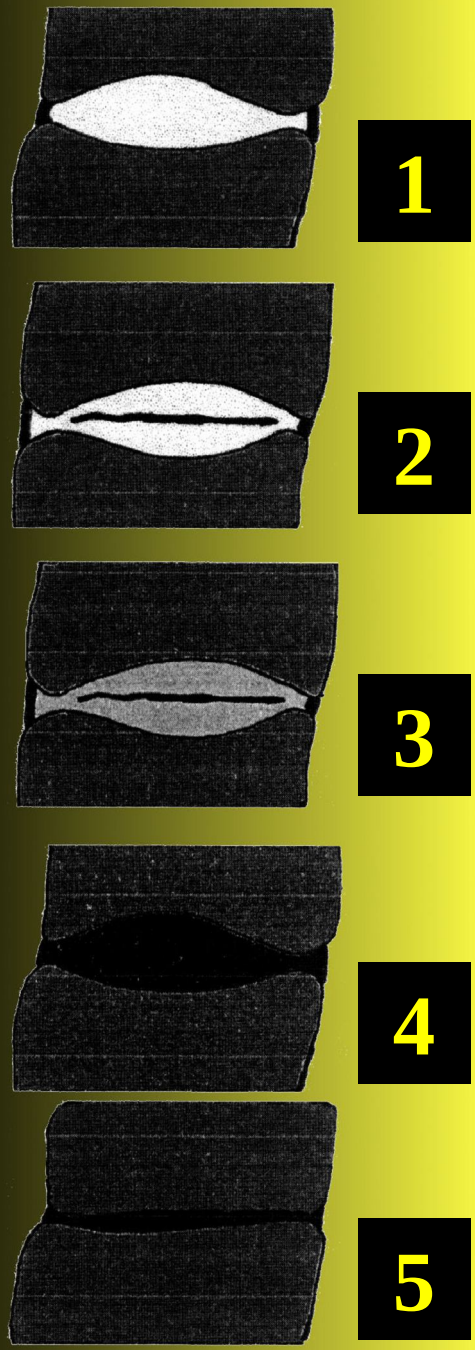
PEARCY , stéréoradiographie , 1985


HYPOMOBILITE
TEMPLIER, ENSAM,(1998)


LINE
FRONT
SCAN
I.R.M.

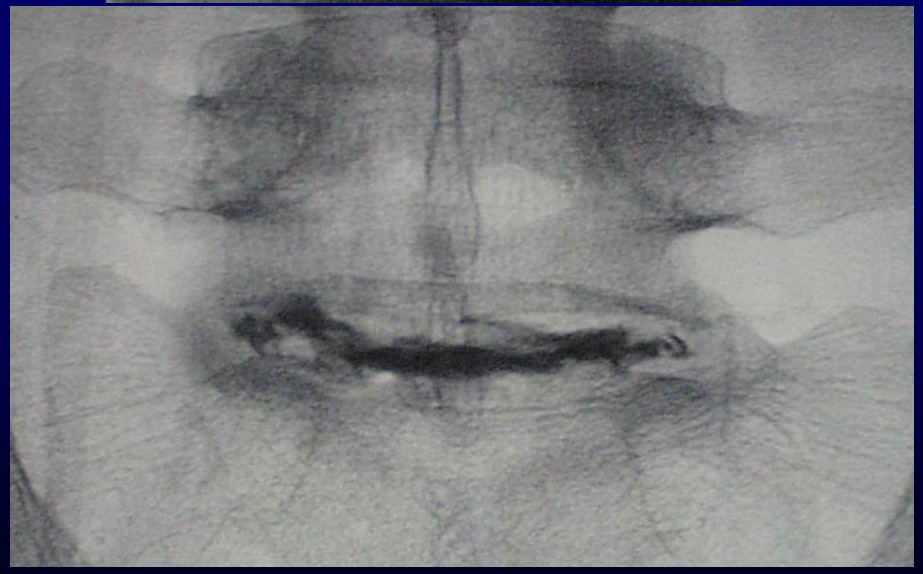
HAUTEUR ET ASPECT DU DISQUE

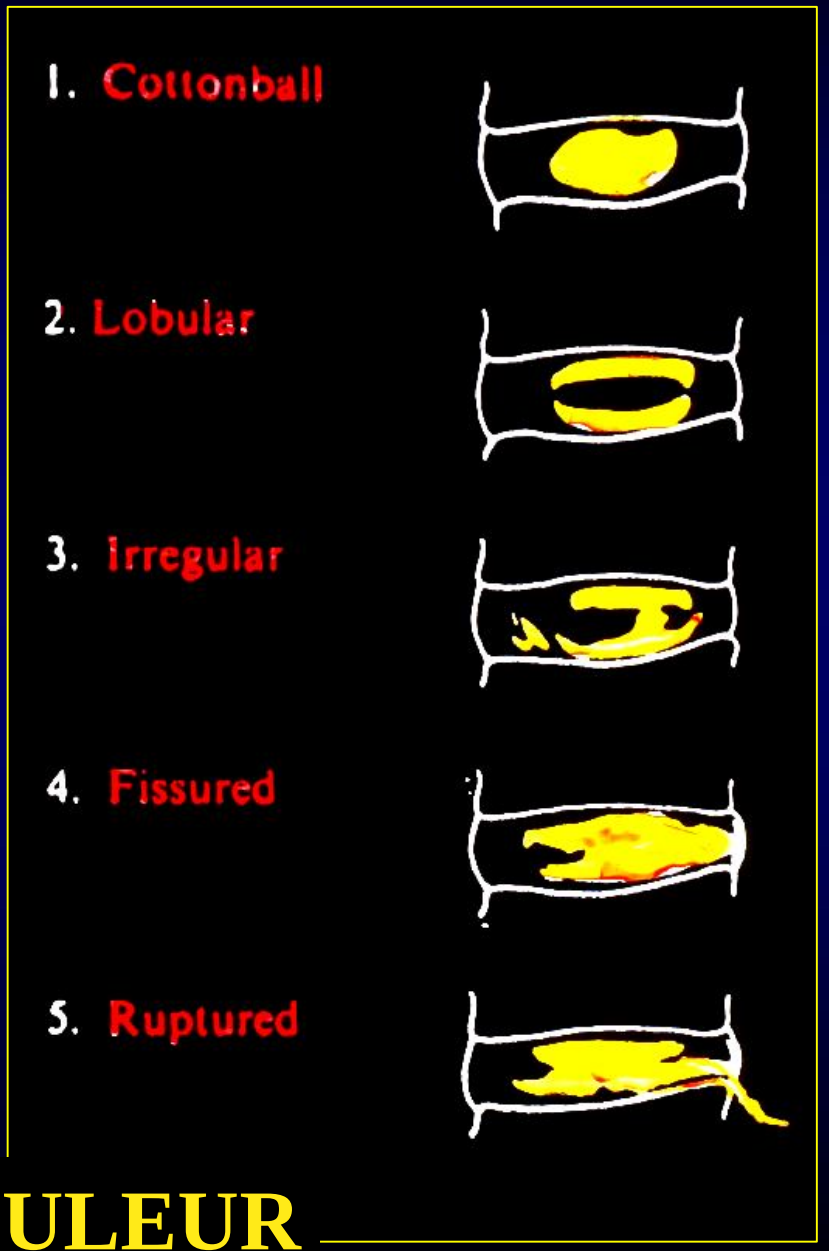




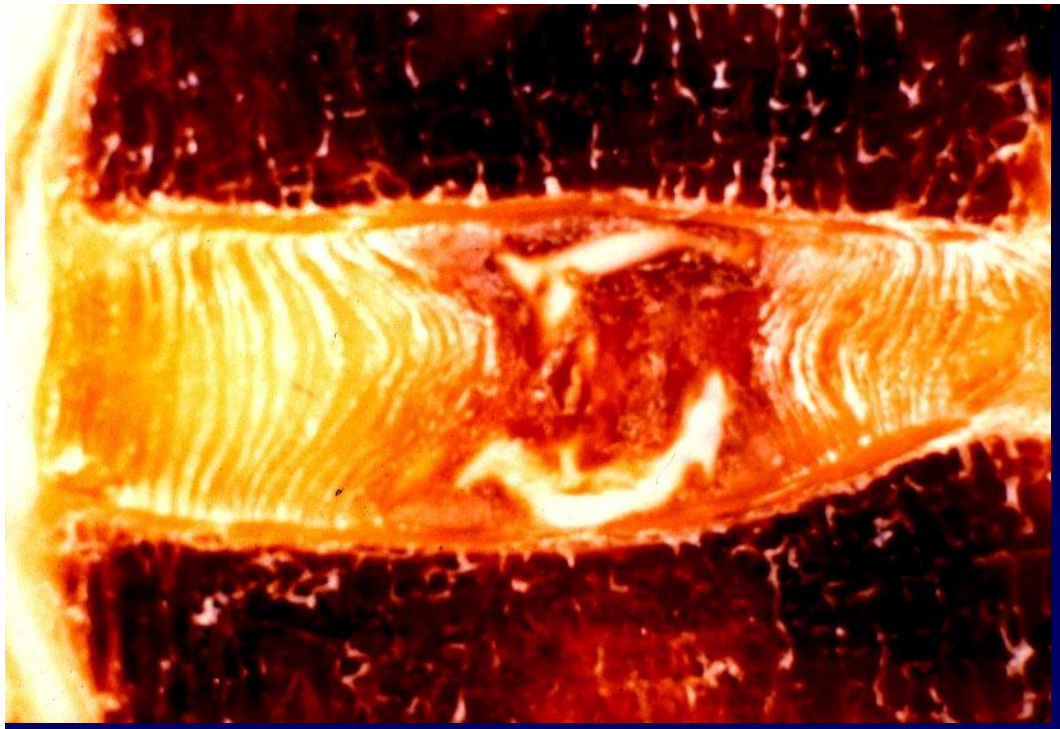
PFIRRMANN (Spine 2001)

DISCOGRAPHIE

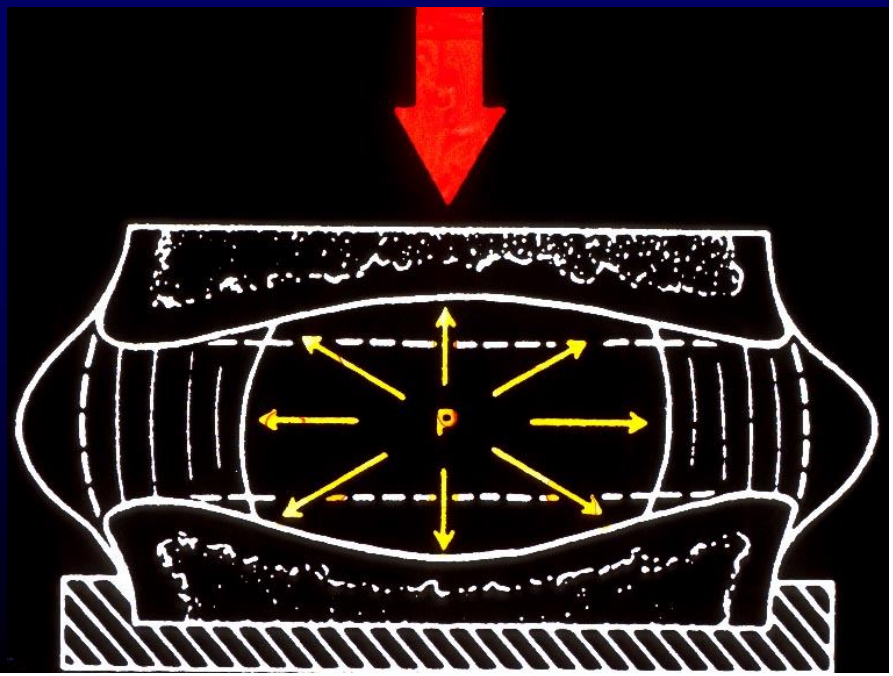




REPRODUCTION de la DOULEUR

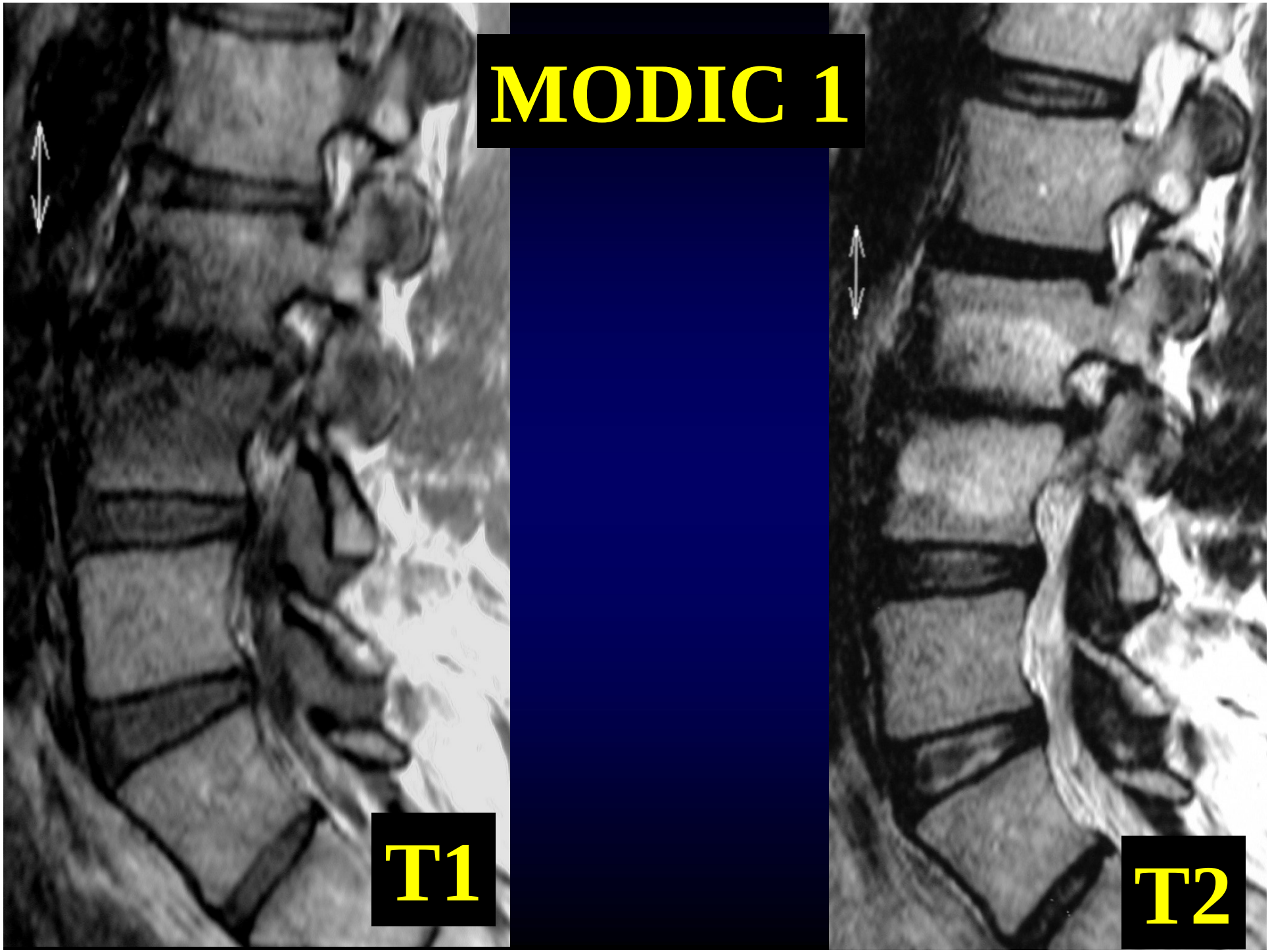


COMPLEXE
DISCO EPIPHYSAIRE



CLASSIFICATION des DISCOPATHIES (MODIC)

	SEQ. T1	SEQ. T2
STADE 1 (OEDEMATEUX))	NOIR	BLANC
STADE 2 (GRAISSEUX)	BLANC	BLANC
STADE 3 (SCLEREUX)	NOIR	NOIR


MODIC 1
T1
T2


Hz

Phénomène de piston
du à l'insuffisance discale

Fissures des plateaux
Microfractures de l'os souchondral

Hypervascularisation (MODIC)

Médiateurs proinflammatoires (BURKE)

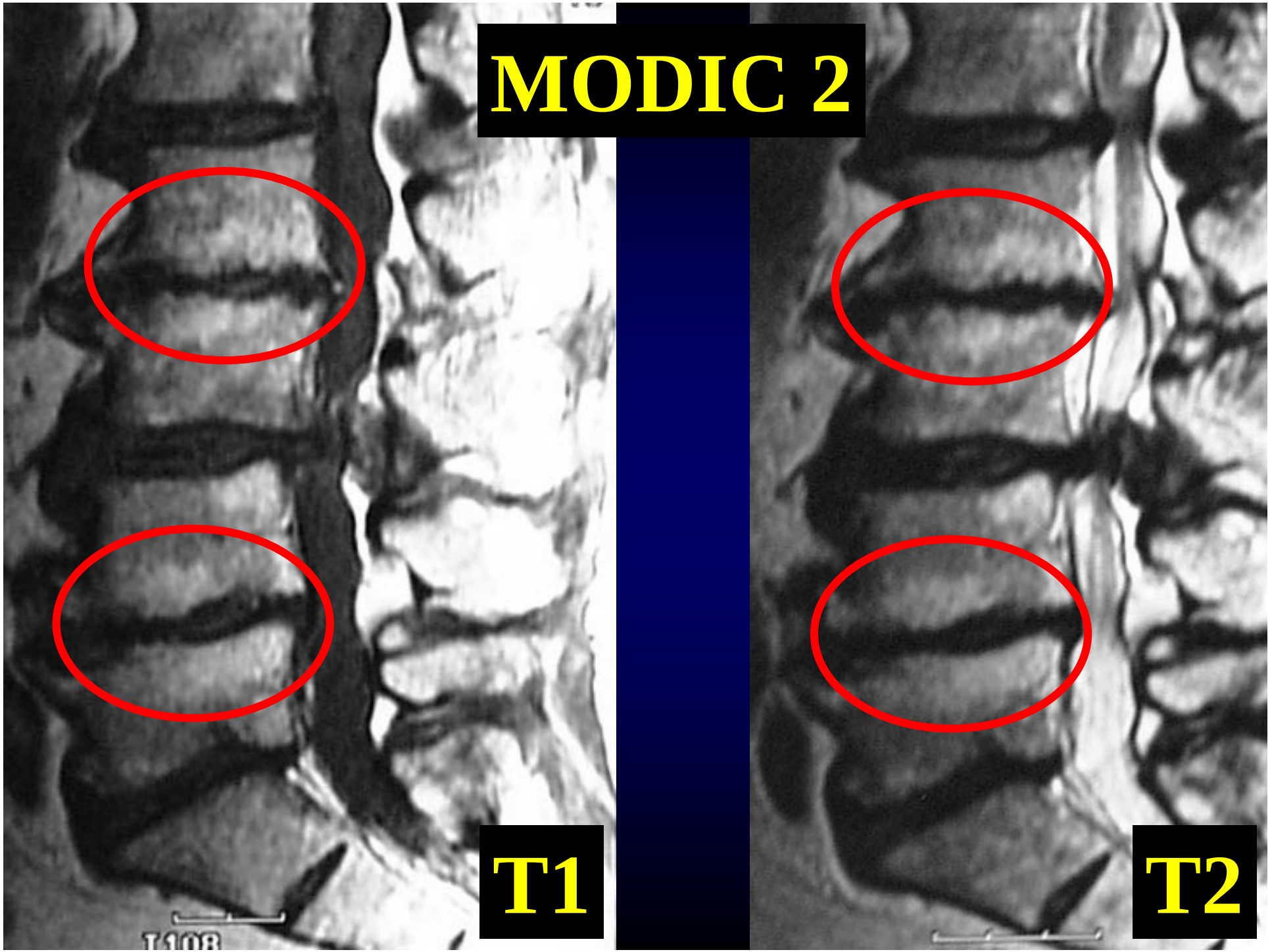
Signal de MODIC 1

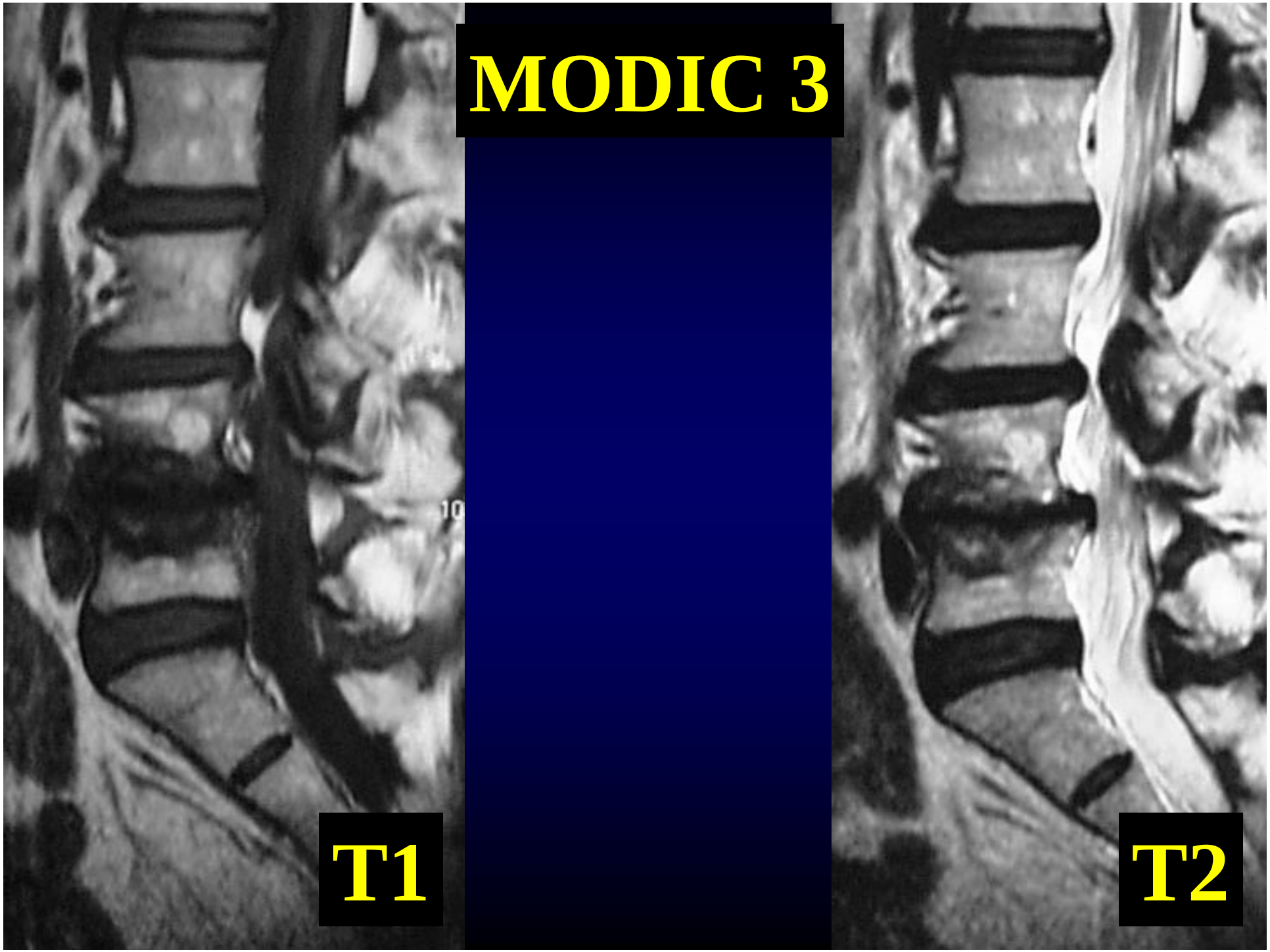
Evaluation clinique dans les Discopathies

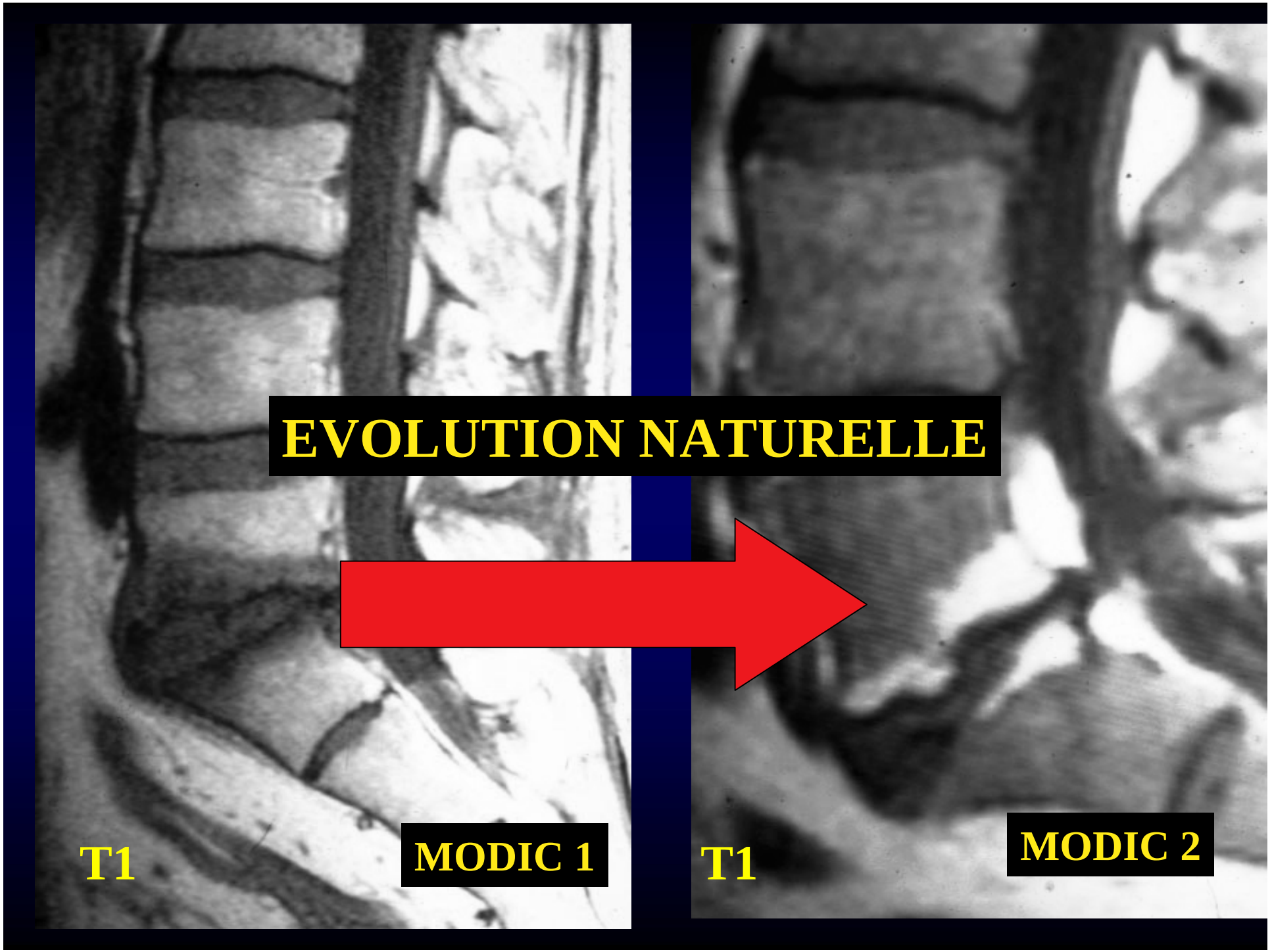
MODIC 1 et 2

- E.V.A.
- SCORE E.I.F.E.L , de QUEBEC
- SCORE D.R.A.D

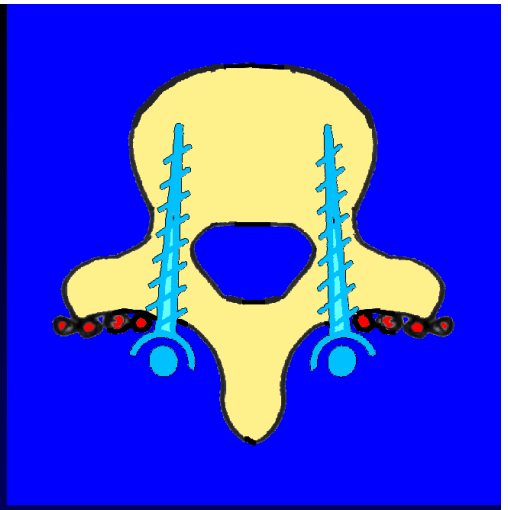
H. RAKOTOVAO (Thèse 2000)


MODIC 2
T1
T2


MODIC 3
T1
T2

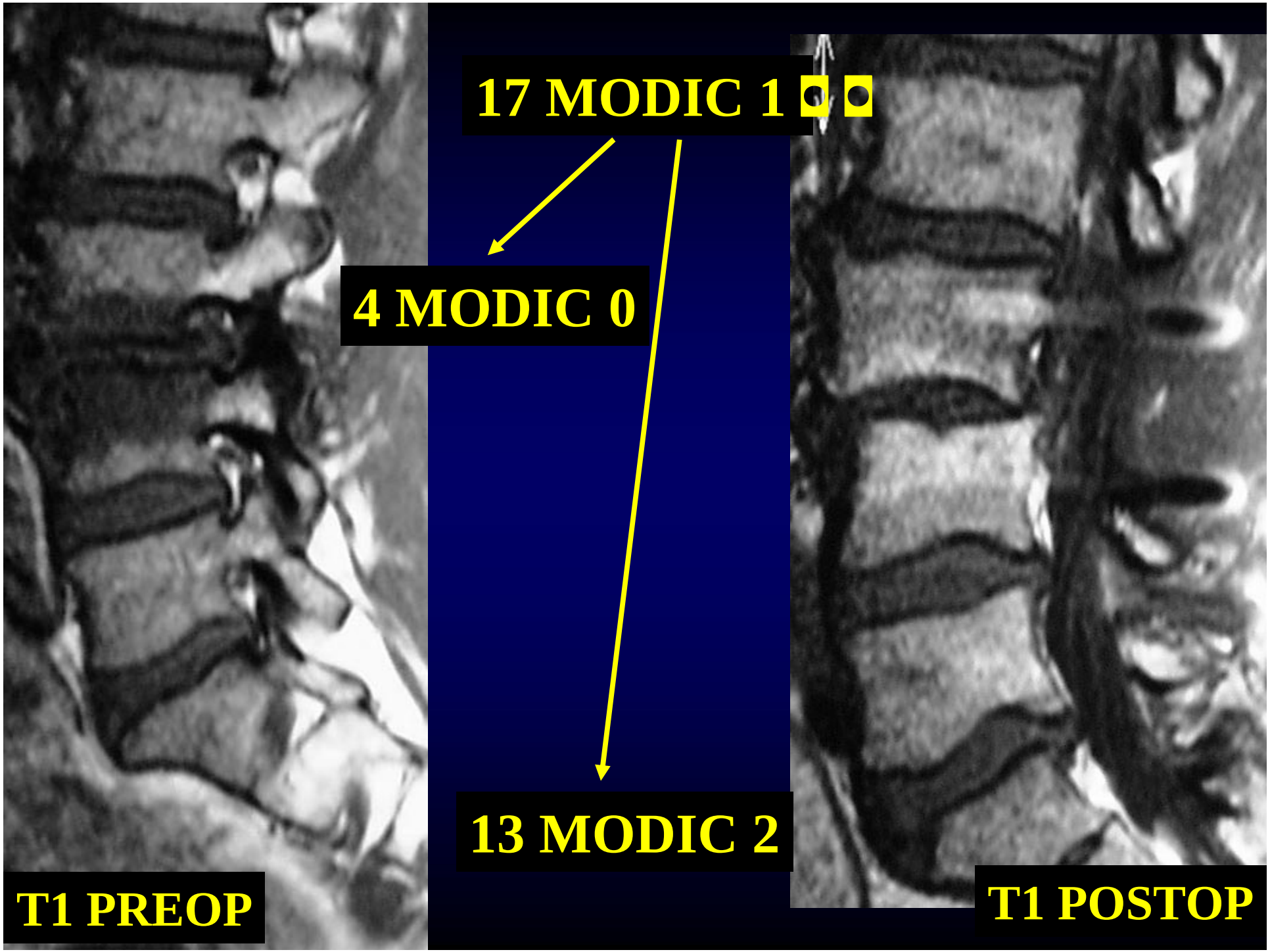

EVOLUTION NATURELLE
T1
MODIC 1
T1
MODIC 2

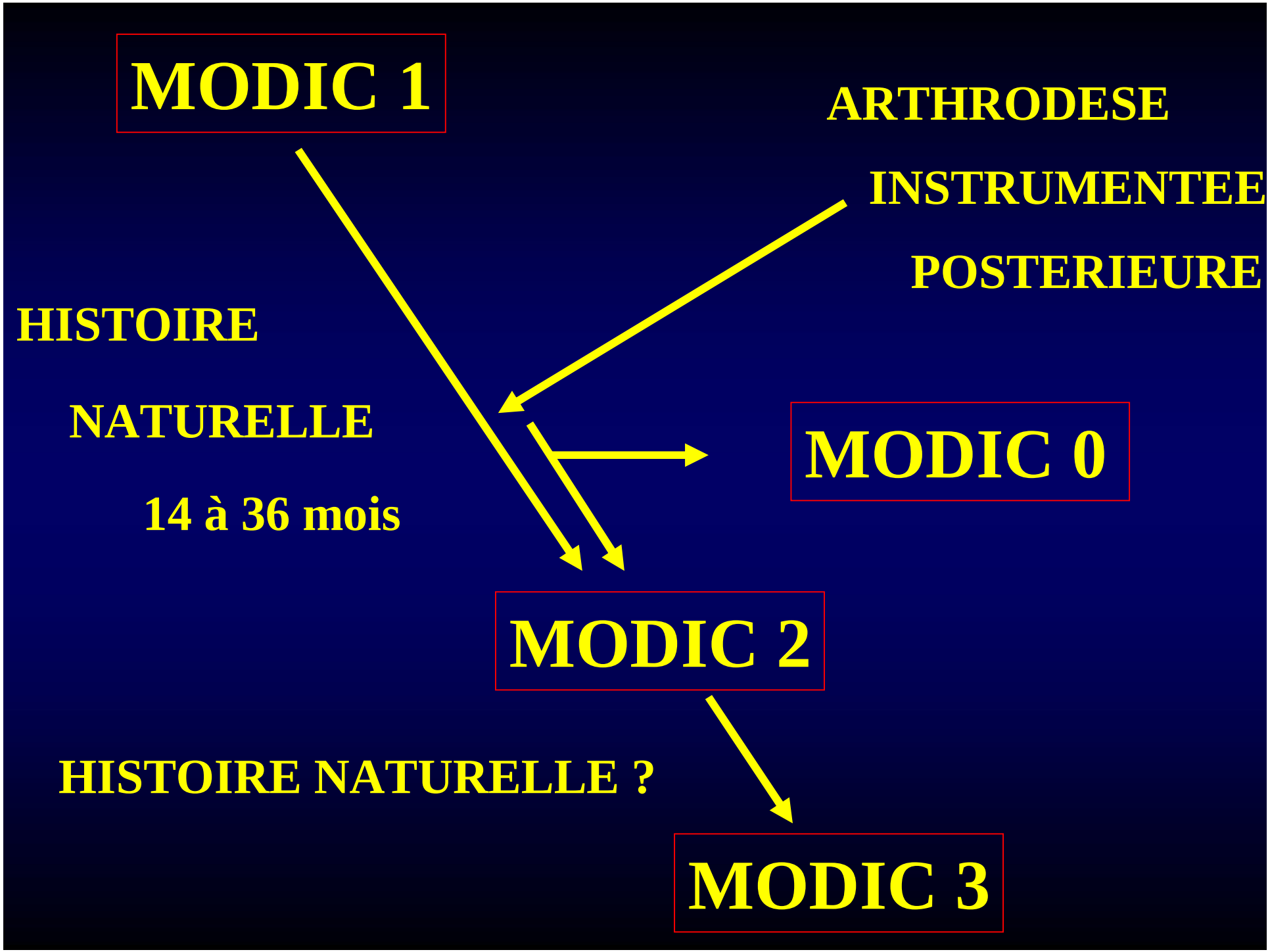
NOTRE ETUDE



- ÉTUDE RETROSPECTIVE
- SÉRIE HOMOGENE
- DEVENIR DU MODIC I APRES ARTHRODESE INSTRUMENTÉE POST- LOMBAIRE (SANS CAGE)

IRM A 6 MOIS


17 MODIC 1
4 MODIC 0
13 MODIC 2
T1 PREOP
T1 POSTOP

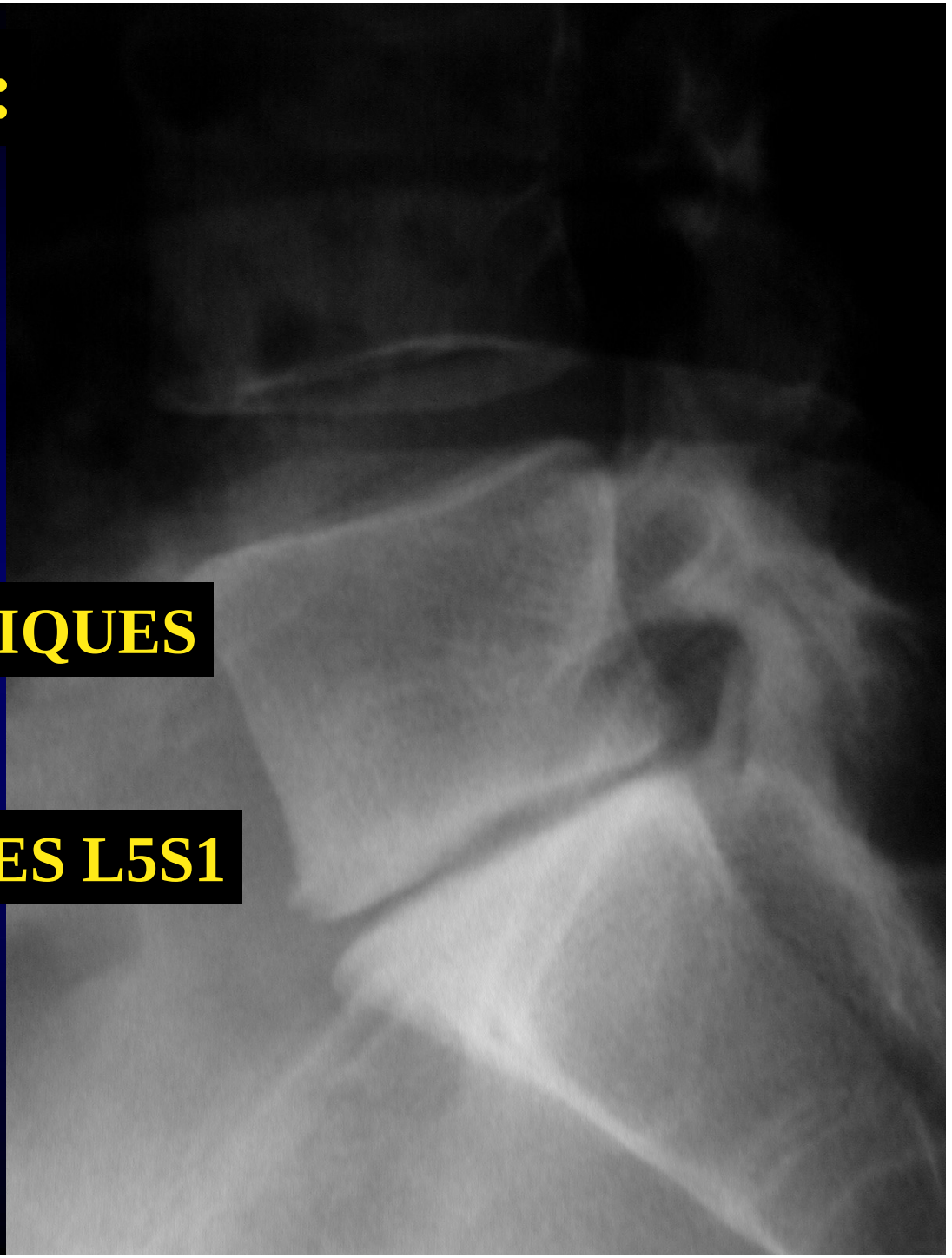

MODIC 1
ARTHRODESE
INSTRUMENTEE
POSTERIEURE
HISTOIRE
NATURELLE
14 à 36 mois
MODIC 0
MODIC 2
HISTOIRE NATURELLE ?
MODIC 3

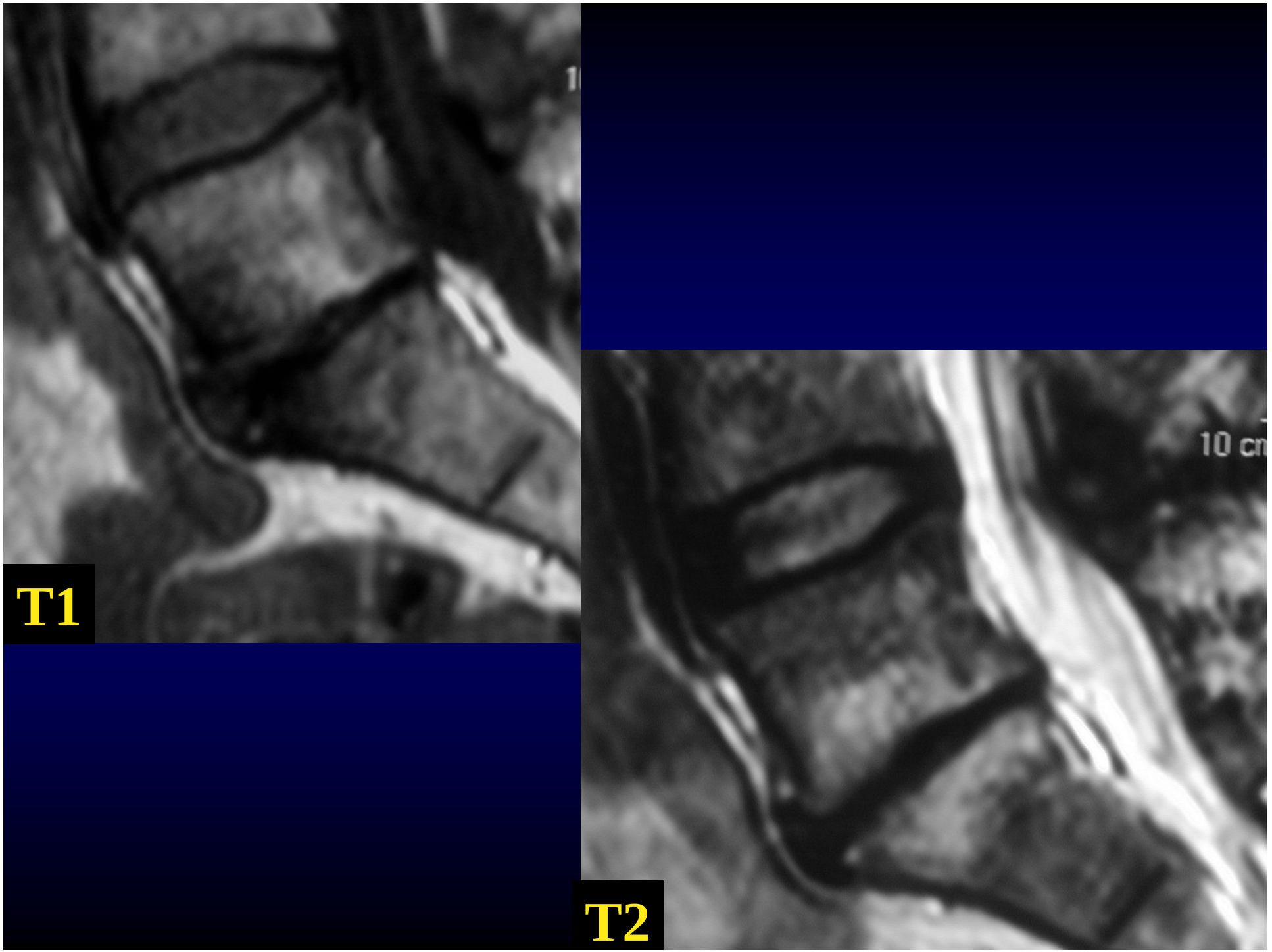
CAS CLINIQUE:

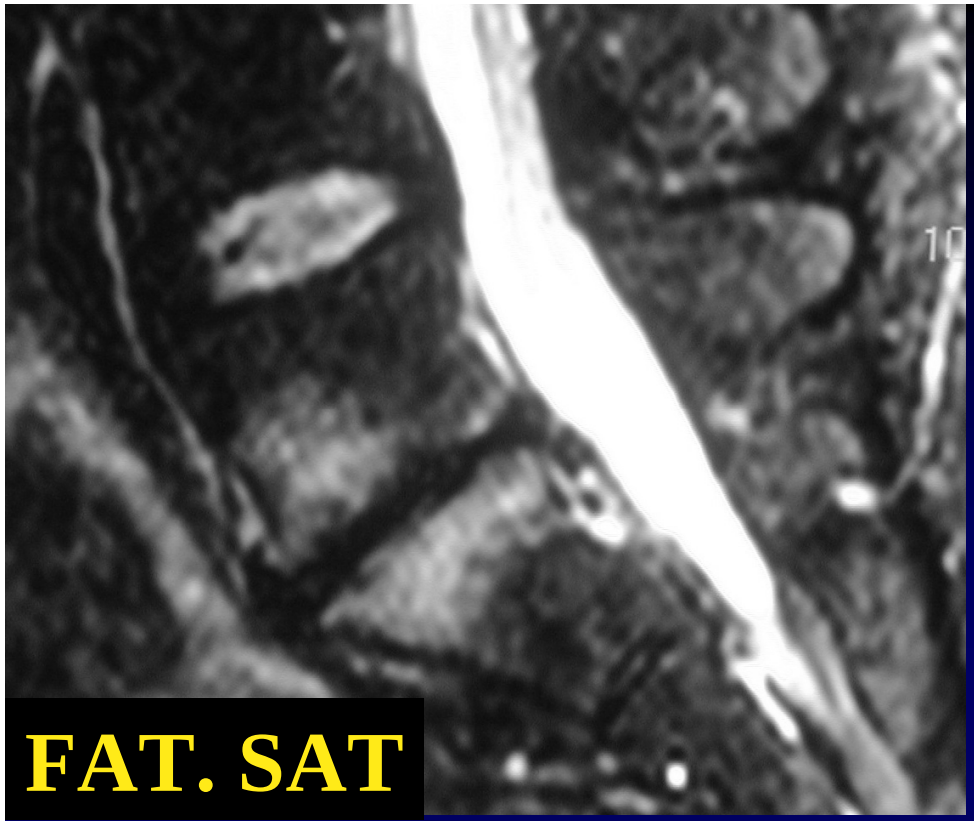
FEMME de 45 ANS

LOMBALGIES CHRONIQUES

APRES 2 DISSECTOMIES L5S1



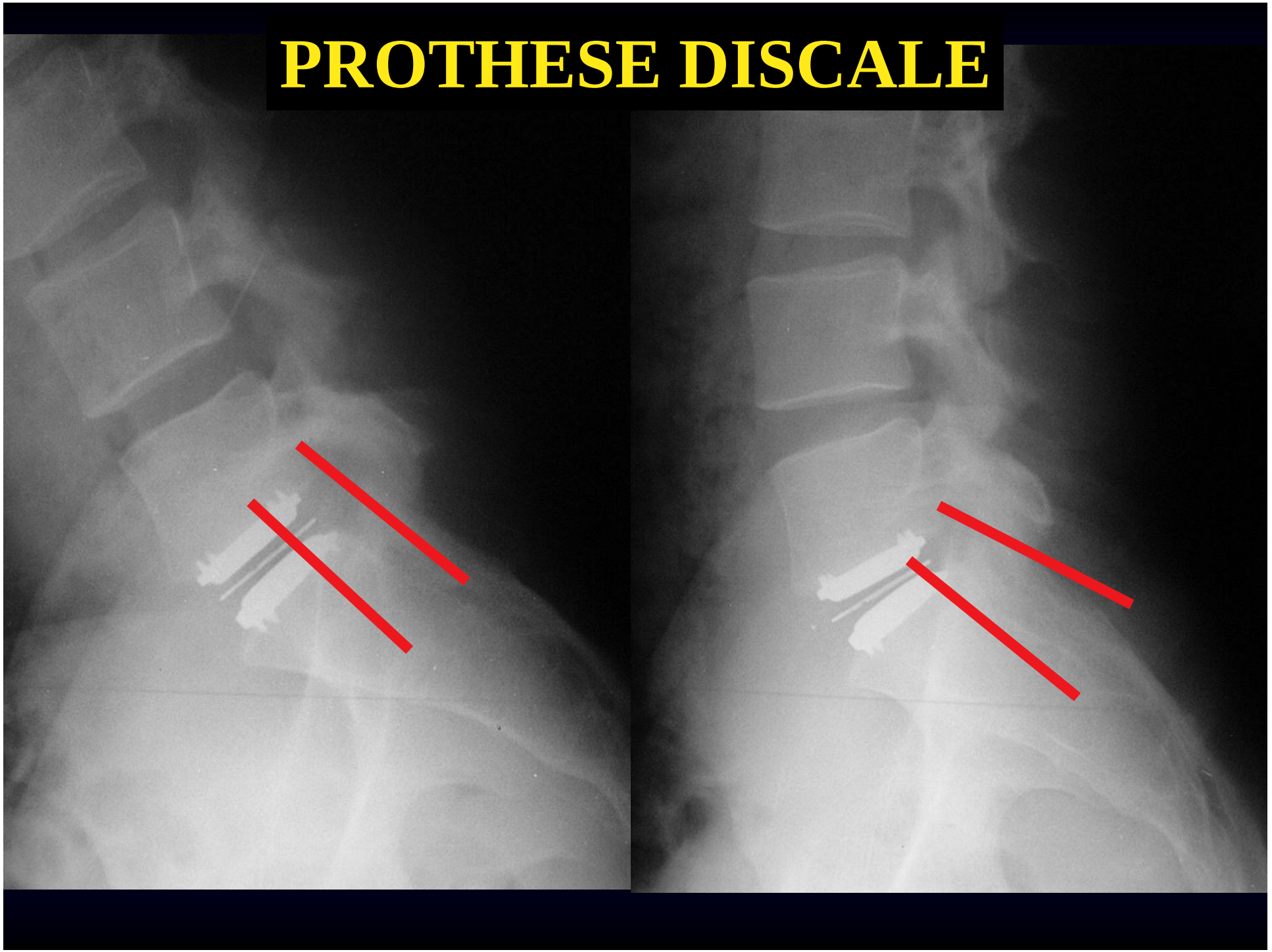

T1
T2

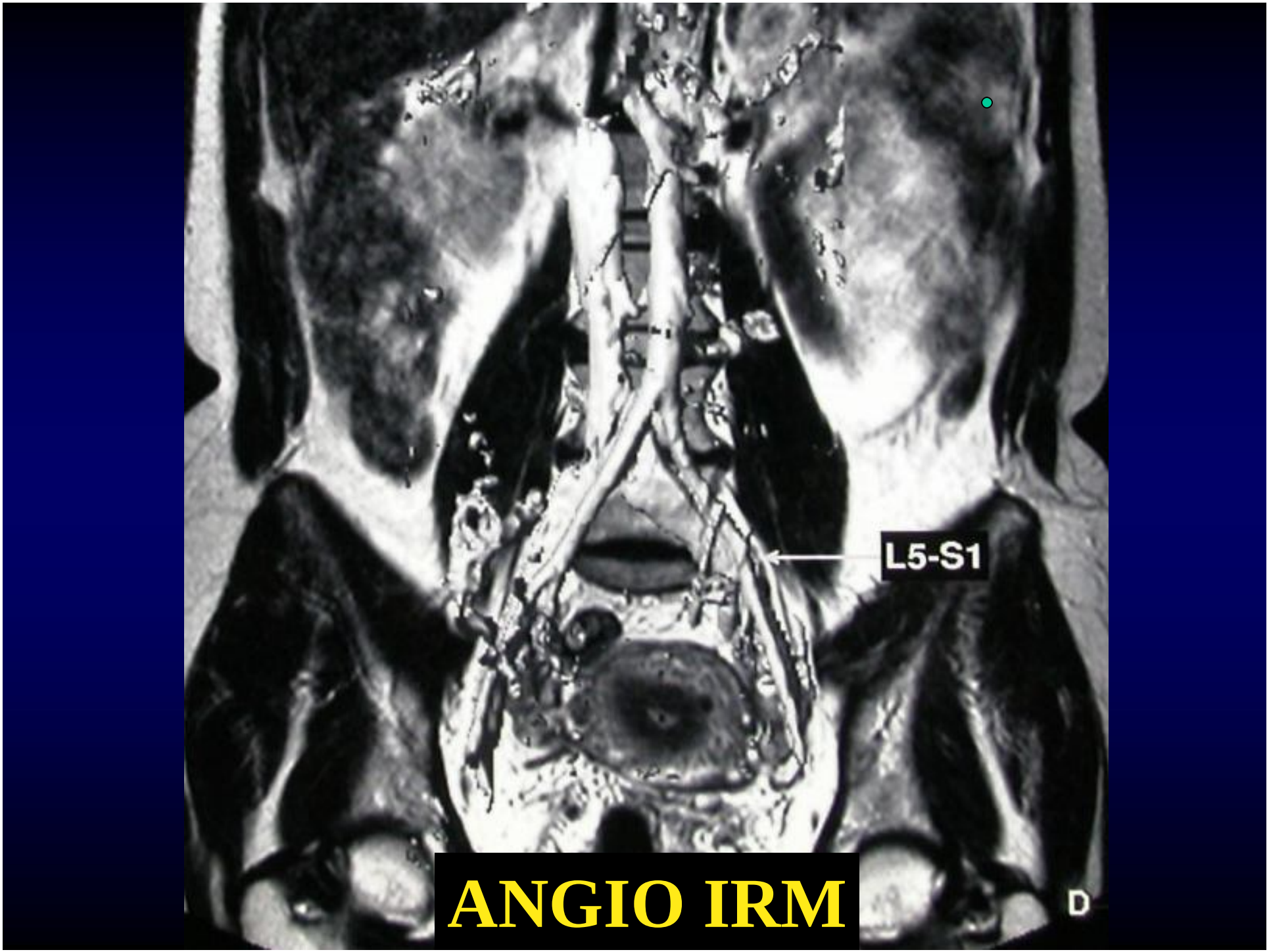


FAT. SAT

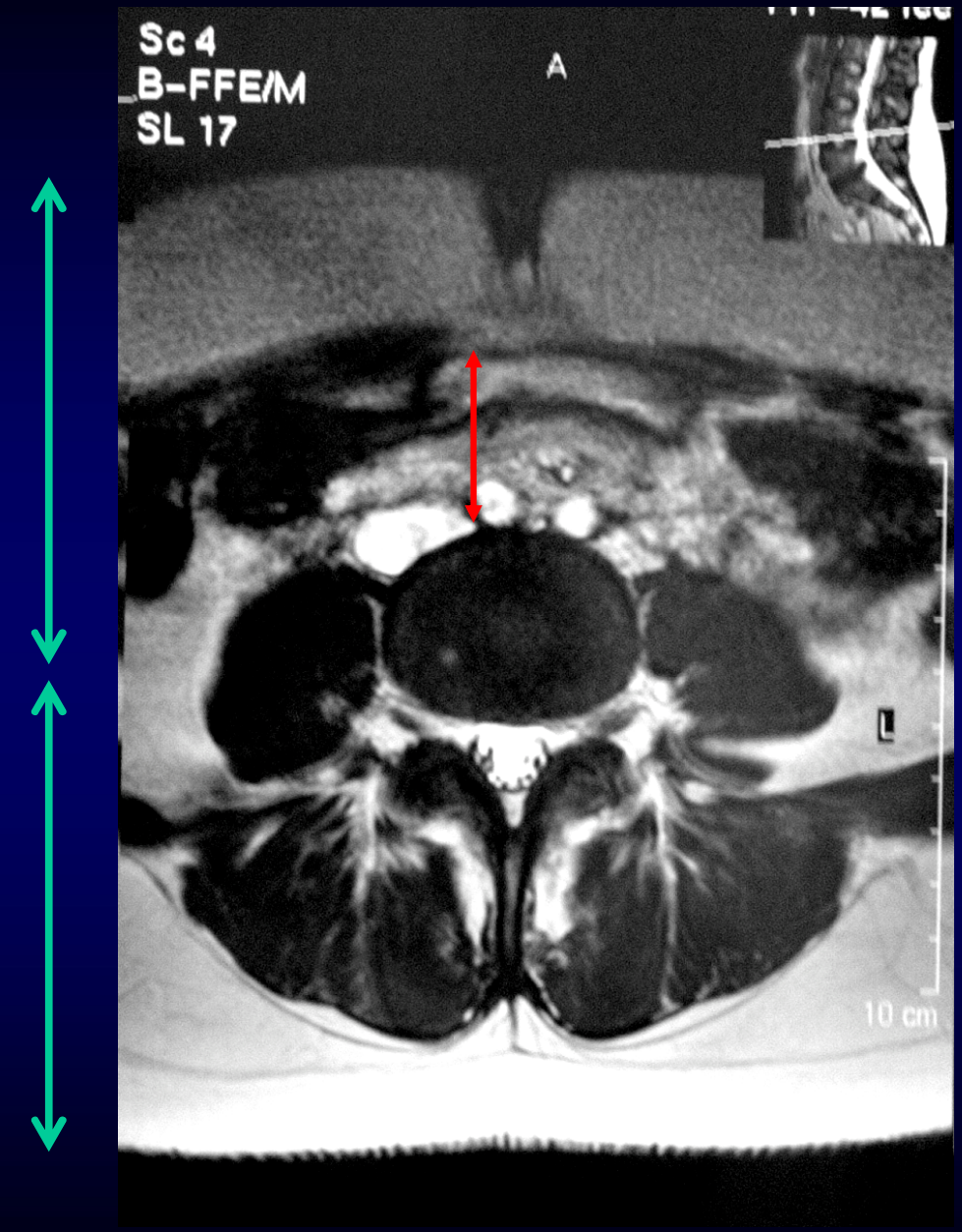
LESION ISOLEE

PROTHESE DISCALE



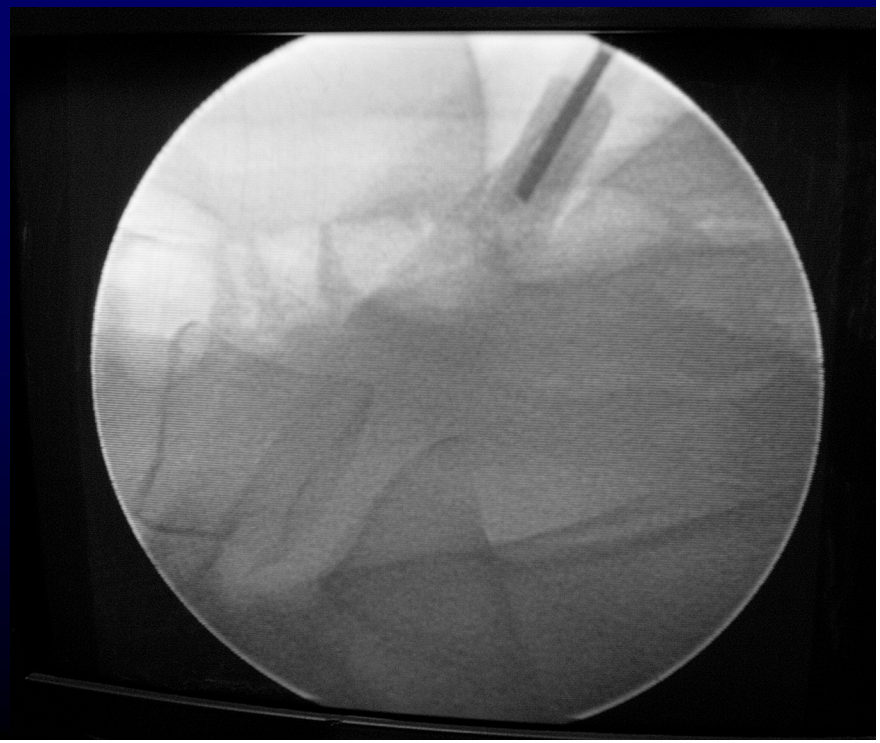


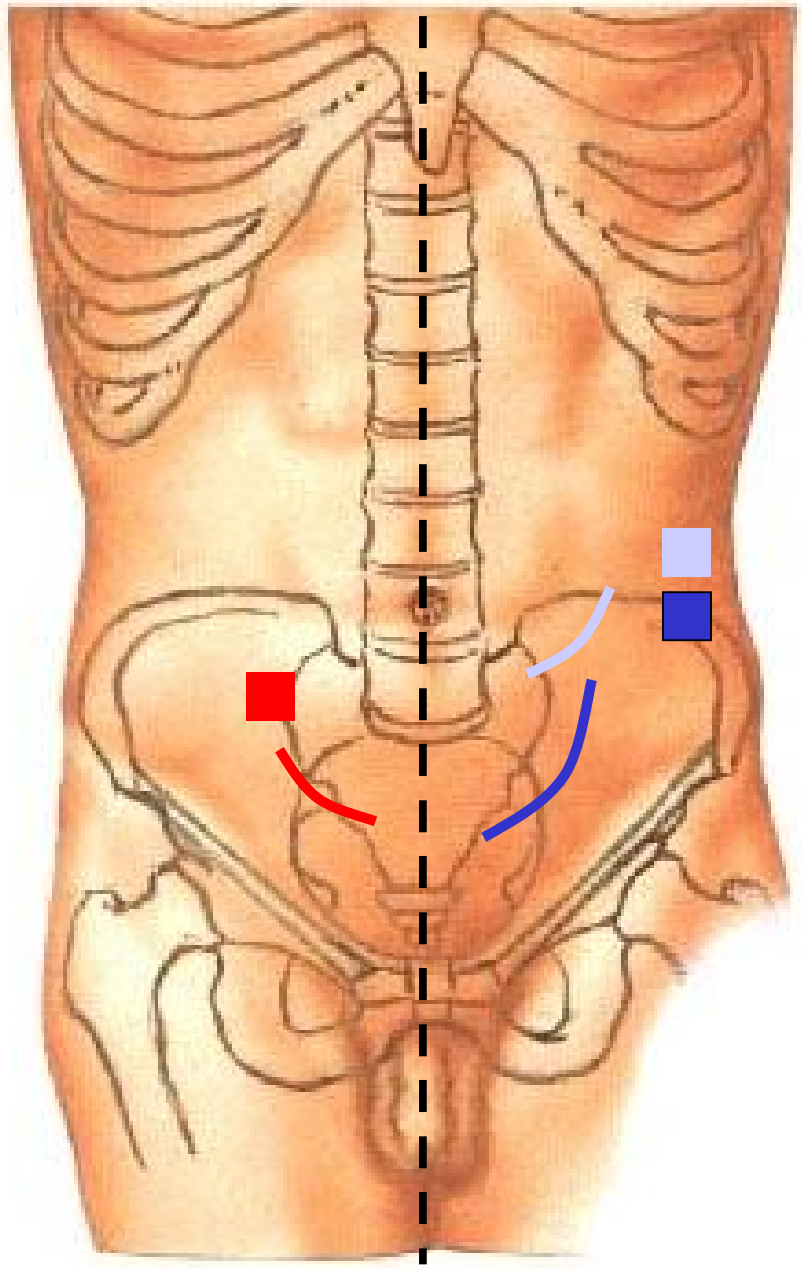
ANGIO IRM


Sc 4
B-FFE/M
SL 17
A
L
10 cm

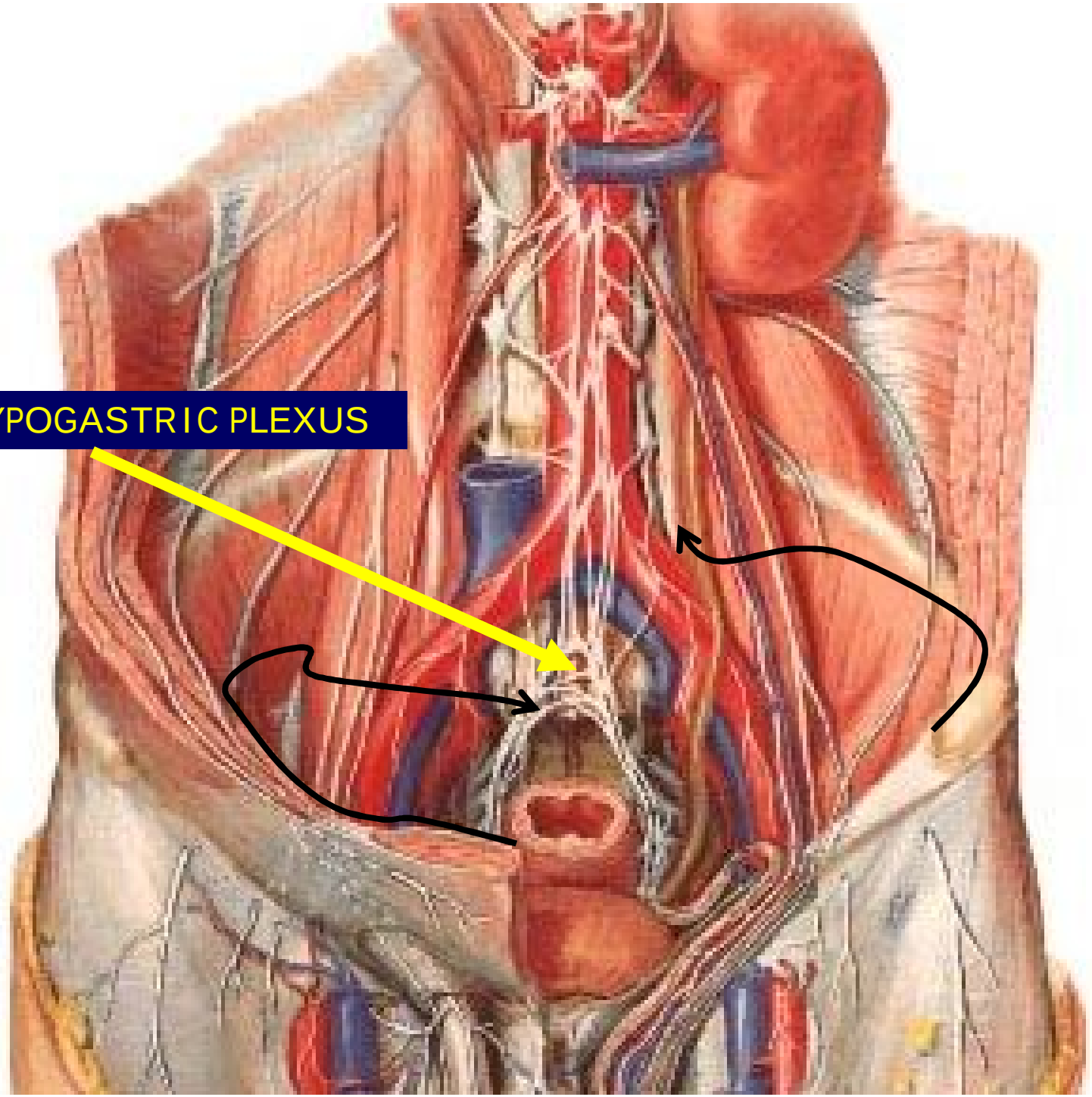
POSITIONING OF THE PATIENT

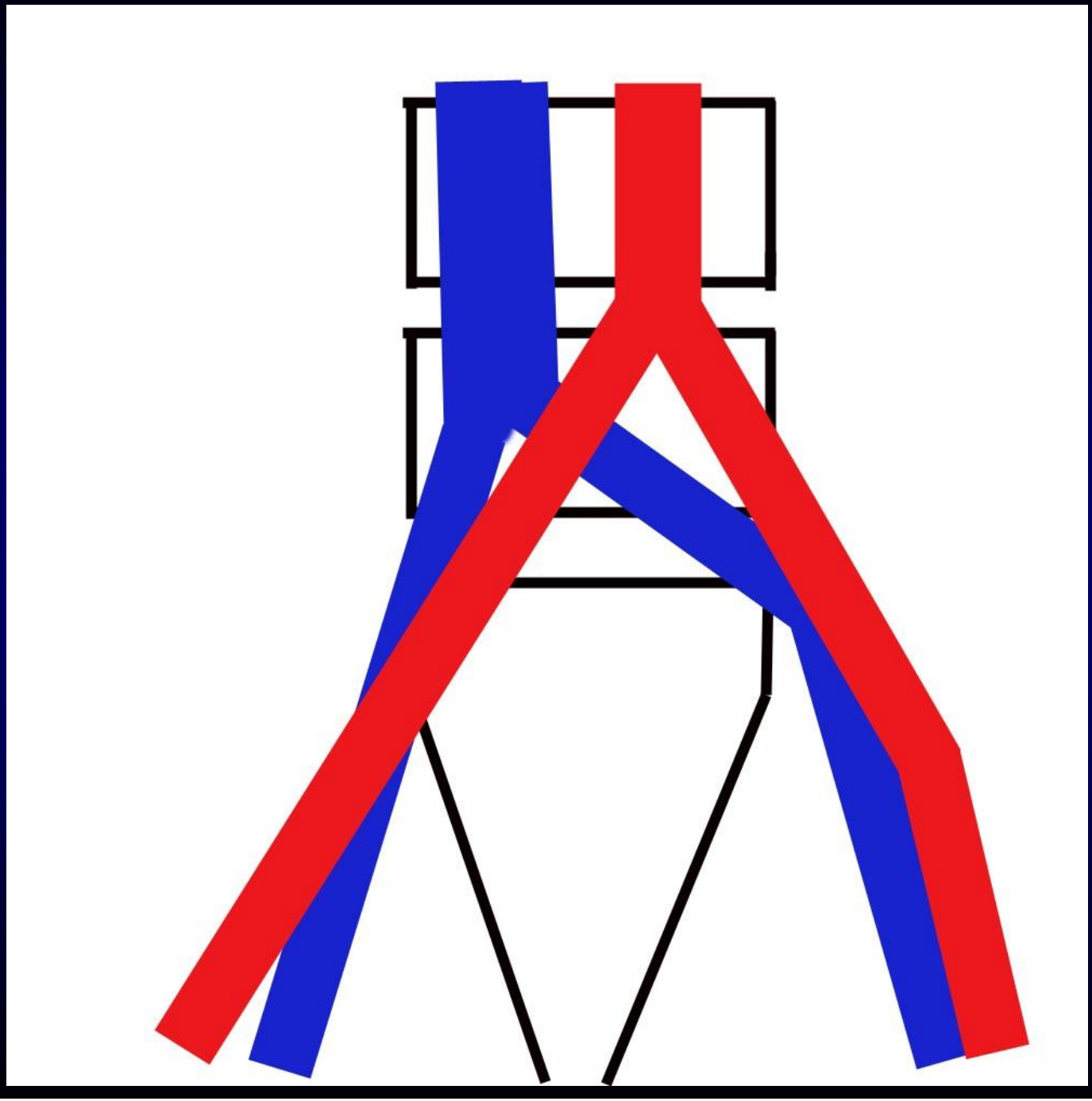
CHECK YOUR POSITION BEFORE, DURING & AFTER THE IMPLANT INSERTION

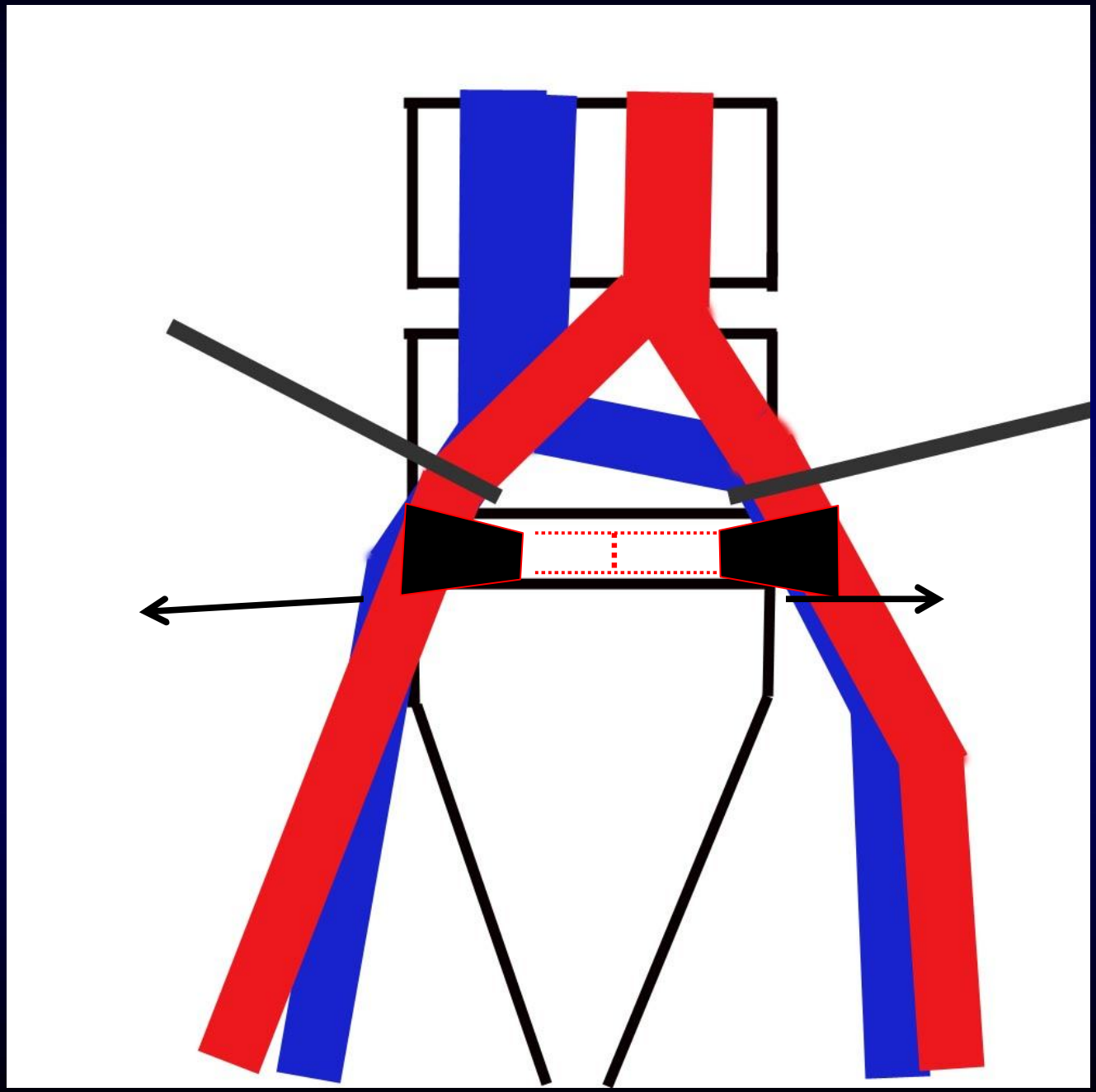


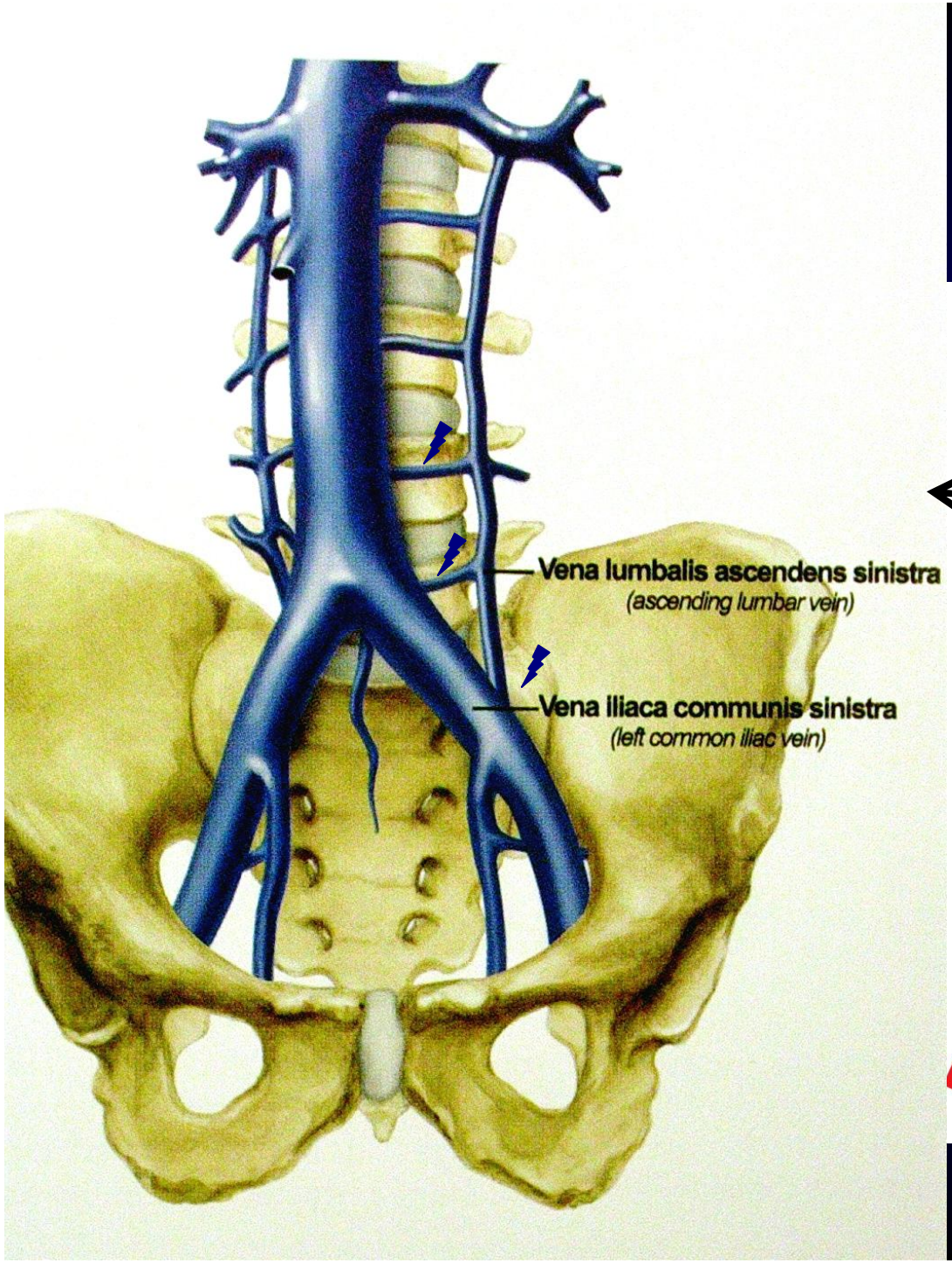


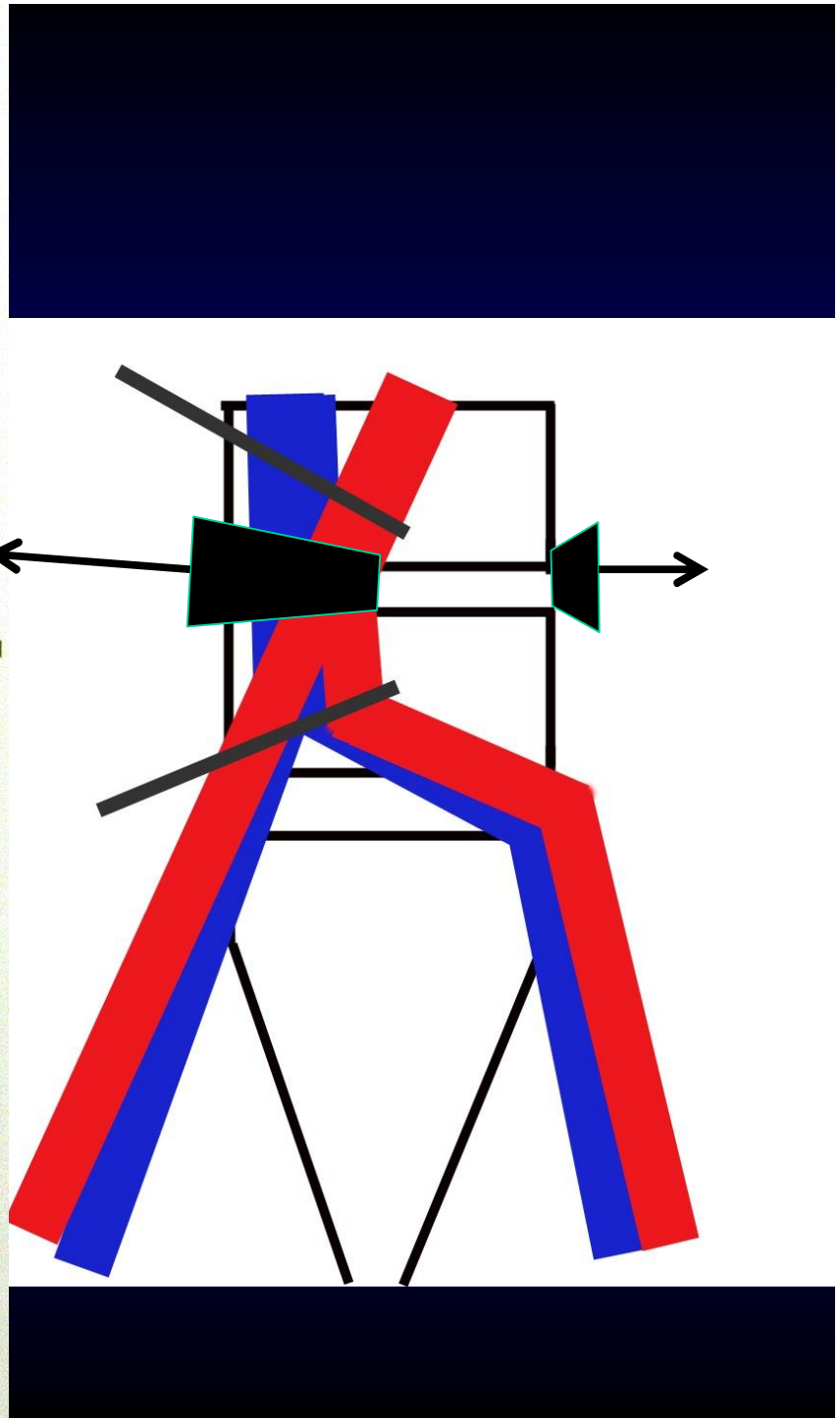
SUPERIOR HYPOGASTRIC PLEXUS

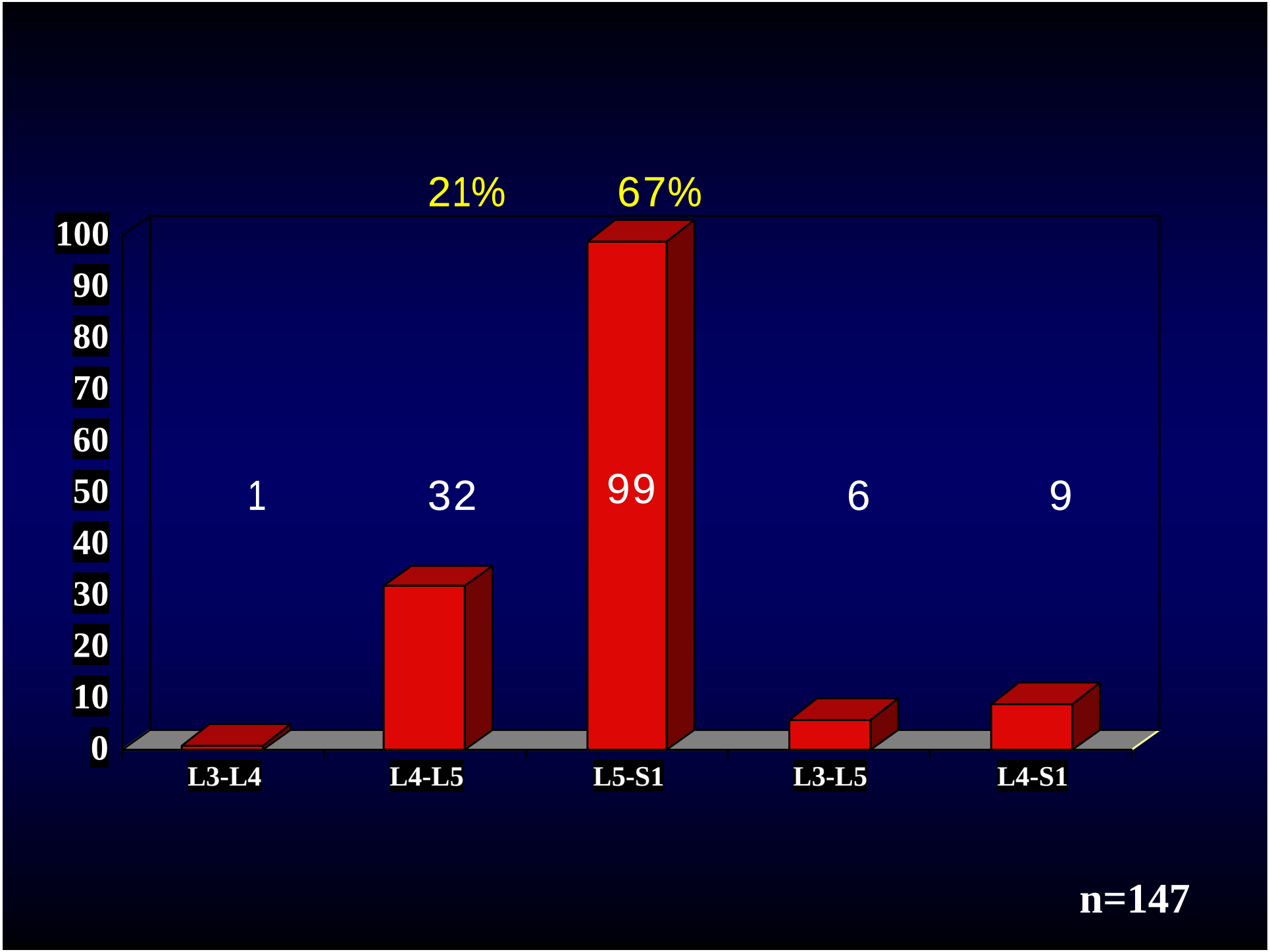







Vena lumbalis ascendens sinistra
(ascending lumbar vein)
Vena iliaca communis sinistra
(left common iliac vein)




21%
67%
100
90
80
70
60
50
40
30
20
10
0
1
32
99
6
9
L3-L4
L4-L5
L5-S1
L3-L5
L4-S1
n=147

CLINICAL RESULTS
(one level prothesis)

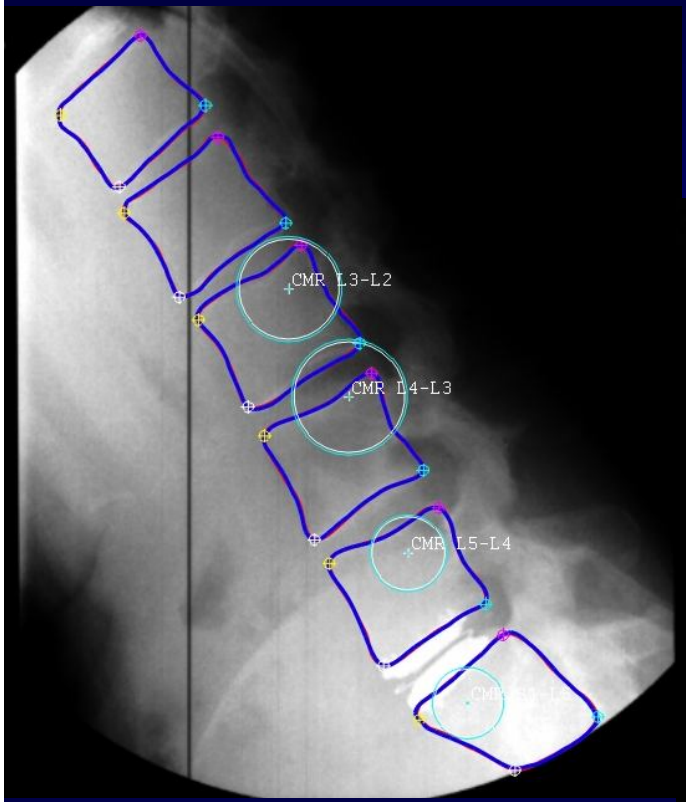
-LUMBAR VAS : 8 to 2,7

-OSWESTRY : 23,7 to 9,5

-SATISFIED : 73%

NO DIFFERENCE WITH IMPLANTS

RADIOLOGIC ANALYSIS :Surgiview™



COMPLICATIONS RELATED TO THE APPROACH

n=94

Minor vessel injury	4	
Sympathectomy effect	3	2 recovered after 6 months
Abdominal superficial hematoma	1	Revision (drainage)
Lymphorrhea	1	Revision (drainage)
Abdominal hernia	4	2 revisions
Infection/ Sexual complication/ Ureteral injury	0	

Learning curve

COMPLICATIONS RELATED TO THE IMPLANTATION PROCEDURE

n=94

	Learning Curve	Implant	Poor indication
Major subsidence= 1			1 Fusion
Minor subsidence= 4	4 (1MAV, 3SBC)		
Adjacent degeneration=2	2 (1PD,1SBC): 1 Prosthesis-1 IDET		

COMPLICATIONS RELATED TO THE IMPLANTATION PROCEDURE

n=94

	Learning Curve	Implant	Poor indication
Persistent LBP= 6			6
Radiculopathy =4 (3 transient, 1 persistant)	1 Fusion		
Secondary facet joint pain =3	3 (1PD,2SBC): steroid injection		

NO SIGNIFICANT DIFFERENCES AMONG THE 3 PROSTHESES

CONCLUSIONS

- **Selection more important than the implant**
- **Specific complications**
- **Restore & maintain MOTION**
- **Maintain SAGITTAL BALANCE**
- **No correlations with GOOD CLINICAL RESULT**
- **Rare but non ignored indications**


.8kHz