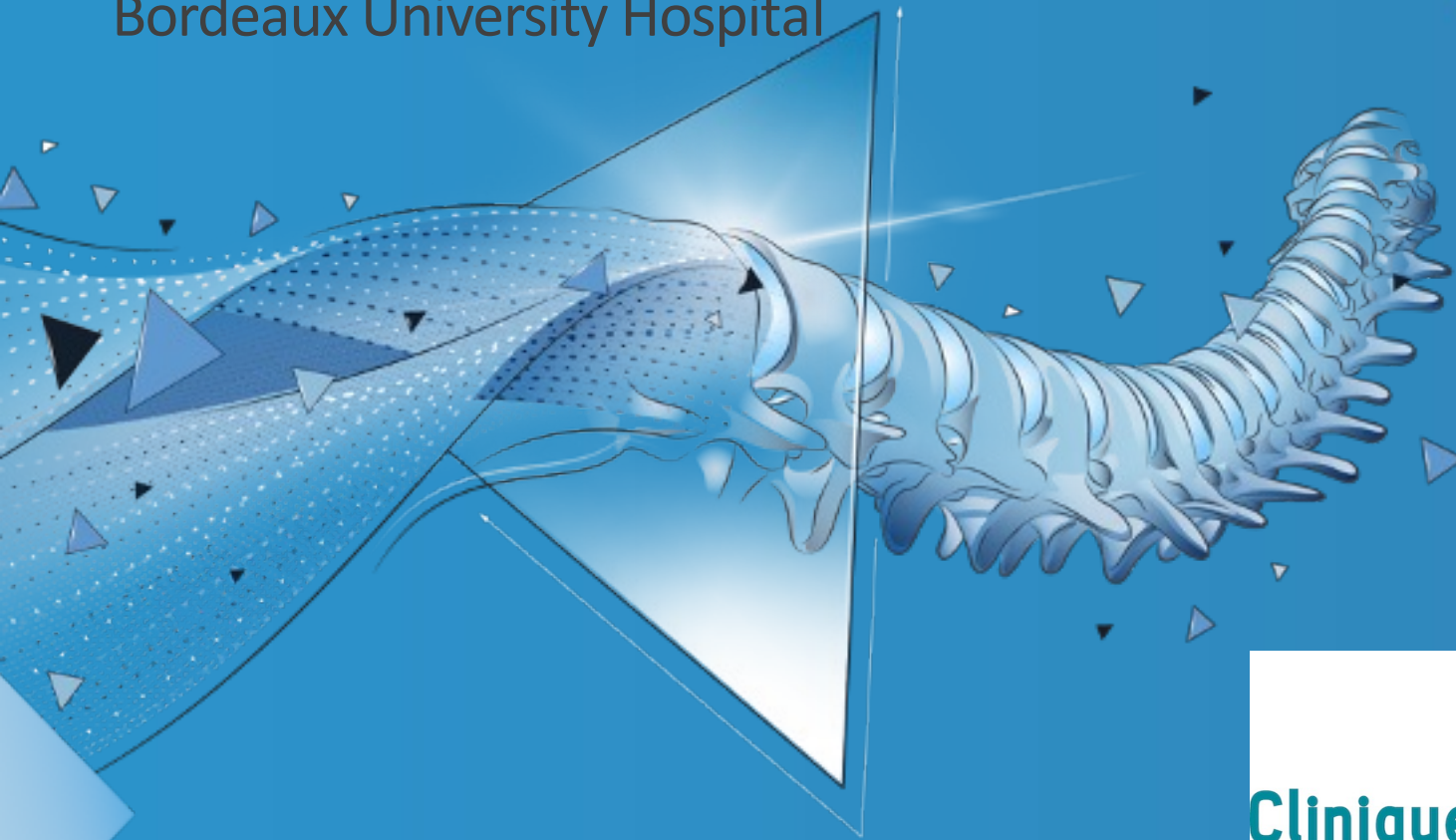


Clinical Application in Deformity Correction

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Clinique du Dos, Bordeaux Terrefort
Bordeaux University Hospital

Neo⁺
BEYOND THE EXPECTED



Clinique du Dos
Bordeaux-Terrefort



Summary

Neo concept of **Controlled Fixation**

Surgical Procedures for **Controlled Reduction**

Different type of deformities/Different type of reduction

- **Flexible Kyphosis => Cantilever**
 - Scheuermann Kyphosis
 - Parkinson
- **Flexible Scoliosis**
 - Idiopathic => **Translation**
 - Neuromuscular => **Bloc Reduction**
- **Rigid Kyphosis => Pedicle Substraction Osteotomy => Domino Compression**

Surgical Approach and Screw Insertion

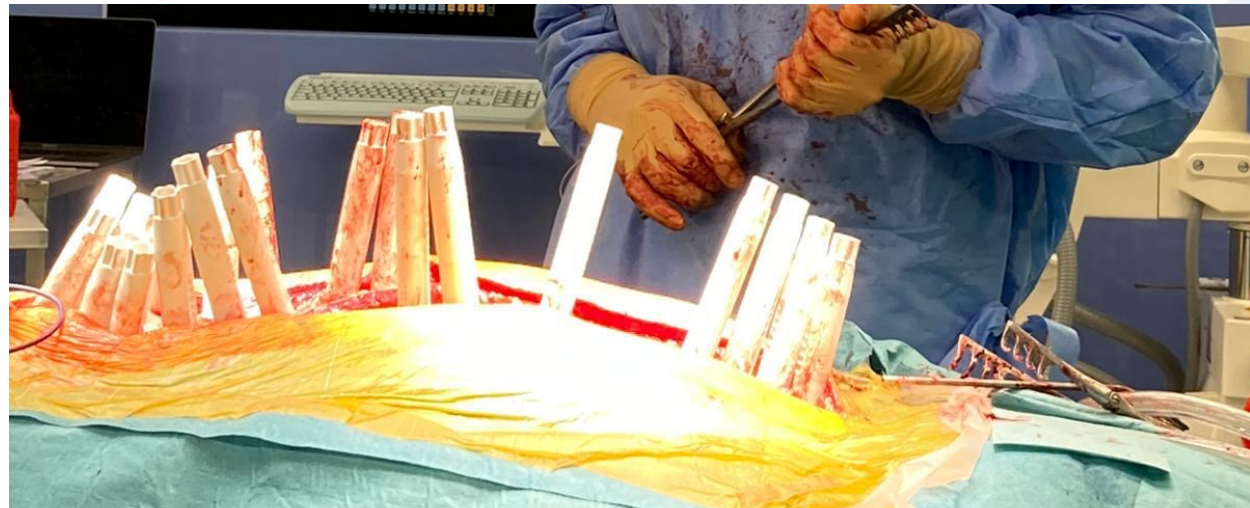
Neor⁺



Surgical approach: Wiltse or posterior **Open** approach

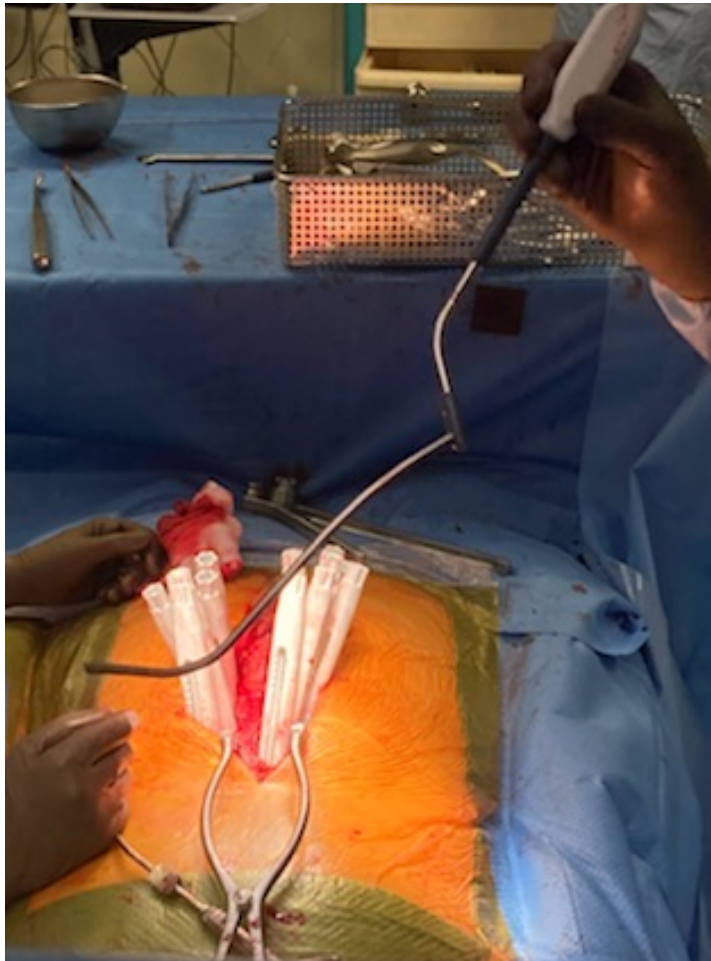
Screw Insertion/ osteotomy/ decompression

What order? Towers, bleeding, instability?

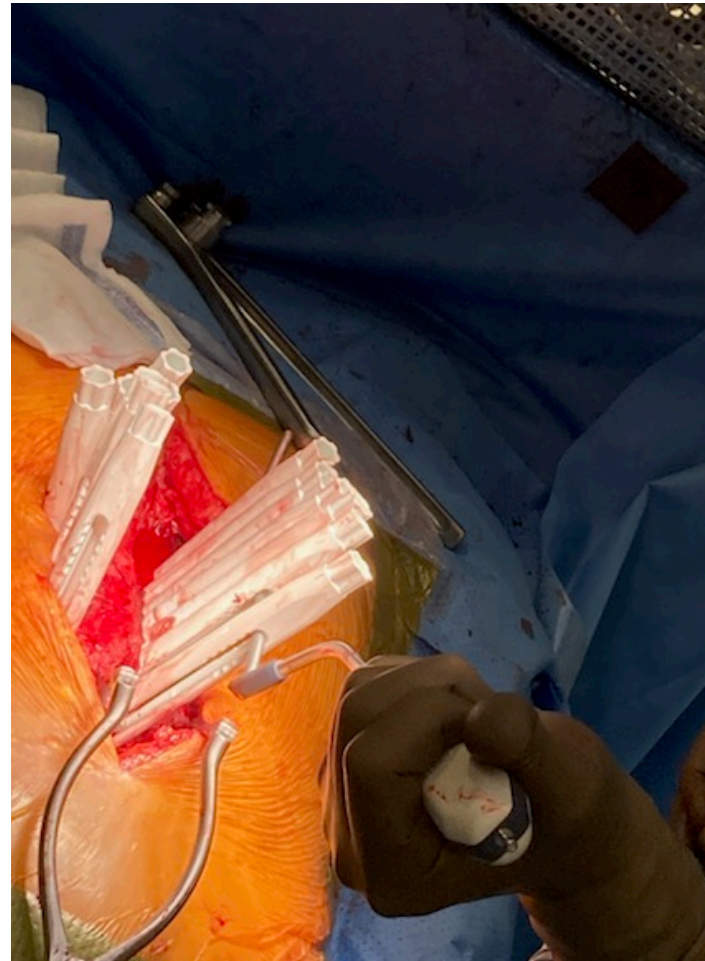


1. Cantilever Controlled Reduction

Neor⁺



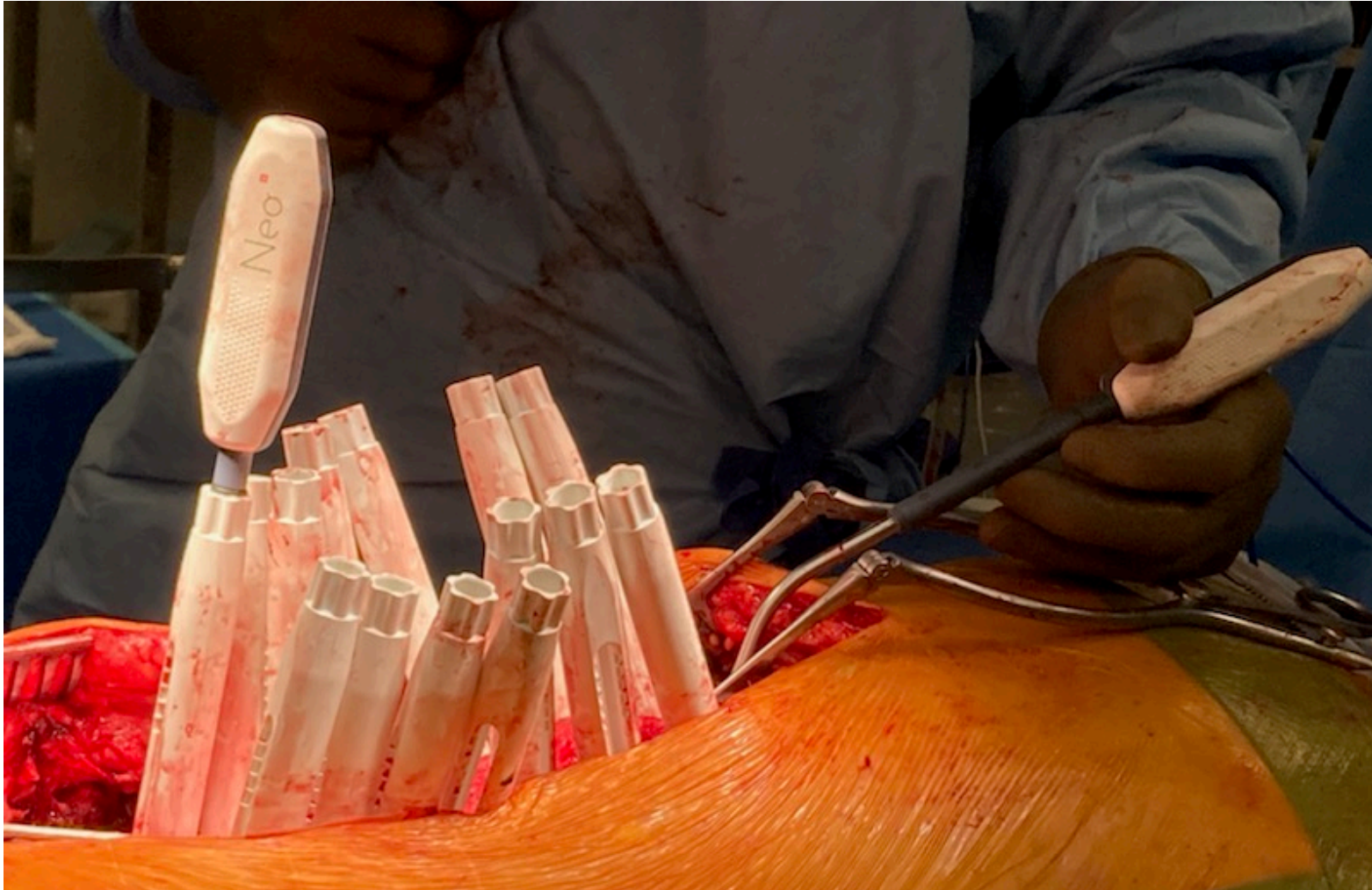
Rod Bending



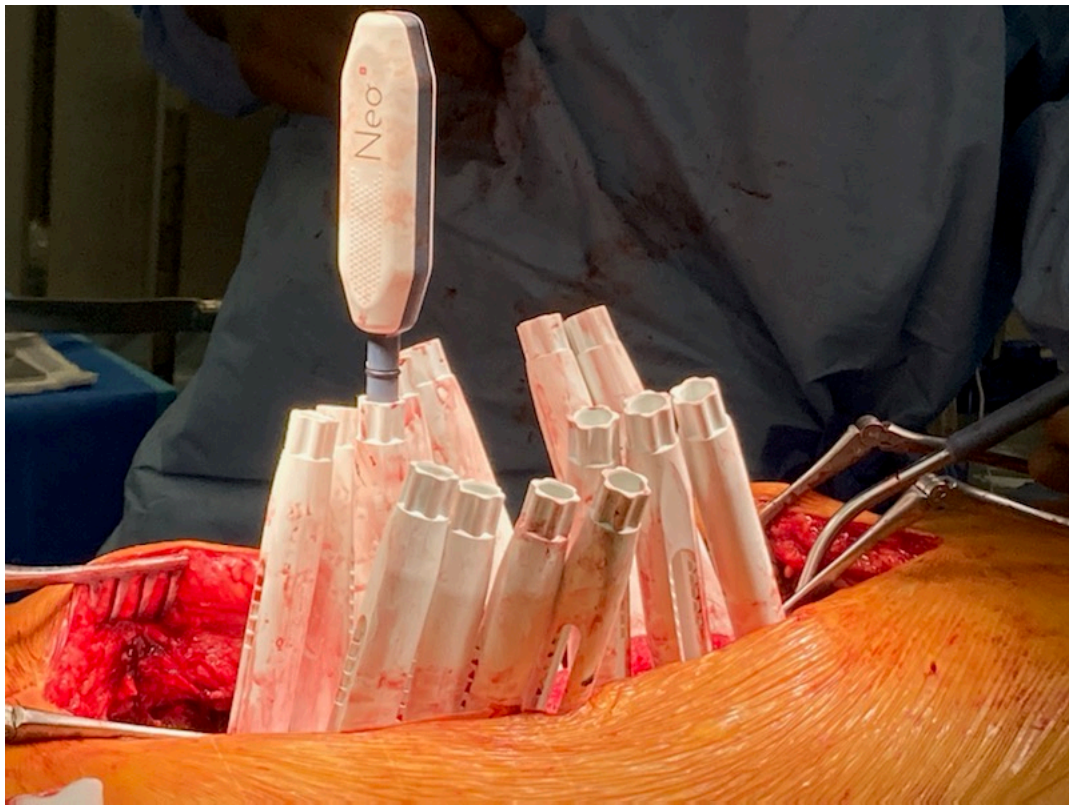
Reduction Chekup +++

Purpose:

L4-S1 Lordosis
Lordosis and in situ
fixation



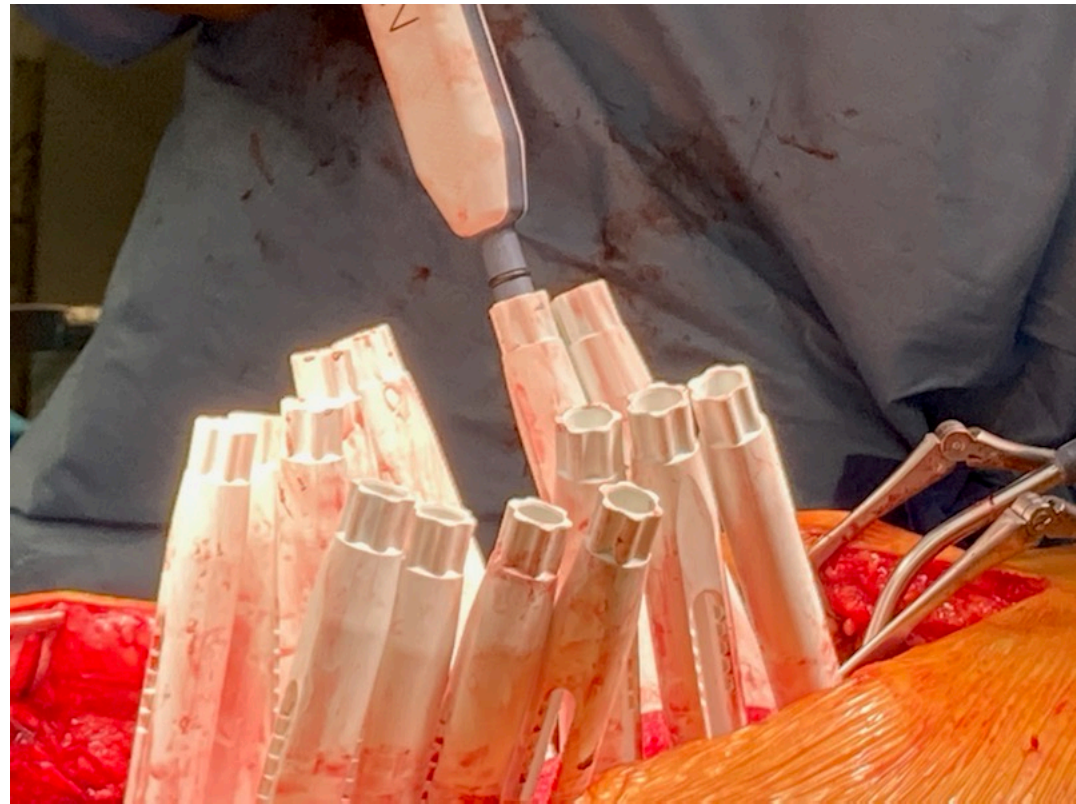
S1 and Iliac fixation

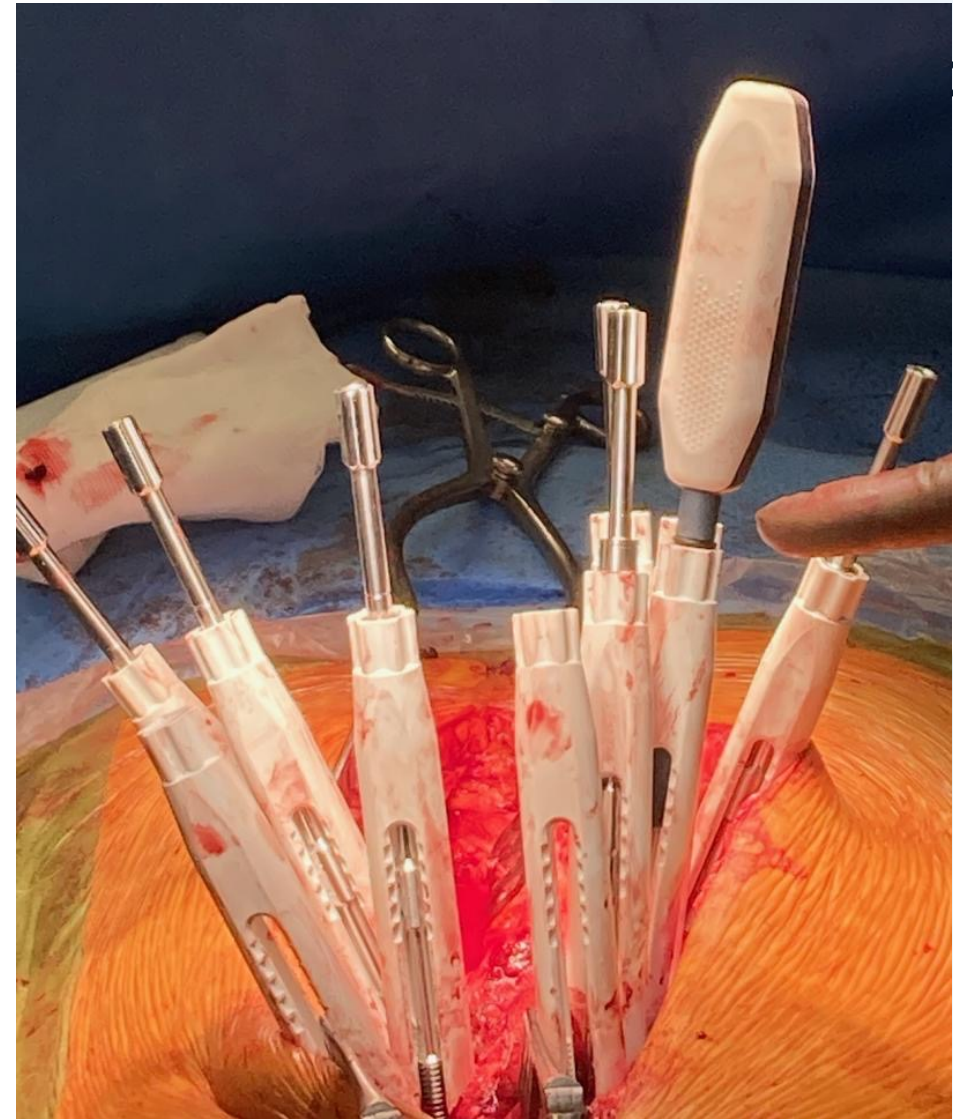
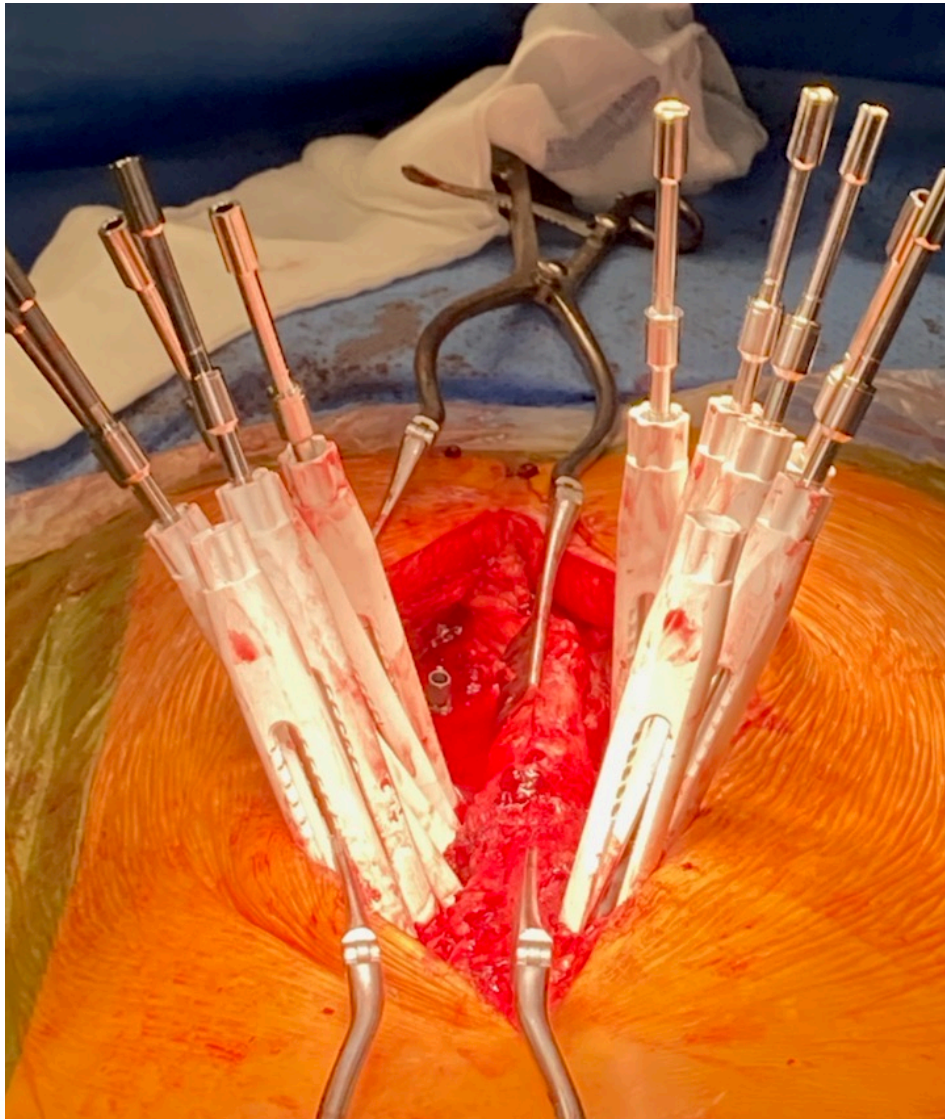


L4 Reduction second check

**Mandatory to understand where
the reduction forces will be +++**

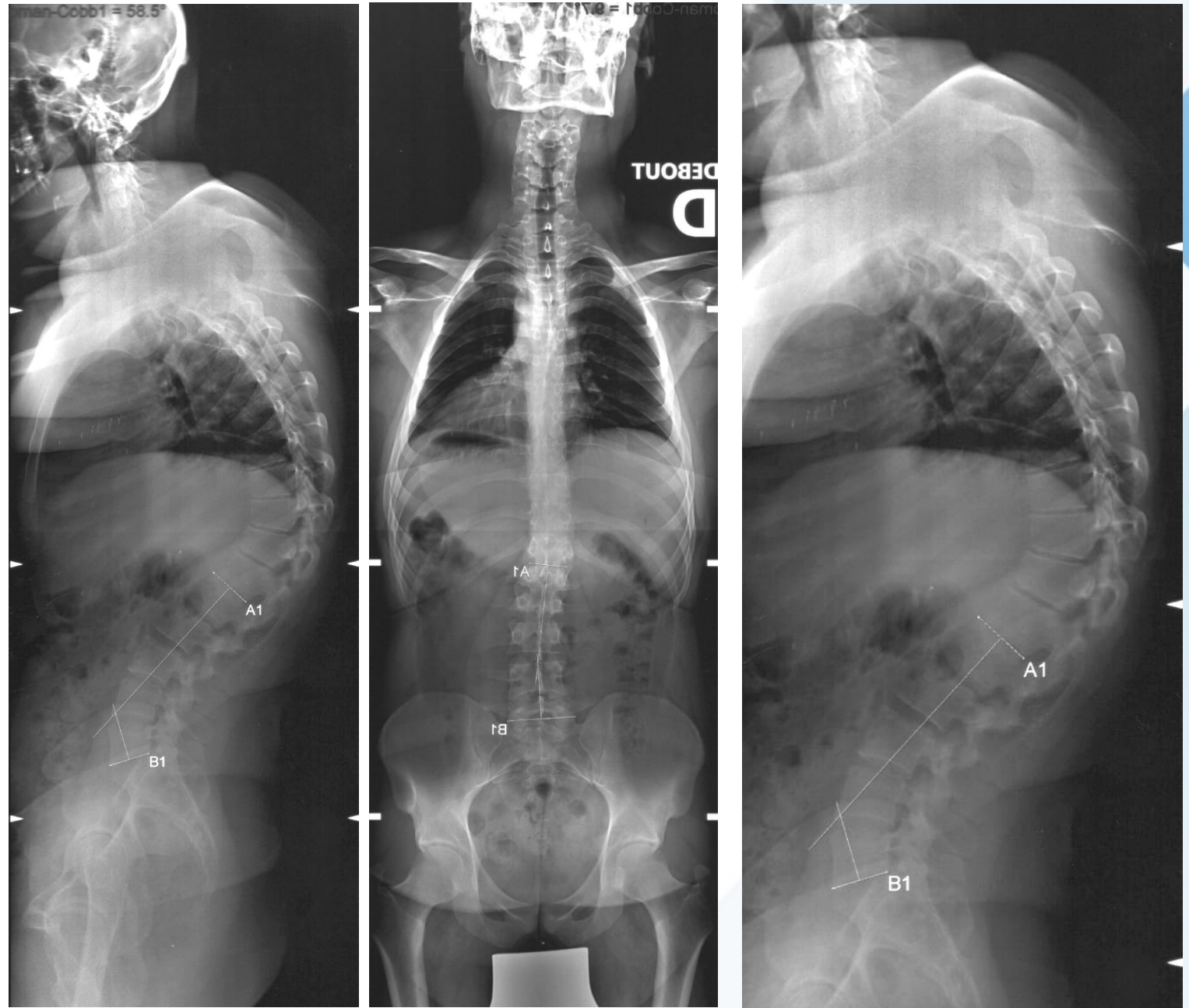
L1 Reduction second check



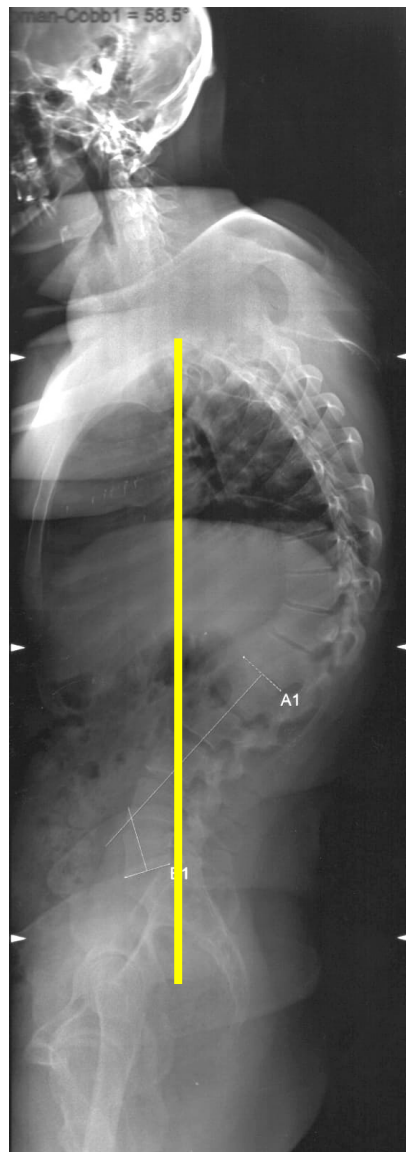


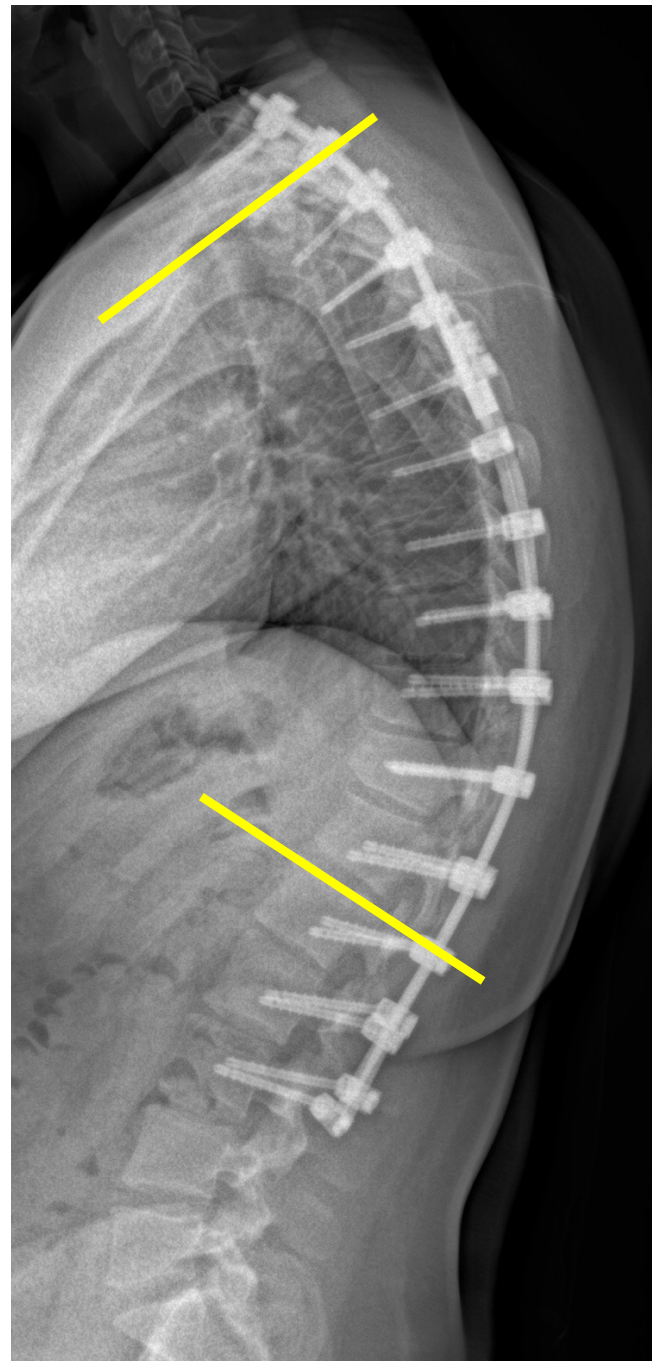
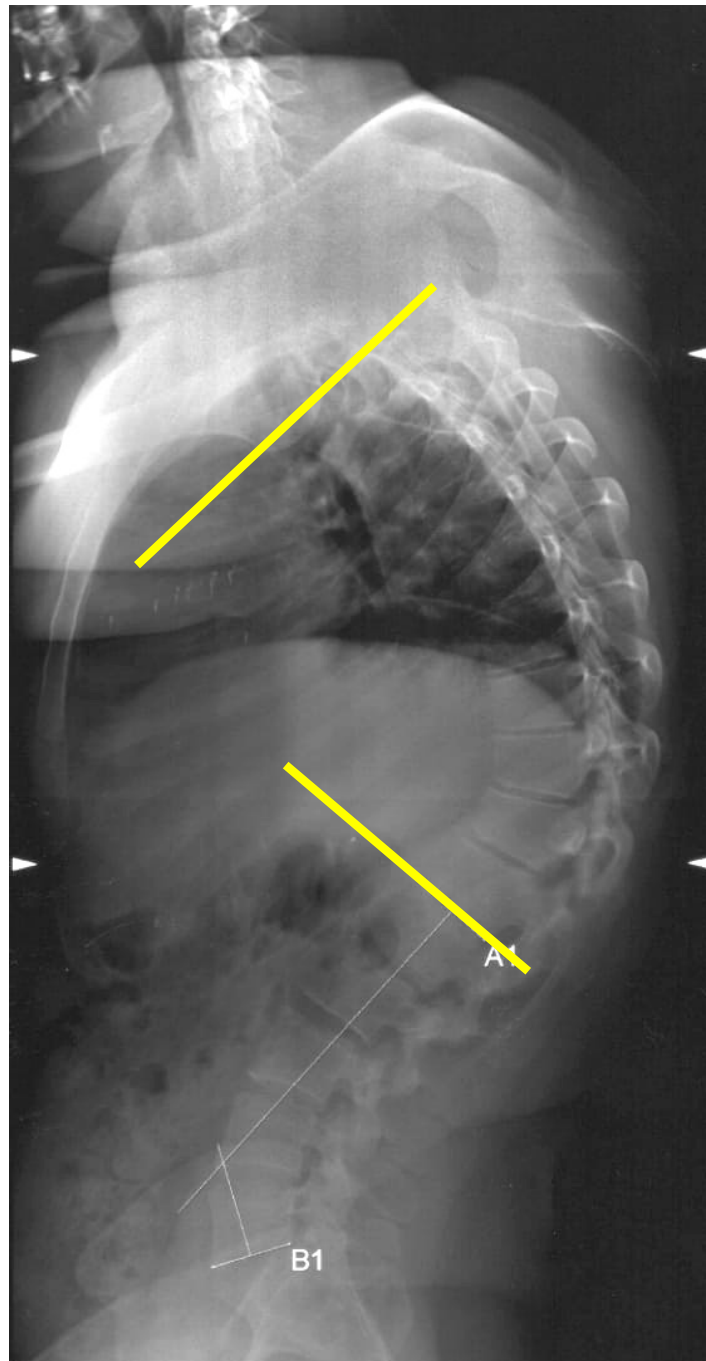
L1 Third Check after L4 tightening

Flexible Thoracolumbar Fusion without pelvic Fixation



Open Surgery





Preoperative Kyphosis= 95°

Postoperative Kyphosis= 65°

Patient Information

70 years old man

L1-L5 fusion in 2018 for lumbar stenosis

Progressive spinal deformity

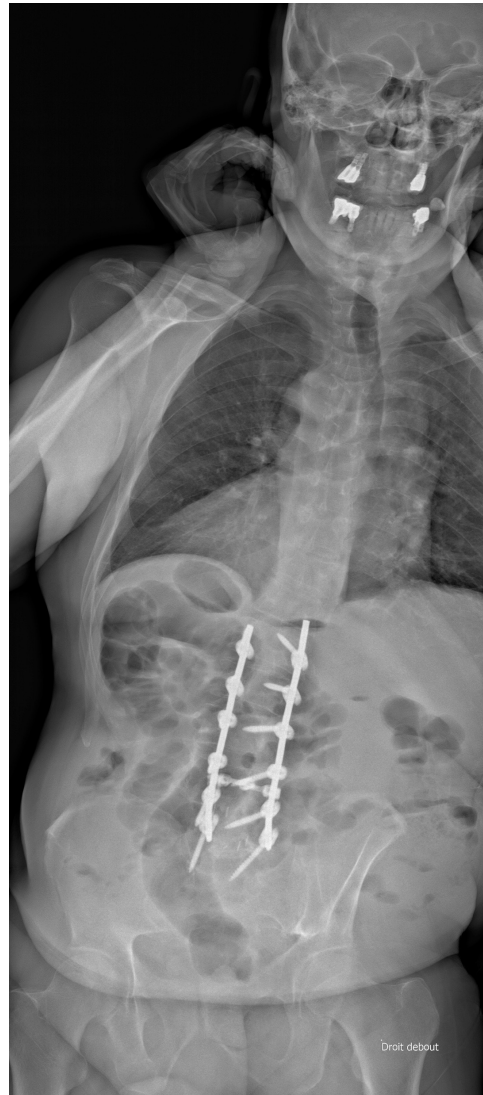
Parkinson disease discovered in 2019

Standing and Walking difficulties

No leg pain, no deficit



A lateral X-ray of the spine showing a minimally invasive surgical approach. A tubular retractor system is visible, consisting of a series of connected tubes and pedicle screws. The approach is used to access the vertebral bodies and discs for minimally invasive discectomy and fusion. The image shows the spine from the neck down to the pelvis, with the surgical approach clearly visible on the right side.

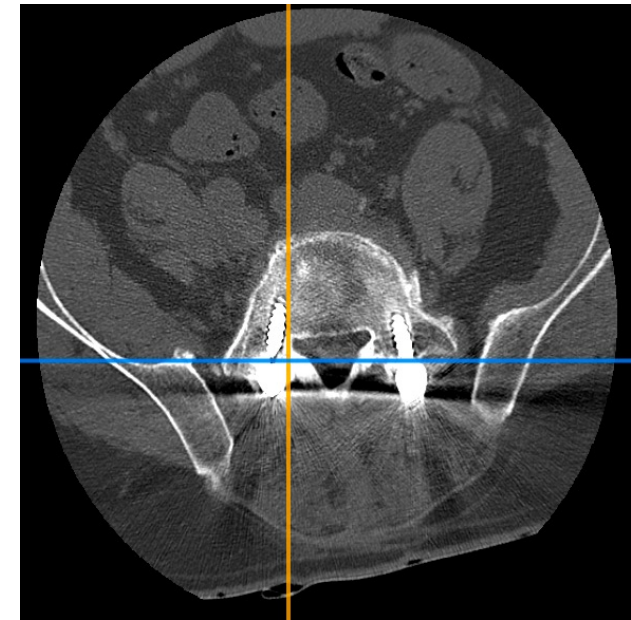
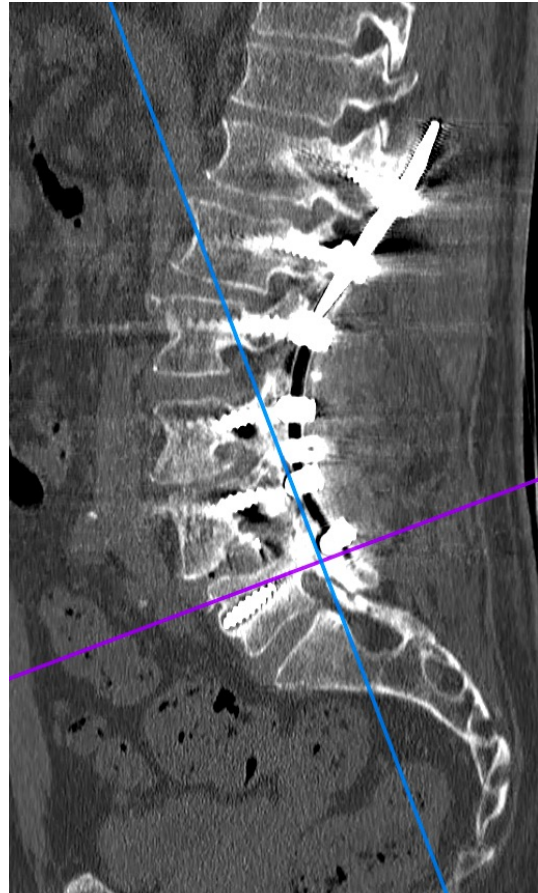
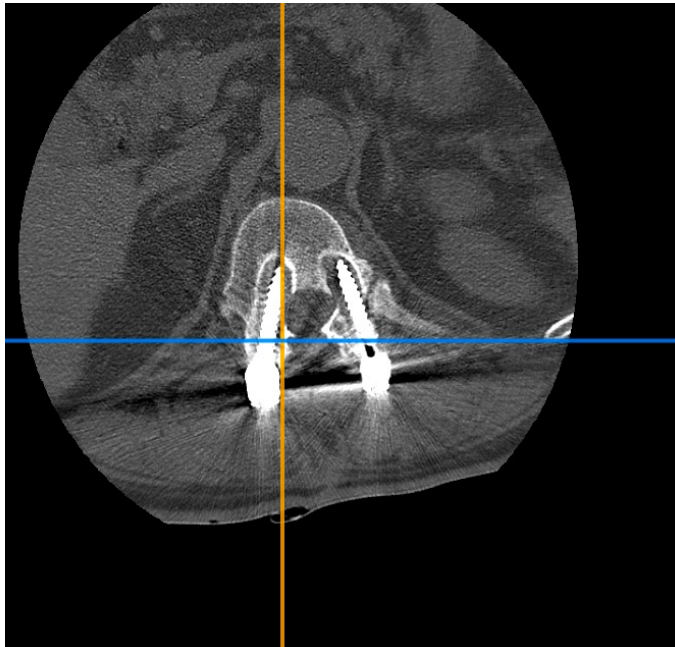

$$LL = 52^\circ$$

PT = 37 °

CSVL = 150 mm

Proximal AND Distal Junctional Kyphosis

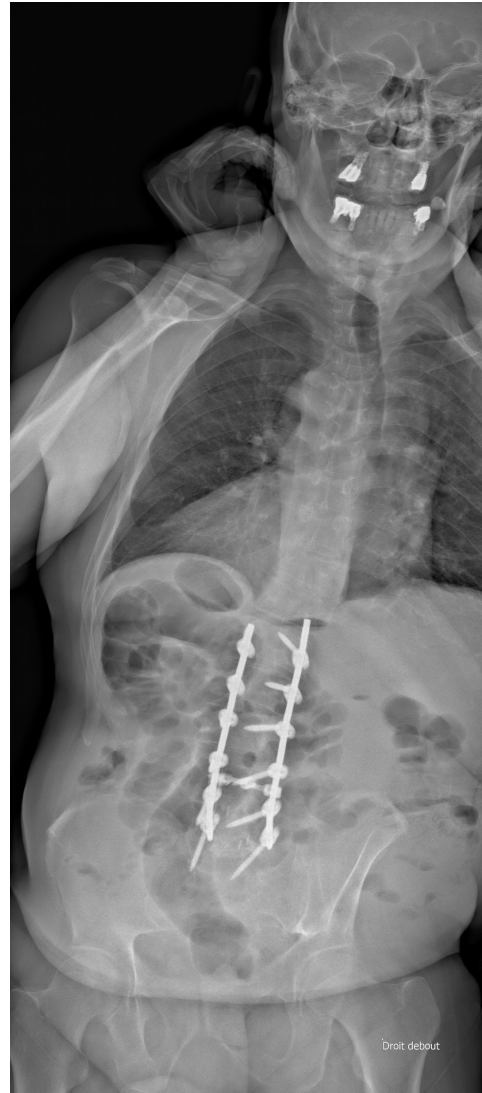
CT-Scan



Proximal and Distal Pseudarthrosis

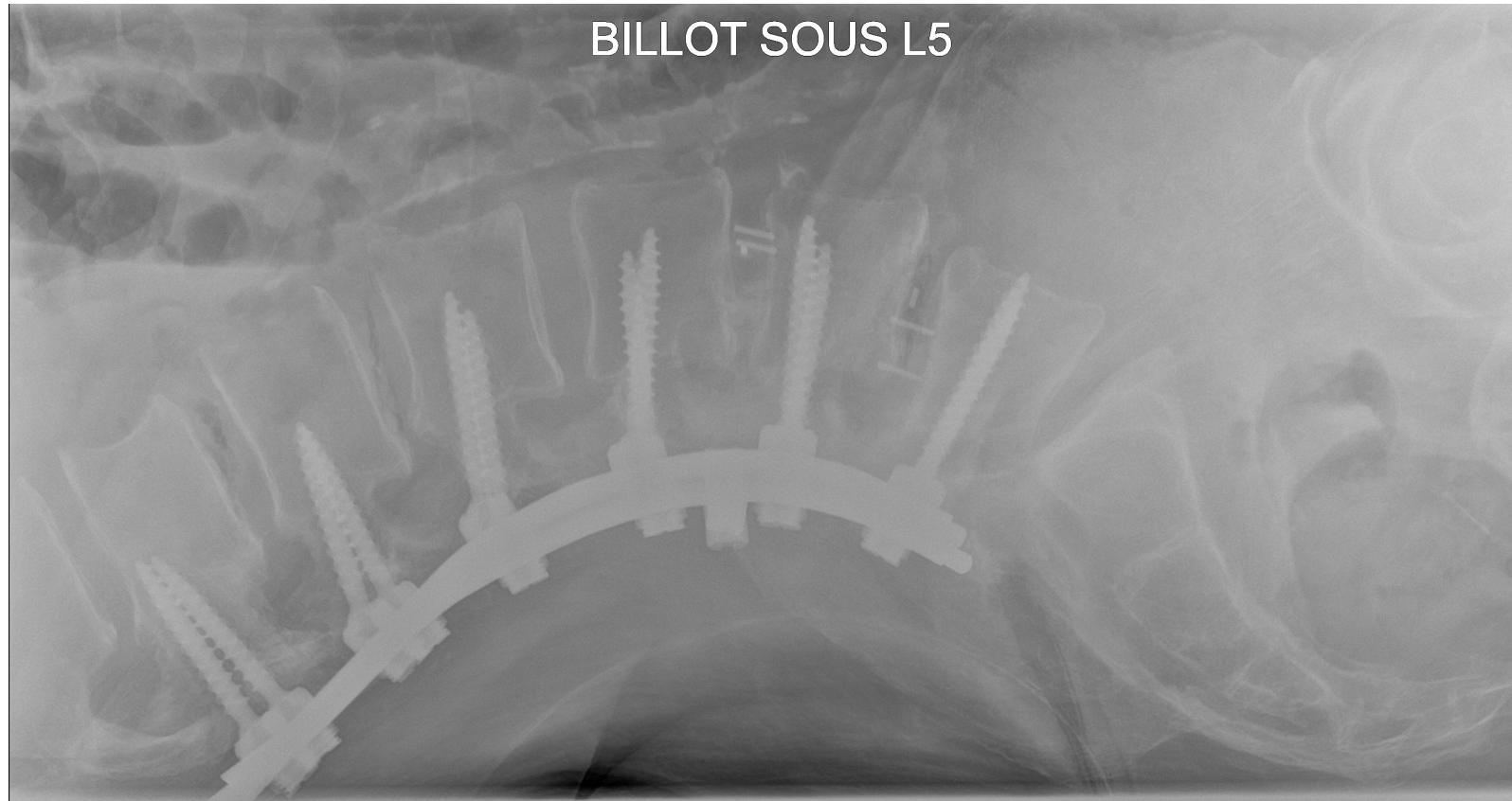
Surgical Planning?

Neor⁺



Bulster X-Ray

Neor⁺



Surgical Procedure

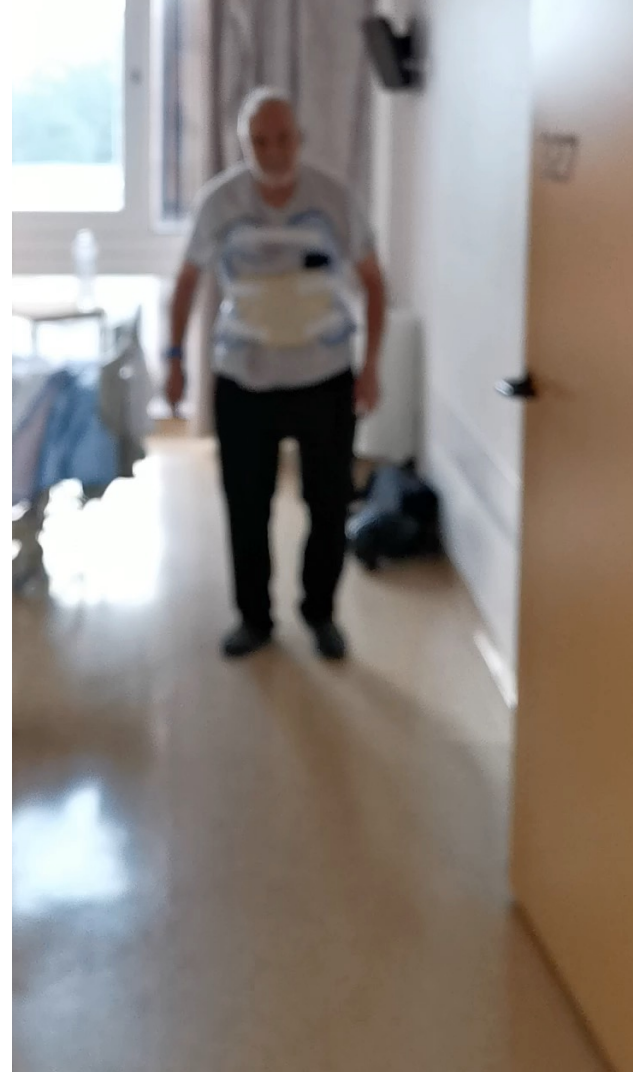
Stage Surgery

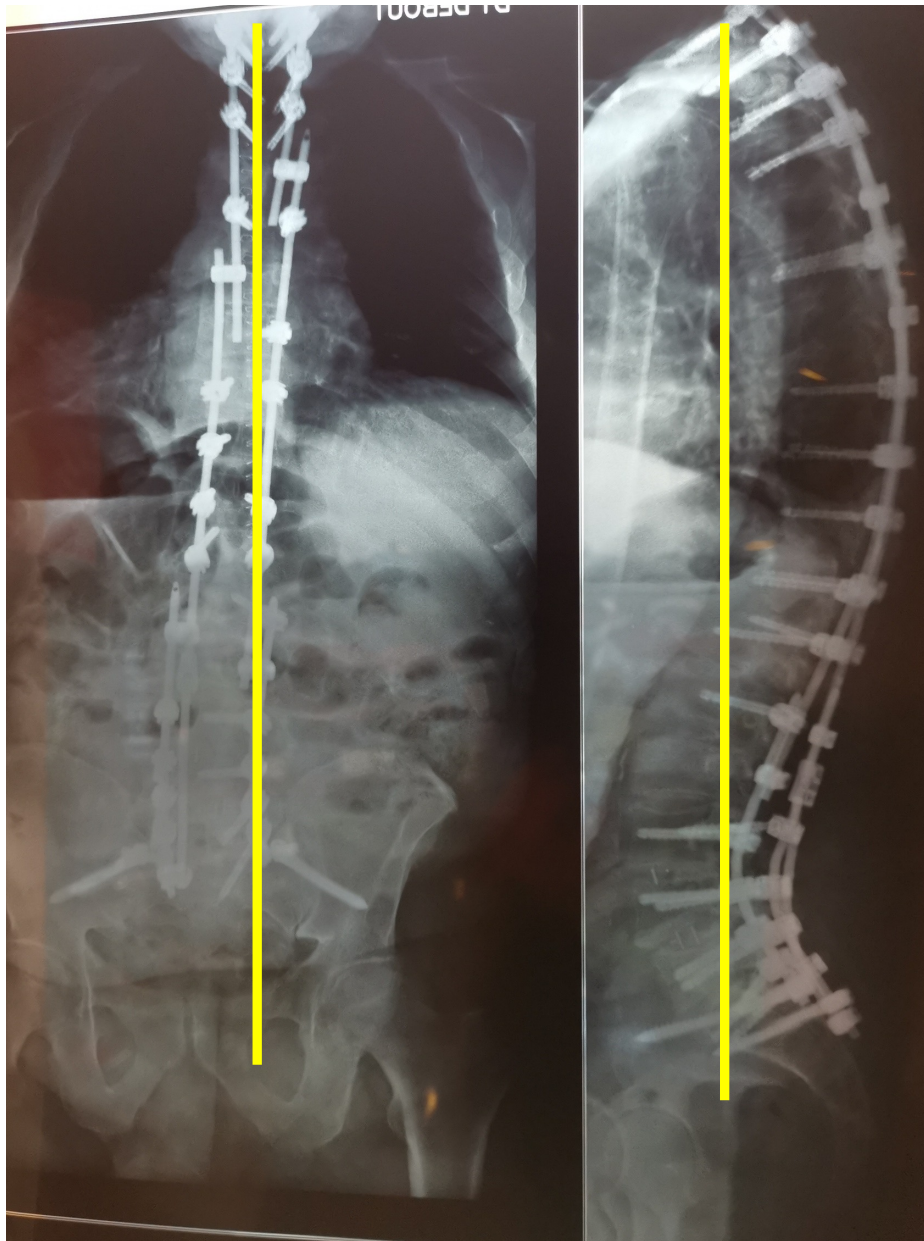
- **Step 1: T2-Ilium posterior fusion by Wiltse approach**
 - Posterior Instrumentation
 - No osteotomy
 - Domino correction procedure
- **Step 2: L4-L5 and L5-S1 anterior graft by ALIF procedure**

6 Days Postop stage 1

Neor⁺

Minimal Invasive Surgery Early Benefit





Stage 1: T2-Ilium Wiltse approach

Operative time = 5 hours

Blood Loss= 700cc

Stage 2: ALIF L4-L5 and L5-S1 3 weeks after

+ 3 months

Neo⁺



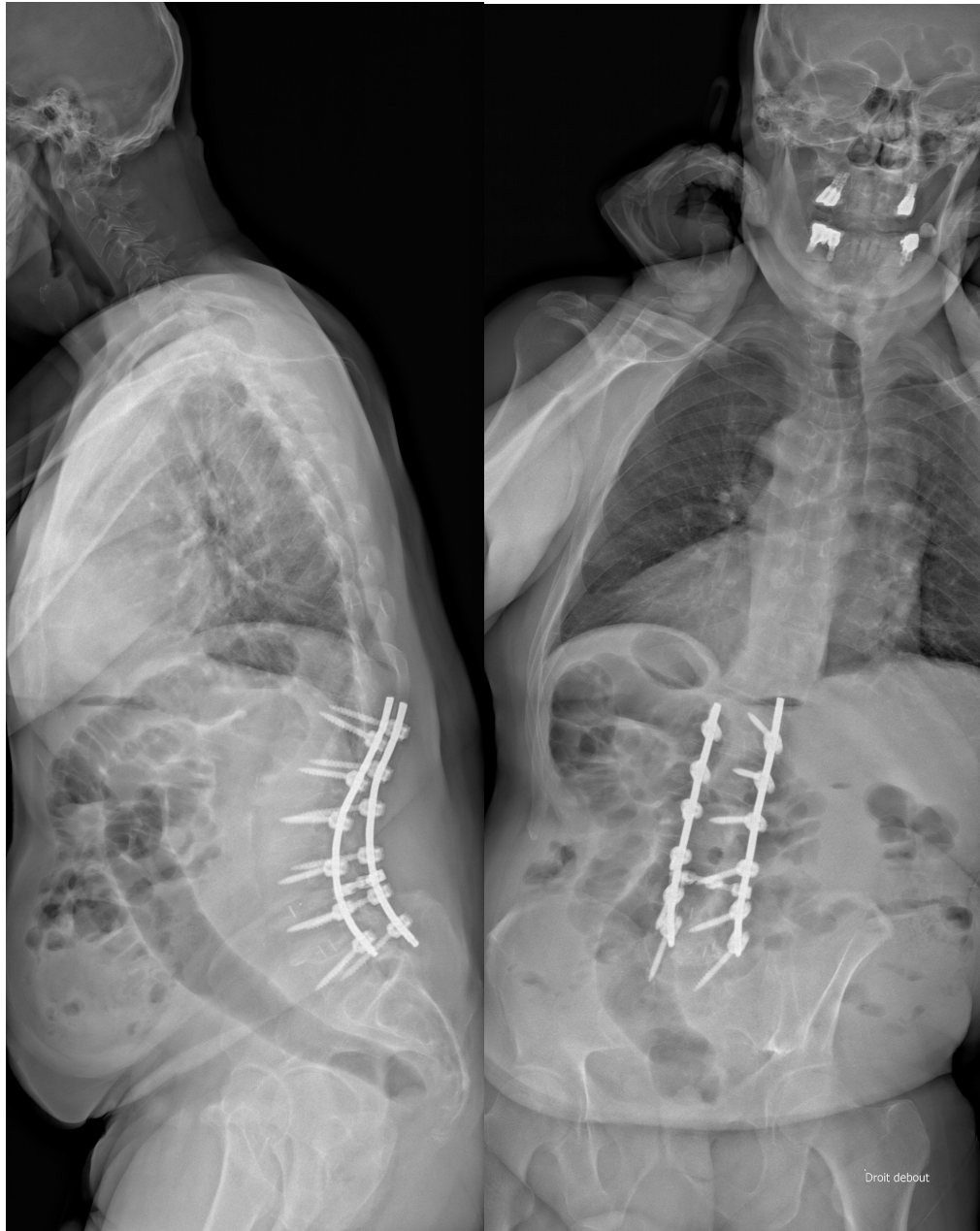
PI = 73°

LL = 64°

PT = 40°

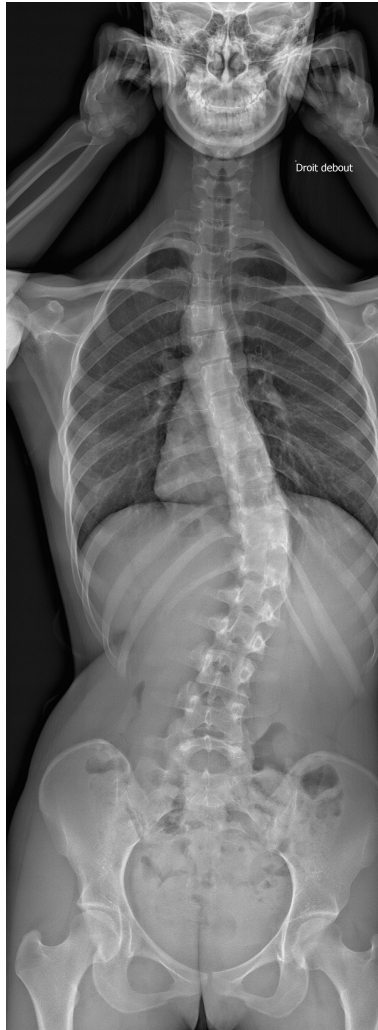
SVA = 28mm

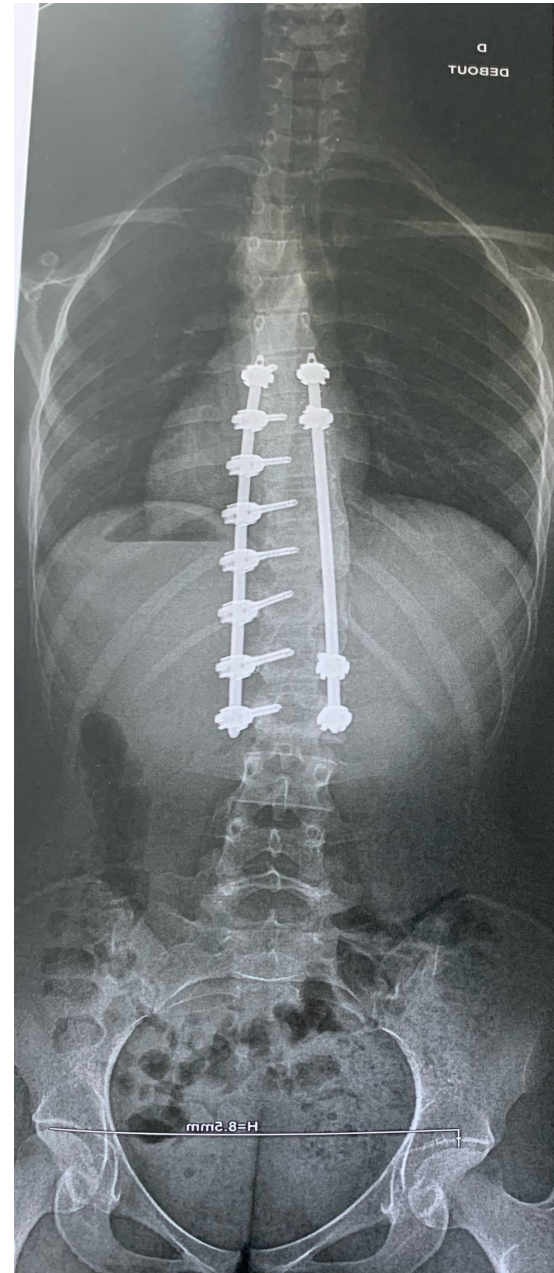
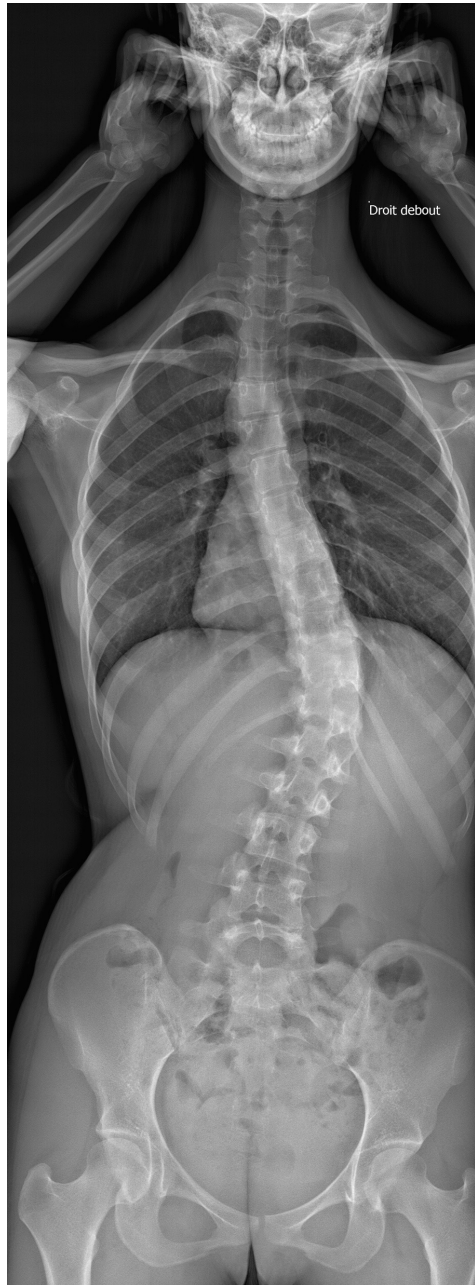
CSVL = 6mm

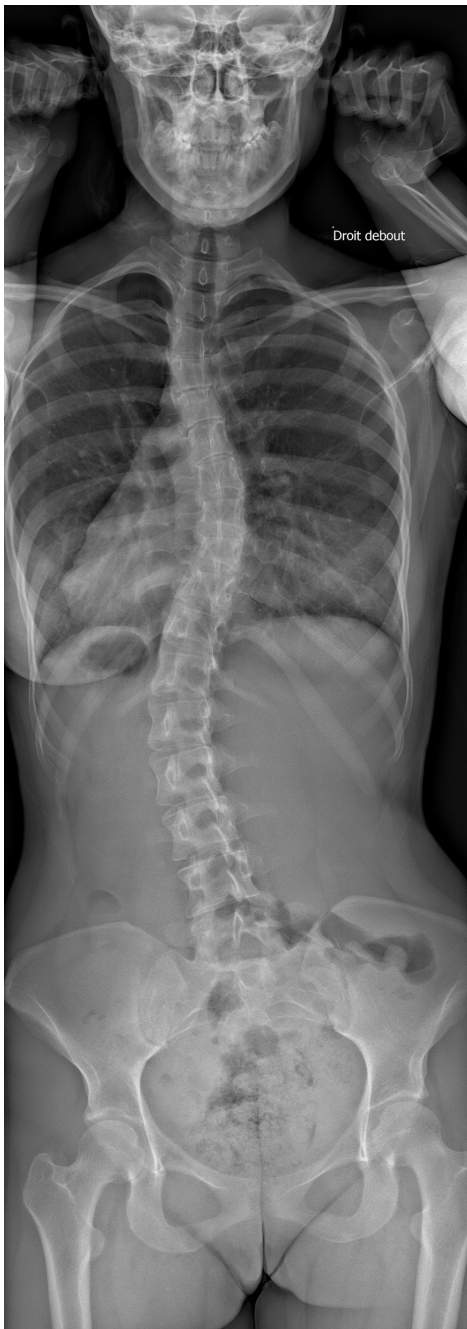


2. Translation Controlled Reduction

Neor⁺

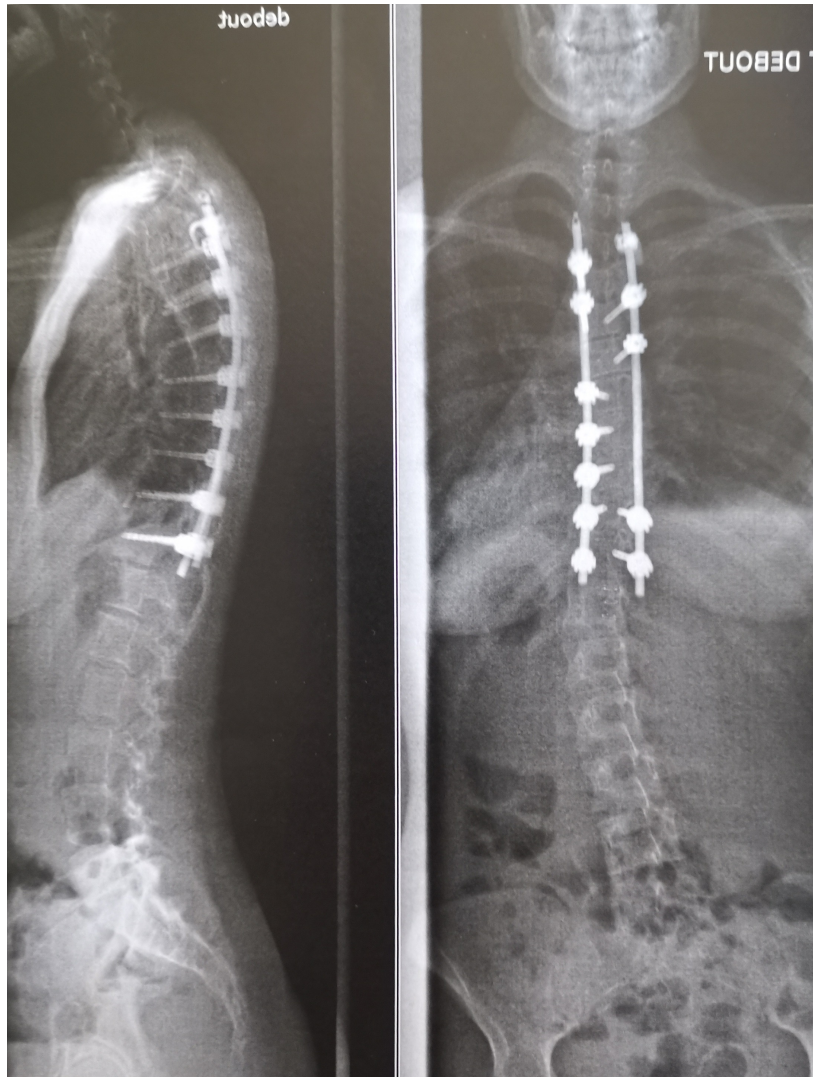


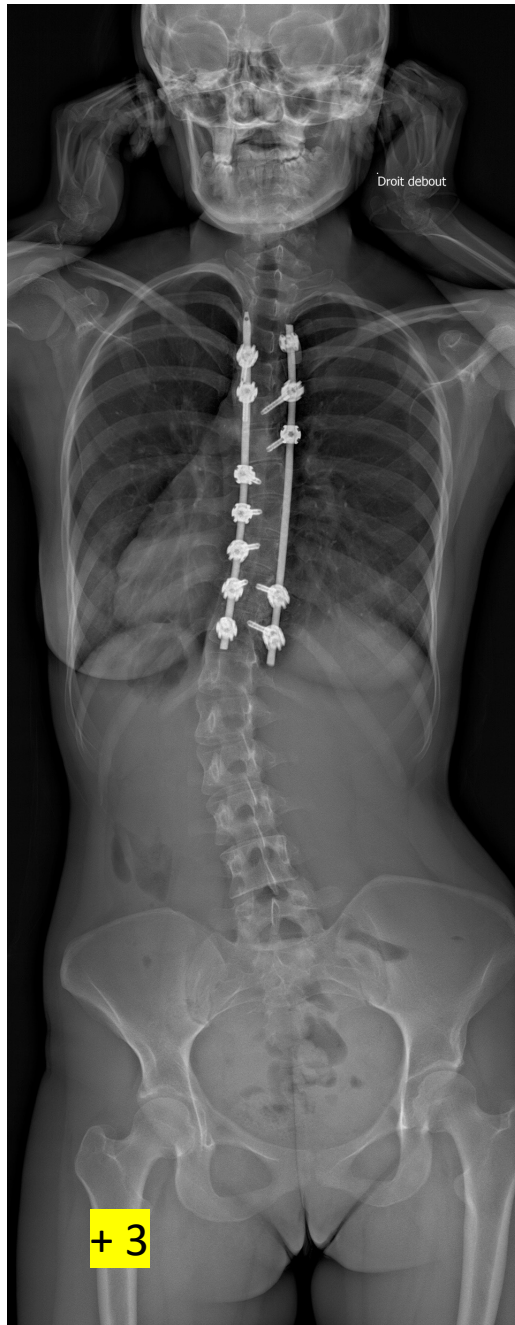


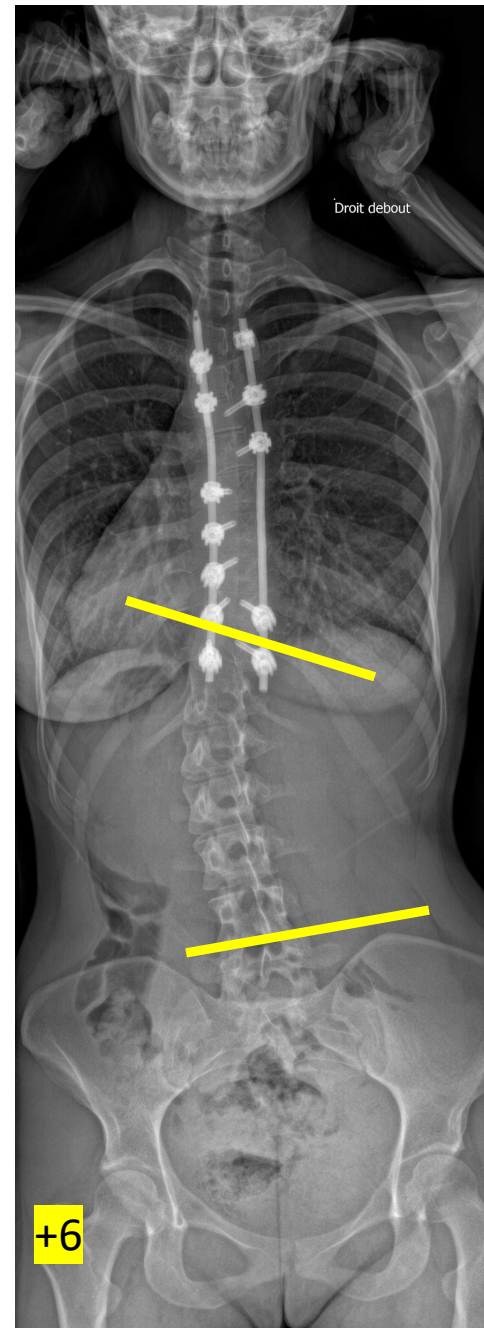
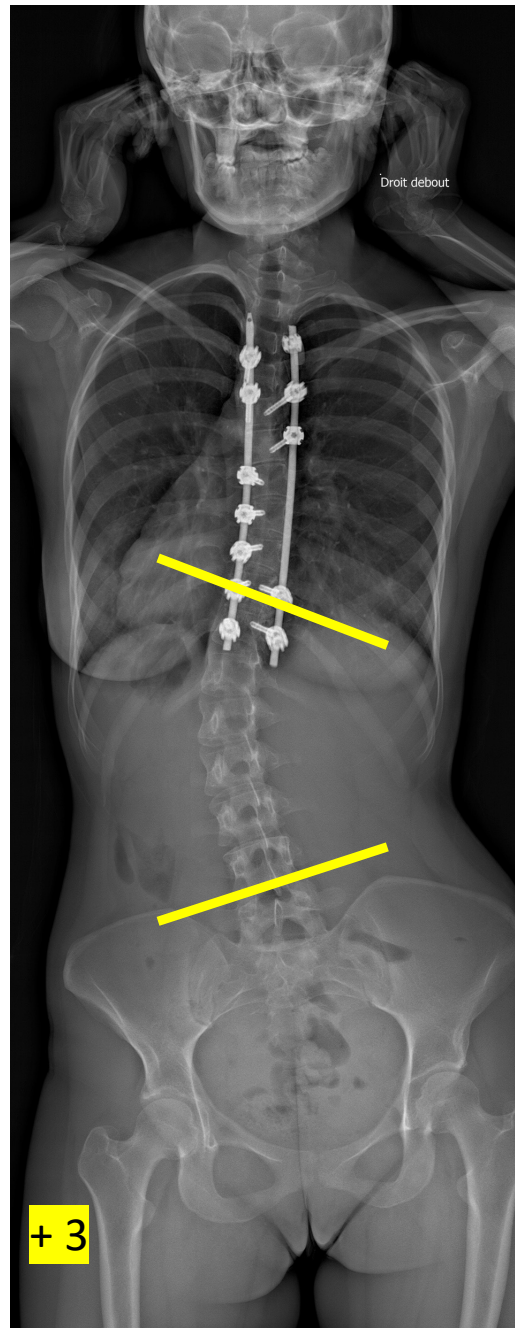
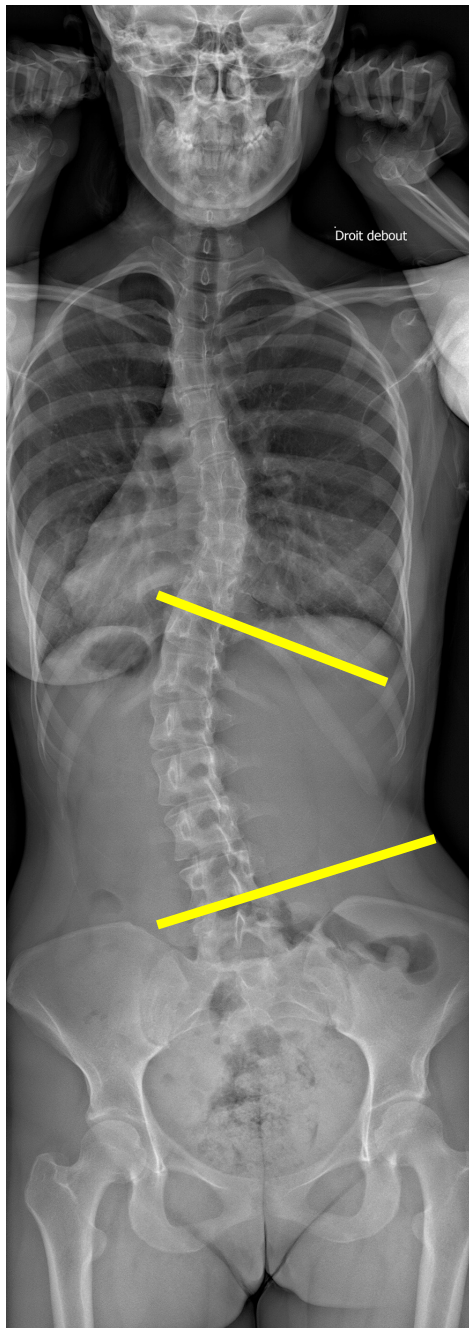


Neo⁺









Neo⁺

3. Bloc Controlled Reduction

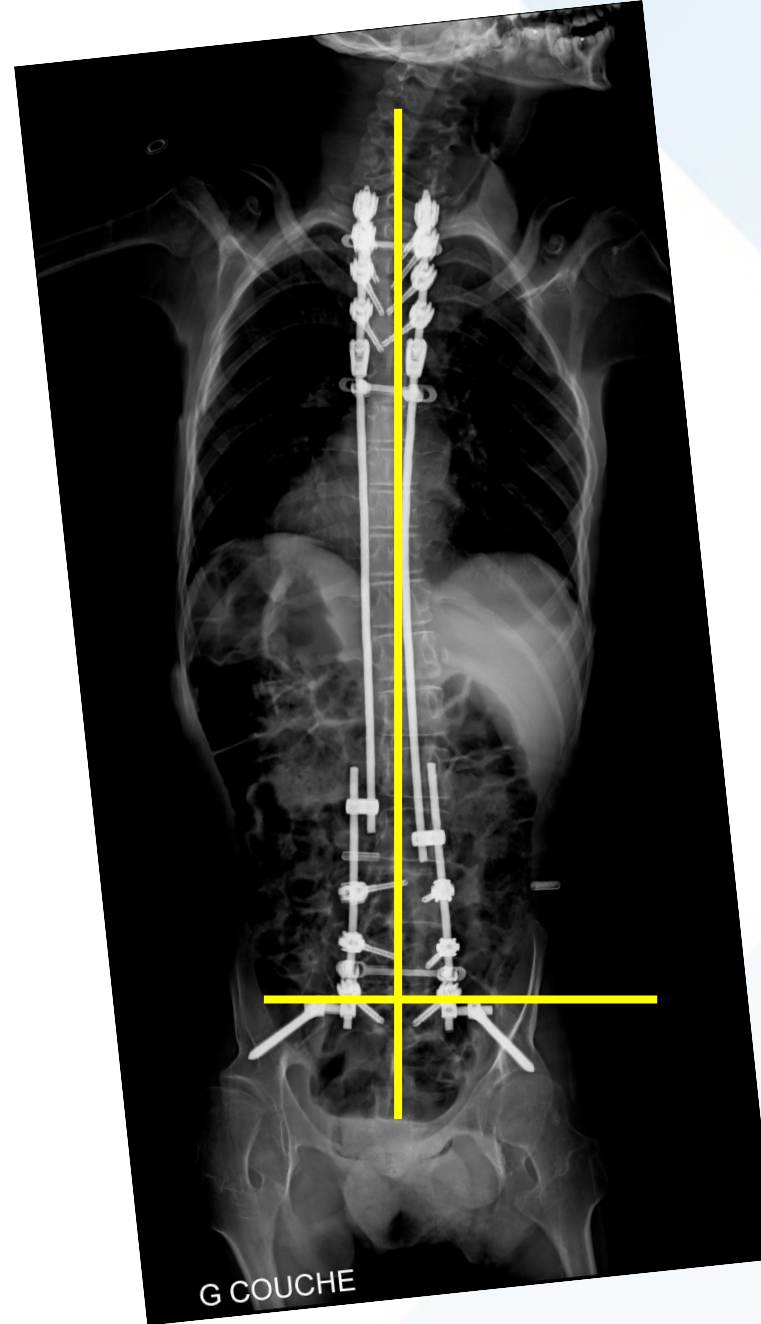
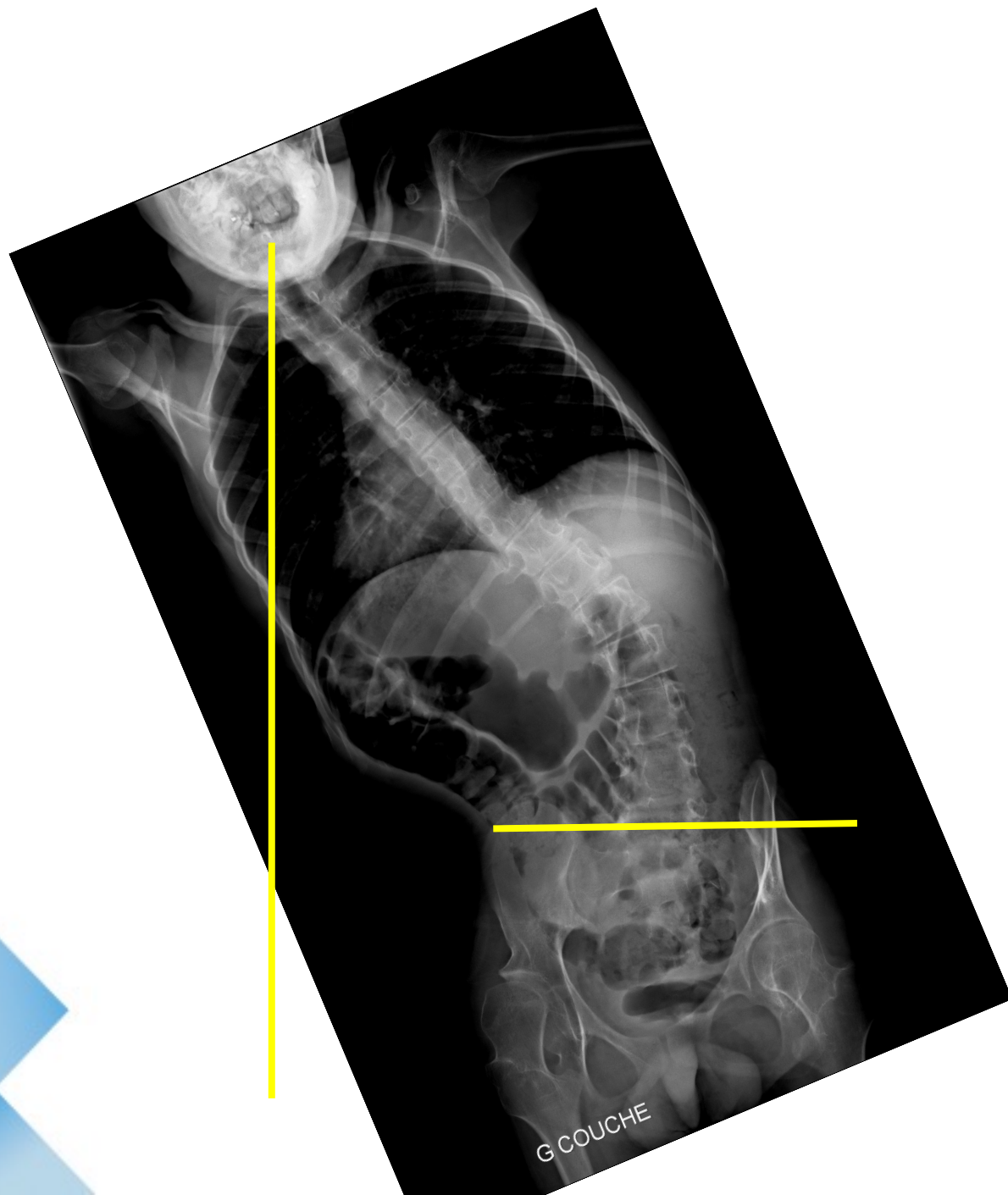
Neor⁺







Neor⁺



4. PSO controlled Reduction

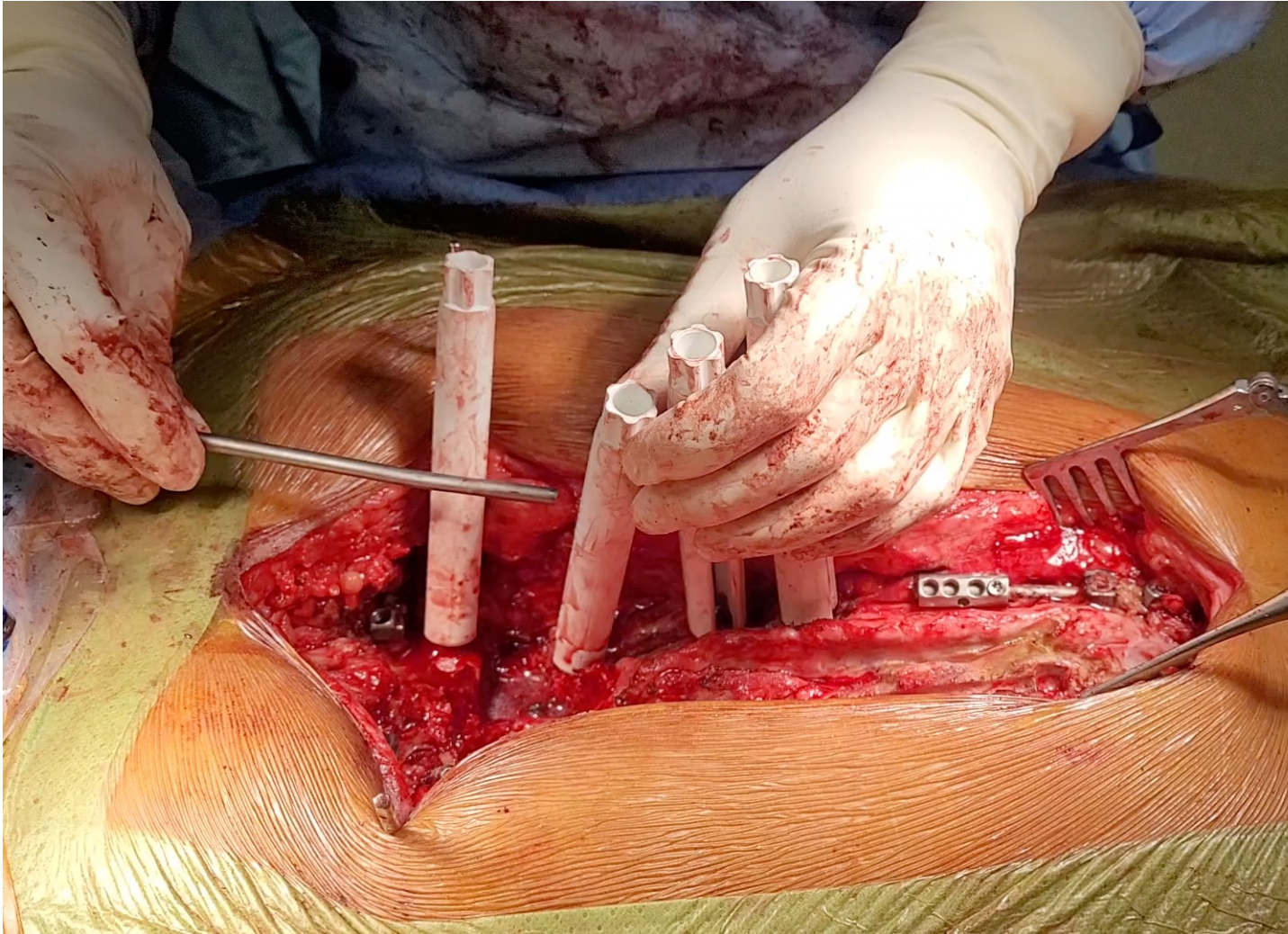
- Expected Difficulties:
- Tower management and PSO procedure





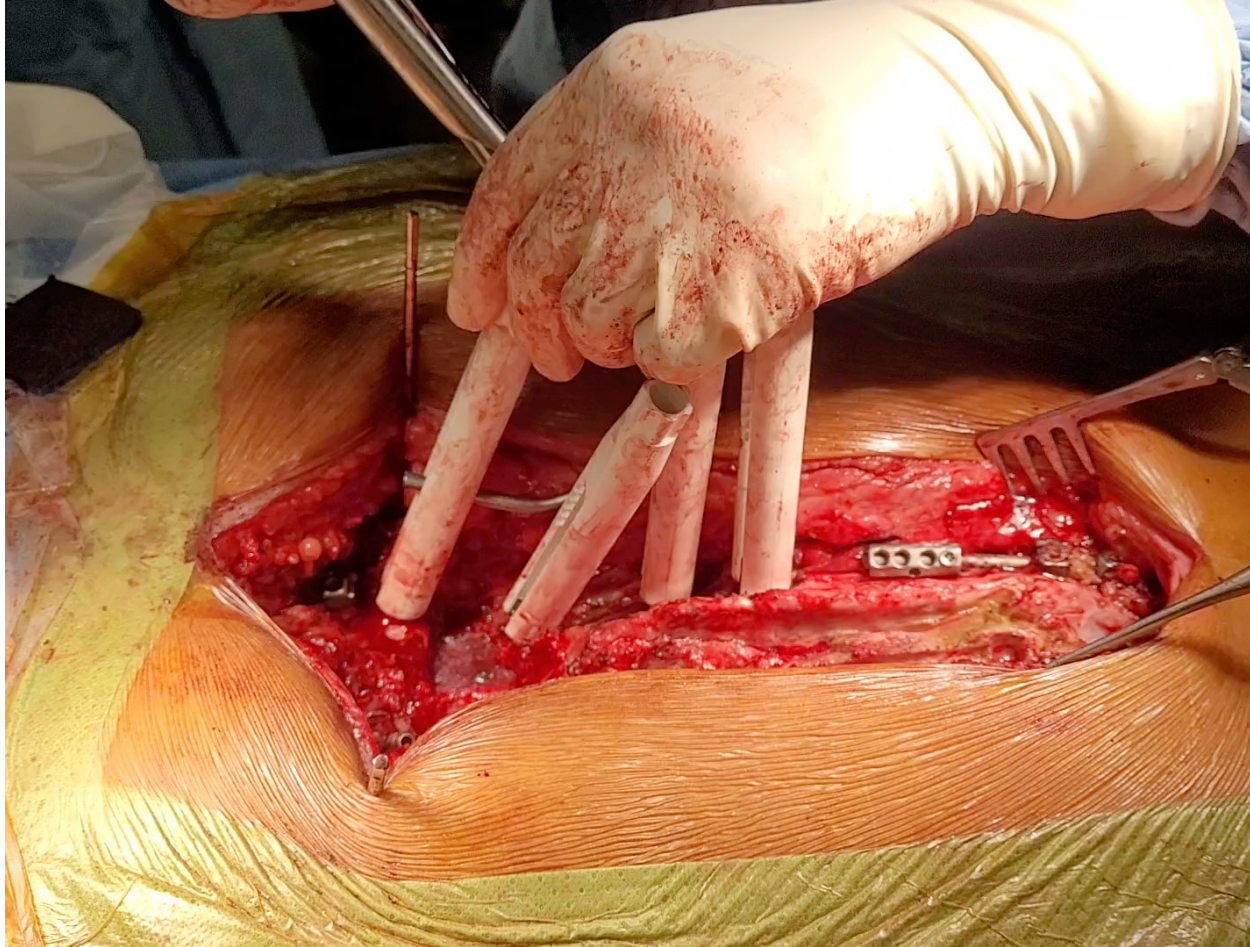
Essai tige proximale

Neor⁺



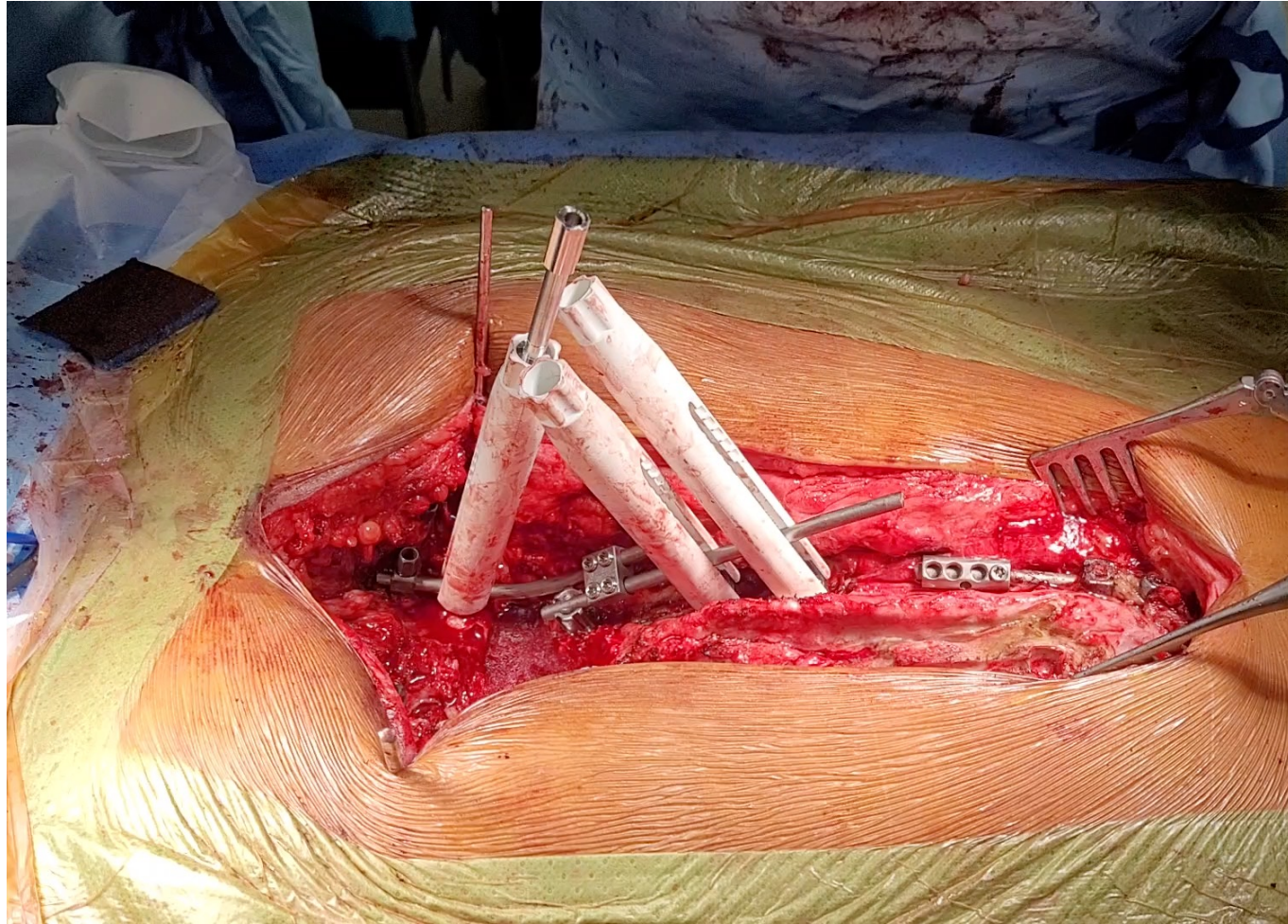
Essai tige distale

Neor⁺



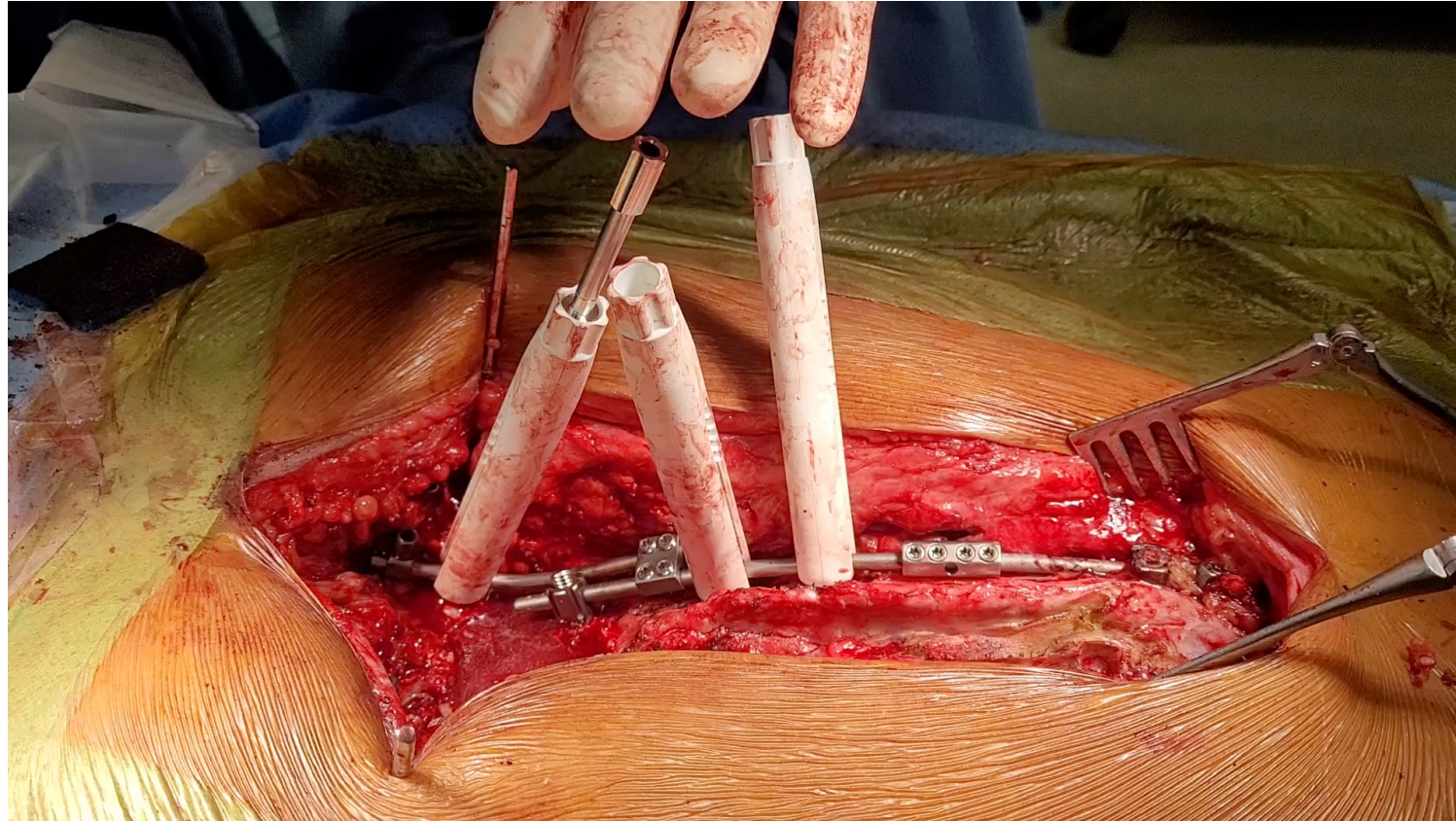
Reduction

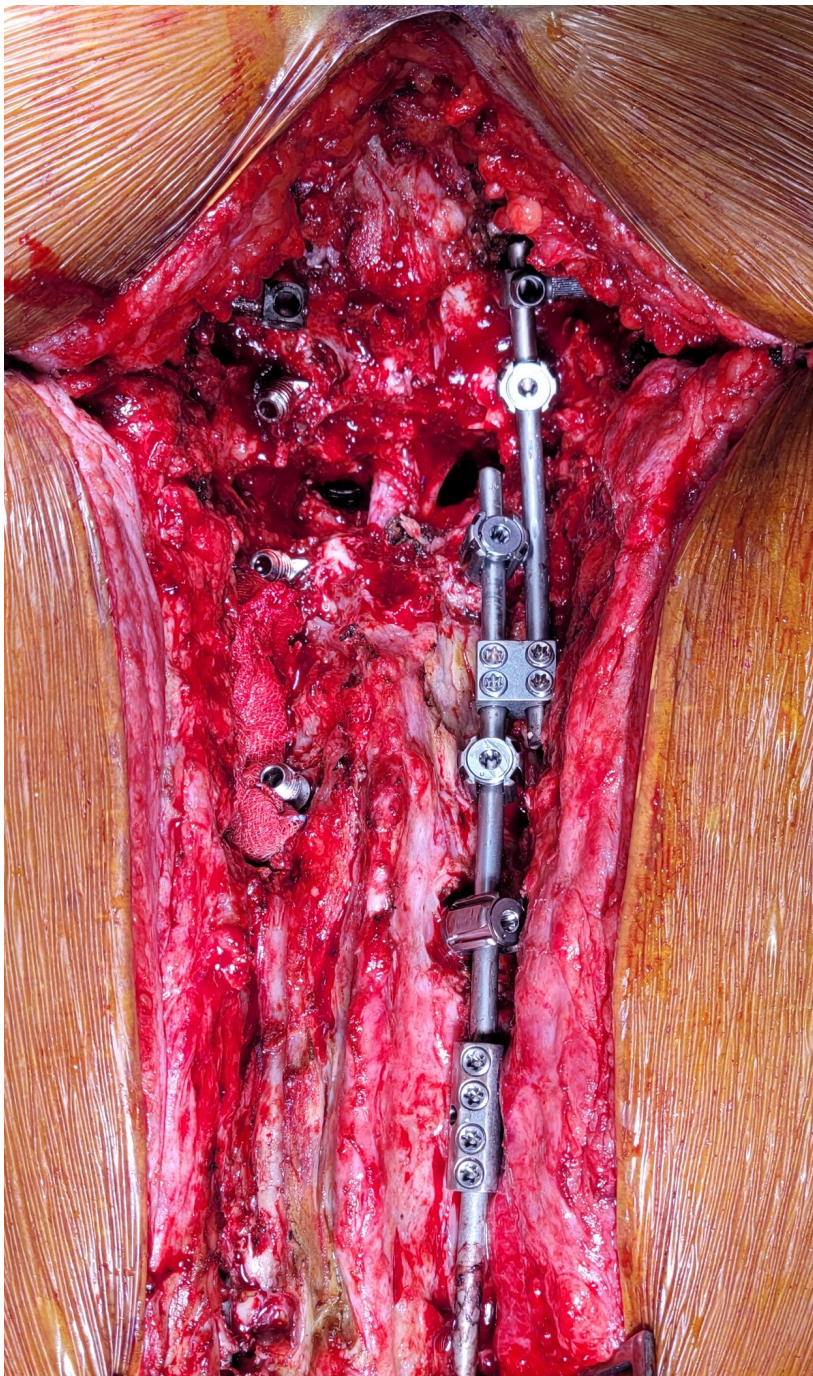
Neor⁺



Cantilever Check

Neor⁺

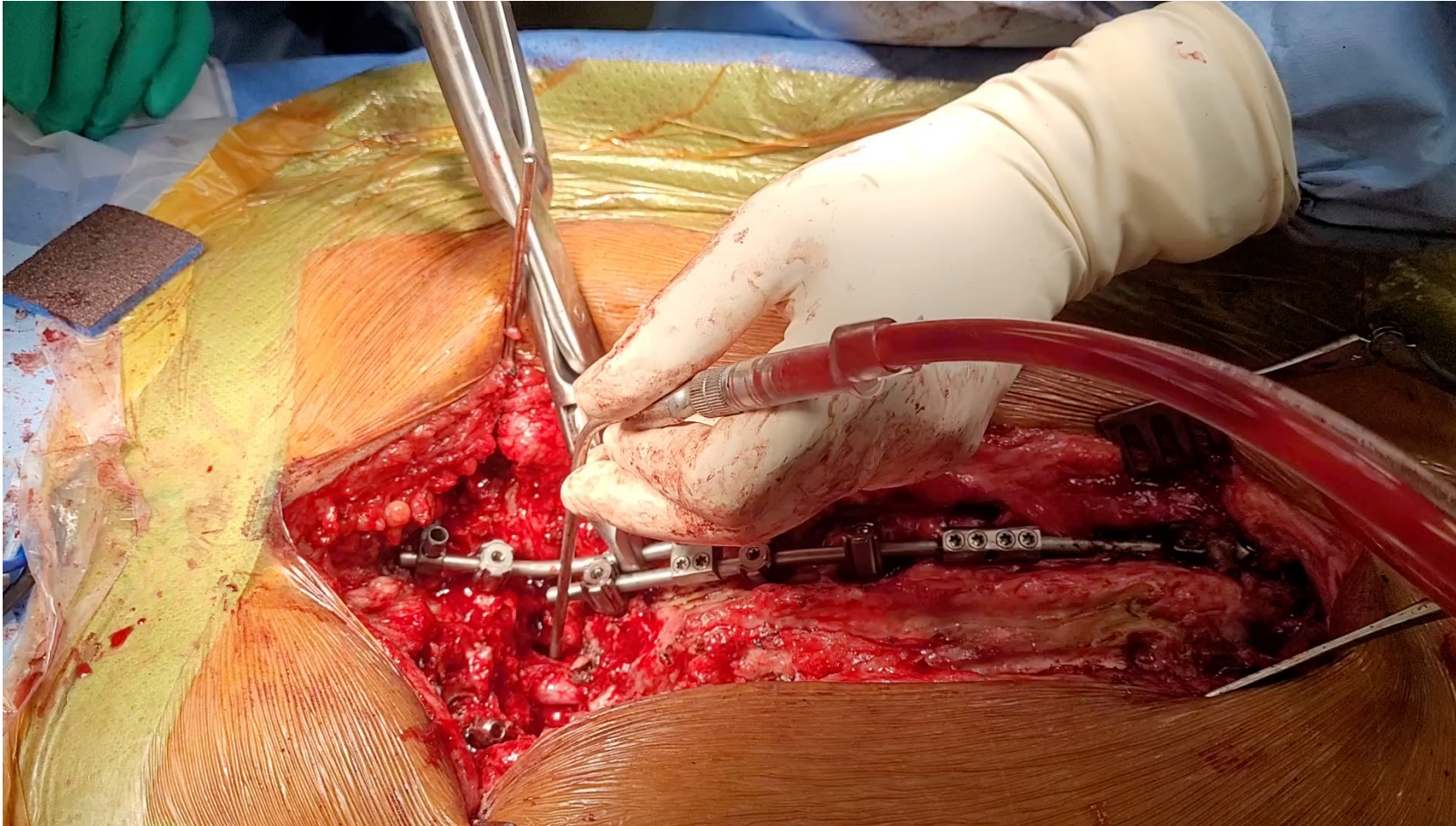


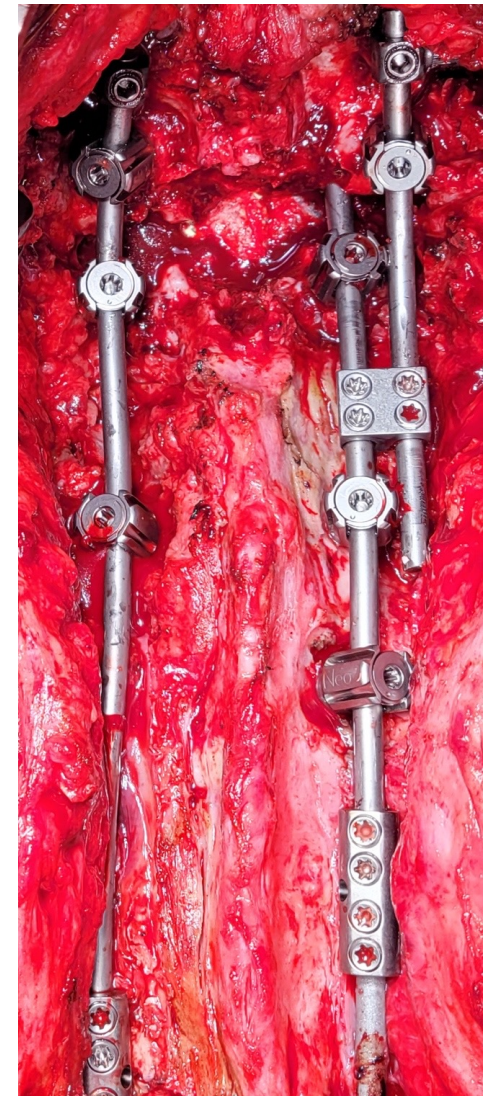
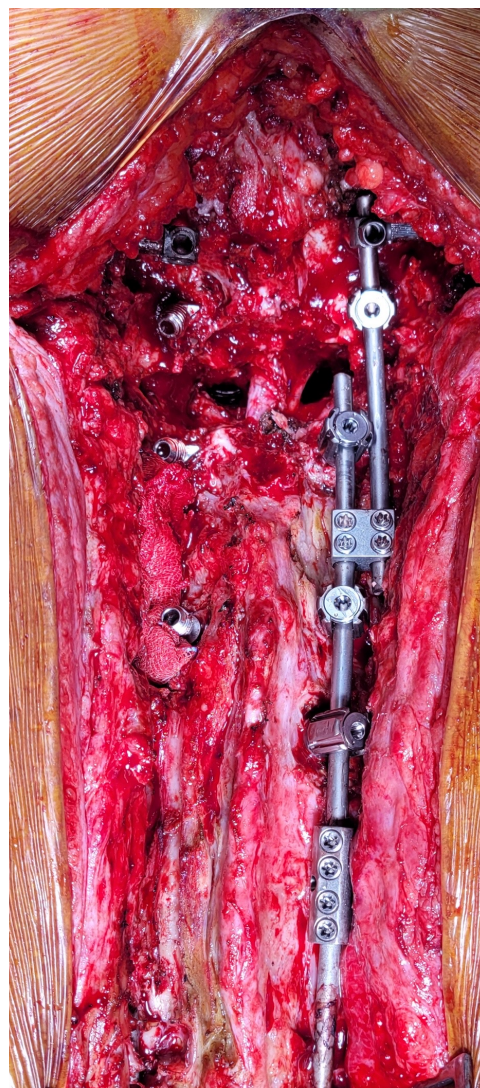
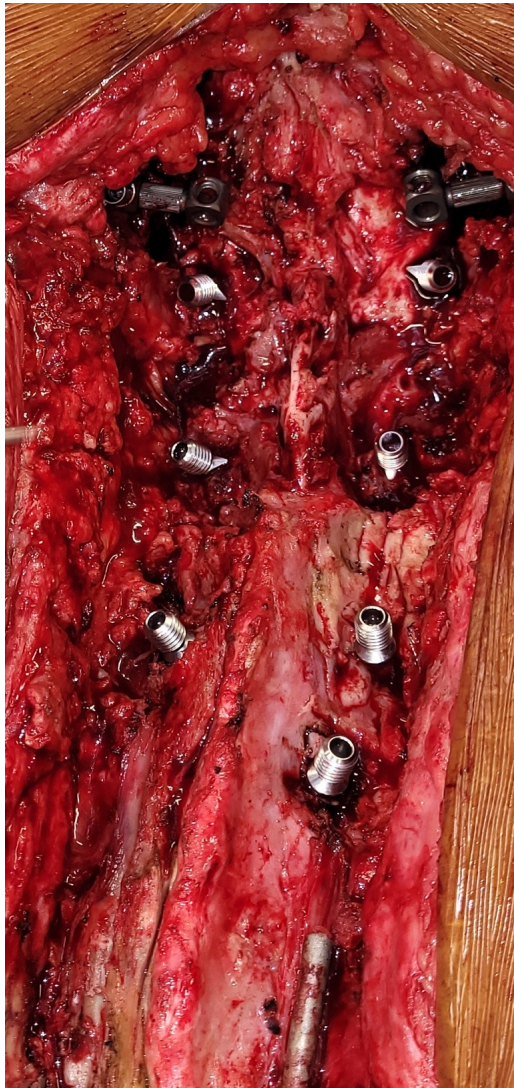


Neor⁺

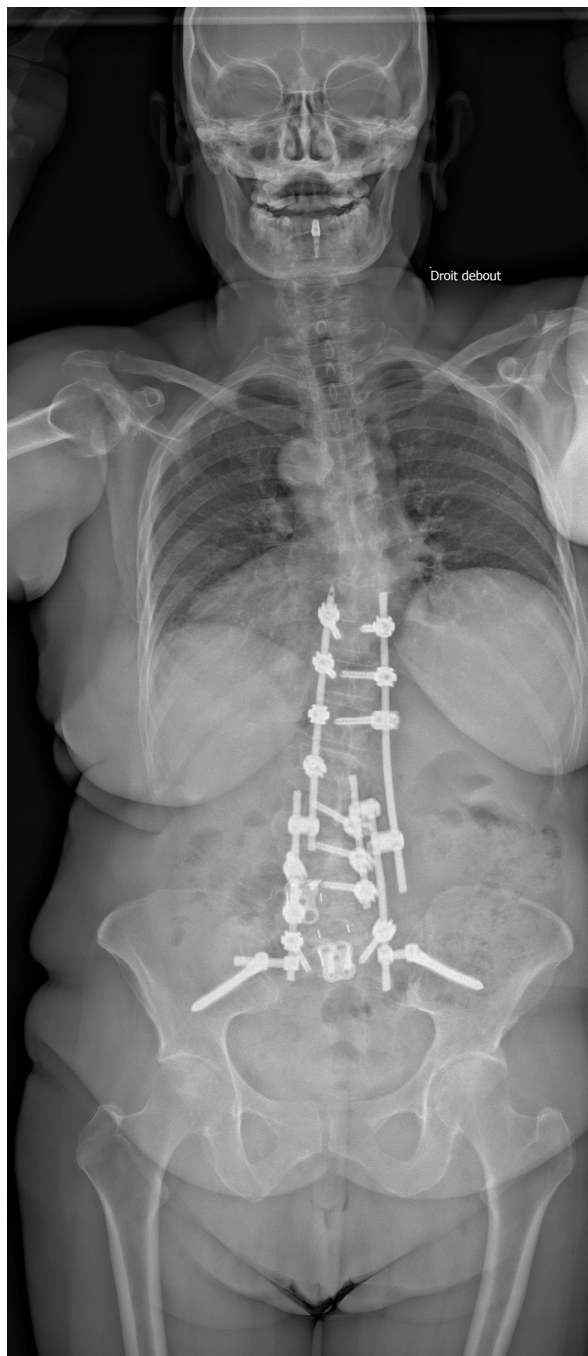
Compression sur domino

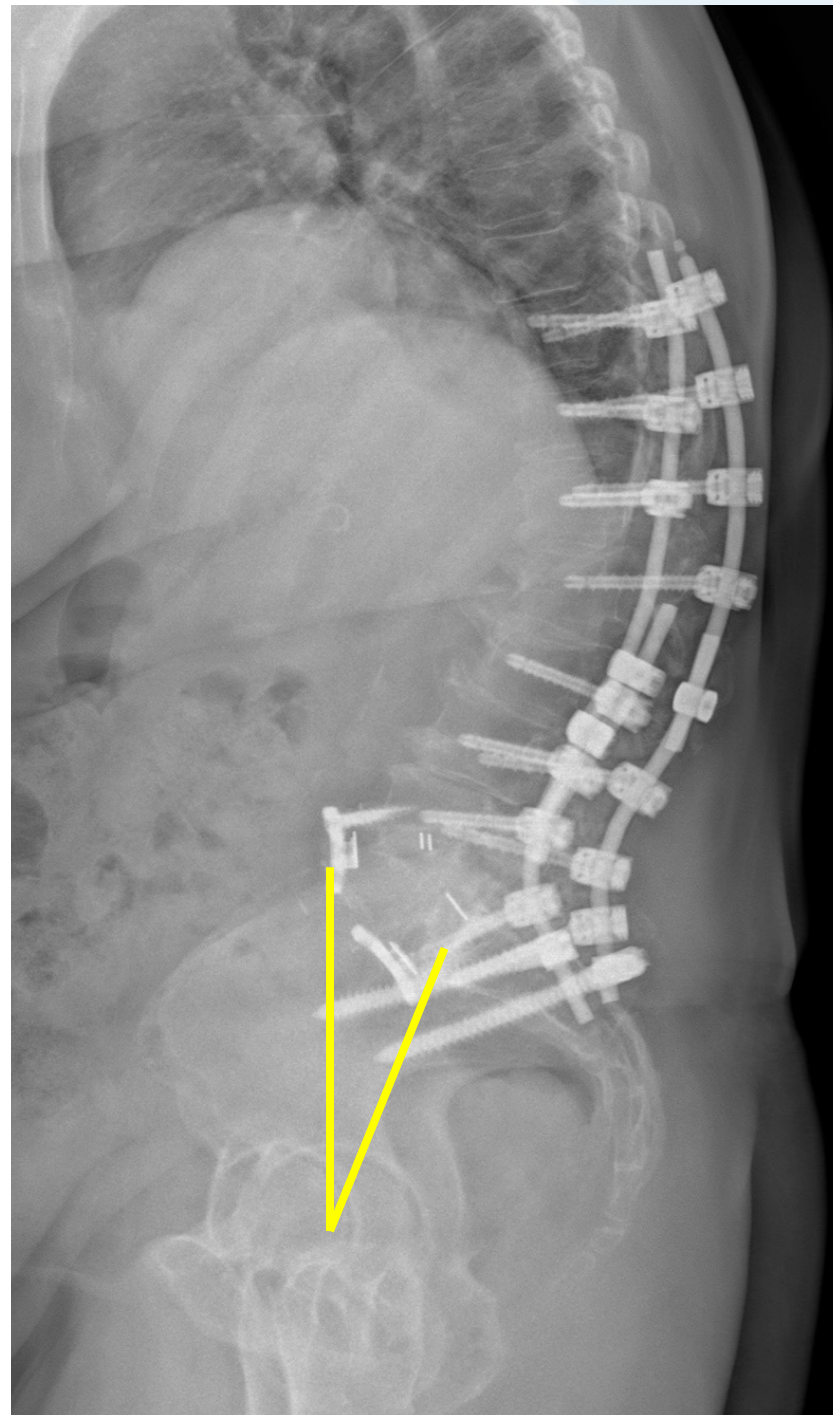
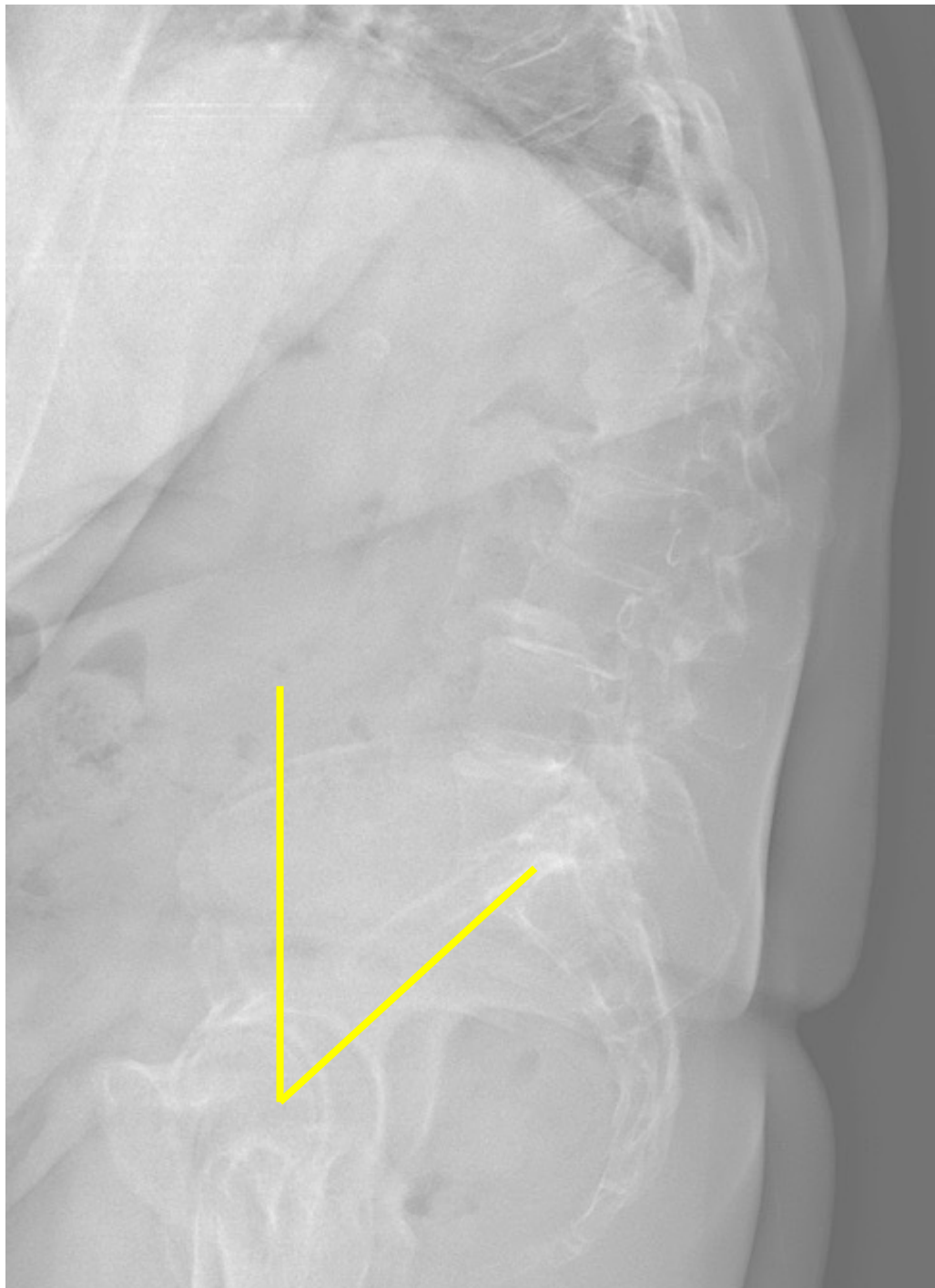
Neo⁺



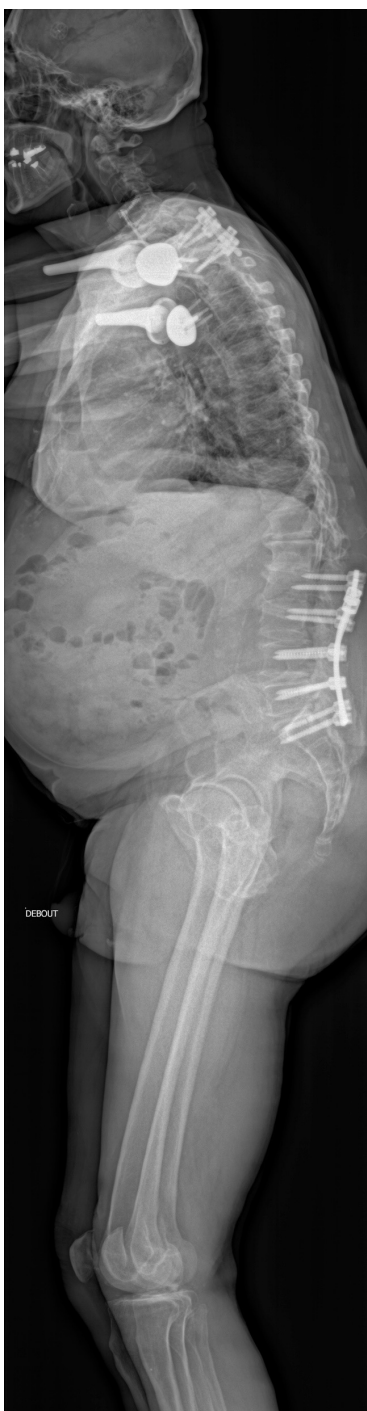




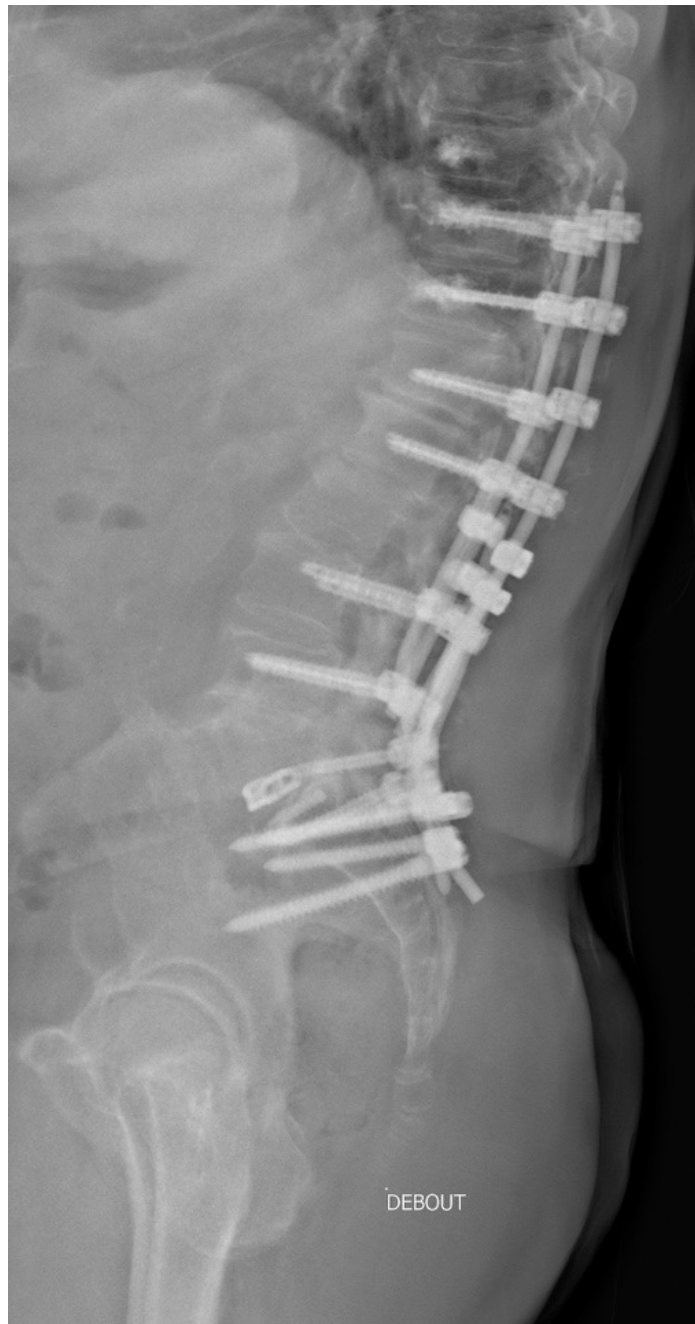
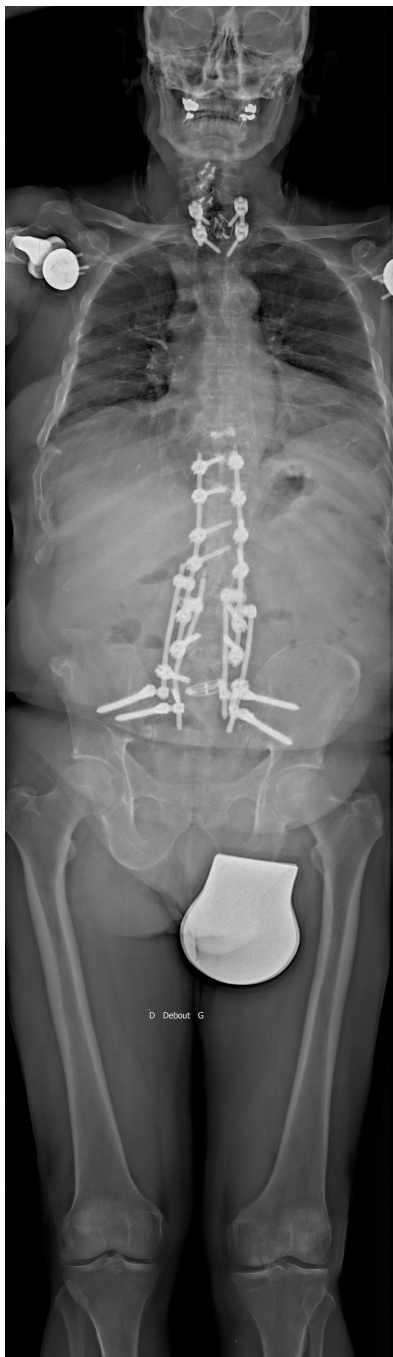
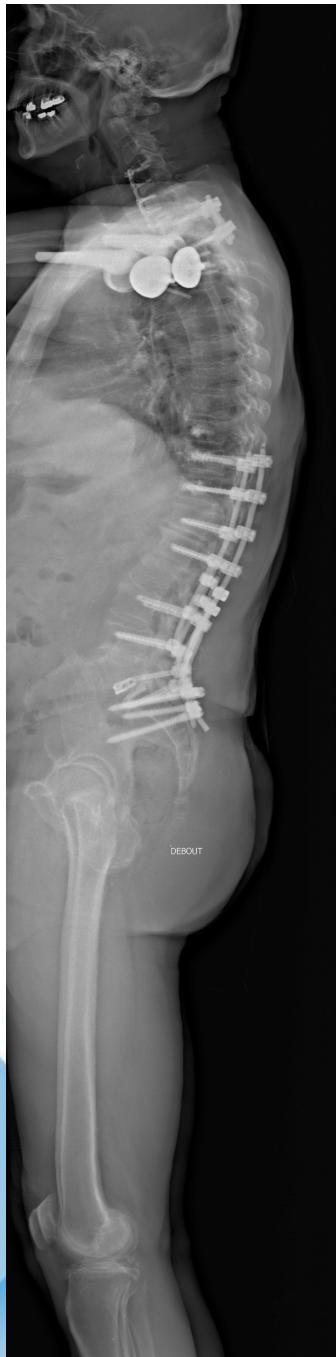




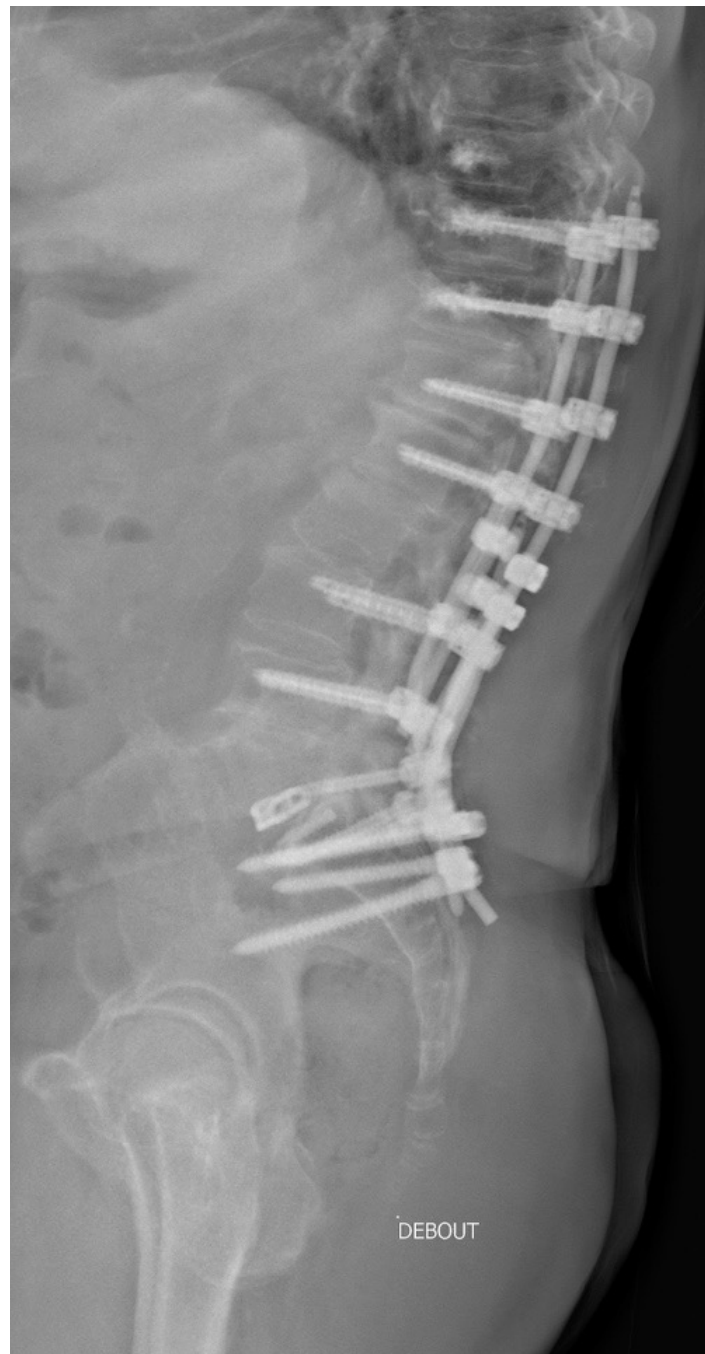
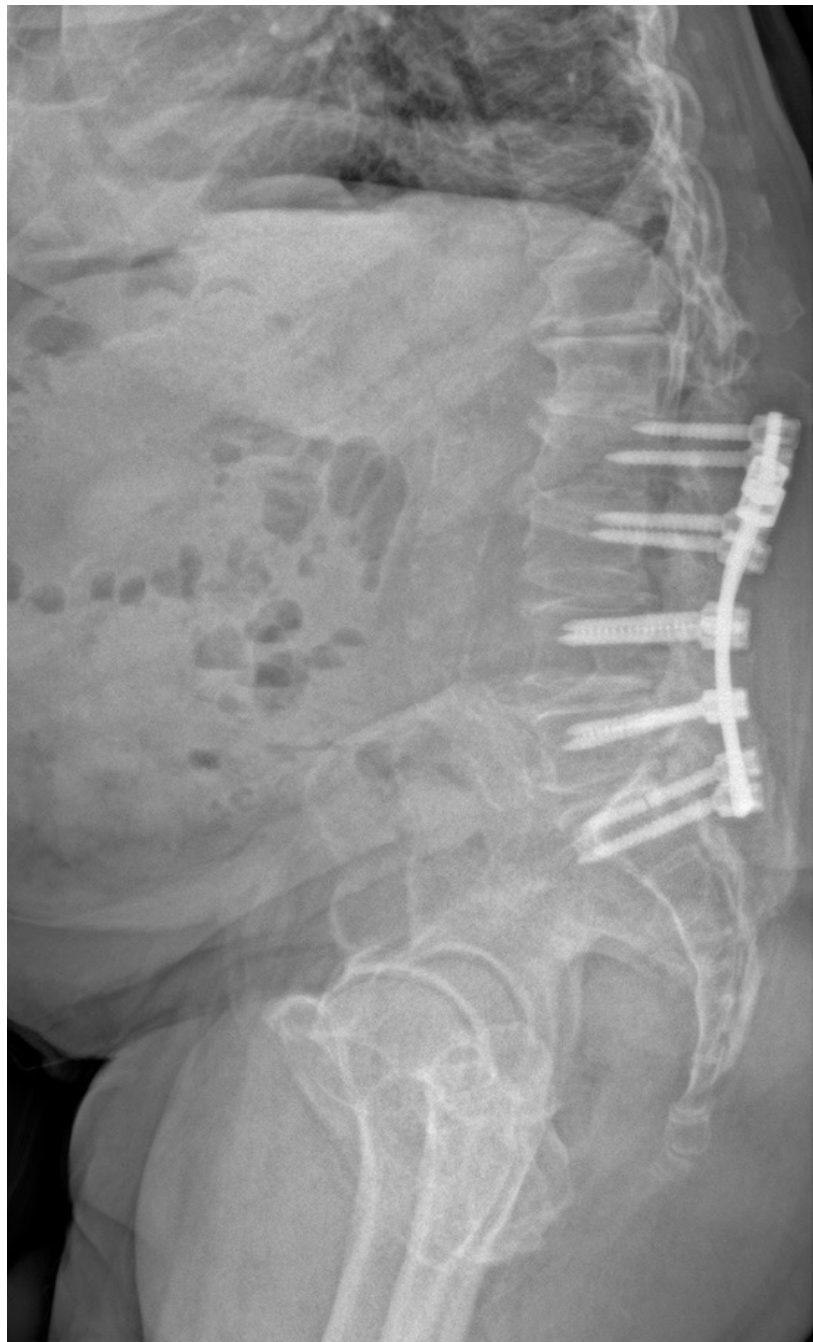
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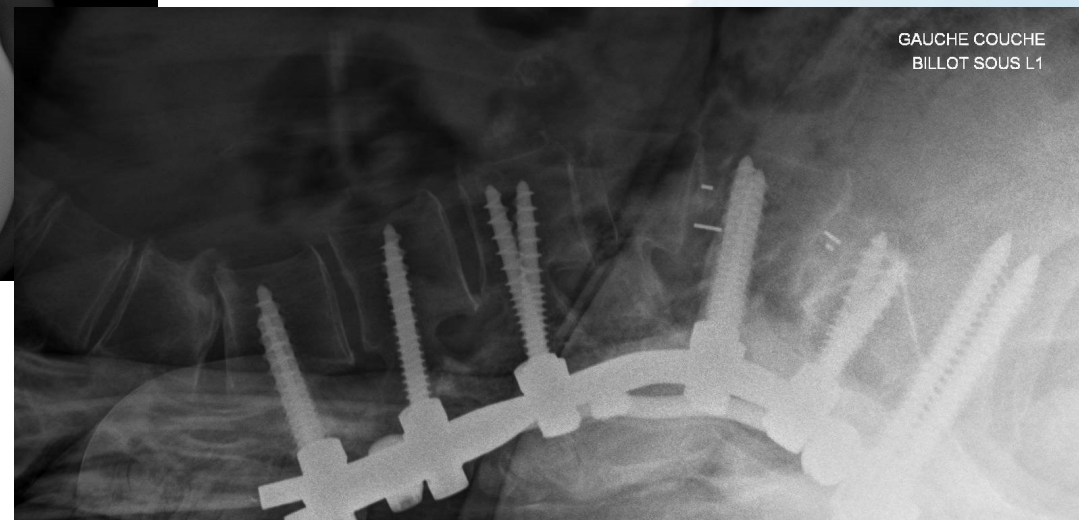
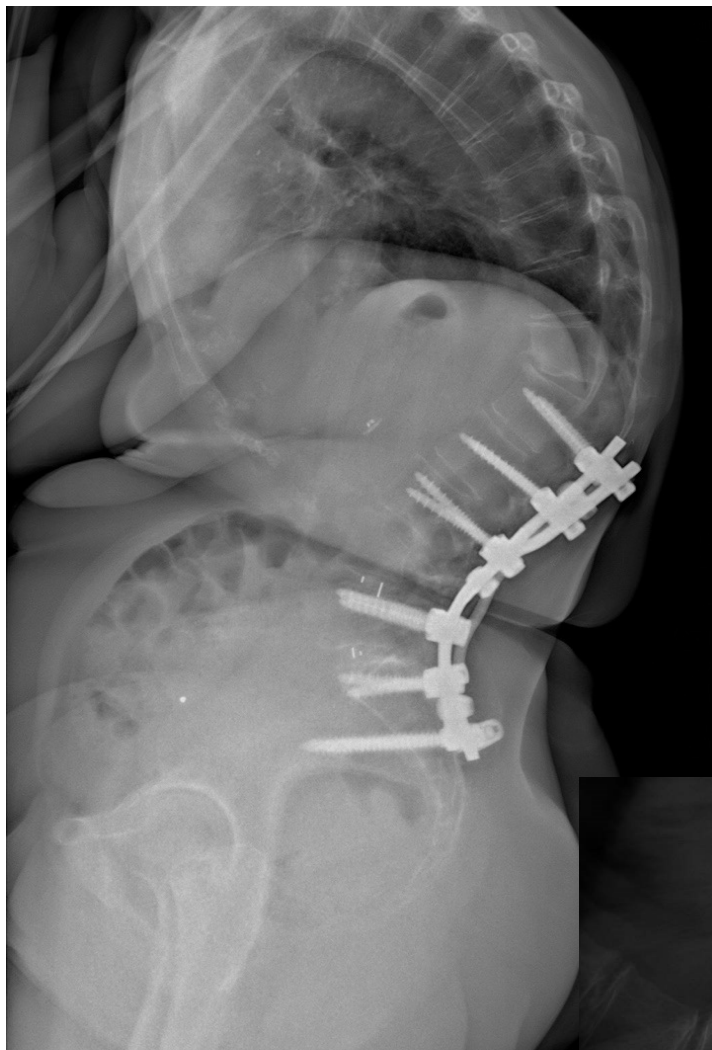
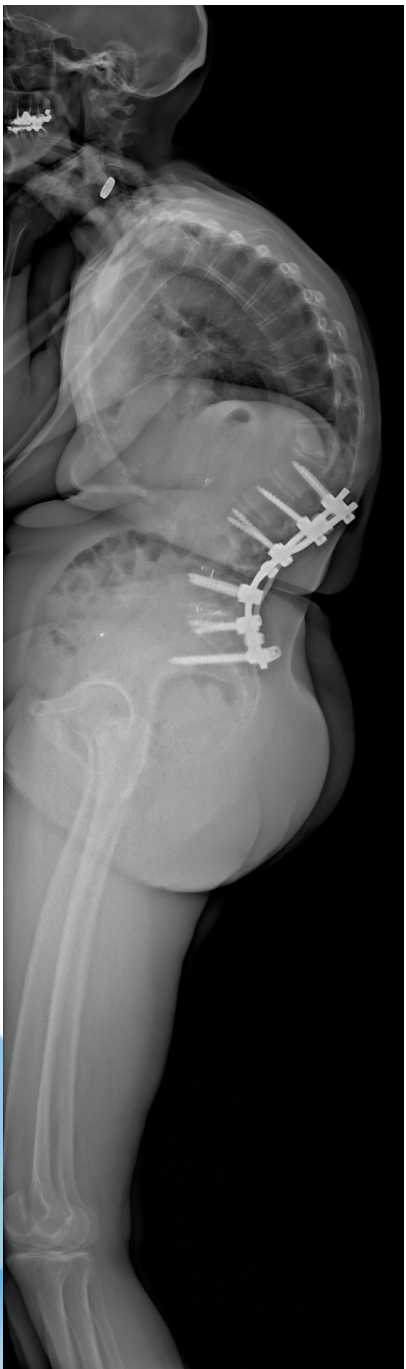
Neo⁺



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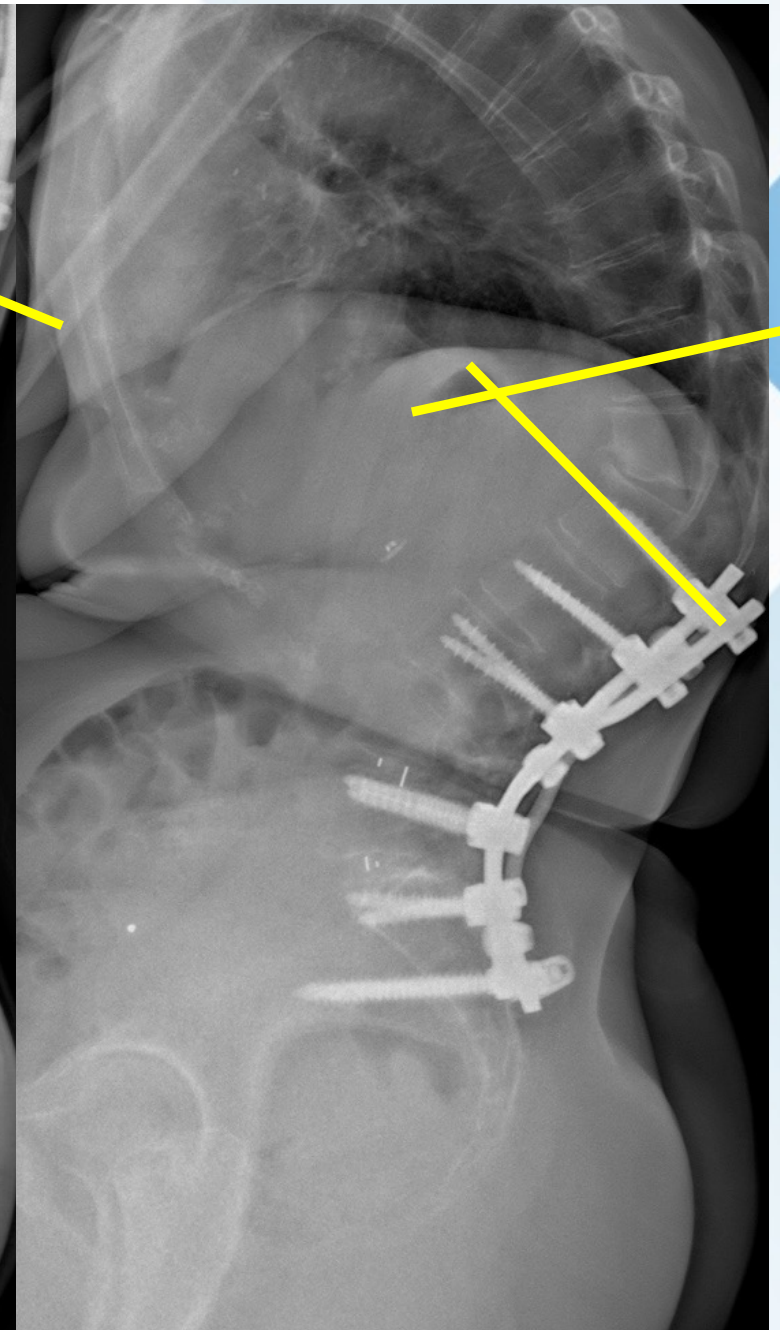
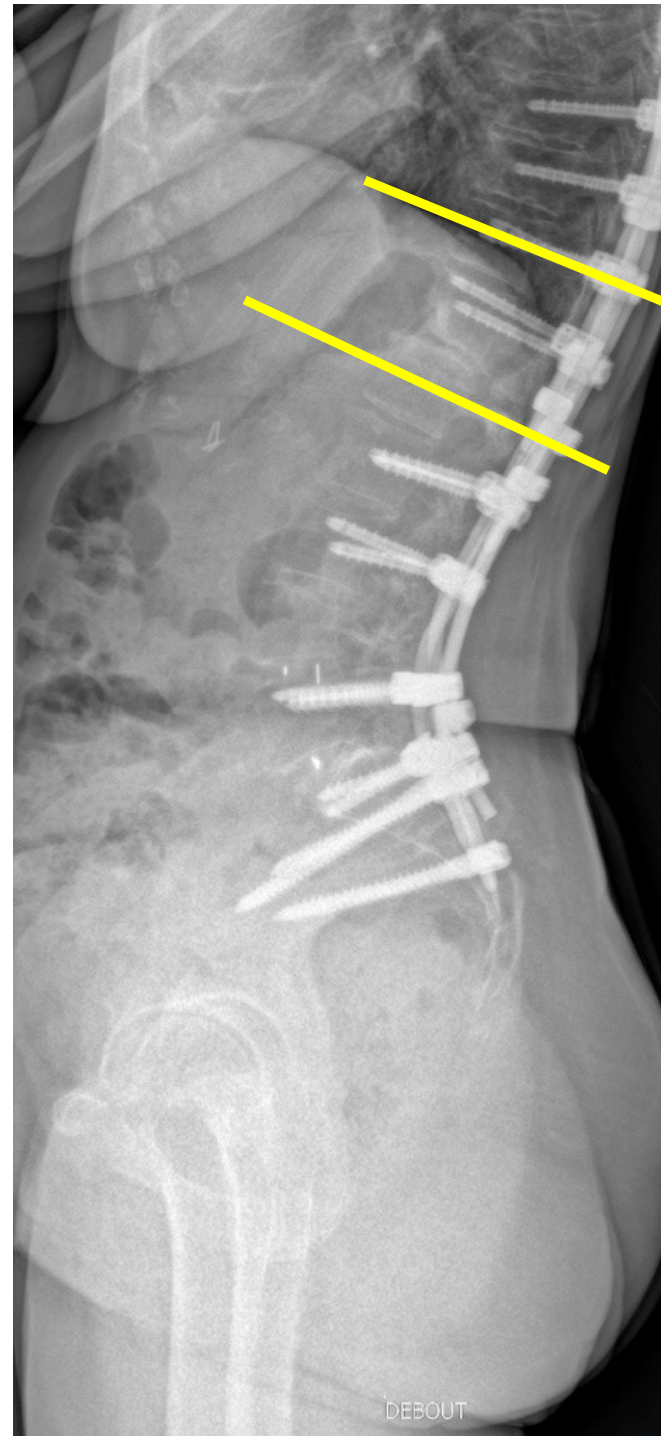
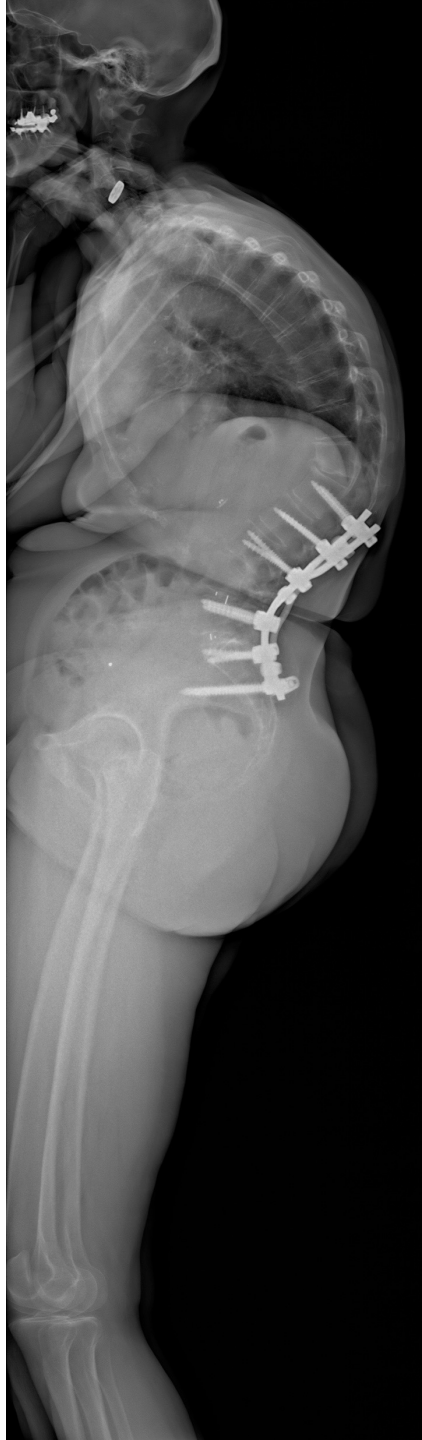


Neo⁺



GAUCHE COUCHE
BILLOT SOUS L1





Take Home Message

- Mandatory to understand the controlled fixation concept
- Learning curve
- Screw insertion and rod bending are a milestone
- Spine flexibility is a second one
- Thus the reduction will be able to follow and be kept under control