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DOM CORIC, M.D.

Current Solutions in Spine Surgery

Spinal Navigation Using BodyTom Intraop CT

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5/2/2013

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DISCLOSURE

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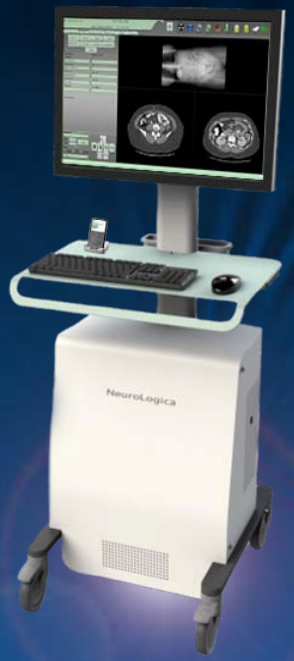
- Spine Wave: Consultant/Stock/Royalties
- Pioneer Surgical: Consultant/Stock/Royalties
- Spinal Motion: Consultant/Stock
- Medtronic: Consultant
- Globus Medical: Speaker Bureau
- United Healthcare: Spine Advisory Board

Introduction

- BodyTom® Core System



-Wireless communication/transfer of images from BodyTom to Workstation (no floor clutter, only cable in power plug).

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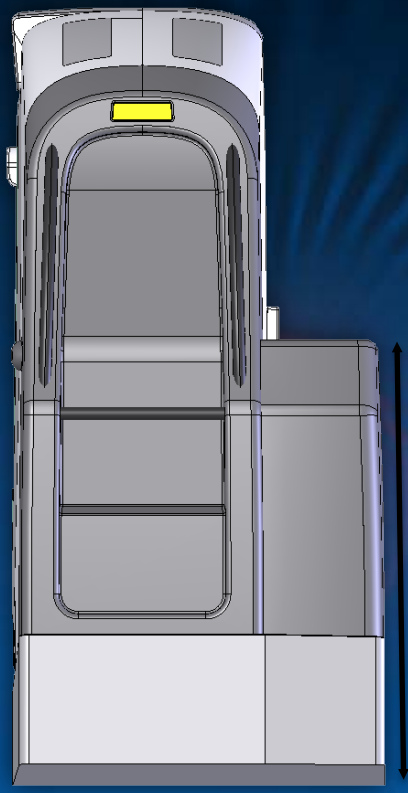
BodyTom® Dimensions

1587kg (3500 lbs)

Side Profile

68.5 CM (27 IN)

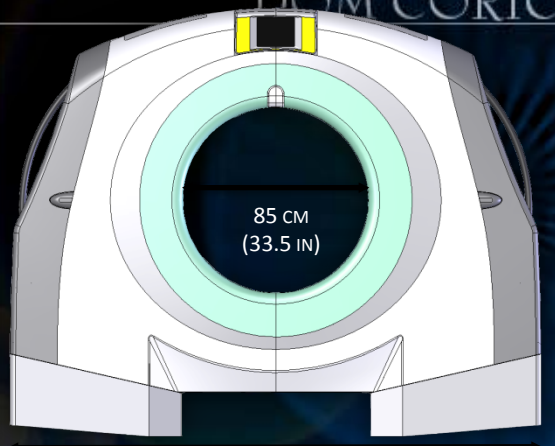


117.5 CM (46.3 IN)

104 CM (41 IN)

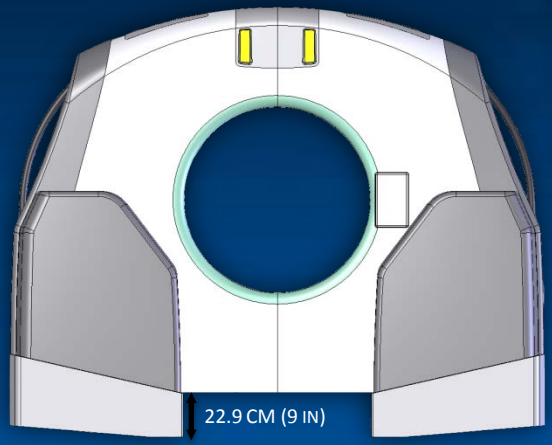
Front Profile

205.7 CM (81 IN)



256.5 CM (101 IN)

Rear Profile



76.8 CM (30.3 IN)

86.4 CM (34 IN)

76.8 CM (30.3 IN)

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BodyTom® Specs

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- 32 Slice Scanner
  - Scanning Parameters
    - **85cm Gantry**
    - **60cm Field of View**
    - 4cm Aperture
    - 32 Simultaneous 1.25mm Slices per Rotation
      - 2.5mm/5mm/10mm
    - 200cm Scan Range
    - Scout, Helical, Axial and Dynamic
    - 4 Positioning Lasers
  - 32 Detectors
    - Solid-State Detectors ($CdWO_4$)
    - Focal Spot Size
      - 1.2mm x 1.4mm
      - 0.7mm x 0.8mm
    - 17 Line Pair
- X-Ray Specifications
  - Tube (Varian)
    - Rotating Anode, Oil-Cooled
    - Tube Voltage 80, 100, 120 &140kV
    - Tube Current 300mA (Maximum)
    - 3.5 MHU Tube
    - 42 Kilowatt Power Supply

Large gantry and field of view.
Same as fixed CT, but portable.

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Brain Images

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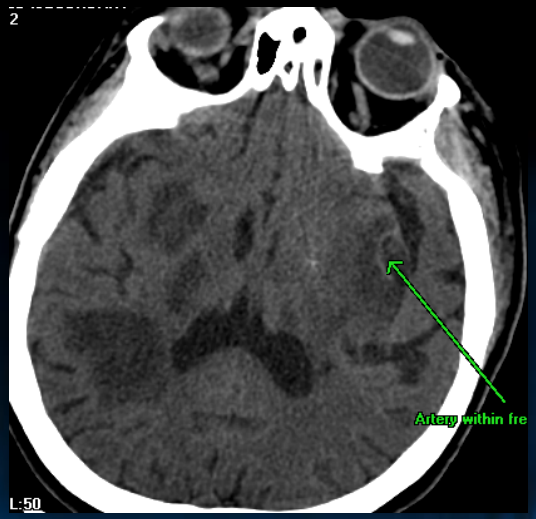

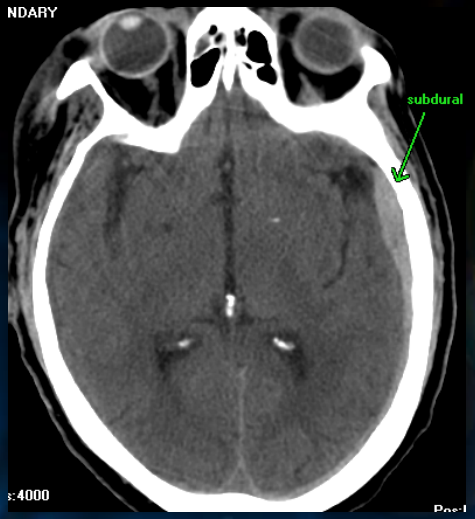

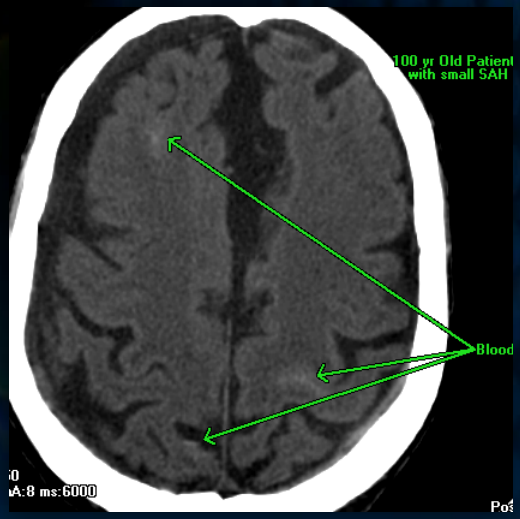

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BodyTom®

Spine Surgery

BodyTom®
Spine Surgery

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- CNSA experience
  - Used with Medtronic Stealth Station as well as BrainLab software.
  - Utilized for both intraoperative Spine and Cranial cases (accuracy allows for soft tissue and intracranial utilization).
    - Most experience with complex spine cases: revision, scoliosis, thoracic hard/soft disc, etc.
    - High resolution allows for use post-thoracic procedures, especially for calcified disc, to definitely establish adequacy of decompression.
    - Also post-PSO to establish adequacy of correction.

BodyTom®
Spine Surgery

DOM CORIC, M.D.

- CNSA experience
  - Advantages
    - One spin of the scanner allows for accuracy over multiple segments (60 cm field of view).
      - Generally thoracic spine to ilium.
      - Total scan time (stopping surgery, scanner in and out) takes ~10-15 mins.
      - Actual image acquisition (spin time) is 30-90 secs.
    - Surgeon/staff do not wear lead. Stand behind portable shields, do not have to leave room/re-scrub.

BodyTom®
Spine Surgery

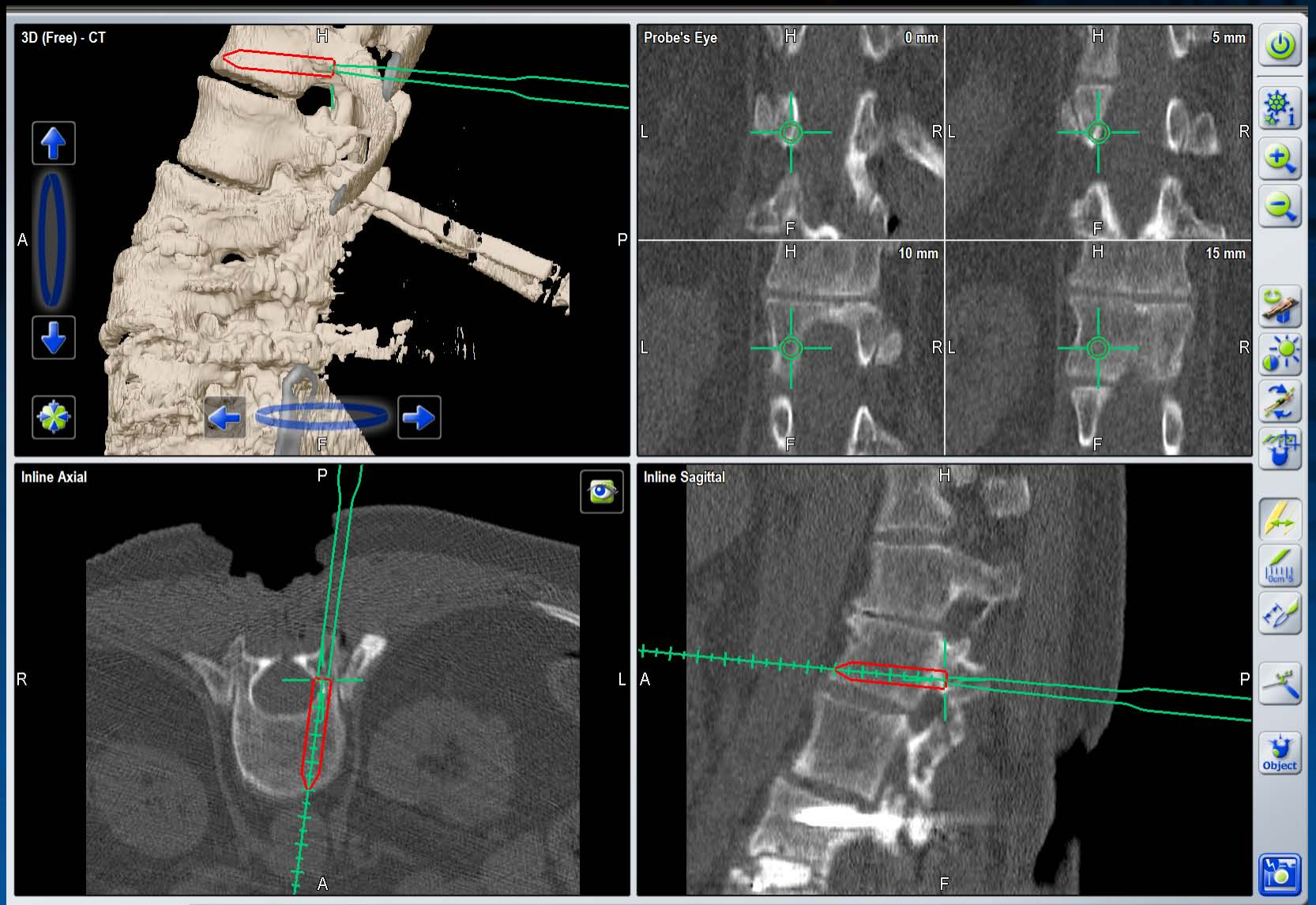
DOM CORIC, M.D.

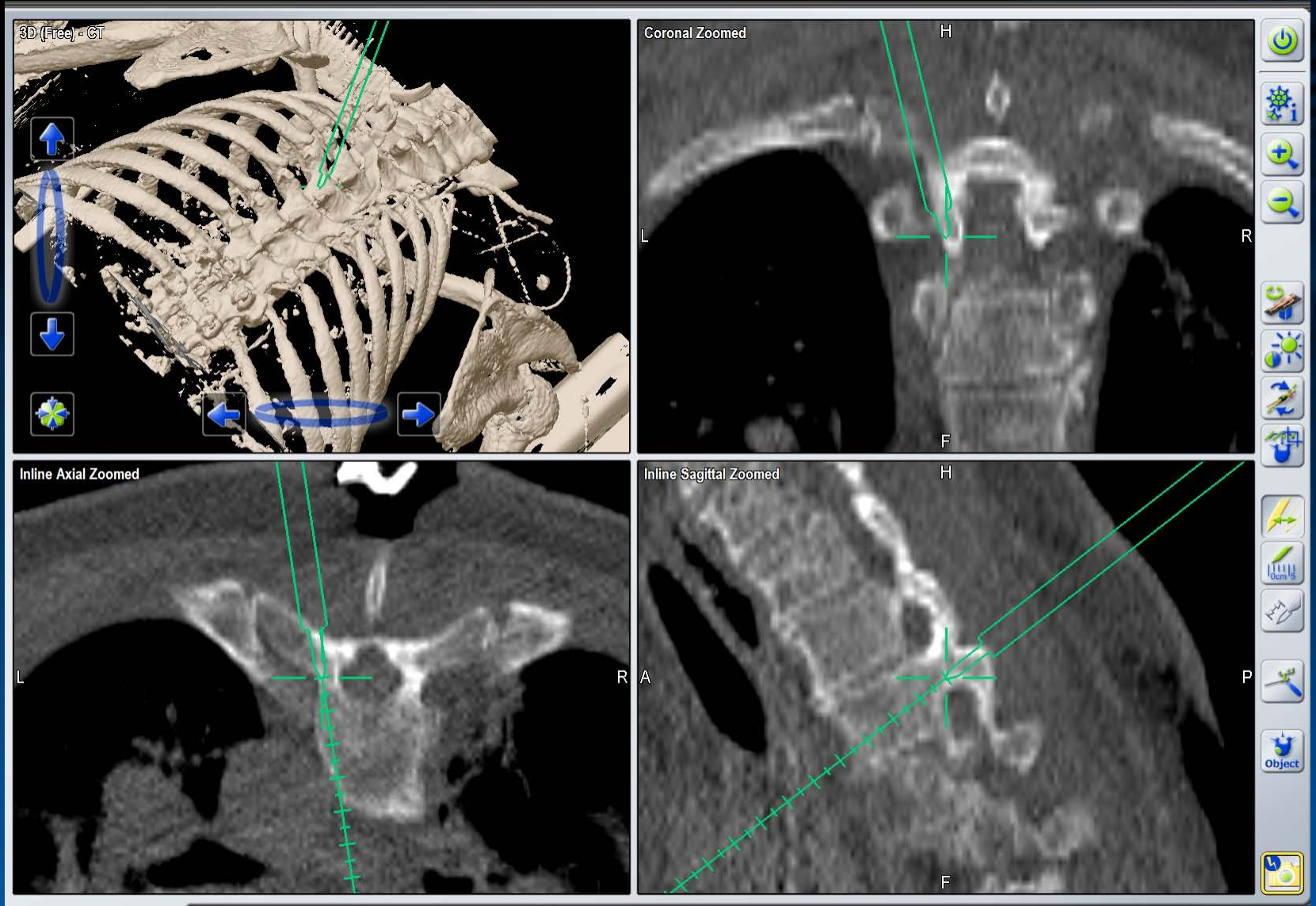
- CNSA experience
  - Advantages
    - Intraop nav allows for dealing with complex pathologies (i.e. redo fusion, scoliosis, altered anatomy).
      - Able to maximize use of segmental fixation (few segments skipped) including largest and longest screws.
      - Post-instrumentation spin confirms effective decompression and essentially eliminates return to the OR for misplaced instrumentation.

BodyTom®
Spine Surgery

DOM CORIC, M.D.

- CNSA experience
  - Disadvantages
    - Stealth software (which we currently use) does not currently allow for spinal auto-registration (AR).
      - Assured by MDT that progress is being made.
      - StealthAiR (AR) is available for cranial use.
      - Use point merge with multiple registration points.
      - Use of fiducials allows for reasonably fast and easy accuracy verification.
    - BrainLab software which does allow for spinal AR.
    - Stryker navigation has submitted spinal AR for approval.


3D (Free) - CT
H
A
P
F
Probe's Eye
0 mm
5 mm
10 mm
15 mm
L
R
F
Inline Axial
P
R
L
A
Inline Sagittal
H
A
P
F
Object
Overview
Accuracy Verification
Probe Straight pos. 1,3 3.5mm / Pos. 1,3
55830-43


3D (Free) - CT
Coronal Zoomed
H
L
R
F
Inline Axial Zoomed
L
R
Inline Sagittal Zoomed
H
A
P
F
Object
Verification
Awl 3mm / Pos. 1-4 55830-35

Case Study

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- TP: Pt is 54 yo F who presents with LBP and bilat LE pain 14 yrs s/p T11-L1 fusion for trauma and 15 yrs s/p L1-5 decompression for tethered cord followed by two subsequent intradural procedures (4 previous surgeries).
  - PE: nonfocal.
  - Imaging shows progressive spondylolisthesis L5-S1 and levo-scoliosis adjacent to fusion with apex L3-4.
  - Incompletely formed L5 hemi-vertebra.

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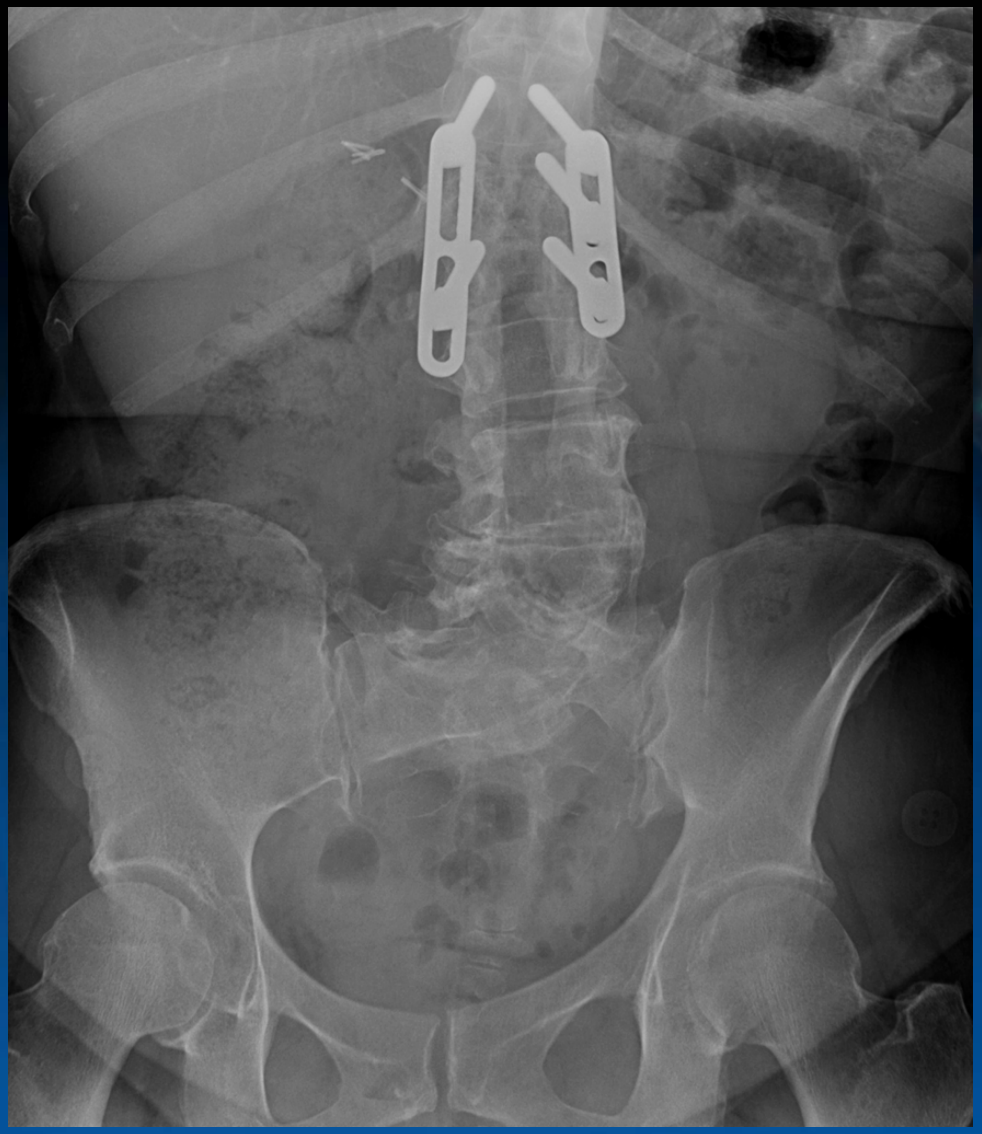

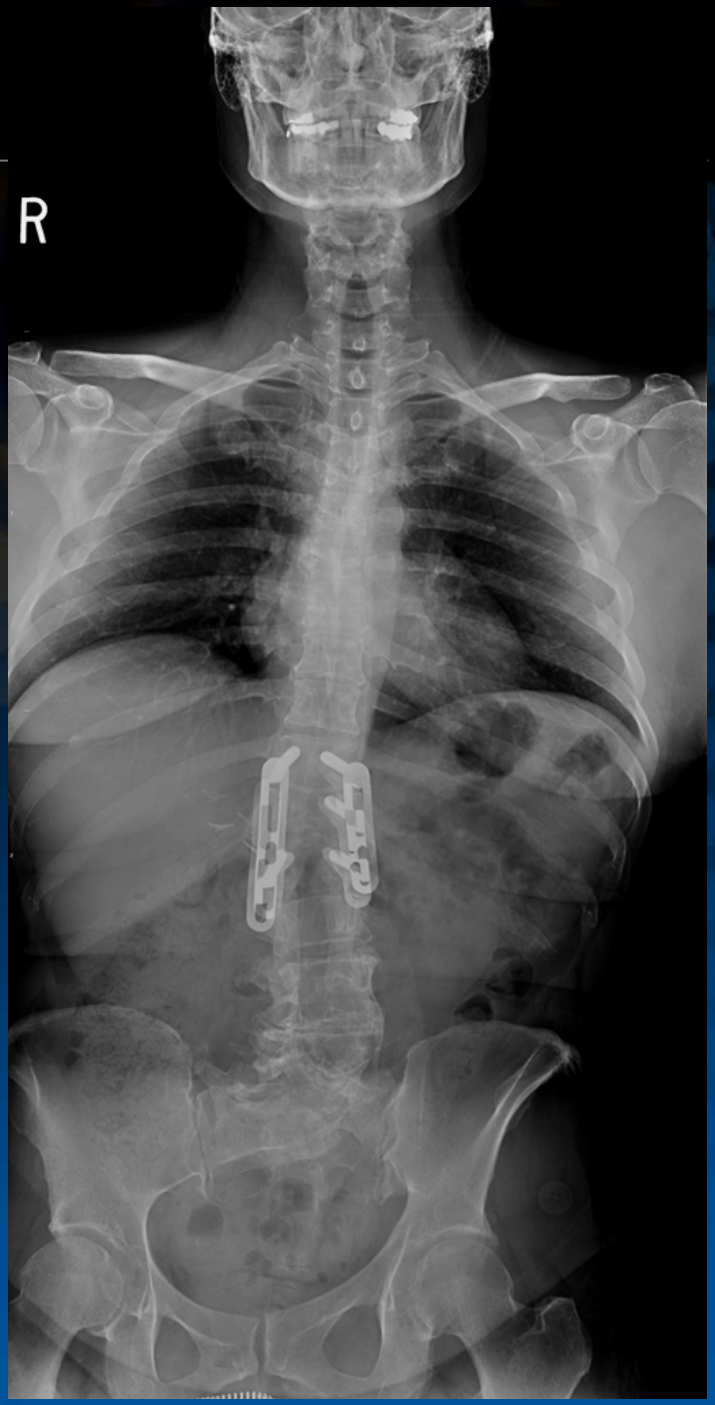

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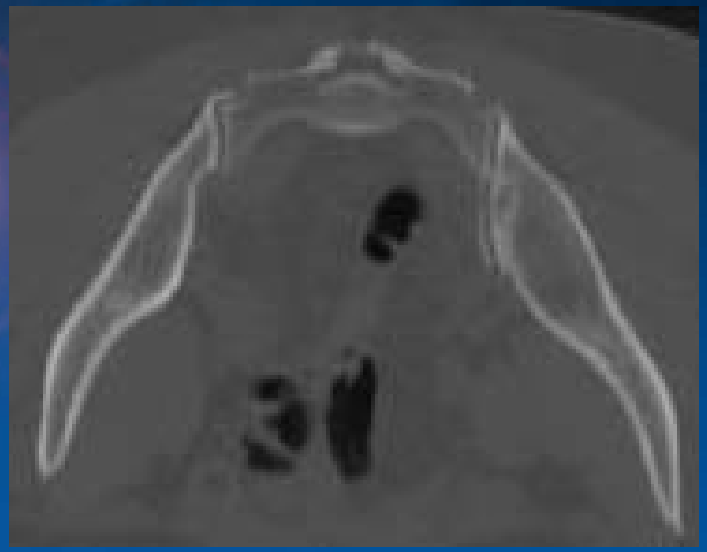
Case Study

- Pt undergoes exploration of fusion with removal of Steffee pedscrew/plate fixation T11-L1 with pedscrew fix T10-S1 with iliac fixation.
  - BodyTom intraop CT with Stealth navigation.



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BodyTom® Intraop Spine Images

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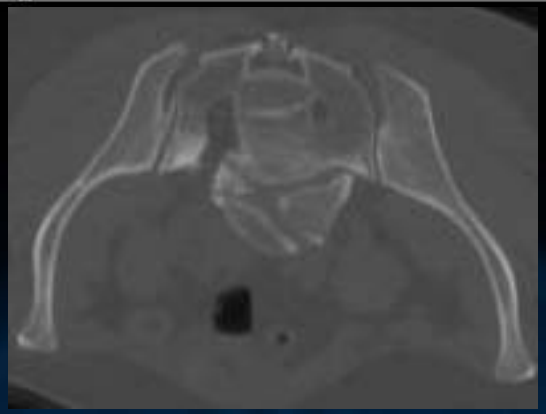
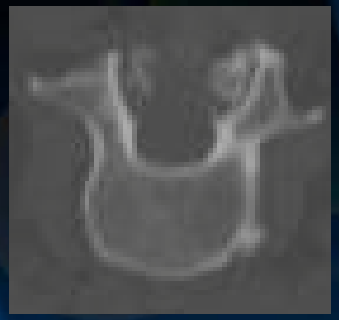
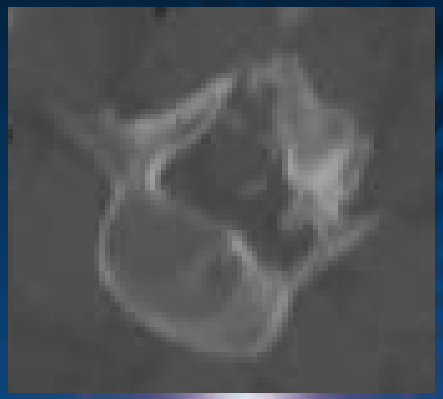
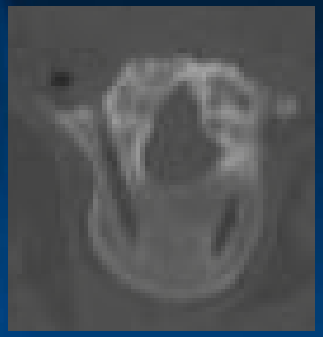
L5-S1 ??



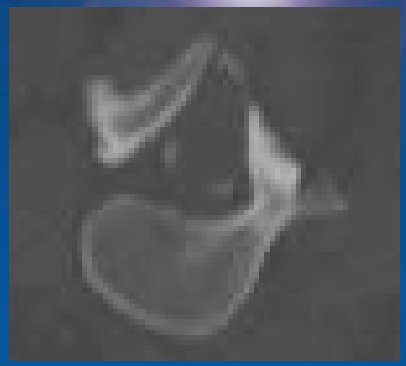


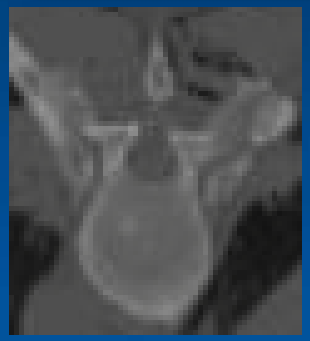
L4





L3





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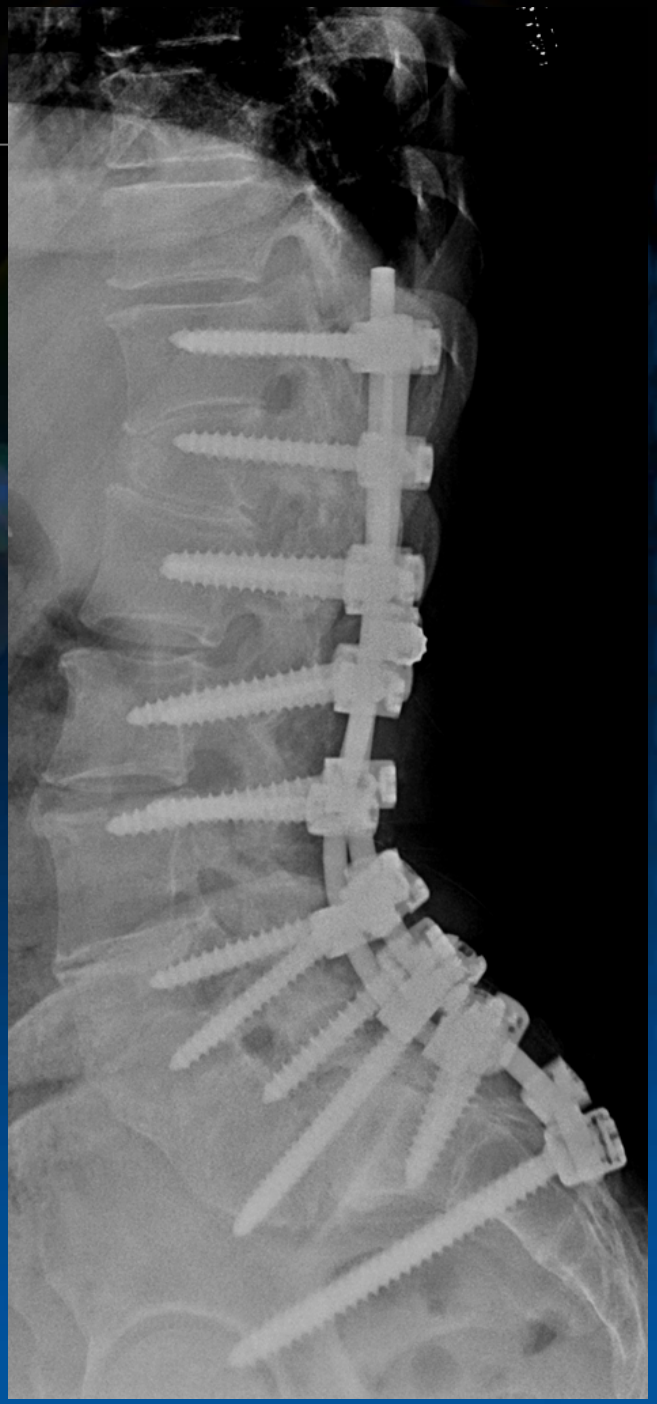

Case Study

- TP: Pt is 23 yo F who presents with progressively severe LBP.
  - PE: nonfocal.
  - Imaging shows 60 degree curve dextro-scoliosis, inferior endplate T11-L3.
  - Compensatory 36 degree curve to left, T7-10.

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Case Study

- Pt undergoes posterior scoliosis correction T4-Ilium with multiple SPOs.
  - BodyTom intraop CT with Stealth navigation.
  - Segmental fixation with good correction of coronal deformity.

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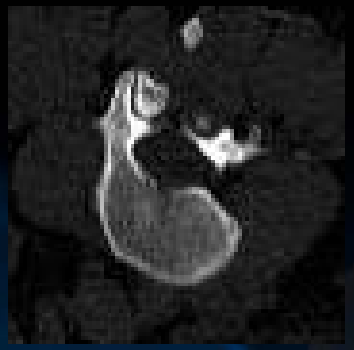


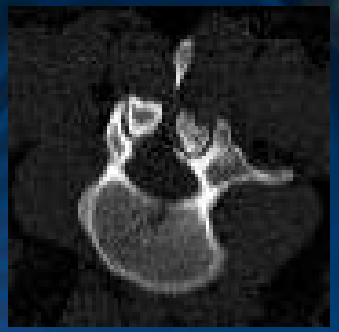

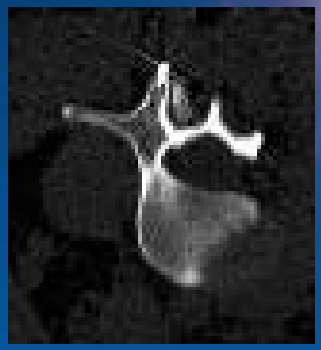

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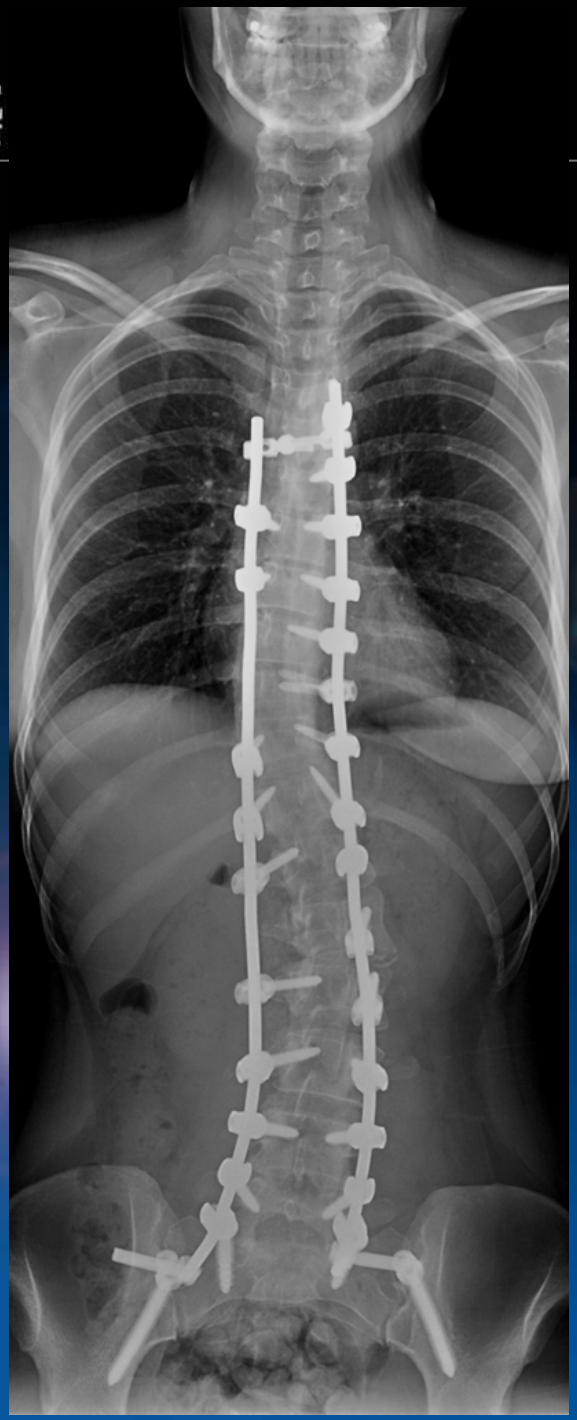

THANK YOU!