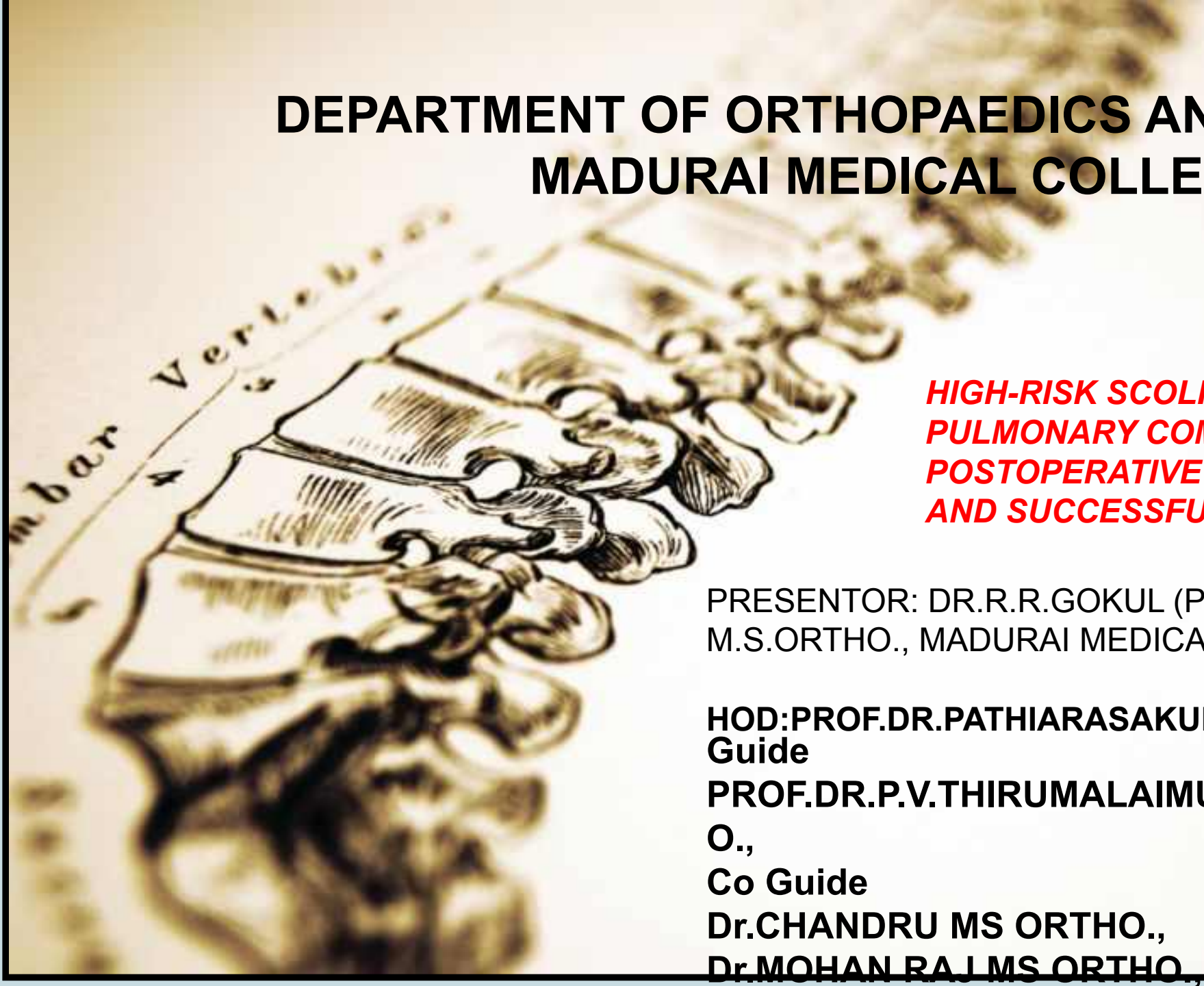
DEPARTMENT OF ORTHOPAEDICS AND TRAUMATOLOGY
MADURAI MEDICAL COLLEGE



HIGH-RISK SCOLIOSIS CORRECTION IN A PULMONARY COMPROMISED PATIENT: POSTOPERATIVE RESPIRATORY CHALLENGES AND SUCCESSFUL OUTCOME

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DEFINITION

- ✔ “ Scoliosis” – Greek word meaning “ crooked”
- ✔ Scoliosis is defined as **lateral deviation of the normal vertical line of the spine**, which when measured on a radiograph, is **greater than 10 degrees**
- ✔ Patient with curves less than 10 degrees ar
  have spinal asymmetry

3 DIMENSIONAL CHANGES IN SCOLIOSIS

- The lateral curvature of the spine is associated with rotation of the vertebrae within the curve

A three dimensional deformity occurring in three planes

1. lateral intervertebral tilting in the **frontal plane**

2. a rotatory component in the **axial plane**

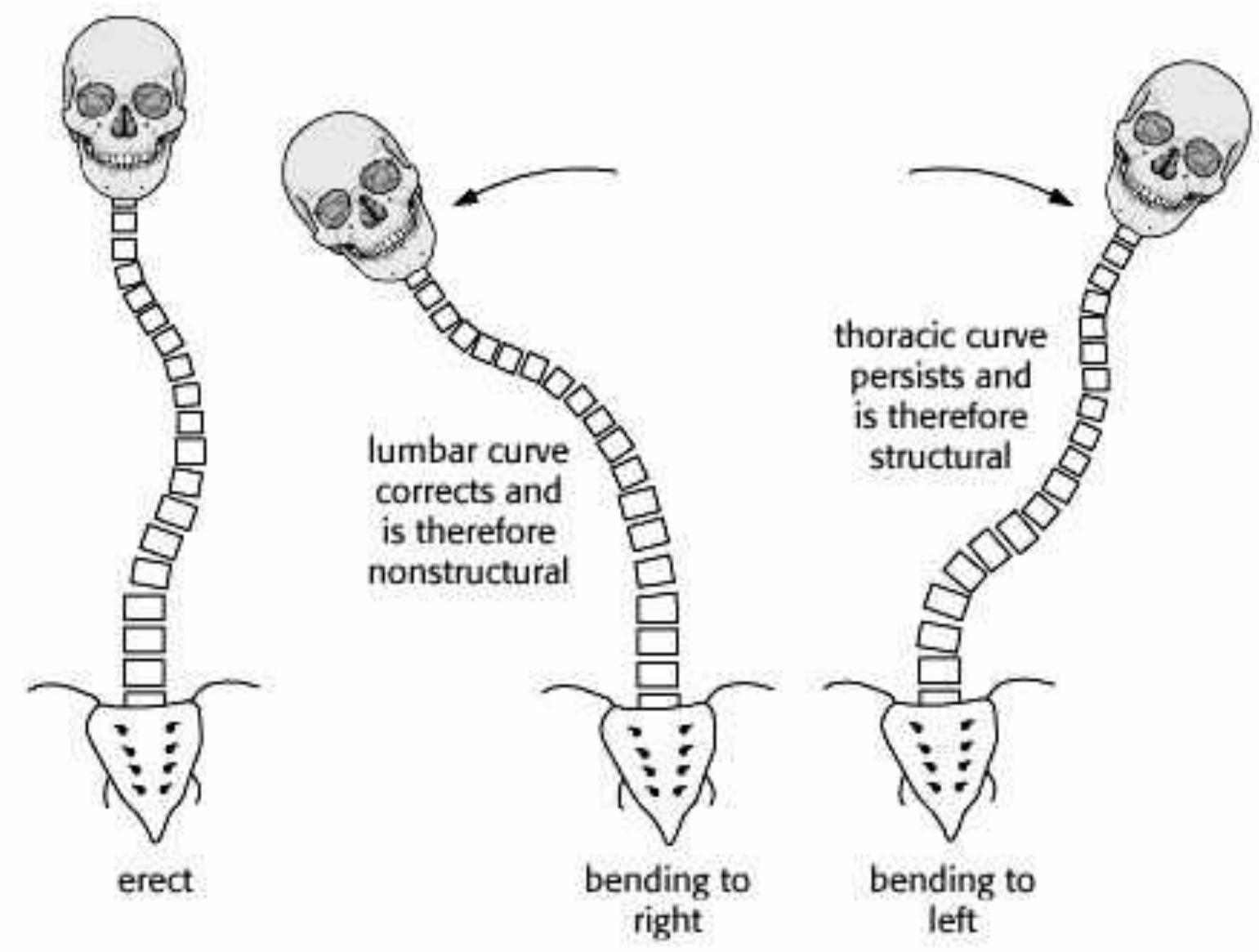
3. intervertebral extension in the **sagittal plane** leading to lordosis of the scoliotic segment

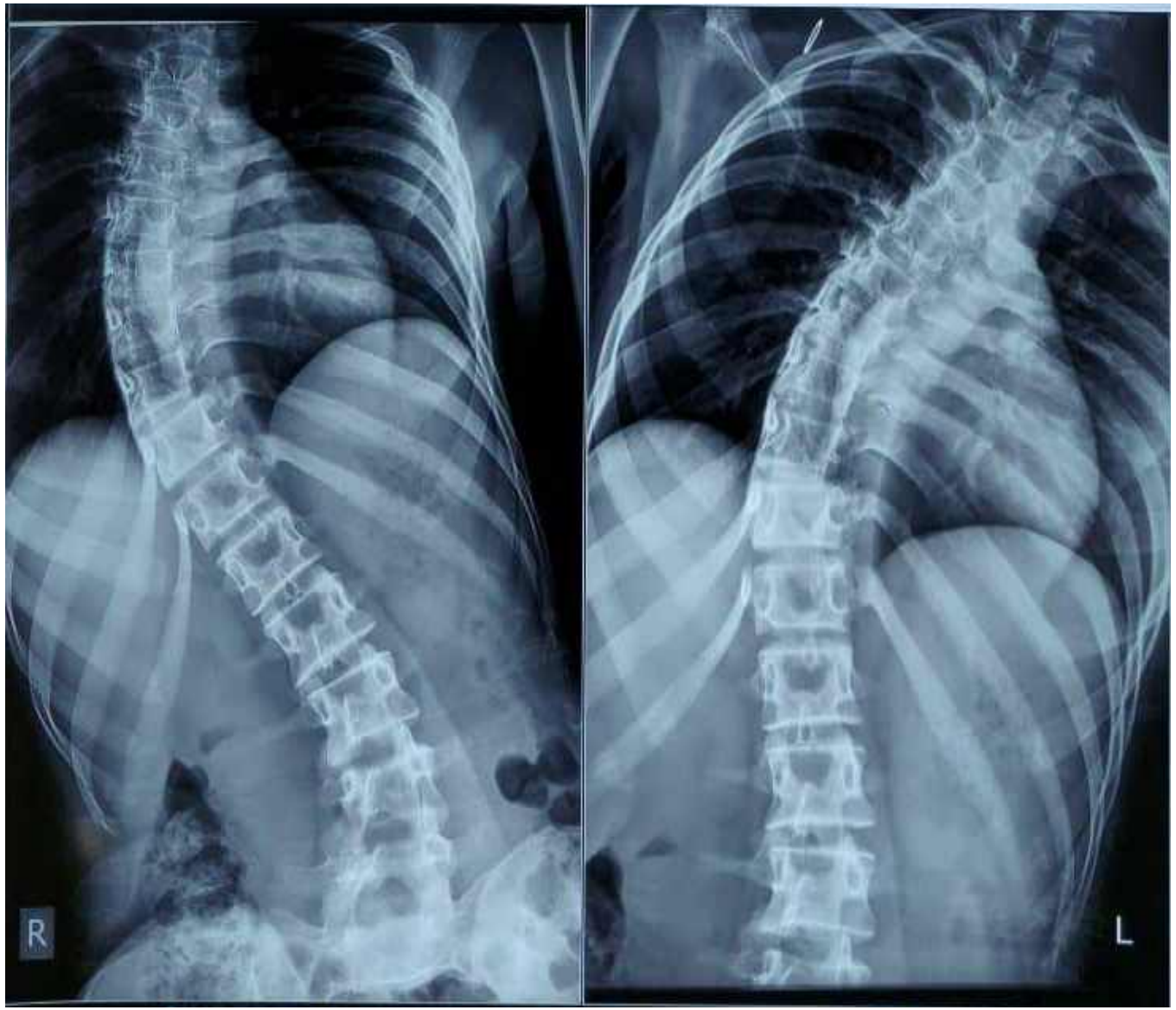
CLASSIFICATION

- **Structural** (radiographically Cobb angle of 25 degrees or more on ipsilateral side bending radiographic views)
- **Non structural** – Compensatory and postrual

STRUCTURAL CURVE

- **Fixed curve**
- **Intrinsic changes** like rotation of vertebra
- In **lateral bending** x ray - **<u>ASYMMETRIC</u>**

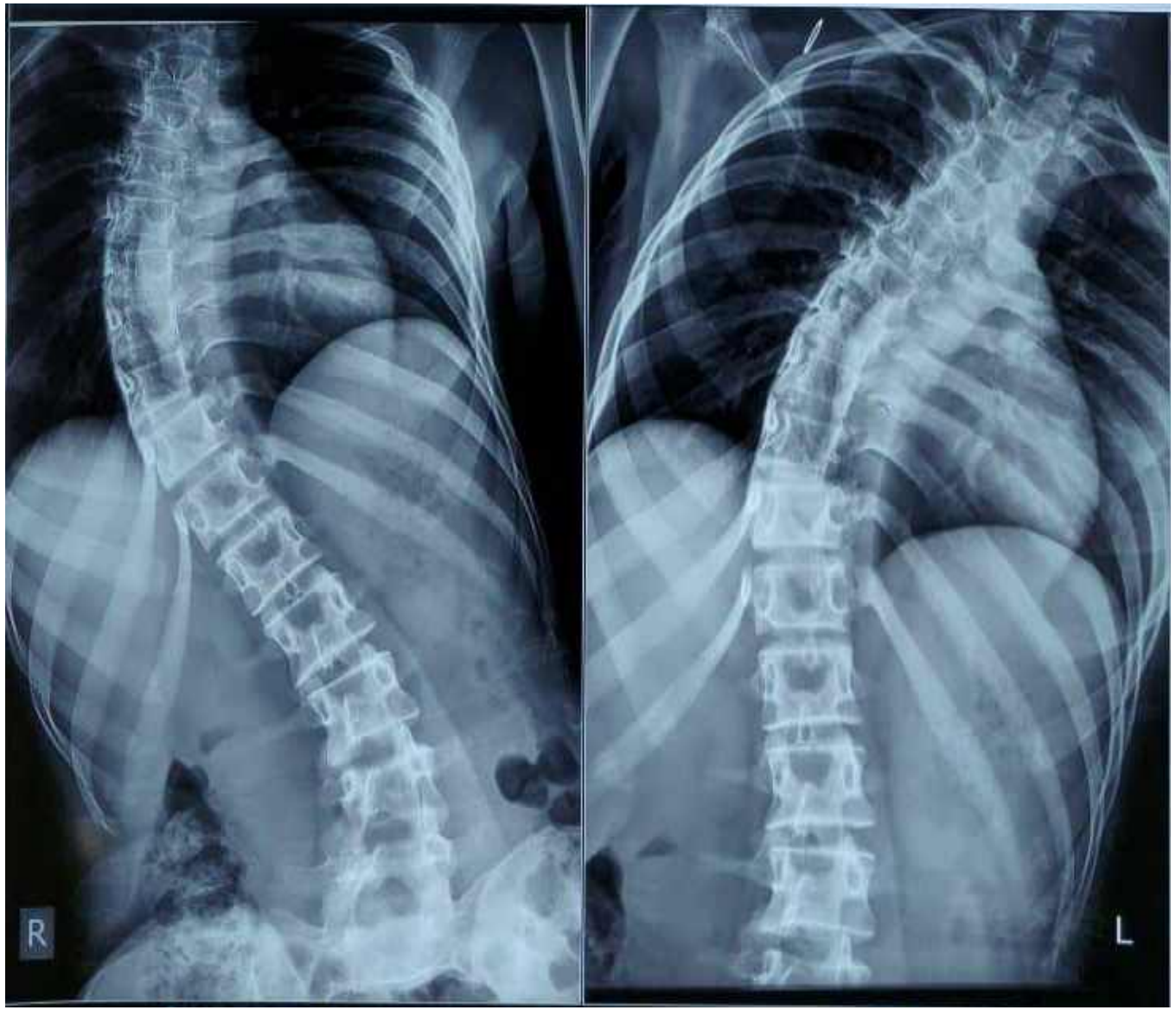

lumbar curve corrects and is therefore nonstructural
thoracic curve persists and is therefore structural
erect
bending to right
bending to left



LATERAL BENDING XRAY

NON STRUCTURAL CURVE

- A **Reversible lateral curve** of the spine that tends to be **positional or dynamic** in nature
- **No structural or rotational changes** in the alignment of the vertebra
- **Disappears** on lateral bending x ray and when the patient is **supine or prone or sitting**



LATERAL BENDING XRAY

ADOLESCENT IDIOPATHIC SCOLIOSIS

- Commonest type
- **Female** predominance
- **Age 10 – 16** years
- Primary **thoracic curve** usually convex to **right**
- **Lumbar curves** to the **left**
- Intermediate (thoracolumbar) and combined (double primary) curves also occur
- **Curves under 20 degree resolves** either spontaneously or remain unchanged
- Not associated with pain

CONGENITAL SCOLIOSIS

- ✔Caused by the presence of vertebral anomalies that result in imbalance of the longitudinal growth of the spine
- ✔Prevalence 0.5 to 1 in 1000 live births
- ✔Associated with neuromuscular, intra spinal abnormality (m/c diastematomyelia), cardiothoracic and genitourinary abnormalities.
- ✔Most curves are progressive warranting surgical intervention.

NEUROMUSCULAR SCOLIOSIS

- spinal deformity caused by neurological or muscular disorders that lead to muscle imbalance and loss of spinal control, resulting in progressive curvature of the spine.
- Long C-shaped curve
  Often thoracolumbar
  Pelvic tilt common
  Continues to progress even after skeletal maturity

PHYSIOLOGICAL EFFECTS OF SCOLIOSIS

- **Mild back ache**
- **DECREASED PULMONARY FUNCTION.**

- **Cosmetic deformity**
- **Lower back pain**
- **Neck pain, headaches**
- **Premature disc and joint degeneration**

RED FLAG SIGNS

1. **Back pain**
2. **Leg pain**
3. **Weakness**
4. **Dysfunction**
5. **Breathlessness**

PHYSICAL EXAMINATION

- Gait check
- Skin inspection
- Assessment of pubertal development
- Neurological examination (including motor , sensory and reflex tests)

INVESTIGATIONS IN SCOLIOSIS

- **Radiographs**

1. X ray PA view and lateral view
2. Lateral bending x ray – right & left
3. Traction view

- **CT Scan**
- **MRI**
- **Pulmonary function test**

LATERAL FLEXION AP RADIOGRAPHS

- Provide information on the upper and lower limits of a fixed curve
- Mobility of the motion segments, as an aid to fusion levels

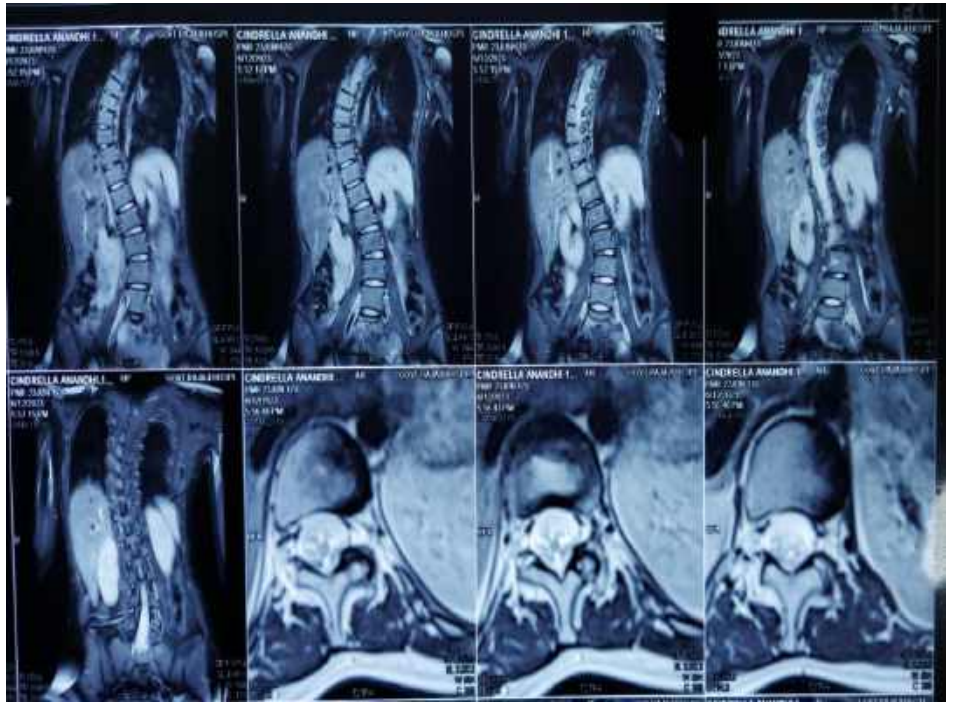
CT SCAN

- CT scans are used to provide improved definition of abnormalities of vertebral size, shape or number

MAGNETIC RESONANCE IMAGINC

- MRI – to evaluate the spinal cord and spinal nerves

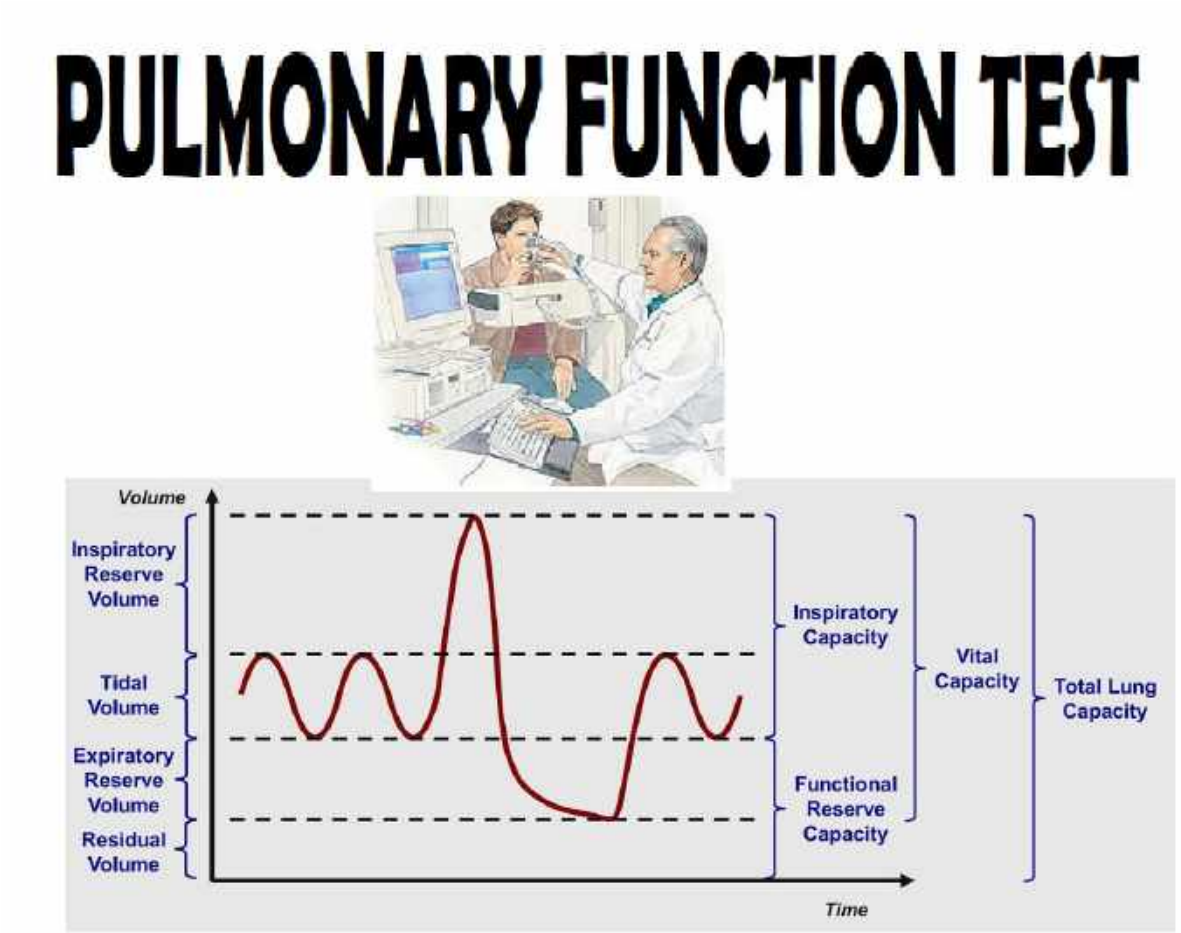
  abnormalities like diastomatomyelia



PULMONARY FUNCTION TEST

Pulmonary function testing for patients with:

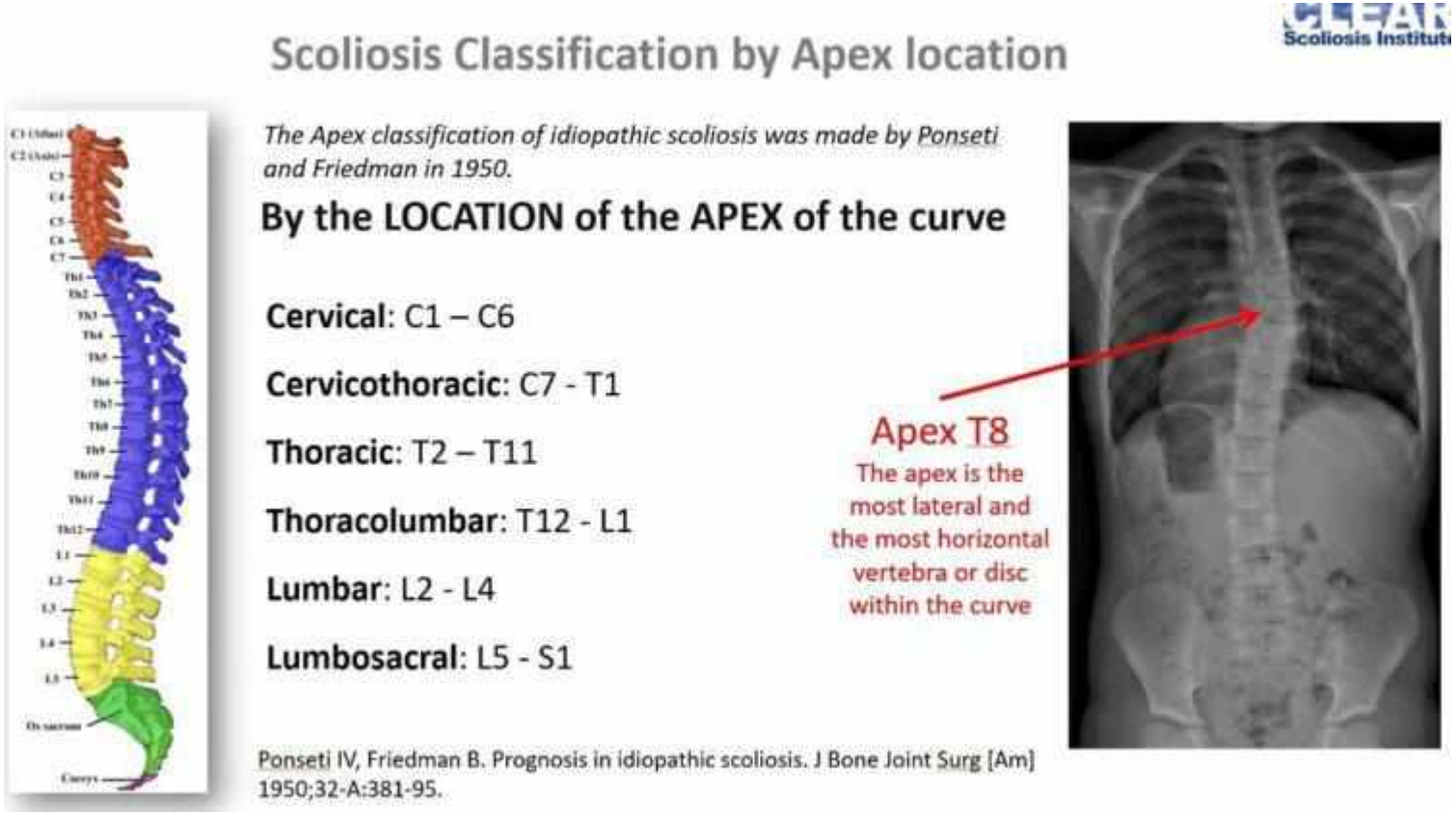
1. Curves greater than 60 degrees
2. Respiratory complaints
3. Scoliosis resulting from a neuromuscular cause



DESCRIPTIVE TERMS

- The side towards which the convexity of the curve is directed is designated as Right or Left
- The involved location of the curve is described as

1. Cervical
2. Cervico thoracic
3. Thoracic
4. Thoracolumbar
5. Lumbar



ASSESSMENT OF SCOLIOSIS

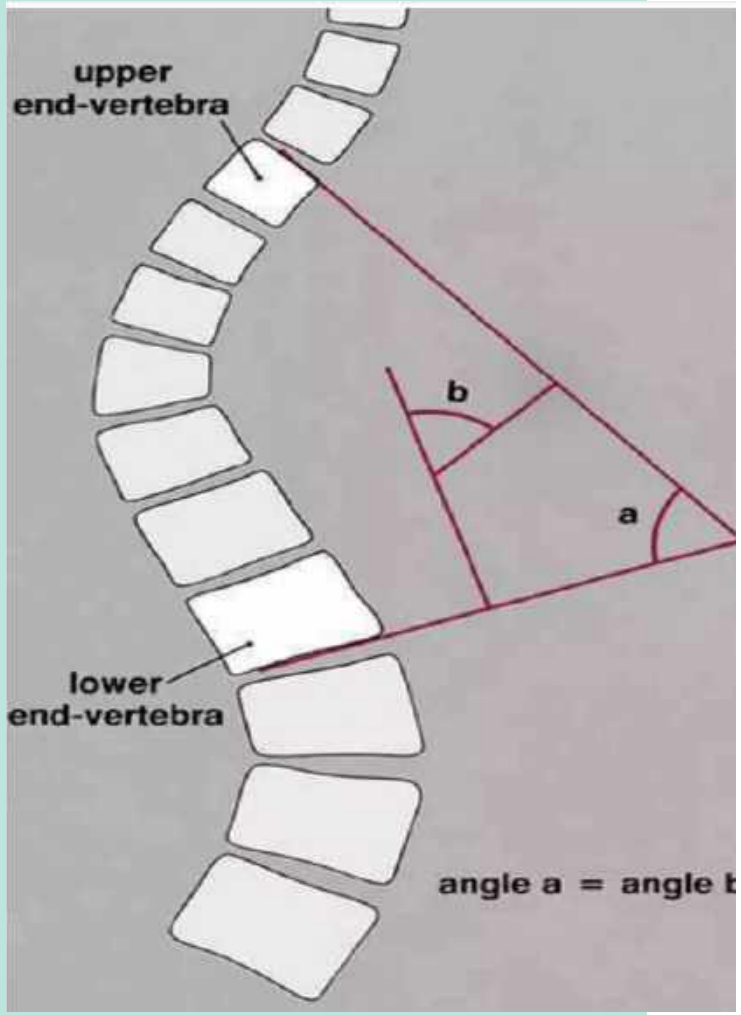
The four basic spinal parameters evaluated in scoliosis are

- **Curvature**
- **Rotation**
- **Flexibility**
- **Skeletal maturation**

CURVE MEASUREMENTS

- **COBB METHOD**

COBB LIPPMAN METHOD



- **Most accepted**
- **AP radiograph** entire spine
- A line is drawn along the **superior border of the cephalad end vertebra and inferior surface of the caudad end vertebra**
- **Perpendicular lines** are erected from each end plate line**, and the vertical (not horizontal) angle** formed by their intersection is measured

LIPPMAN - COBB'S classification

GROUP	ANGLE OF CURVATURE
I	<20
II	21-30
III	31-50
IV	51-75
V	75-100
VI	101-125
VII	>125

NON OPERATIVE TREATMENT

1. Observation – young patient with mild curve <20 degrees
2. Orthotic treatment

- Progression of curve beyond 25 degrees
- Curve of 30-40 degrees in skeletally immature

OPERATIVE TREATMENT

1. <30° failed conservative treatment
2. 30-45° with progression
3. >30 ° with cosmetically unaccepted in skeletal maturity
4. Patients with pulmonary compromise
5. Increasing curve in growing child
6. Thoracic lordosis
7. Significant cosmetic deformity

CASE ILLUSTRATION

A 25 years old female patient came to opd with

C/o progressive spinal deformity

C/o progressive breathing difficulty.

On examination

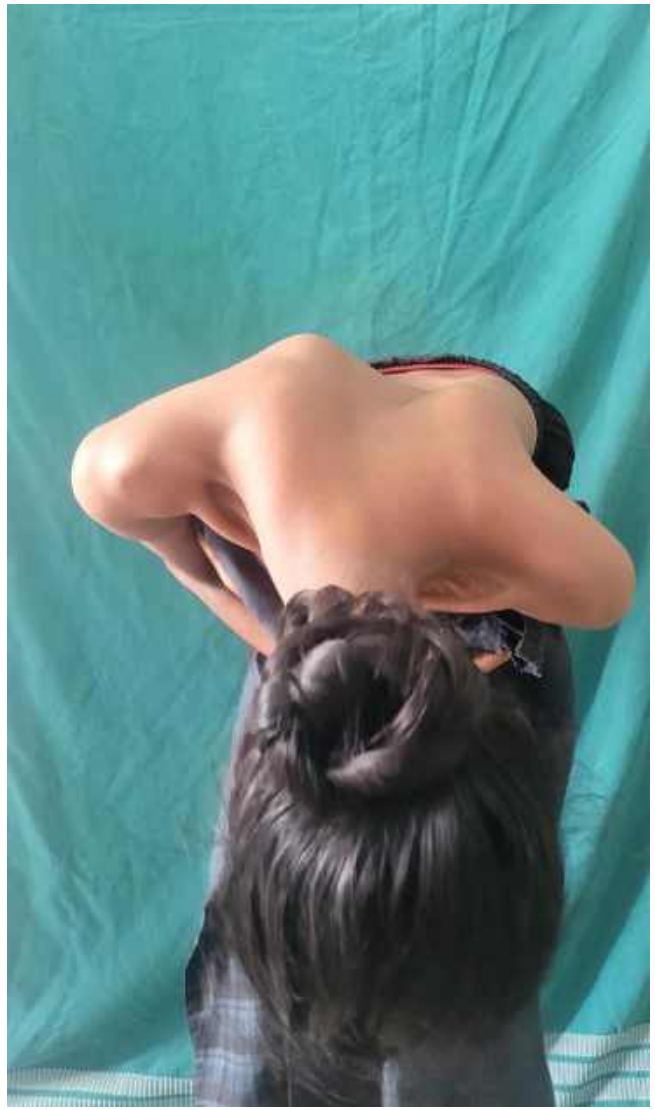
The patient found to have thoracolumbar scoliosis with Right sided convexity without neurological defecit

There are no neurocutaneous markers like

Cafe au lait spots

No tuft of hair over the spine

PREOP CLINICAL PICTURES

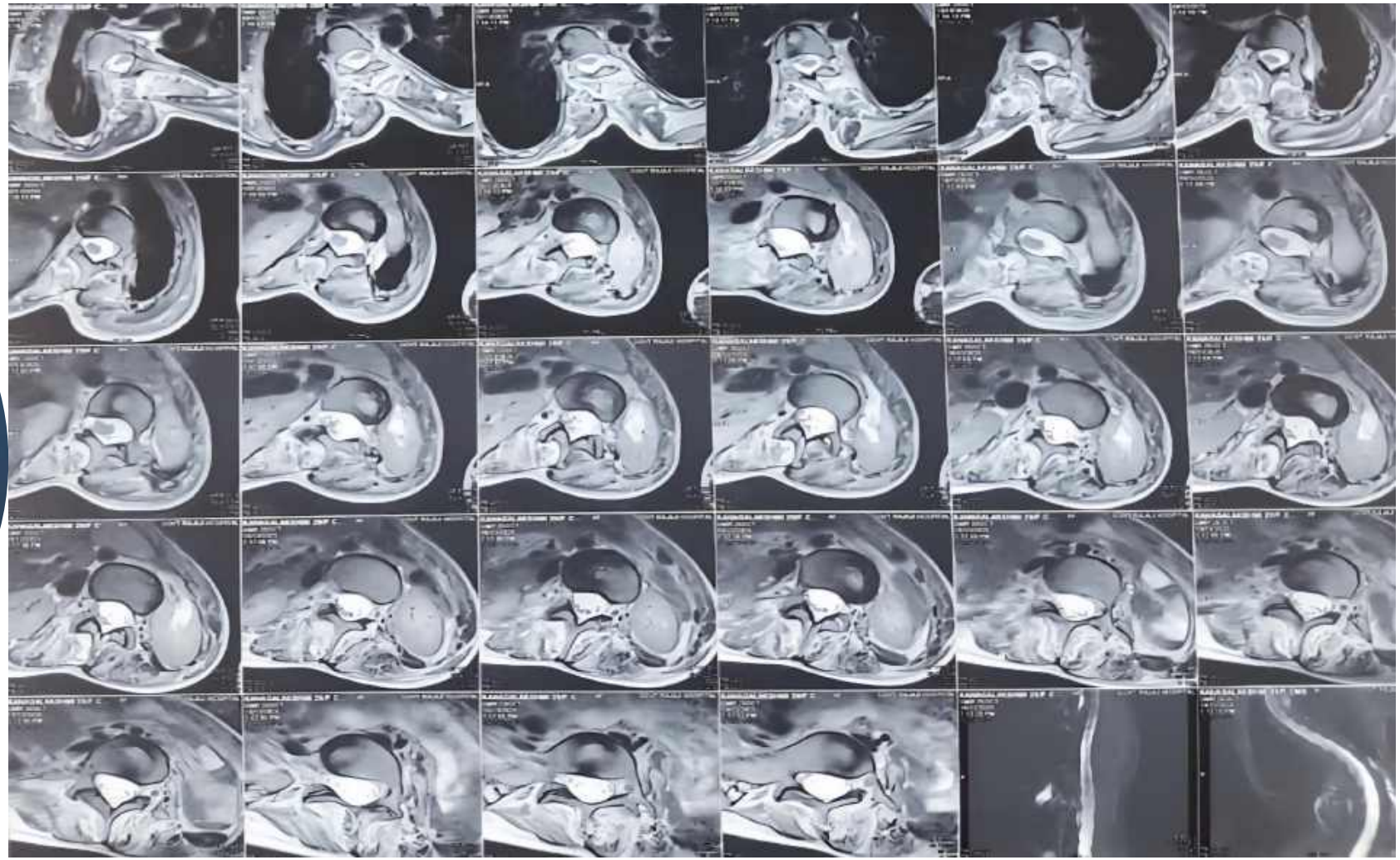


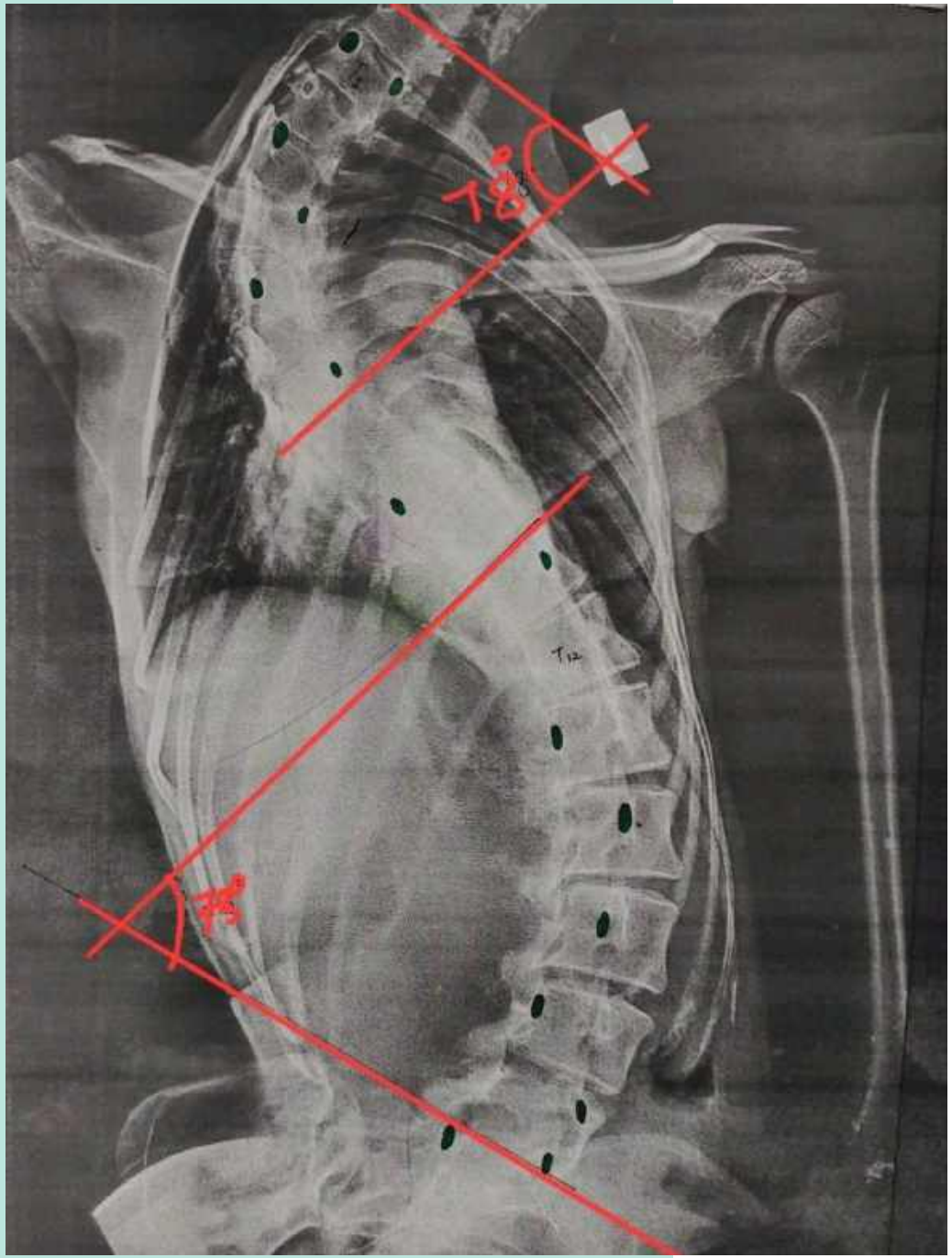
PREOP IMAGINGS

X-RAY

MRI IMAGES

MRI IMAGES





Two major cuves oberved

MAIN THORACIC CURVE = 78 DEGREES

LUMBAR CURVE = 73 DEGREES

Both are **structural curves.**

LENKE'S CLASSIFICATION - 3C-

CHALLENGES IN THIS CASE

1. **RIGID STRUCTURAL MAIN THORACIC AND LUMBAR CURVE**
2. **SKELETAL MATURITY**
3. **SEVERE SCOLIOSIS WITH COBBS ANGLE >70 DEGREE**
4. **PULMONARY COMPROMISE**

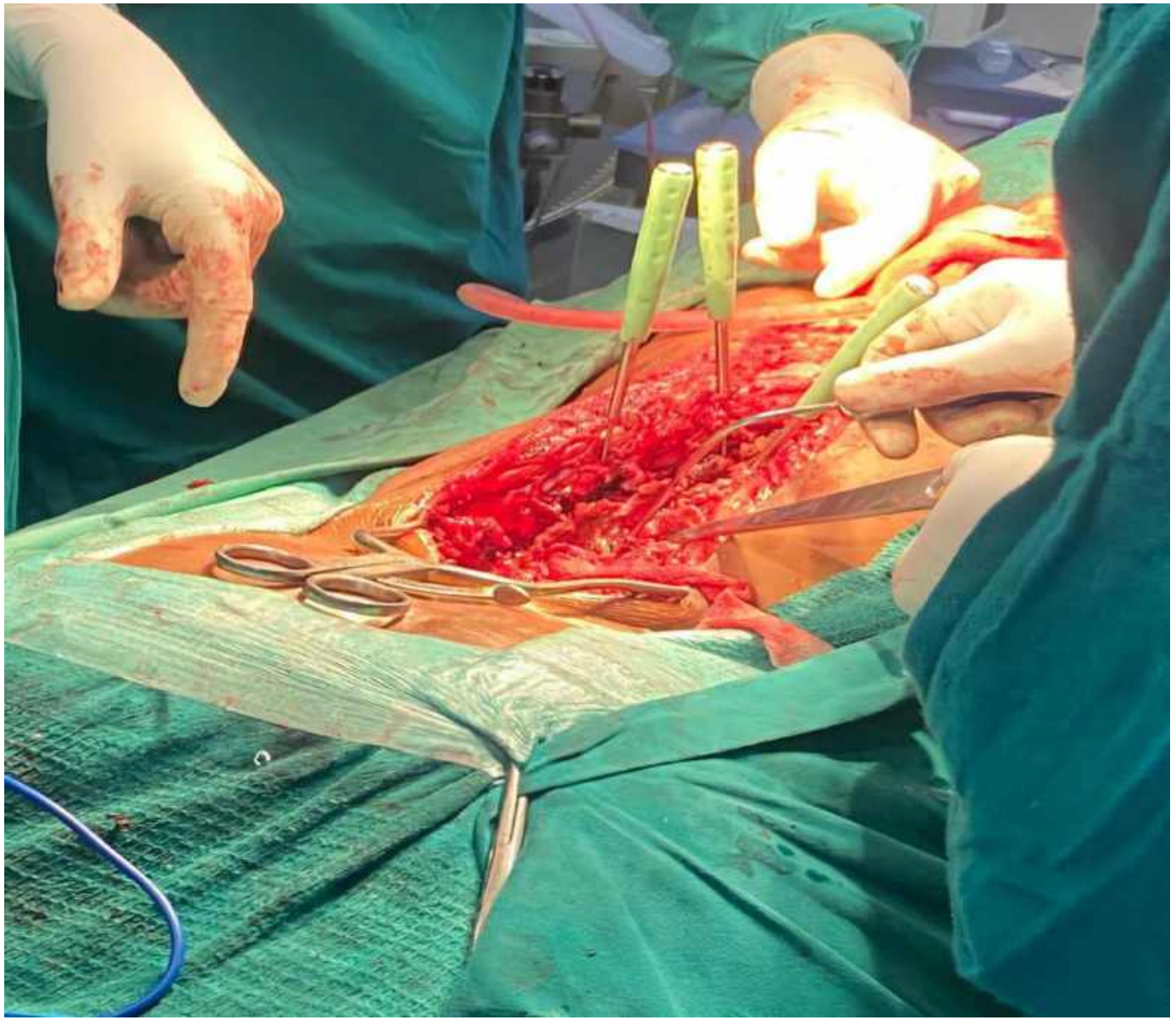
SURGICAL PLAN

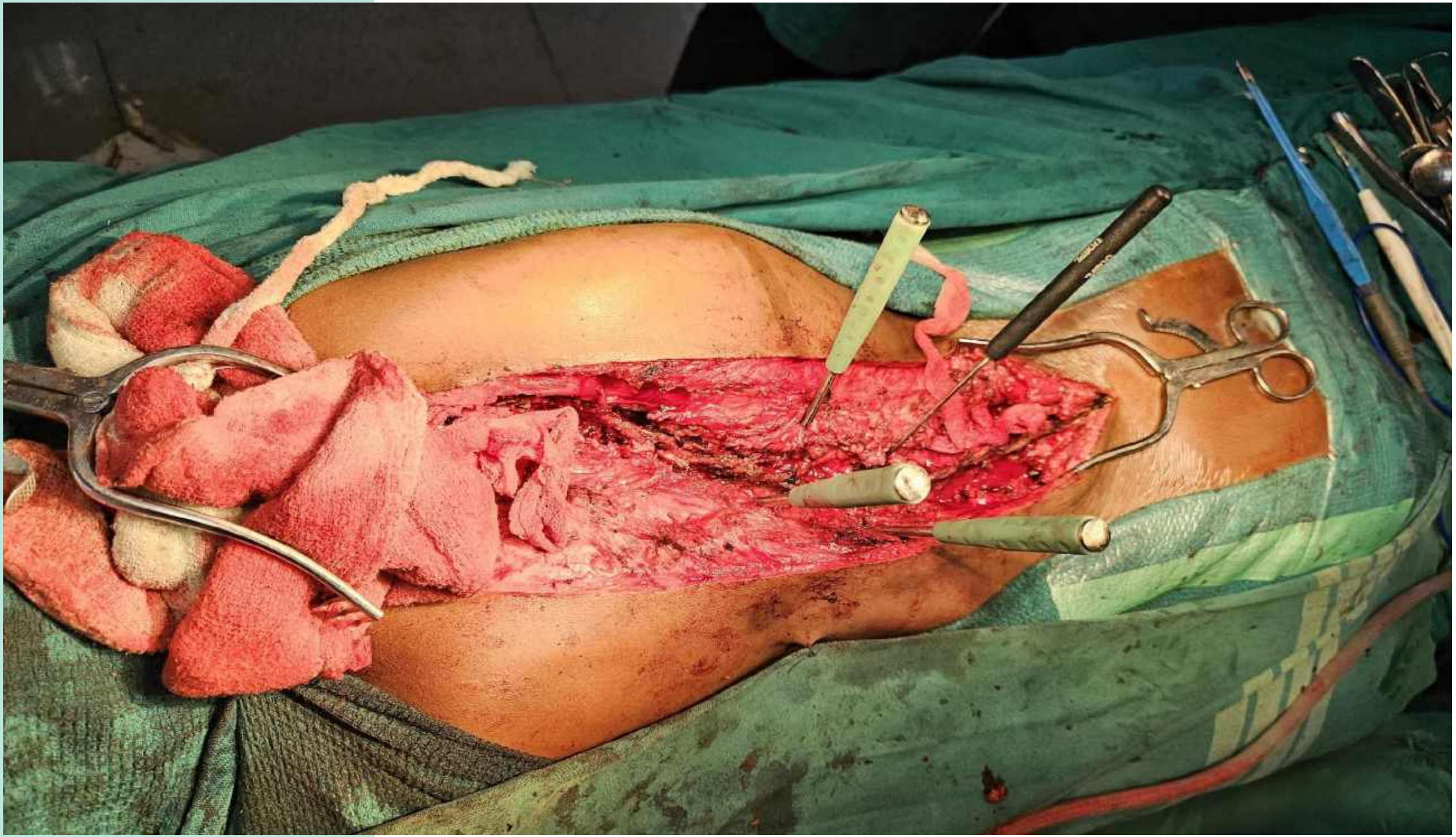
SPINAL DEFORMITY CORRECTION BY POSTERIOR INSTRUMENTATION AND FUSION USING FEMORAL HEAD ALLOGRAFTS UNDER NEUROMONITORING

PATIENT POSITIONING

Prone positioning with traction applied over skull using skull tong and b/l lowerlimbs using skin traction

Spinal fusion done from T1-L4 at appropriate levels



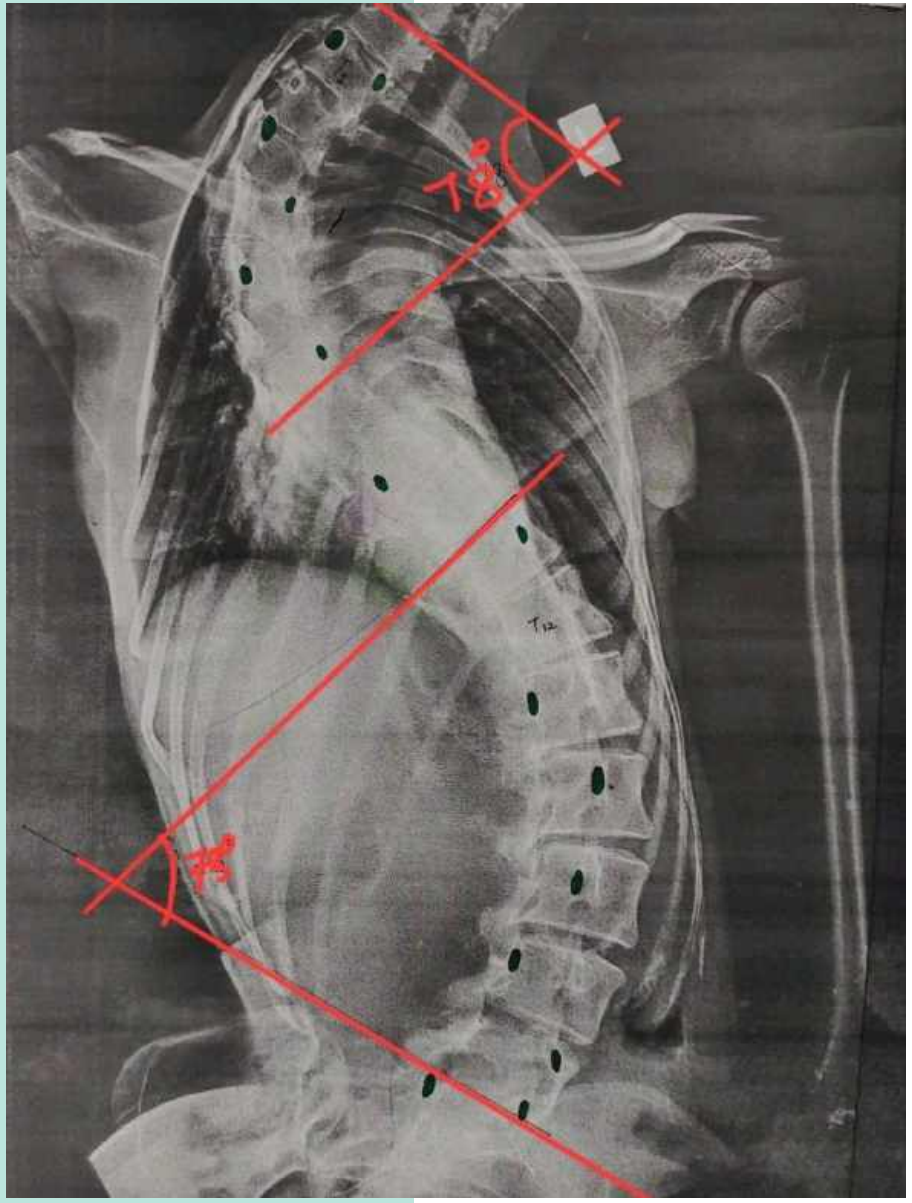


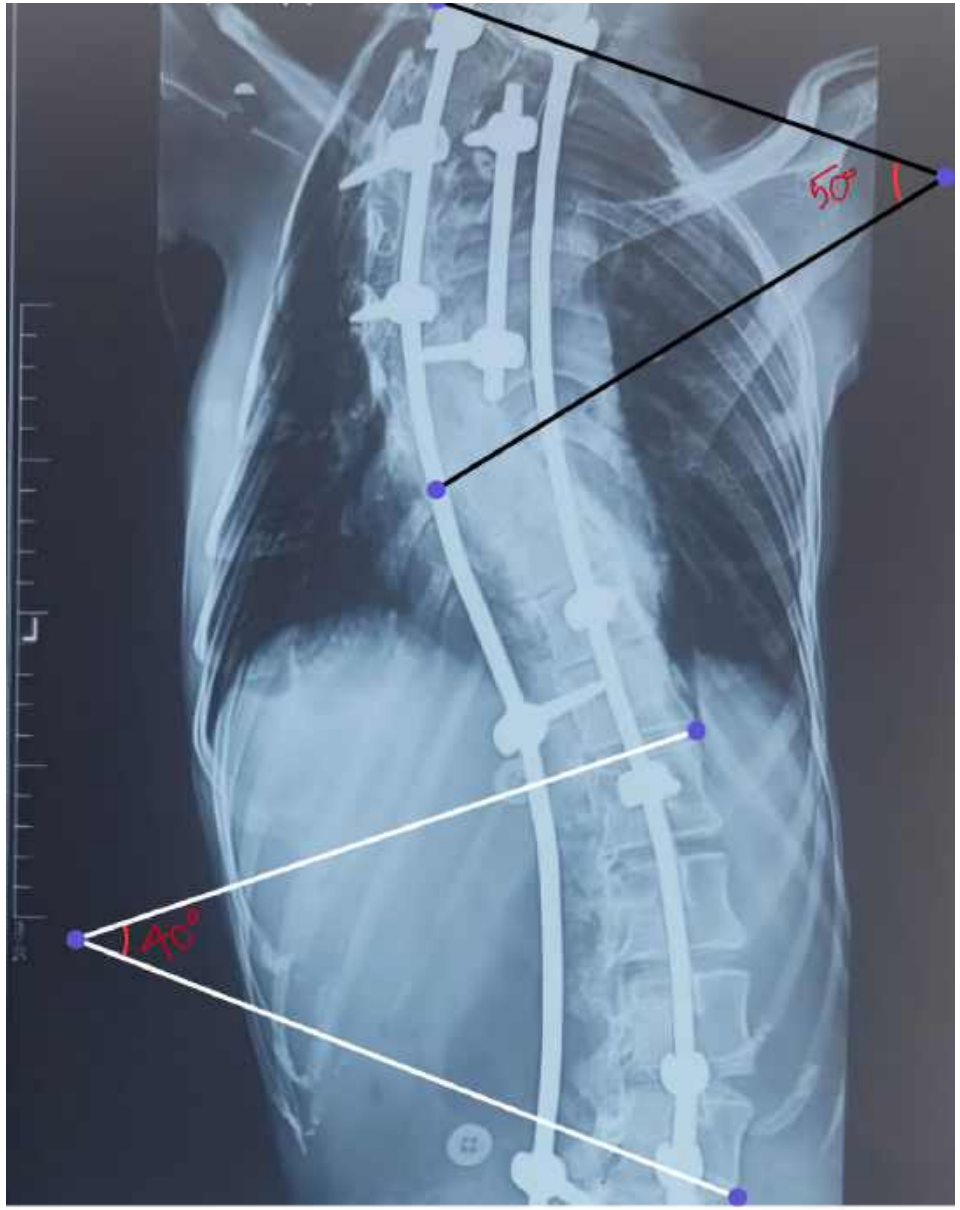
Spinal deformity correction done using rod rotation method

POST OP XRAY

Govt Rajaji Hospital, Madura
JDRM=5680. KANAGA LAKSHMI 24YRS,
spine, AP and LAT
08-01-2026
Govt Rajaji Hospital, Madurai

PREOP AND POST OPERATIVE COBBS ANGLE





PREOP AND POST OP CLINICAL PICTURE

TAKE HOME MESSAGE.....

1. With earlier diagnosis,the patients have lesser cobbs angle which will have good prognosis and lesser post operative complications and good scoliosis correction
2. Due to neglection of the scoliosis at earlier stages this case presented with **SEVERE RIGID SCOLIOSIS** with **PULMONARY COMPROMISE** and **COSMETIC DISFIGURATION**

THANK YOU