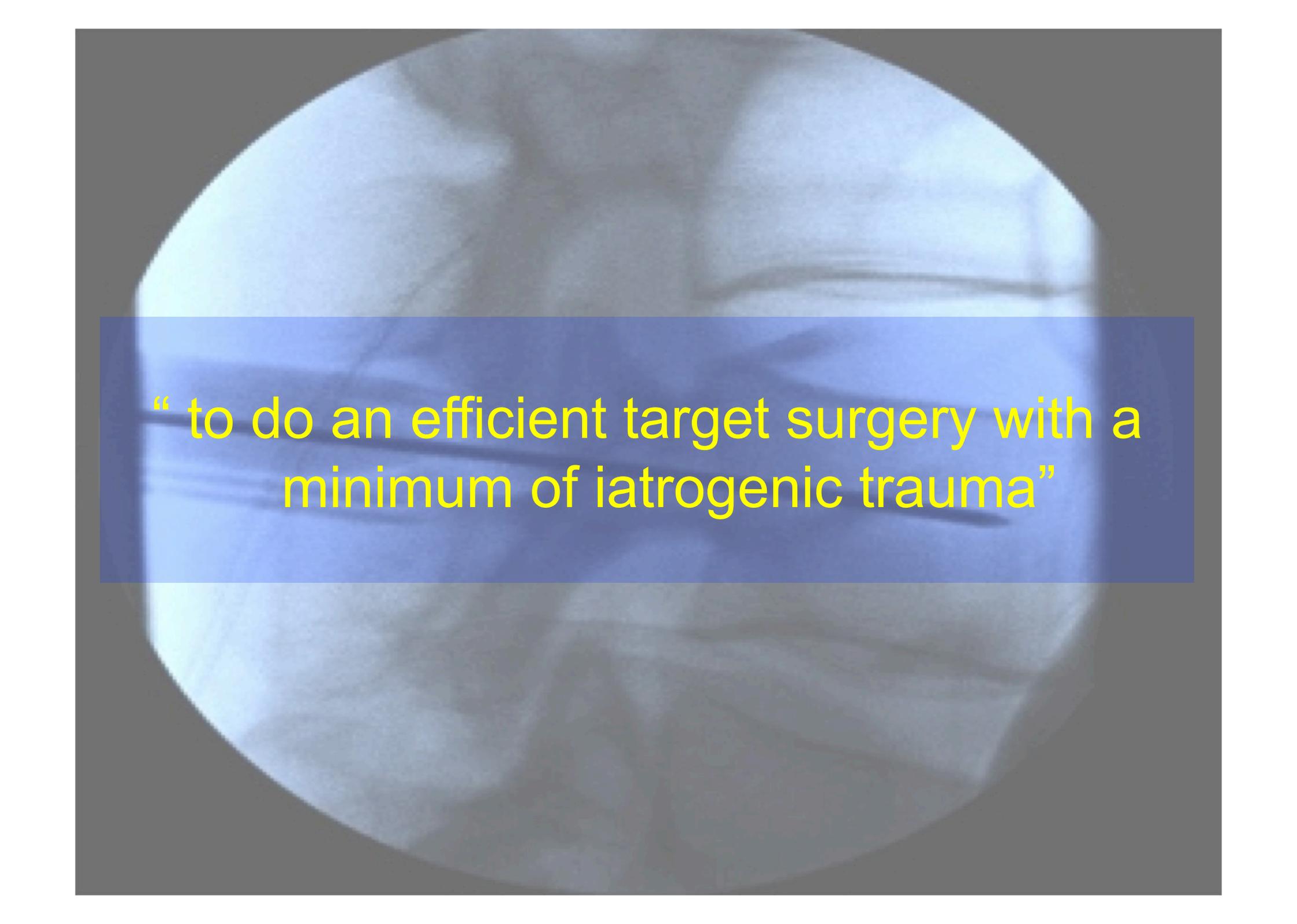




# THE ADVANTAGES OF M.I.S.S. IN THE LUMBAR SPINE

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“ to do an efficient target surgery with a minimum of iatrogenic trauma”

## Access principles in MISS

- Skin incision
- Route to target
- Collateral damage
- Target exposure
- Target treatment
- Postoperative traces

## Skin incision

- Adequate placement
- Adequate size
- cosmetic

## Route to target

- Least traumatic
- Fast

# Collateral damage

- Negligible
- Reparable

## Target exposure

- Adequate

# Target treatment

- Efficient
- Without restrictions due to approach

## Postoperative traces

- Negligible
- Not relevant for outcome
- Options for return

# Factors influencing MISS strategy

- Preoperative planning
- Positioning of the patient on OR table
- Localization of skin incision
- Dissection technique
- Instruments and implants

# Factors influencing MISS strategy

- Dissection technique

“a muscle or bony structure should basically be treated with the same care as a nerve or a blood vessel”

# Factors influencing MISS strategy

- Instruments and implants



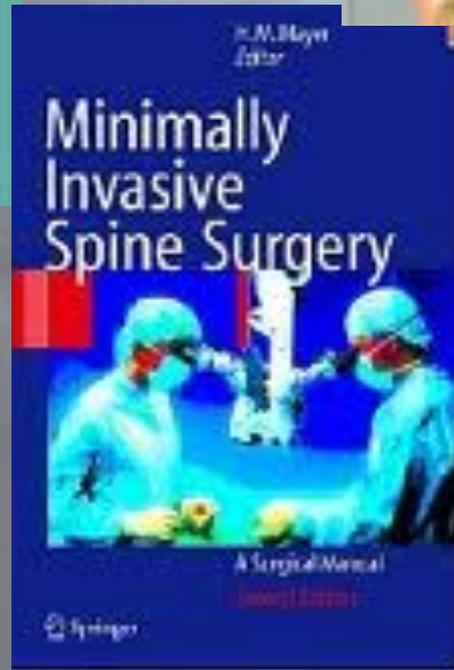
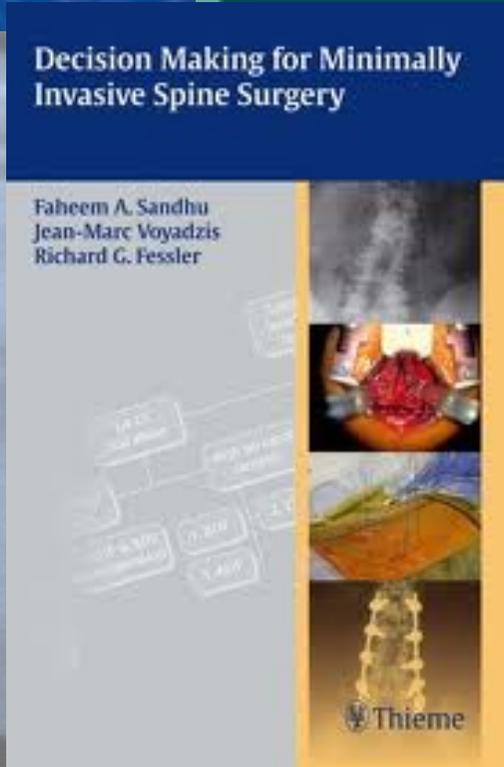
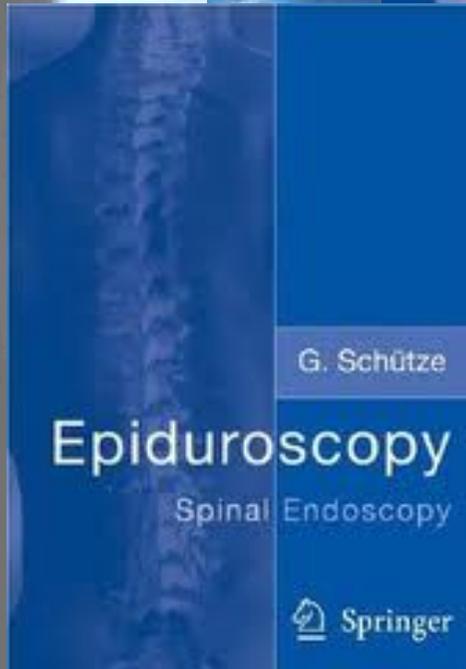
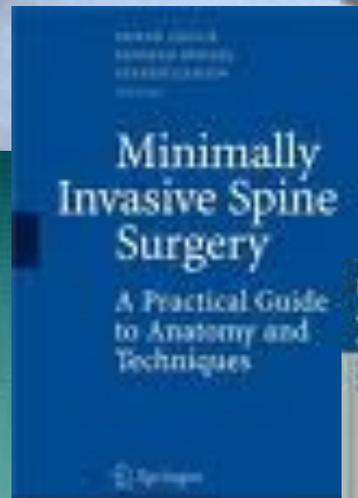
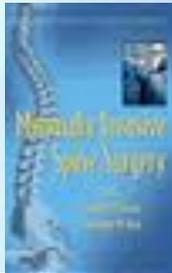
# Factors influencing MISS strategy

- Instruments and implants



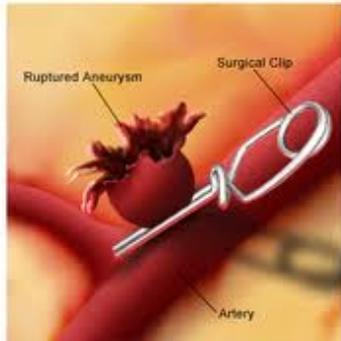


- Minimally invasive surgery  
5.220.000 results
- Minimally invasive spinal surgery  
736.000 results
- Minimally invasive lumbar surgery  
682.000 results

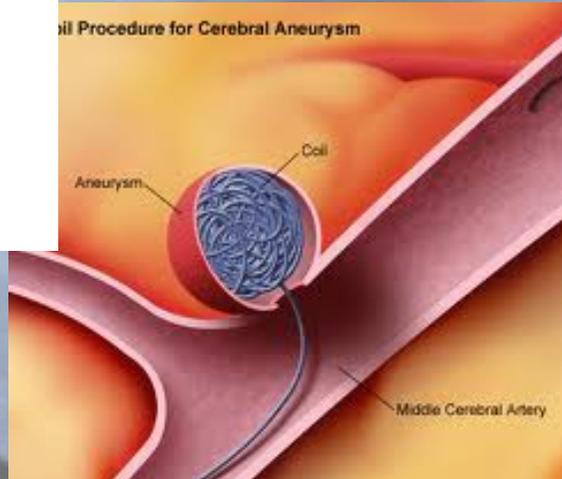




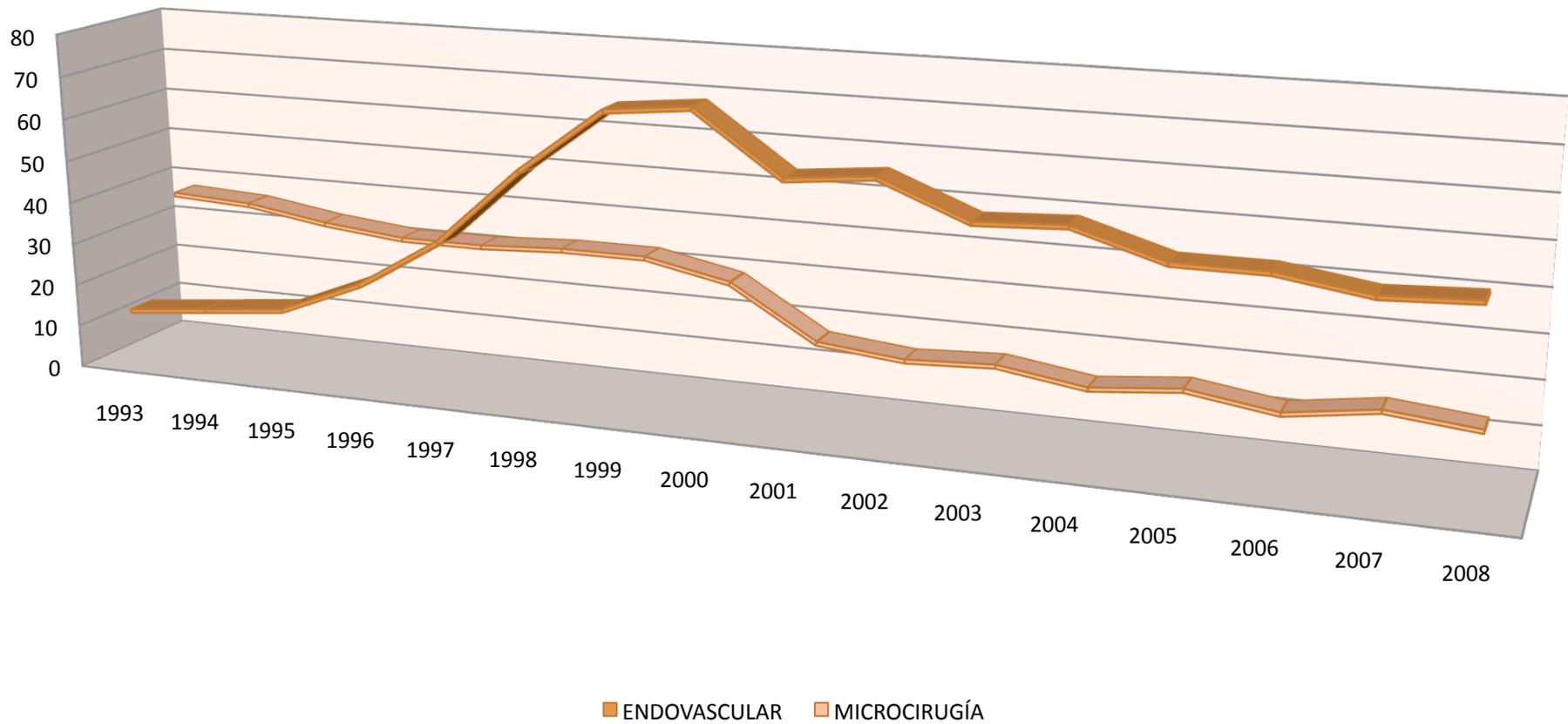
Clipping Treatment for Cerebral Aneurysm



Coil Procedure for Cerebral Aneurysm



## Brain aneurysms treated in H. Univ. Puerta de Hierro 1993- 2008



# History and evidence

1955, Malis, microscope and bioplar coagulation



# History and evidence

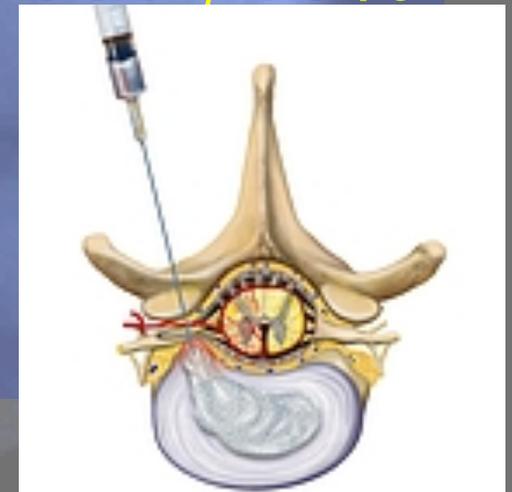
60s, Yasargil, microneurosurgery



85% good-excellent

## History and evidence

- 1963, Smith, percutaneous enzymatic dissolution of nucleous pulposus
- FDA study, 1975, inconclusive
- Multiple complications including paraplegia
- Double-blind study Gogan and Fraser, 80% good results at 10 years
- No improvement in back pain



## History and evidence

- 1985, Onik, percutaneous automated discectomy at L4L5 or higher levels.
- 75% overall success rate published
- Its role remains investigational.



## History and evidence

- 80s, Asher and Heppner, CO2 laser
- 1990, Yonezawa, Nd-YAG laser
- Results of laser still unclear
- No controlled prospective studies





## History and evidence

- 1910, Jacobaeus, thoracoscopy, laparoscopy
- 1929, Dandy, endoscopic removal of loose cartilage from intervertebral disc.
- 1942, Pool, intrathecal endoscopy
- 1989, Stoll, epiduroscopy
- 1993, Mack, videothoracoscopy





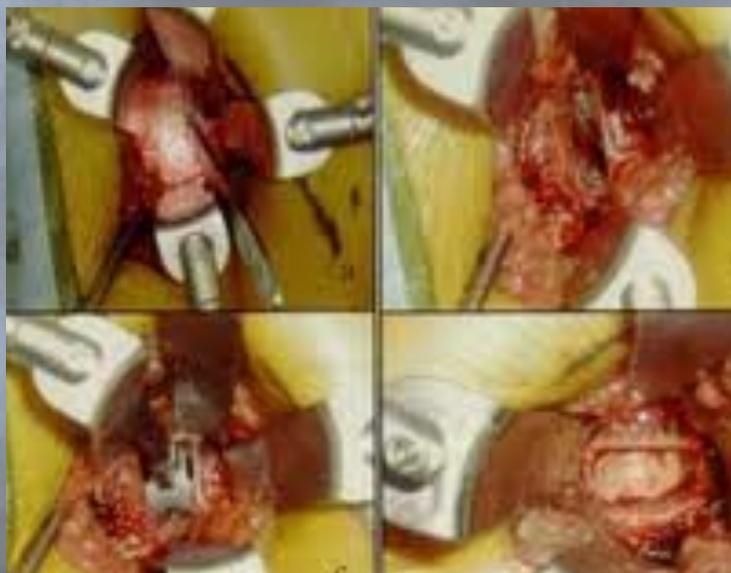
## History and evidence

- No large randomized study has been done to compare this technique to the standard microdiscectomy.



## History and evidence

- 1991, Obenchain, laparoscopic approach to lumbar spine
- 1993, Burns, ALIF



# History and evidence

- 1989, Orelud, percutaneous lumbar fixation by external fixator
- 2000, Lowery, Kulkarni
- 2001, Foley



# Navigation



# Applications of MISS in lumbar spine

- Lumbar disc herniation
- Lumbar canal stenosis
- Spondylolisthesis
- Deformities
- Fractures
- Tumors
- Other (chronic pain, fibrosis)

# MISS techniques in lumbar spine

- Interventional and semi-invasive procedures
  - Spinal injection procedures
  - Radiofrequency denervation
  - Epidural steroid injections
  - Adhesiolysis

# MISS techniques in lumbar spine

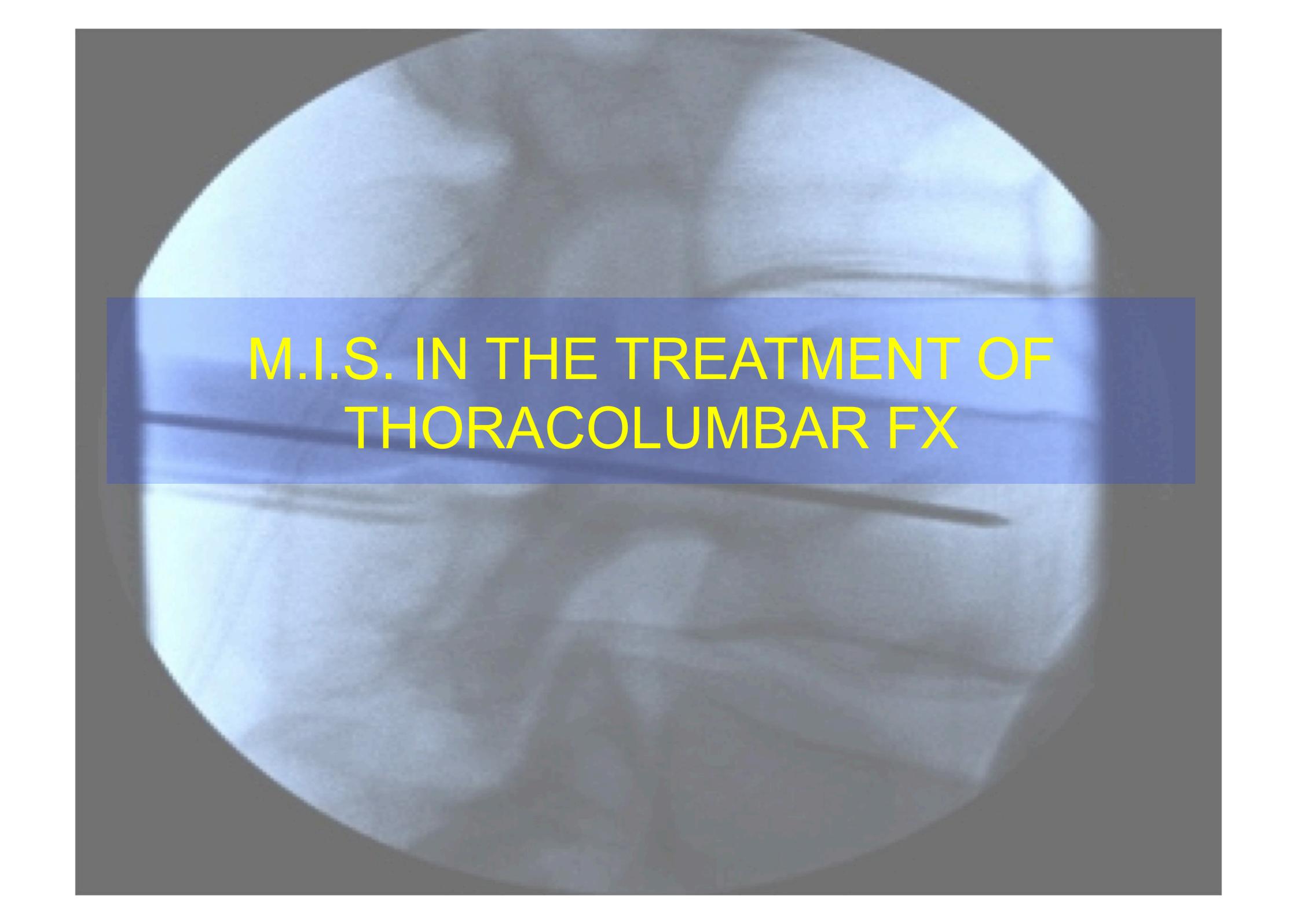
- Intradiscal surgical procedures:
  - Laser disc decompression
  - Nucleoplasty
  - Nucleotomy
  - Chemonucleolysis

## MISS techniques in lumbar spine

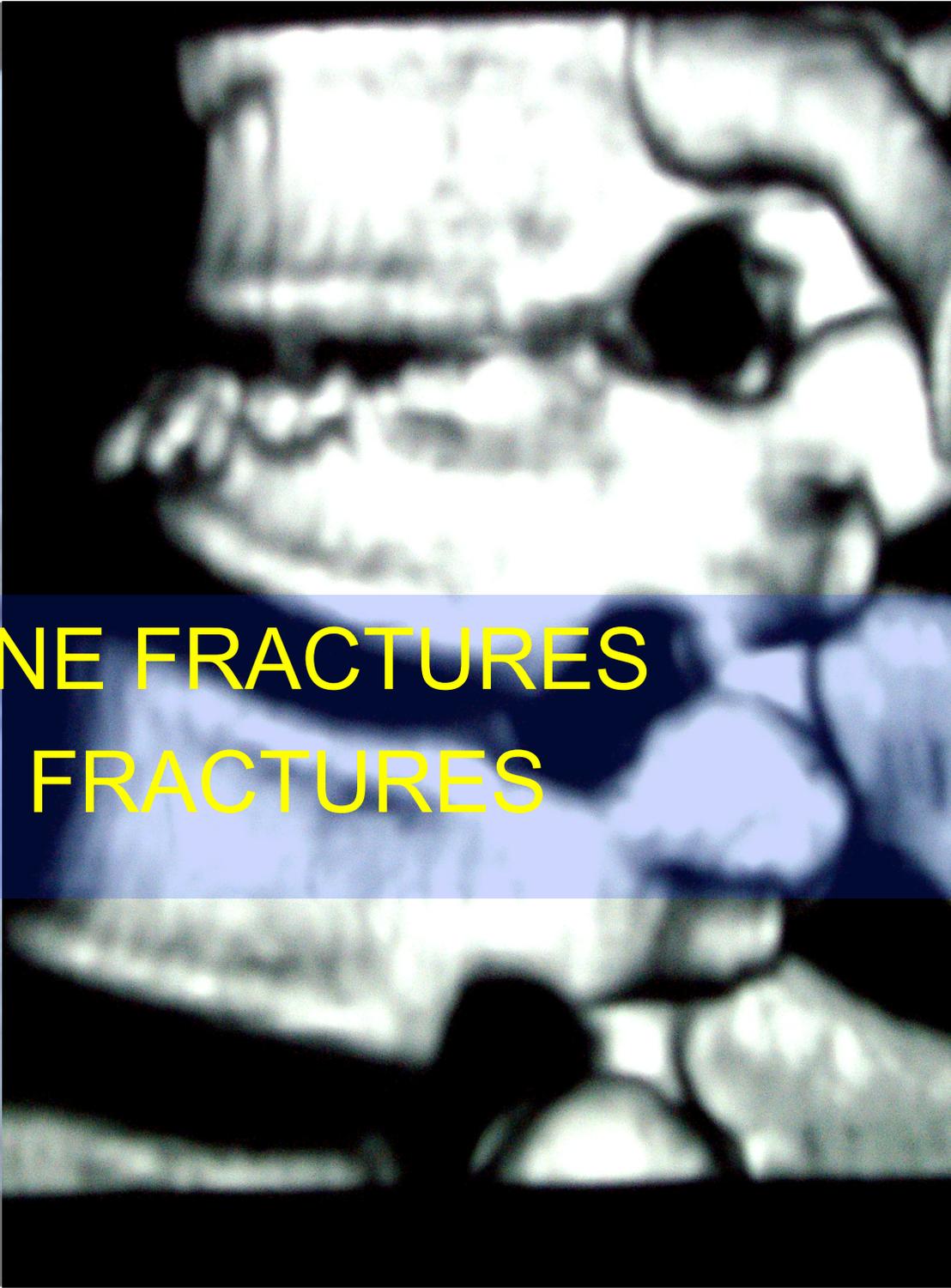
- Microdiscectomy
- Microsurgical interlaminar paramedial approach (tubular)
- Microsurgical translaminar approach (tubular)
- Endoscopic discectomy/ laminectomy
- Transforaminal endoscopic discectomy

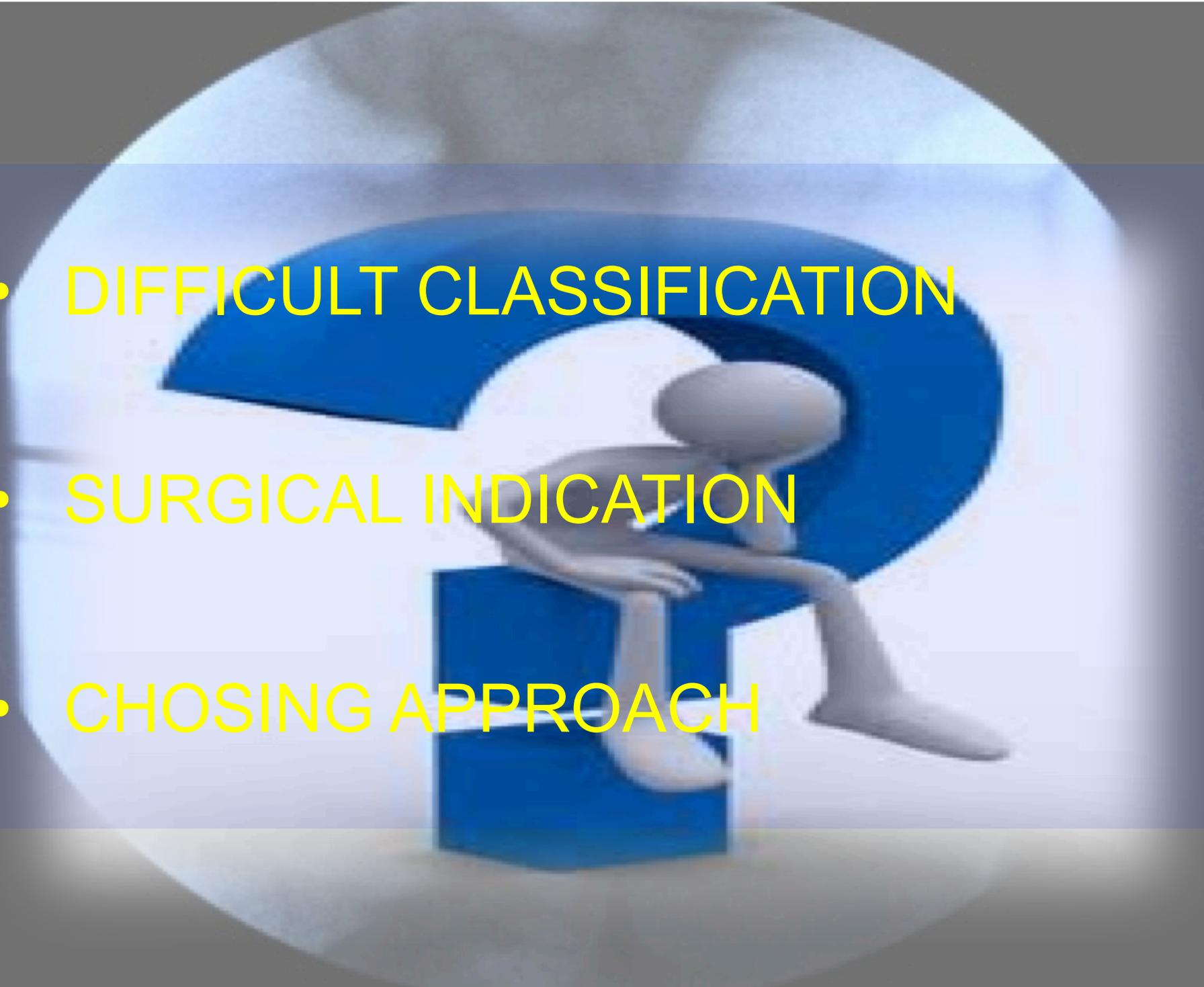
# MISS techniques in lumbar spine

- Percutaneous screws placement
- PLIF, TLIF, XLIF, AxiaLIF
- Vertebroplasty
- Kiphoplasty

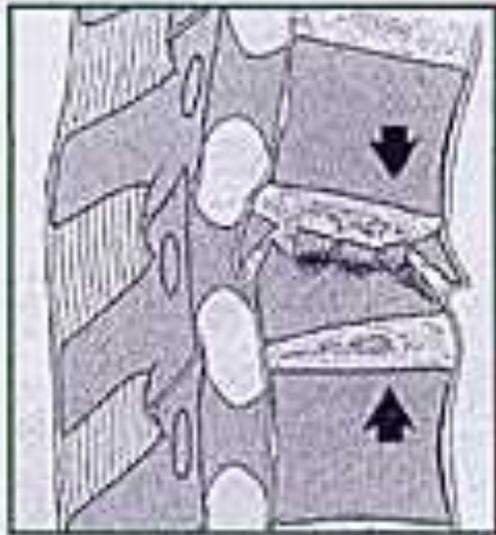


# M.I.S. IN THE TREATMENT OF THORACOLUMBAR FX

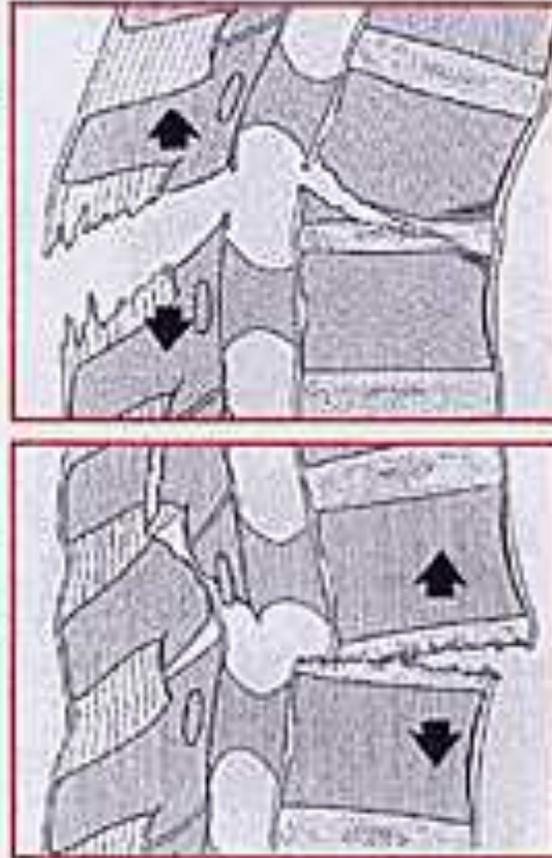
- 
- 2/3 SPINE FRACTURES
  - 15-20% FRACTURES

- 
- DIFFICULT CLASSIFICATION
  - SURGICAL INDICATION
  - CHOSING APPROACH

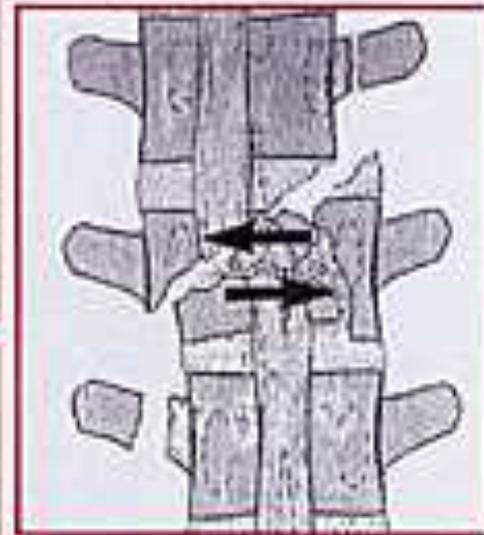
**A**



**B**



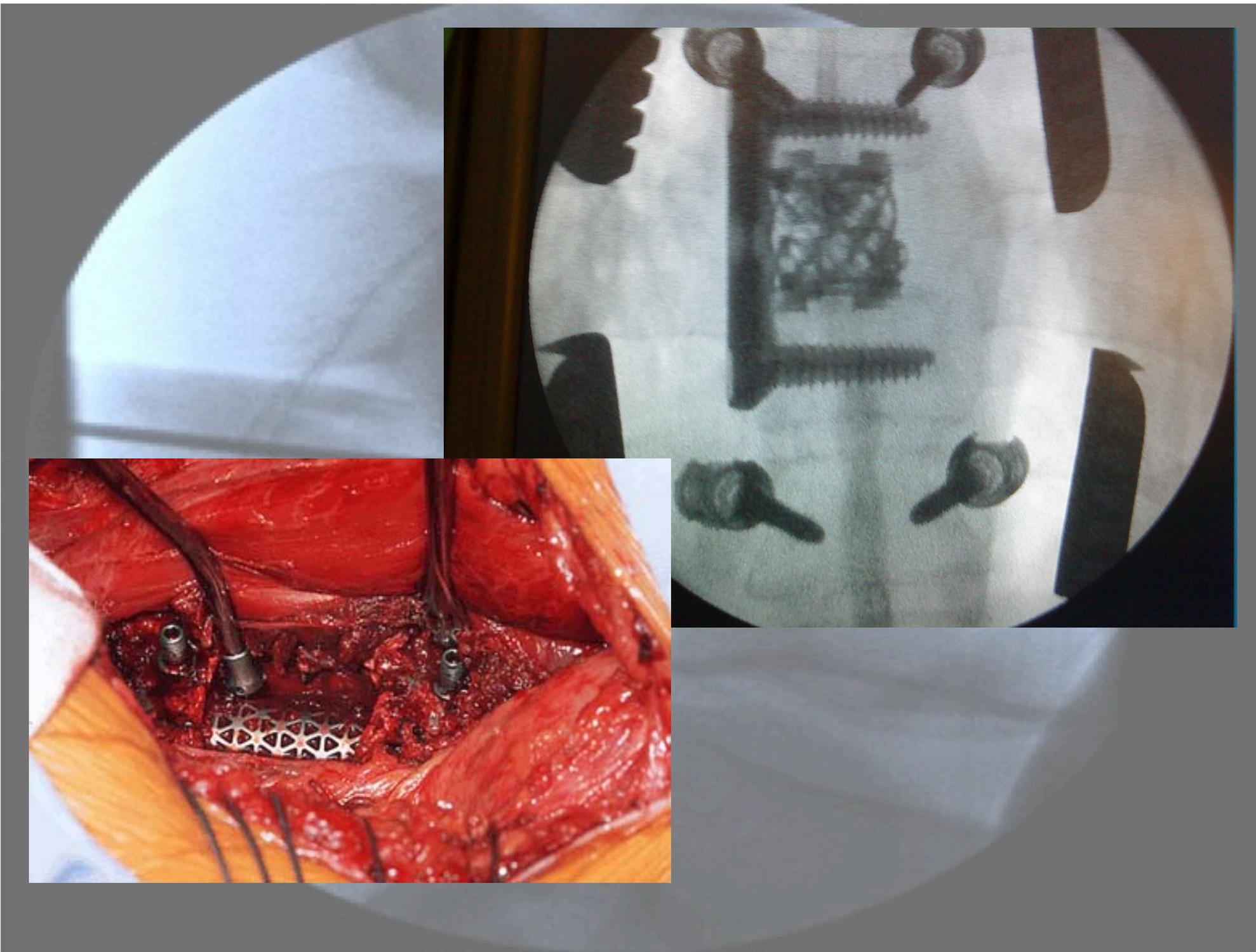
**C**



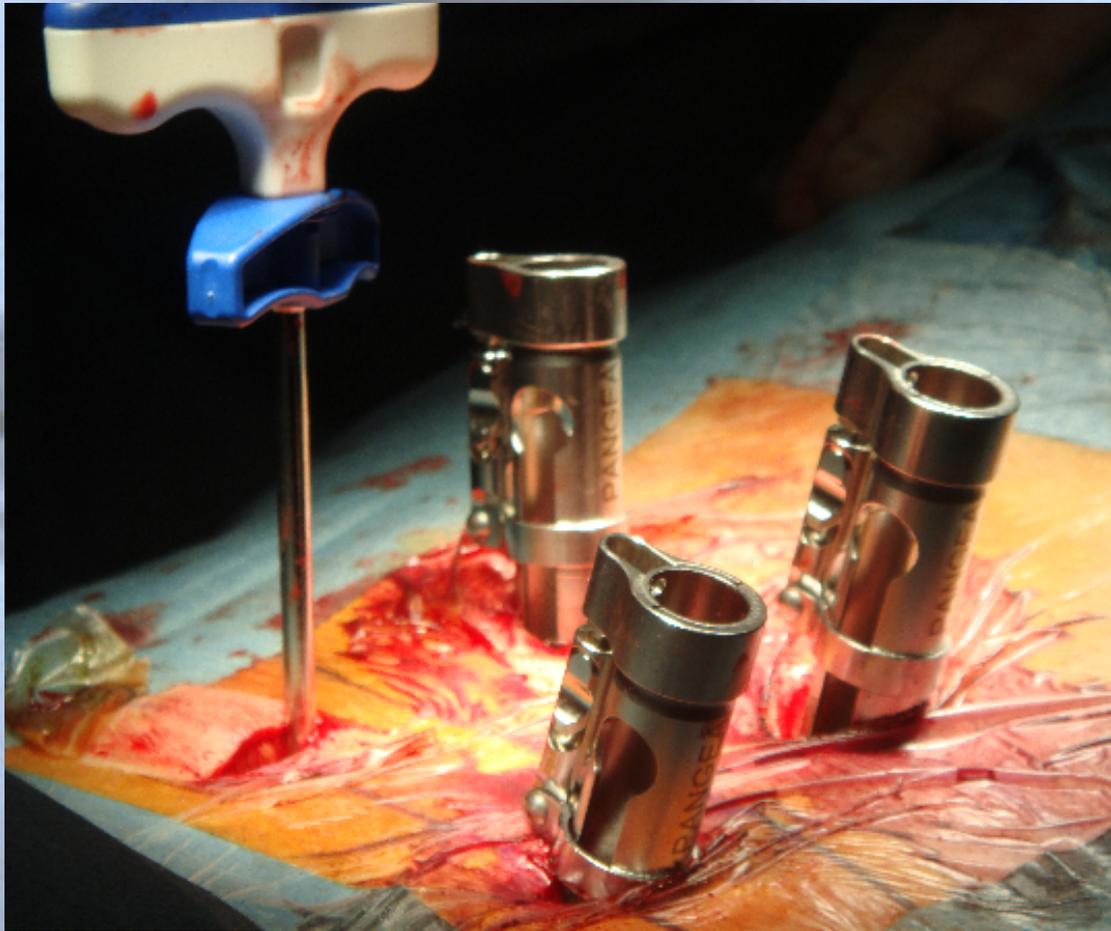
# MIS TECHNIQUES IN THORACOLUMBAR FX

- vertebroplasty
- Kyphoplasty- stent (VBS)
- Percutaneous screws
- MISS decompression
- Posterior corpectomy













LEZ

Hospital Puerta de Hierro  
29.10.2009  
11:04:2

62 ☀  
46 🌑

ARO  
D10221104

29.10.2009  
11:13:12

65 ☀  
46 🌑

291104

29.10.2009  
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63 ☀  
49 🌑

kVp

100

ALVARO

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46

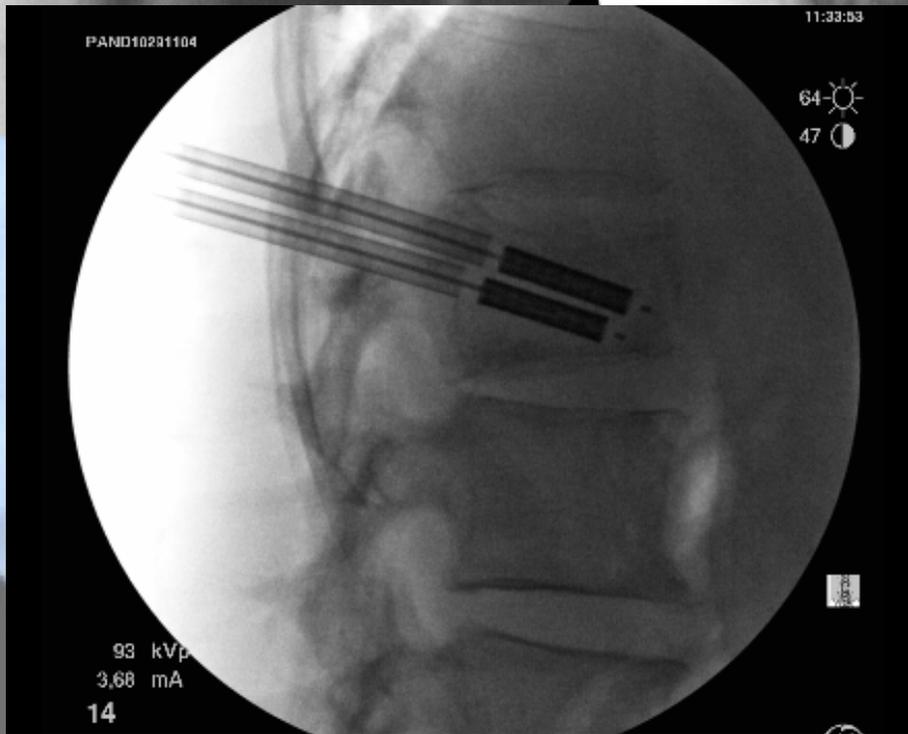
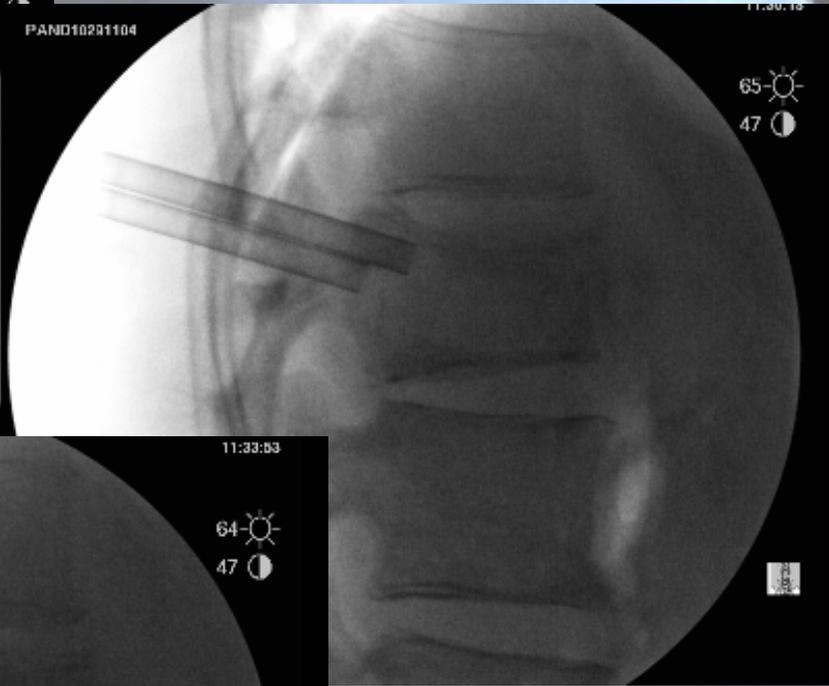


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47



PAND10291104

11:33:53

64

47

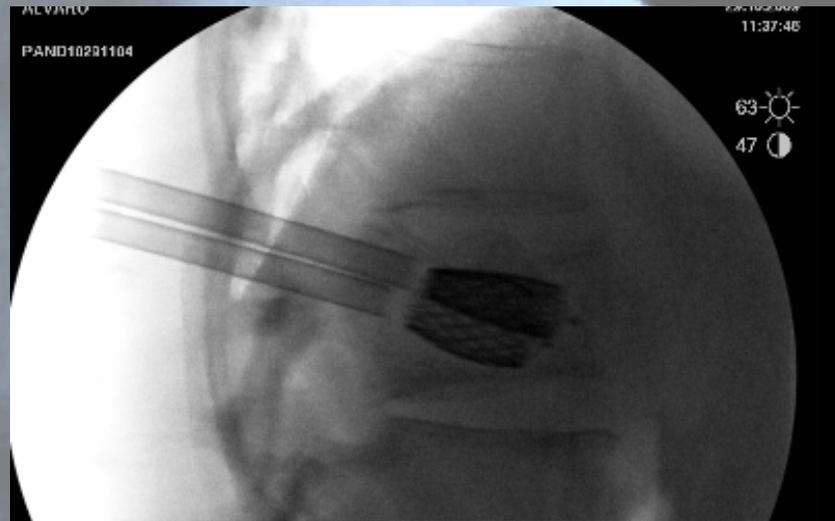
92 kVp  
3,67 mA

93 kVp  
3,68 mA

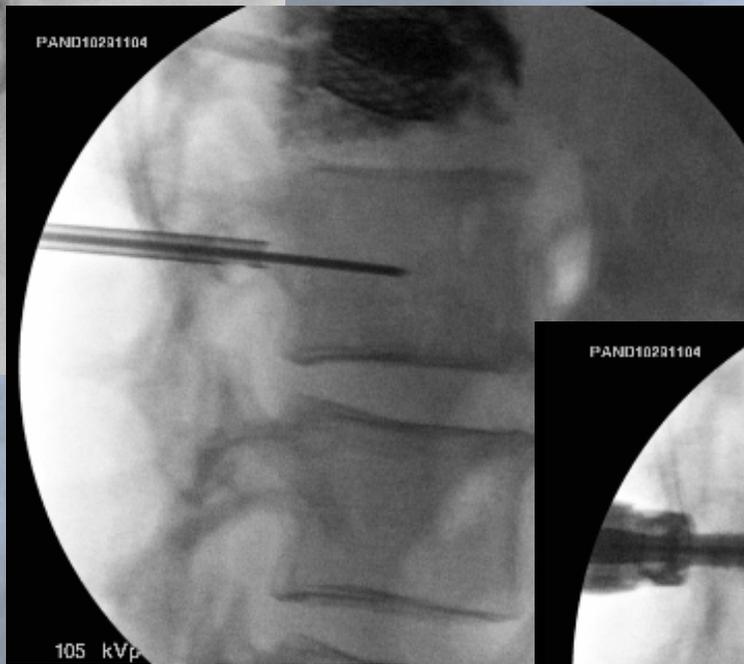
14

PAND

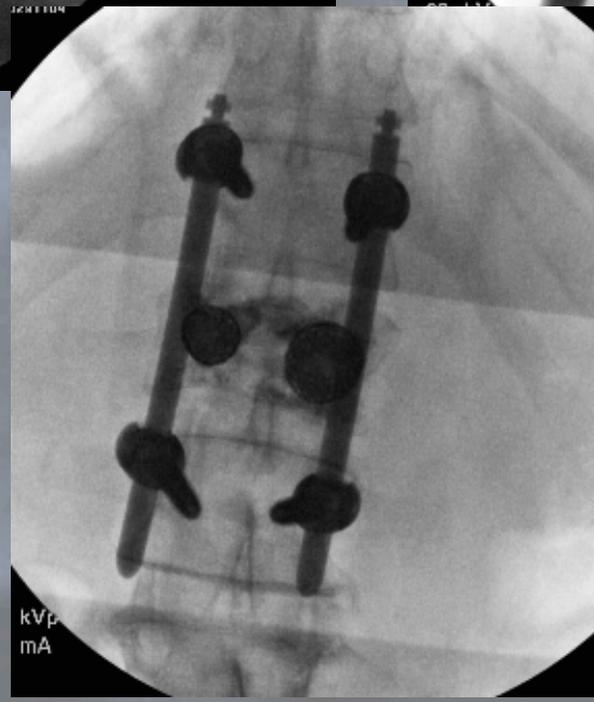
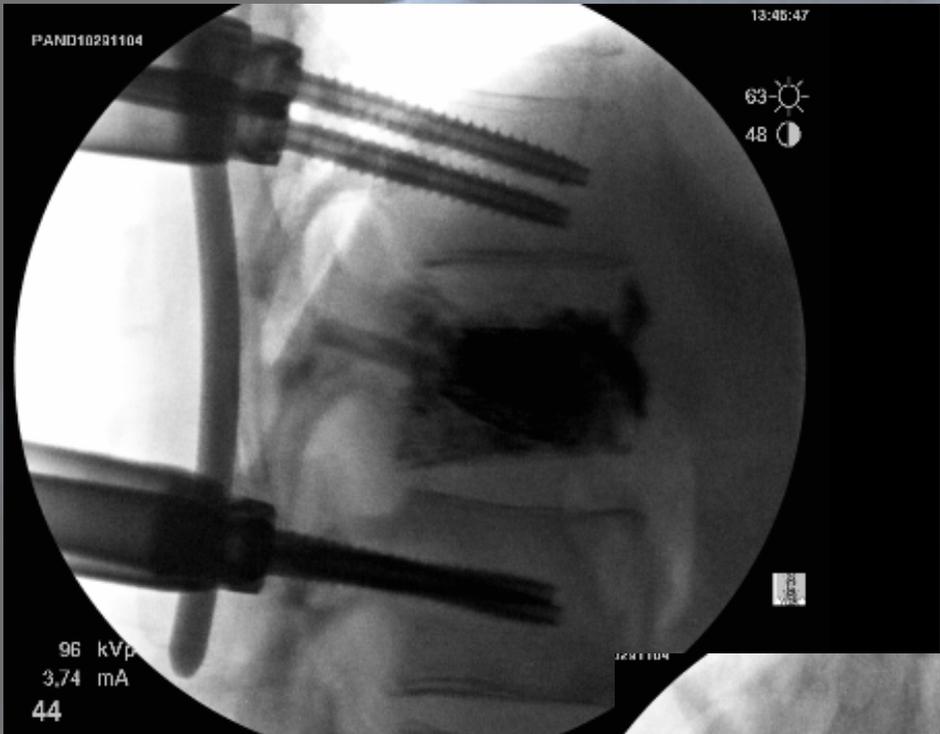
PAND











# PROTOCOL

- Indwell urinary catheter
- Surgical drainage in mini open, not in percutaneous only
- 24h mobilization
- Thoracolumbar orthosis for 8 weeks
- Postop analgesics: NSAIDS + TRAMADOL + MORFINE
- CONTROL POSTOP RX, 4 WEEKS, 3 MONTHS, 6 MONTHS, ANUAL

## TL FX MISS

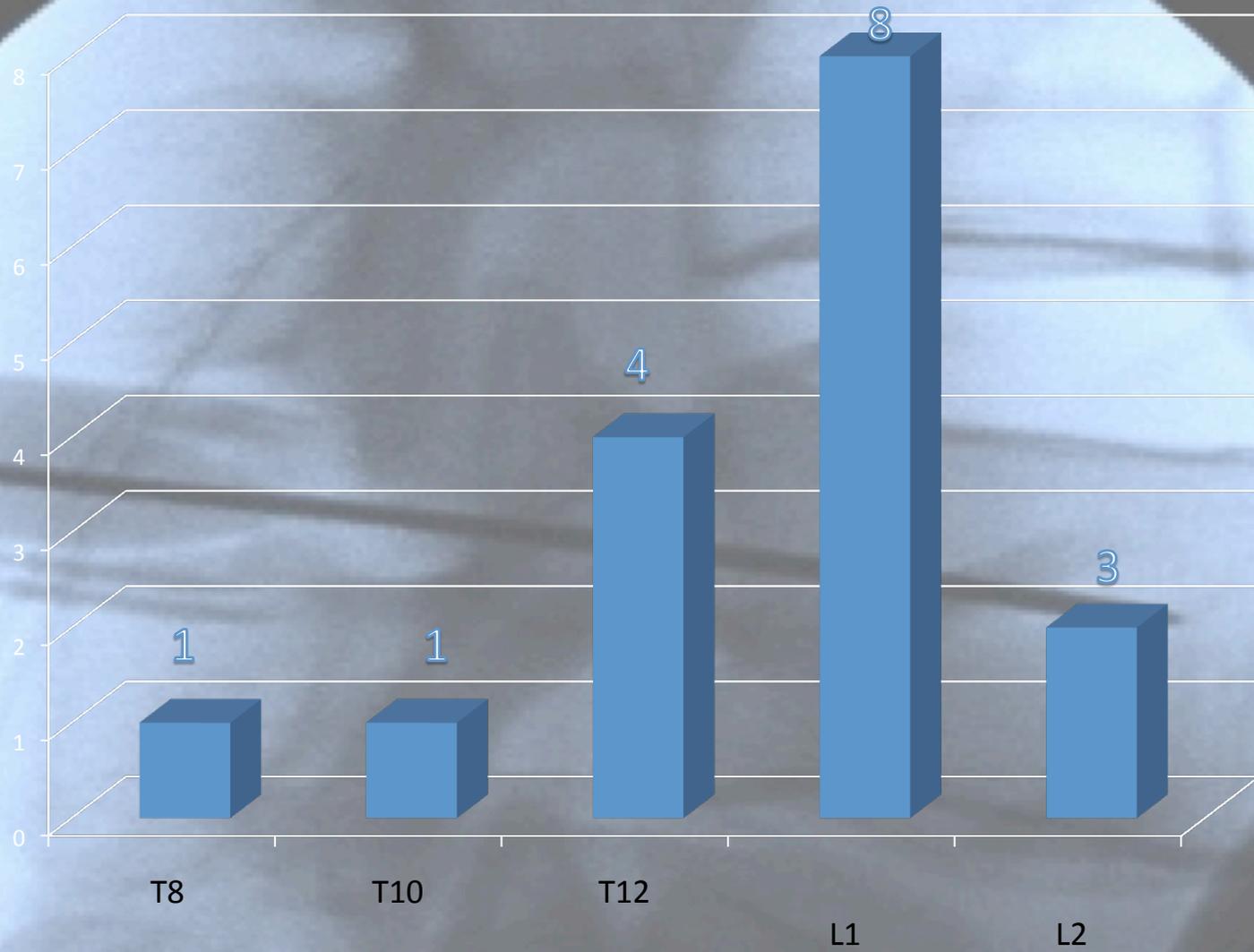
- 17 patients
- AO A3
- Median follow up 12 months
- 12 men, 5 women
- Median age 34 yrs

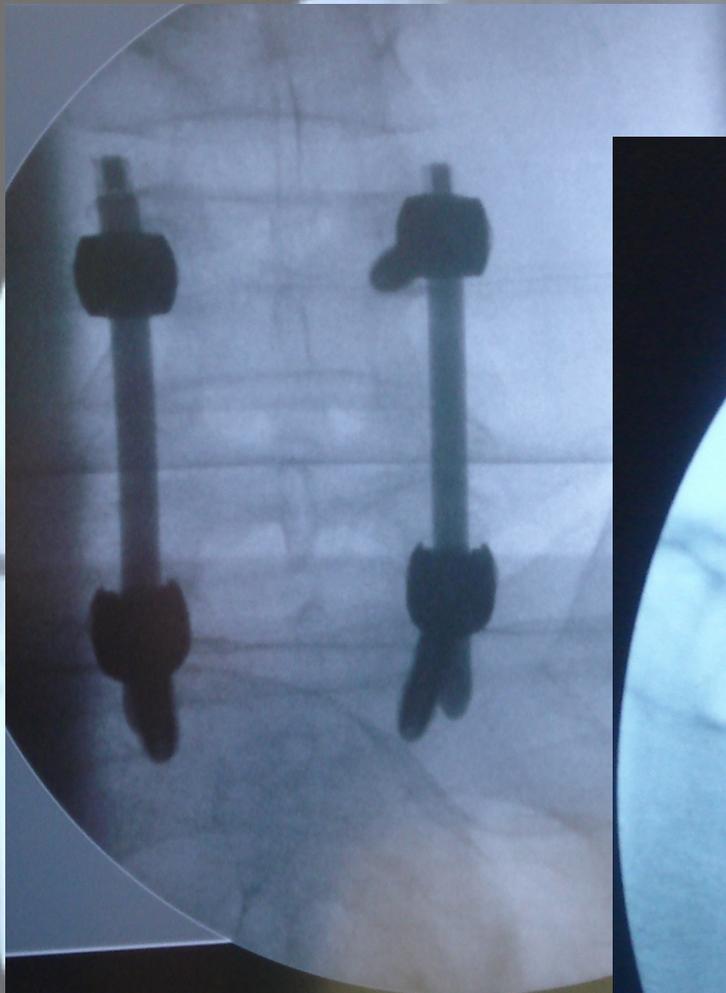
## TL FX MISS

- 8 percutaneous screws
- 4 percutaneous screws + stent kyphoplasty
- 5 (miniopen + arthrodesis ) + contralat percut screws

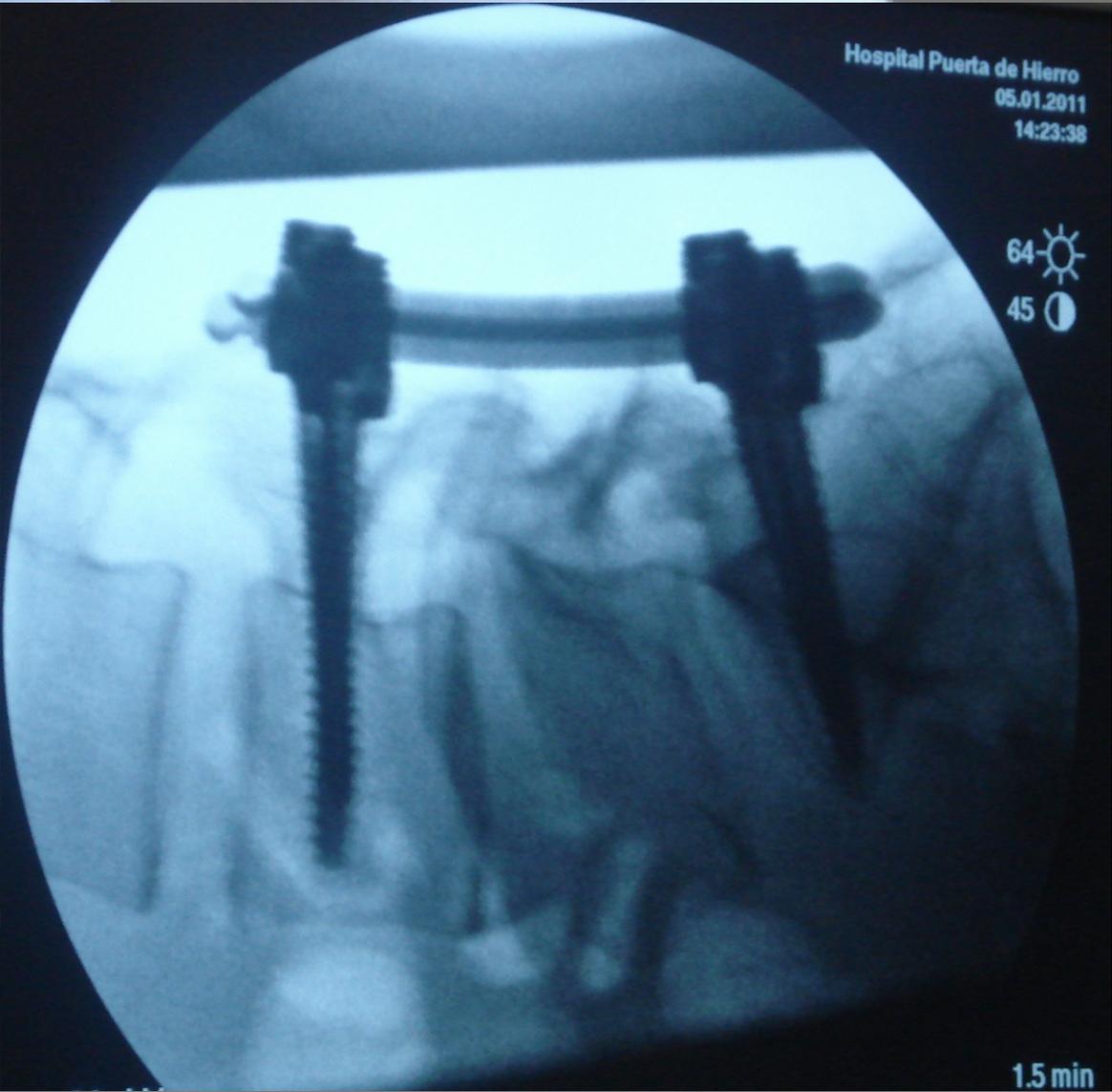
# TL FX MISS

- PANGEA SPIRIT SYNTHES
- MATRIX SYNTHES
- BALLISTA BIOMET





1/50  
01.2011  
15:51:15  
0.00 mGy\*cm<sup>2</sup>  
263.96 μGy  
79 kV 2.88



Hospital Puerta de Hierro  
05.01.2011  
14:23:38

64  
45

1.5 min

# MISS ADVANTAGES

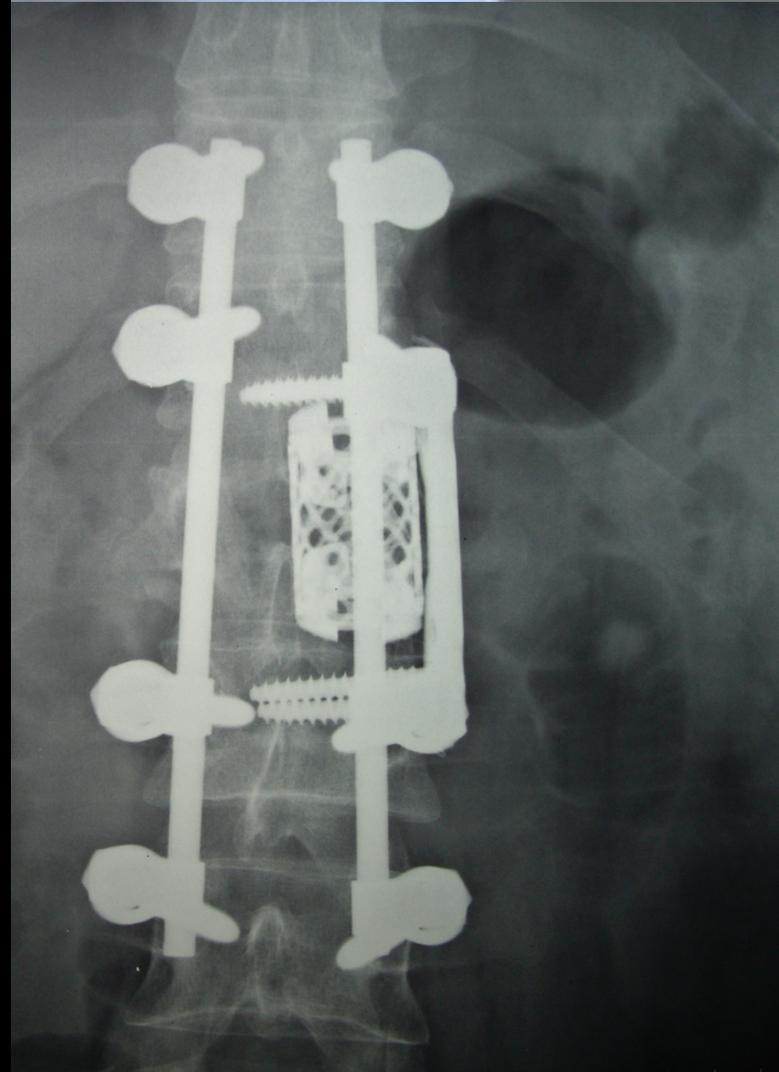
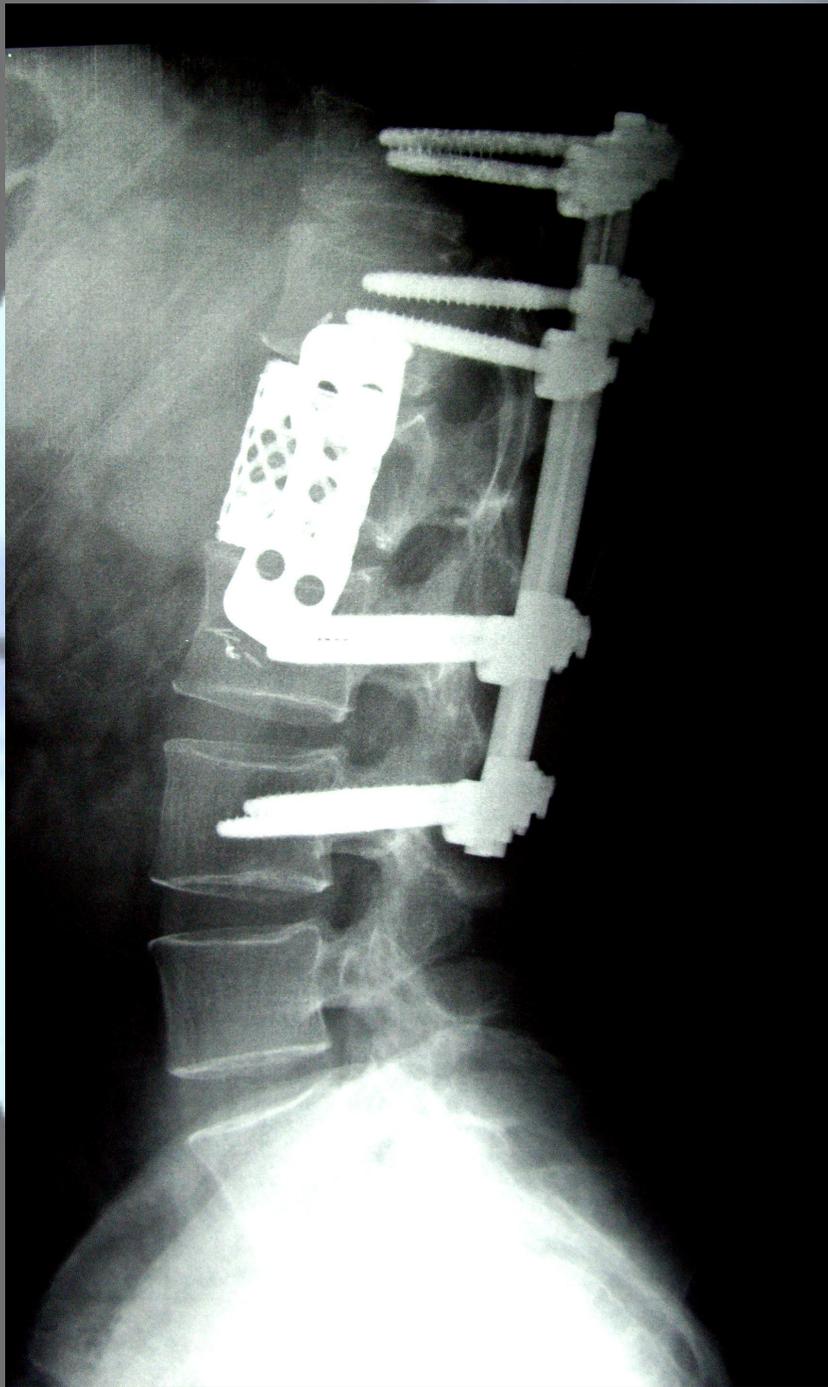
- SHORT HOSPITAL STAY
- LESS POSTOP ANALGESIA
- LESS BLOOD LOSS
- BETTER FUNCIONAL RECOVERY

# COMBINED APPROACH

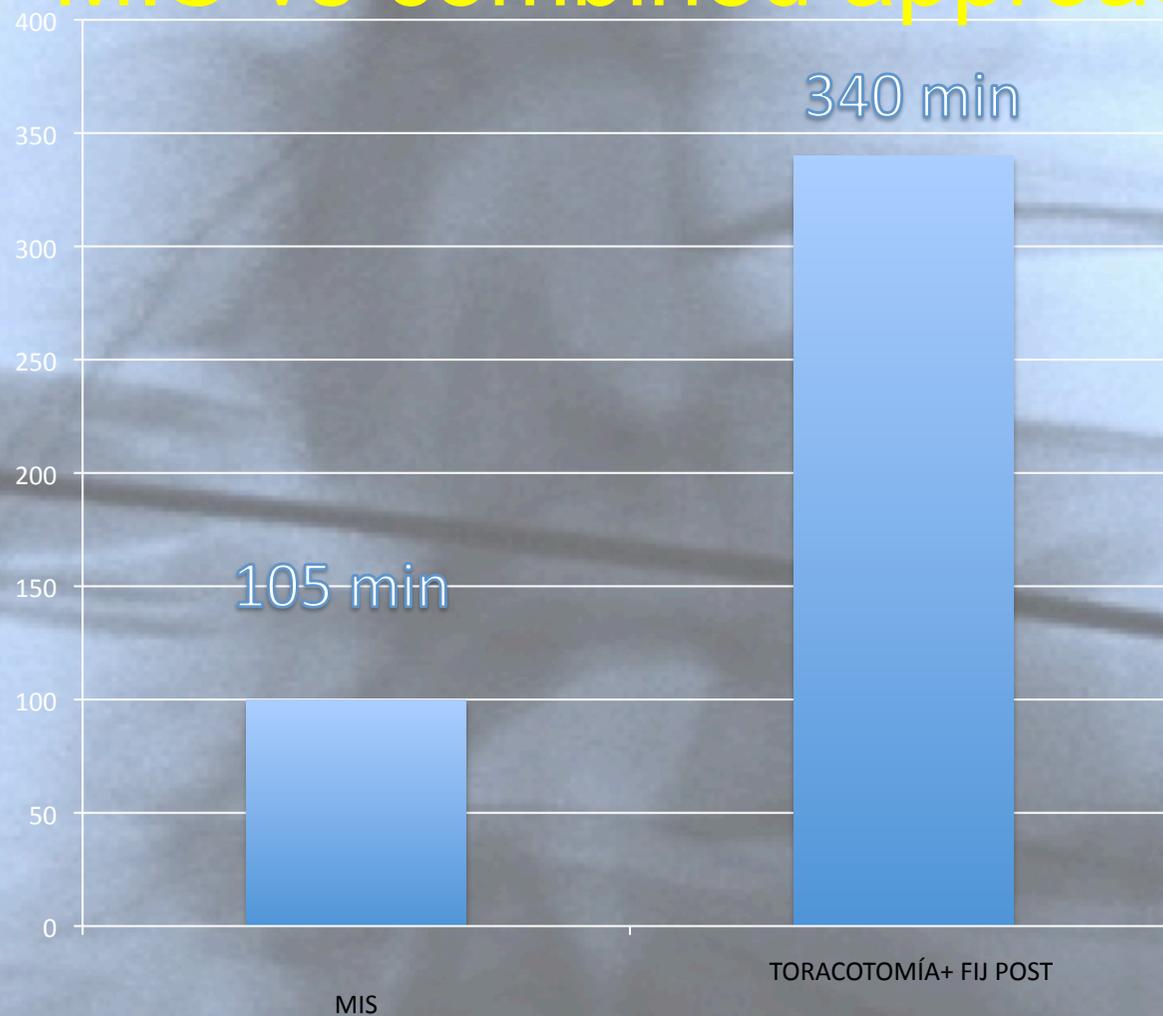
- 10 PATIENTS
- AO A3 AND B FRACTURES
- WITHOUT MOTOR NEURO DEFICIT
- T12 AND L1

# COMBINED APPROACH

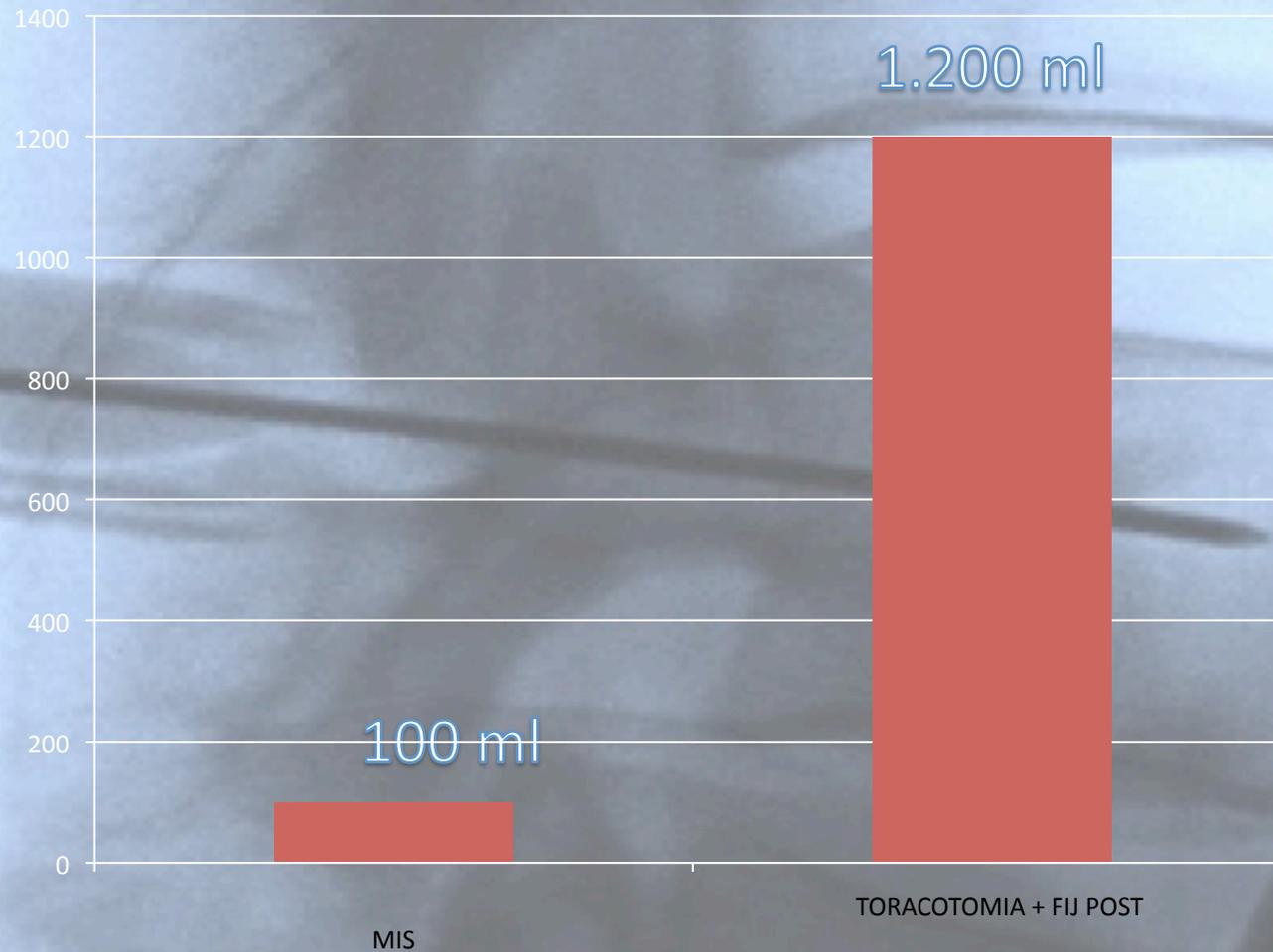
- 1st time
  - thoracotomy
  - thoracophrenolaparotomy
  - Videoassisted minithoracotomy
- 2nd time
  - Posterior instrumented arthrodesis



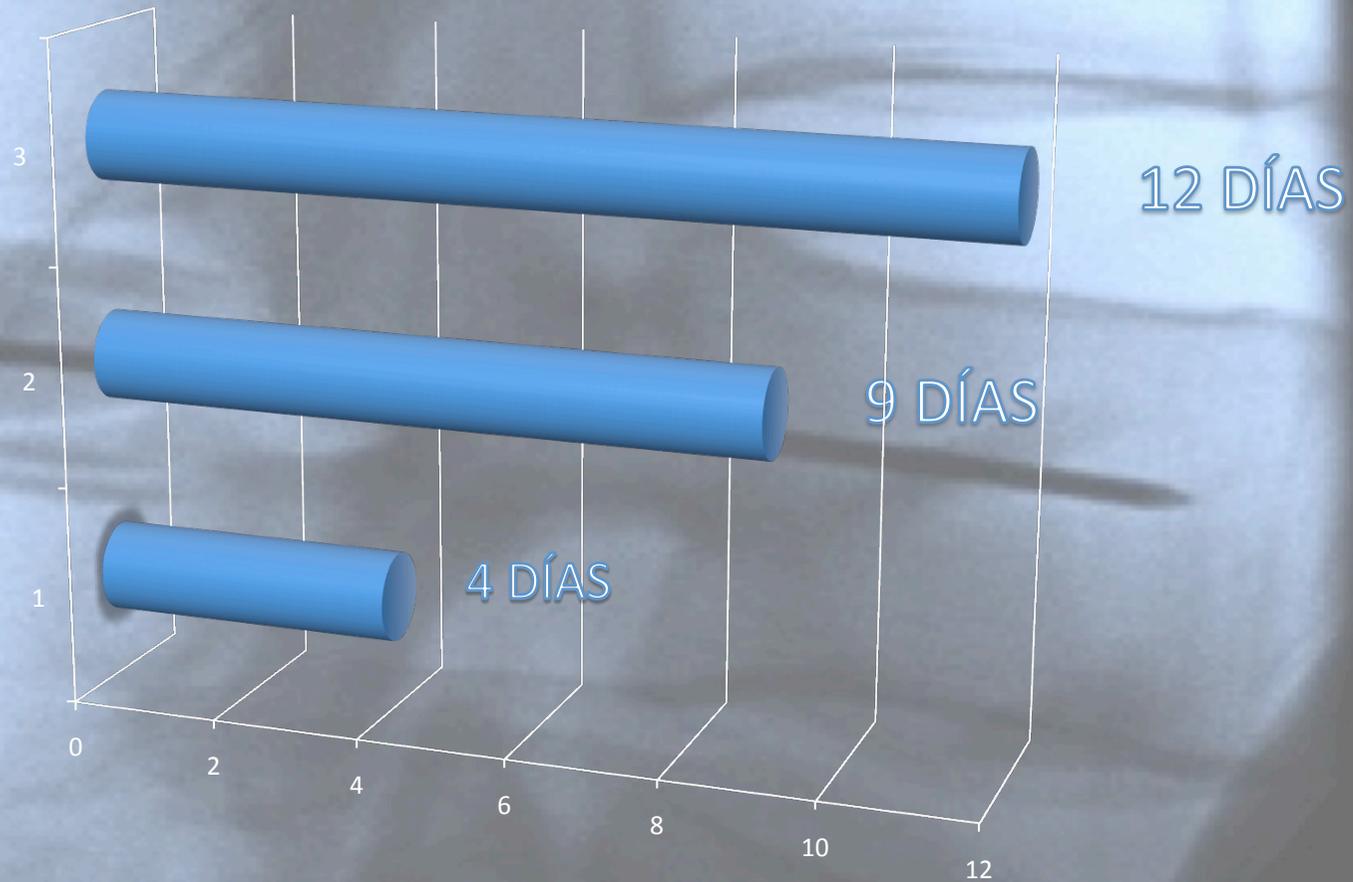
# MIS vs combined approach



# MIS vs combined approach



# MIS vs combined approach



# MIS vs combined approach

- Loss of sagittal correction
  - MIS, 12 months, 3°
  - Thoracotomy + post fixation , 14 months, 3°
- Postthoracotomy neuropathic pain
  - MIS, 0%
  - Thoracotomy + post fixation , 80% requires treatment.

# MIS vs combined approach

- Less hospital stay
- Less surgical time
- Less blood loss
- No post thoracotomy neuropathic pain
- No loss of correction

# MIS DISADVANTAGES

- Learning curve
- High radiation dose
- Difficult making arthrodesis
- Evidence based medicine