

Lower cervical spine



HC Pape, MD FACS



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Objectives

1. Review the role of diagnostic procedures
2. Review indications of timing of surgical fixation and decompression after spinal cord injury (SCI)
3. Review specifics for Bechterew's cases
4. Understand that individualized treatment may be helpful for the treatment of acute injuries: case examples



I imagine that you are familiar with:

1. Anatomy
2. Classification (s)
3. Principles of treatment of standard cases
4. Imagine that sometimes you have to think out of the box



Cervical Spine Injuries

- 10,000-12,000 cases annually in US
- Causes: MVA, sports, falls, acts of violence
- Immense economic impact
 - Estimate: \$7.7 billion, US
- Prognosis after severe SCI remains grim



Diagnostics

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Diagnostics

“Motorcycle vs. truck”

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Truck driver:

**“I was driving on the highway and I
heard a pop about 2 miles ago”**



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General Goals

Fracture / SCI

- +/- Pharmacologic Treatment
- +/- Urgent Closed Reduction

Spine Decompression

Spine Stabilization

Neurologic
Improvement/
Preservation

Prevent
Medical
Complications

Allows for
Early
Mobilization

Protects
Neurologic
function



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Is Surgery Reasonable?

- Managed conservatively in the past
- Surgery was associated with neurologic decline
- Bedrest and postural techniques led to fusion
- Spontaneous neurologic recovery with non-operative management



Guttman, 1963

UK Royal College of Surgeons



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Non Op Management

- Deterioration
 - 5/63 in one series
- Advances
 - Critical care
 - Neuroanesthesia
 - Surgical technique
 - Instrumentation



Katoh et al, *Spine* 1996



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Delayed Surgery

- Allow patient to stabilize
- Address all medical issues
- Let cord edema resolve
- Series and case reports of neuro decline after early surgery



Marshall, LF et al J Neurosurg, 1987



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Early Surgery

- Early decompression limits secondary injury
- Animal data
- Provides the best chance for neurologic recovery
- Early mobilization decreases hospital costs, LOS, medical complications



Early Surgery

- Urgent surgery is not more dangerous than early surgery

McLain et al, *Spine* 1999

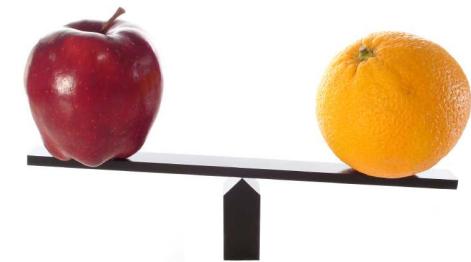
- Shorter LOS, decreased pulmonary complications, equivalent neuro outcomes

McKinley et al, 2004



Early Surgery

- Early decompression (<12 hrs) of cervical injuries may significantly improve neurologic function
 - *Papadopoulos et al J Trauma 2002*
- Early decompression (<24 hrs) in pts with **incomplete** injury resulted in better outcomes
 - *La Rosa et al Spinal Cord 2004*
- Early decompression (<8 hrs) did not improve neurologic recovery
 - *Pointillart et al Spinal Cord 2002*

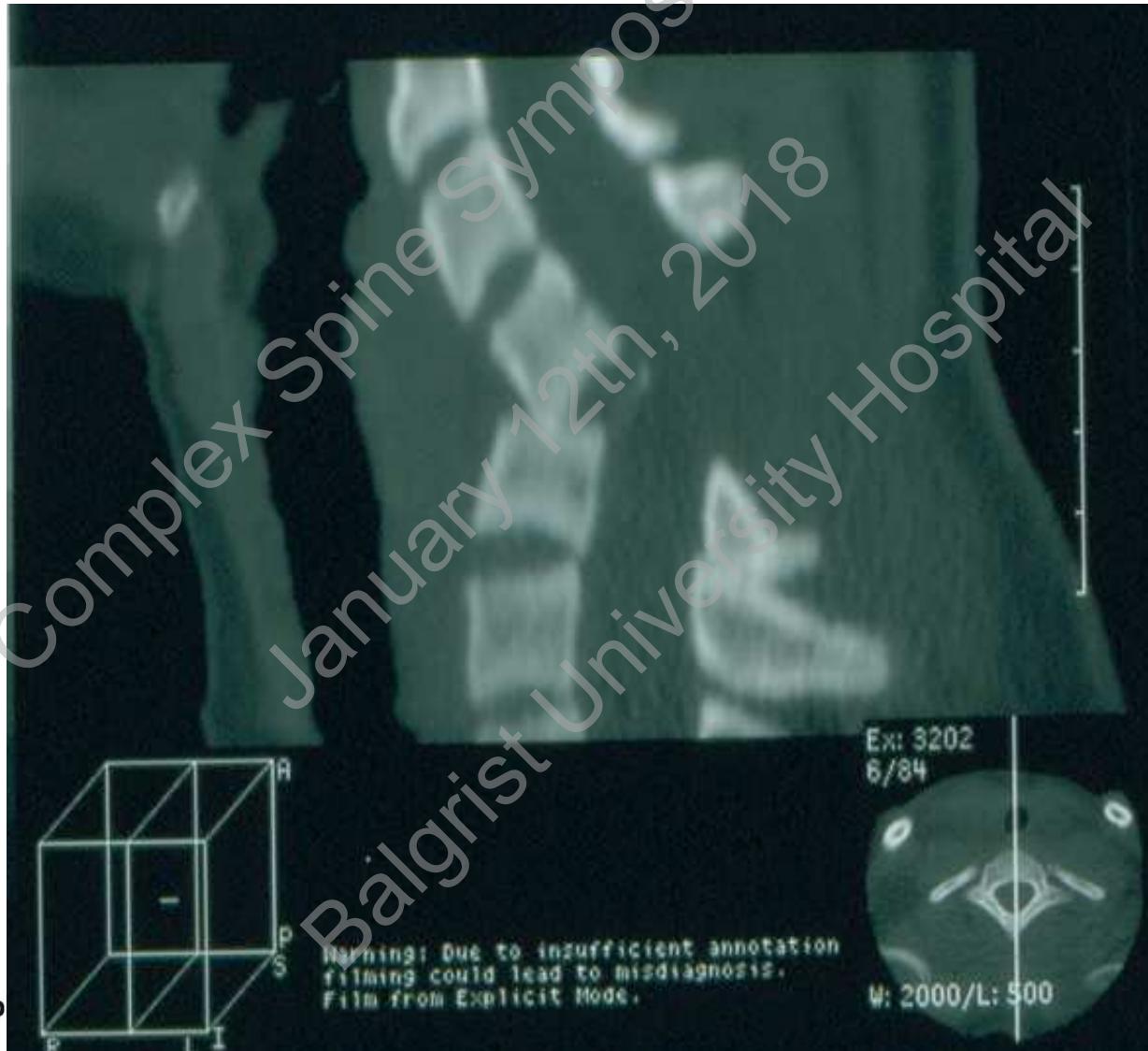


CASE PRESENTATION

- 16 year old female
- Diving accident into pool at graduation party
- Unable to move lower extremities

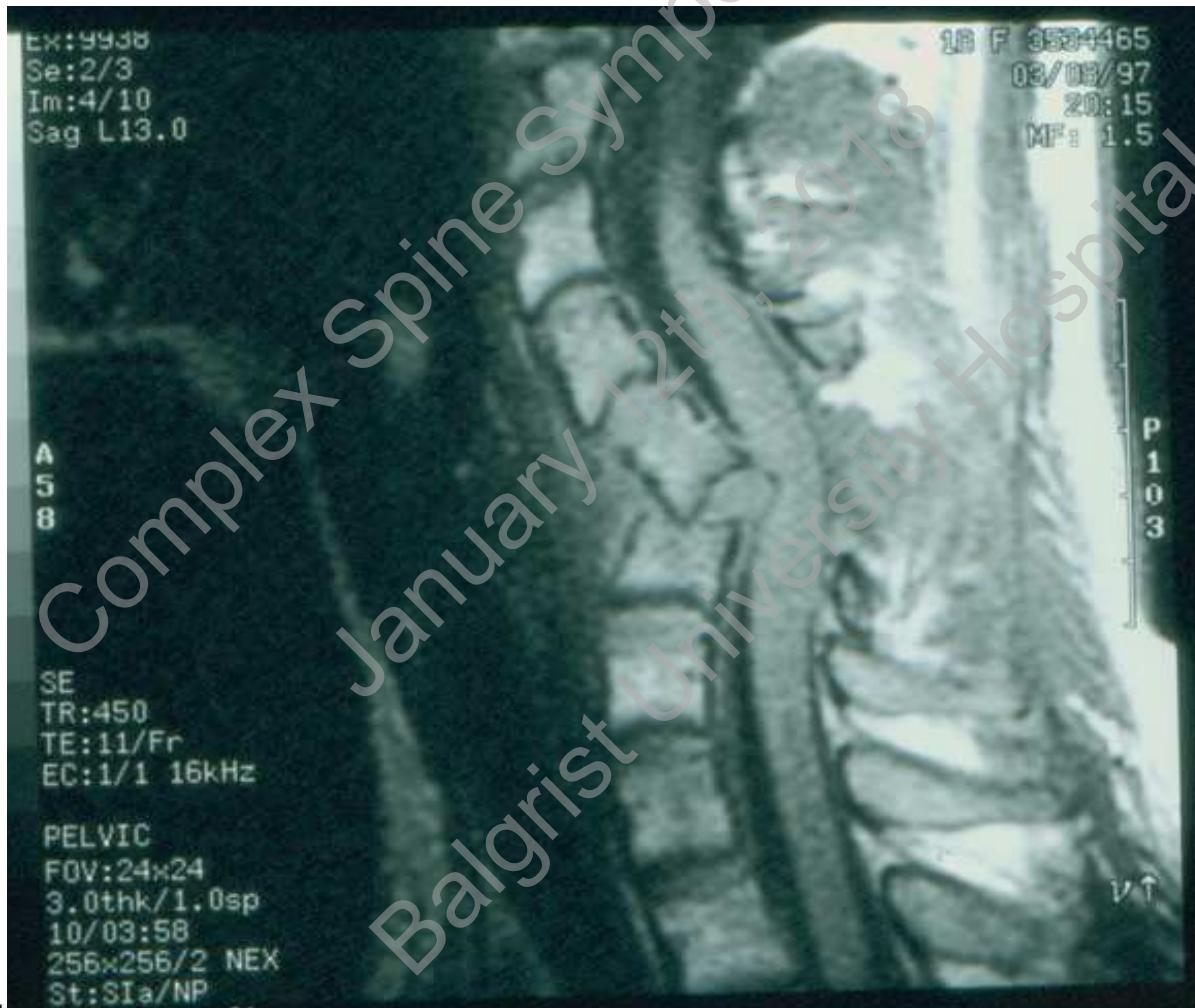


CT Scan C-Spine



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MRI C-Spine



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Post-Op



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A Clinical Practice Guideline for the Management of Patients With Acute Spinal Cord Injury: Recommendations on the Use of Methylprednisolone Sodium Succinate

Global Spine Journal
2017, Vol. 7(3S) 203S-211S

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Bechterew's: what is special ?



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Bechterew's: what is special ?





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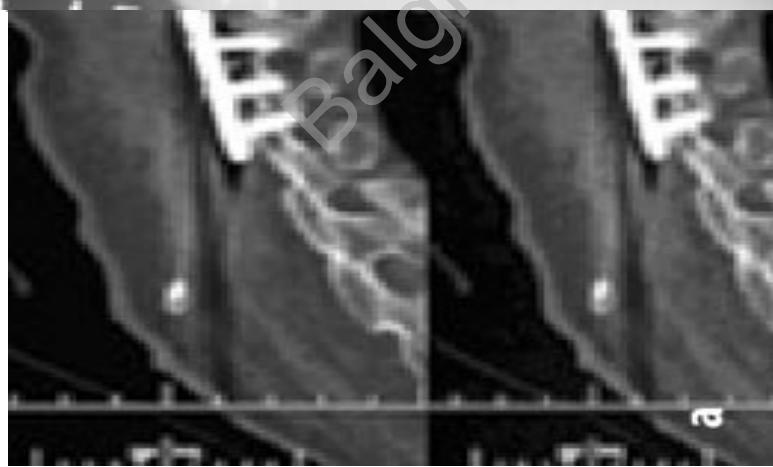
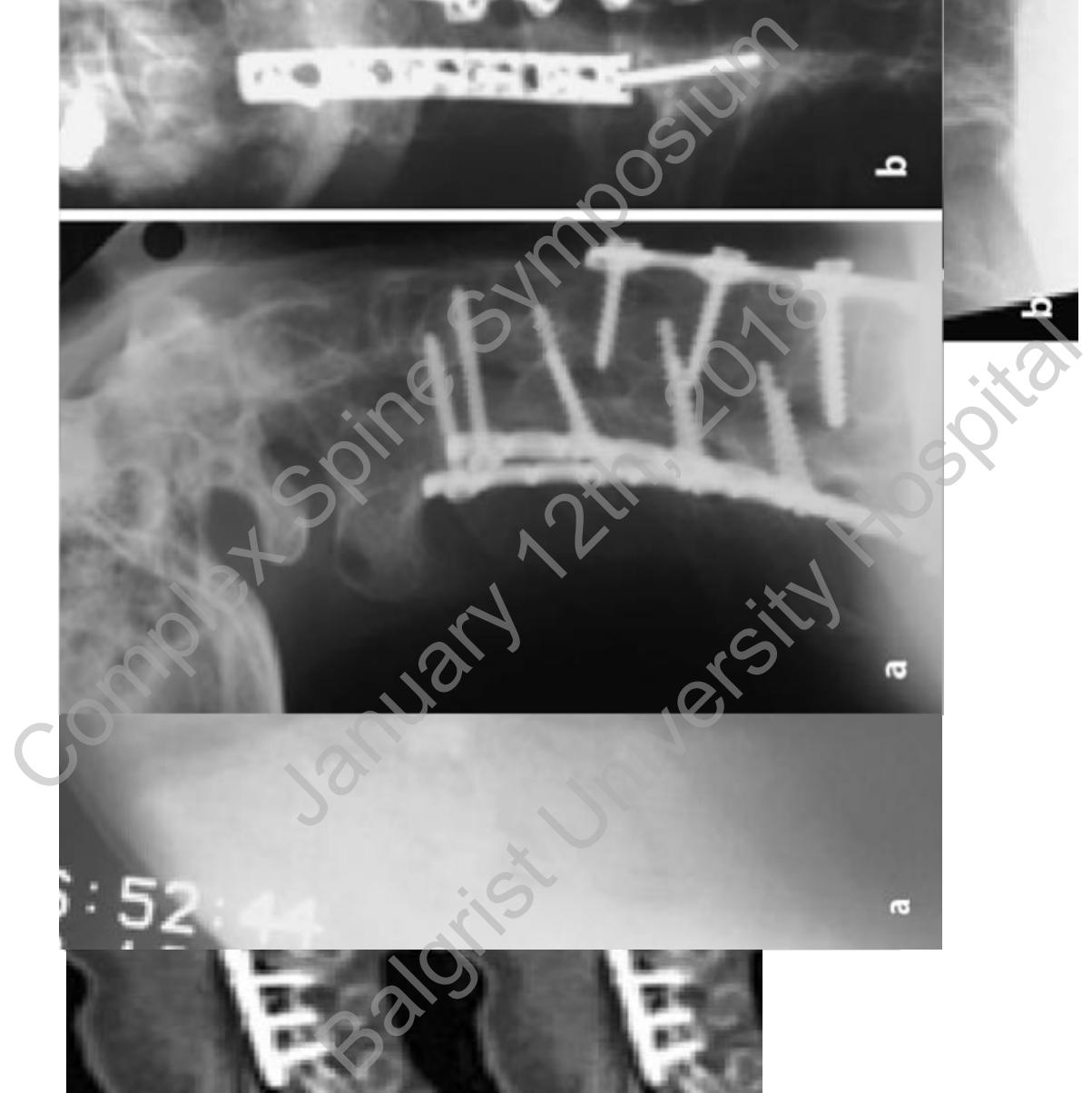


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Welcome to reality



15-Jähriger schwer verletzt

Beim Spielen mit Pistole löste sich ein Schuss

[REDACTED] - Drei Jugendliche hantierten im Keller eines Einfamilienhauses in [REDACTED] mit einer Handfeuerwaffe. Ein Schuss löst sich, ein Jugendlicher (15) verletzt sich schwer.

tetraplegic below C5



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ventral



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dorsal

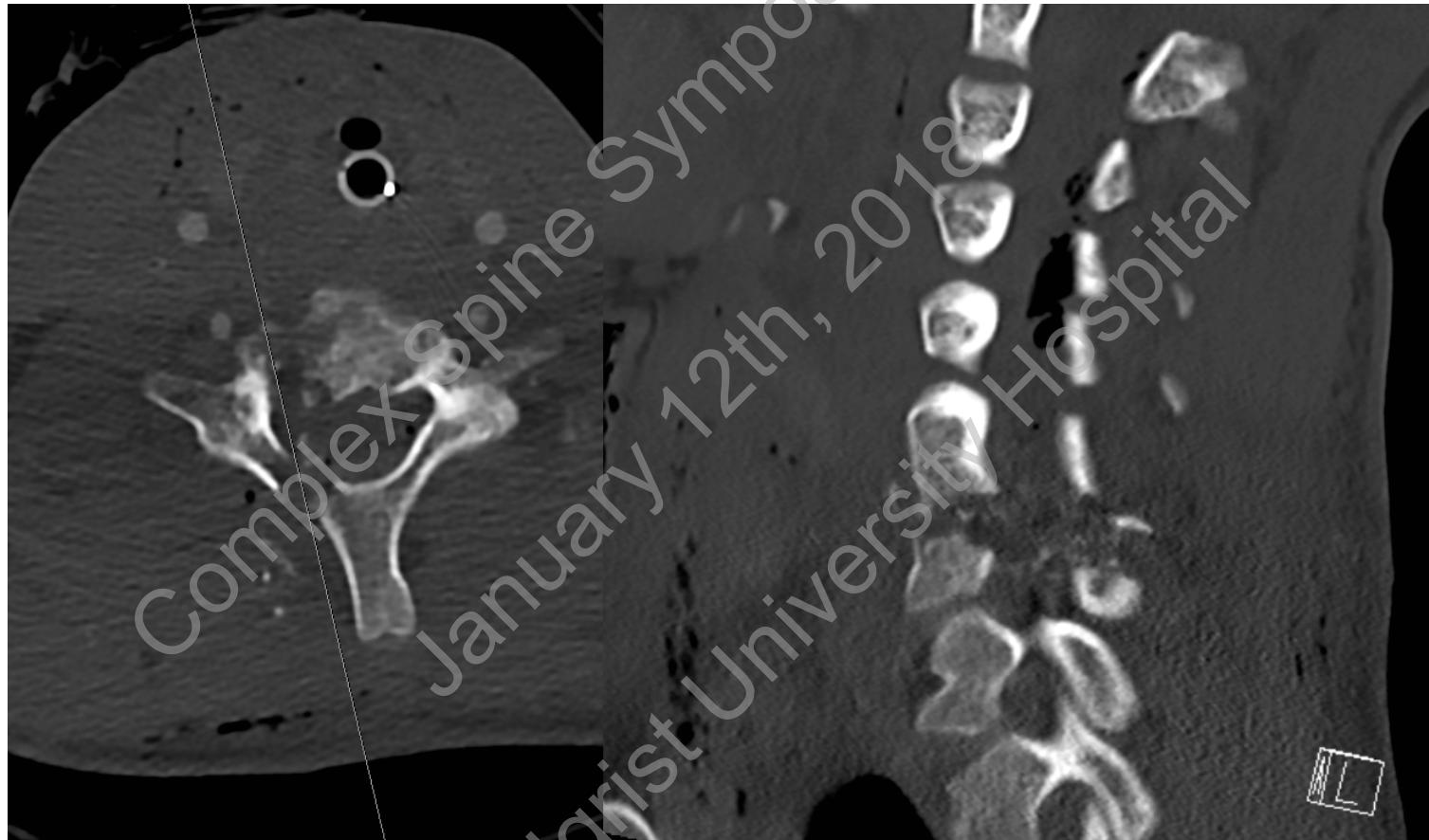


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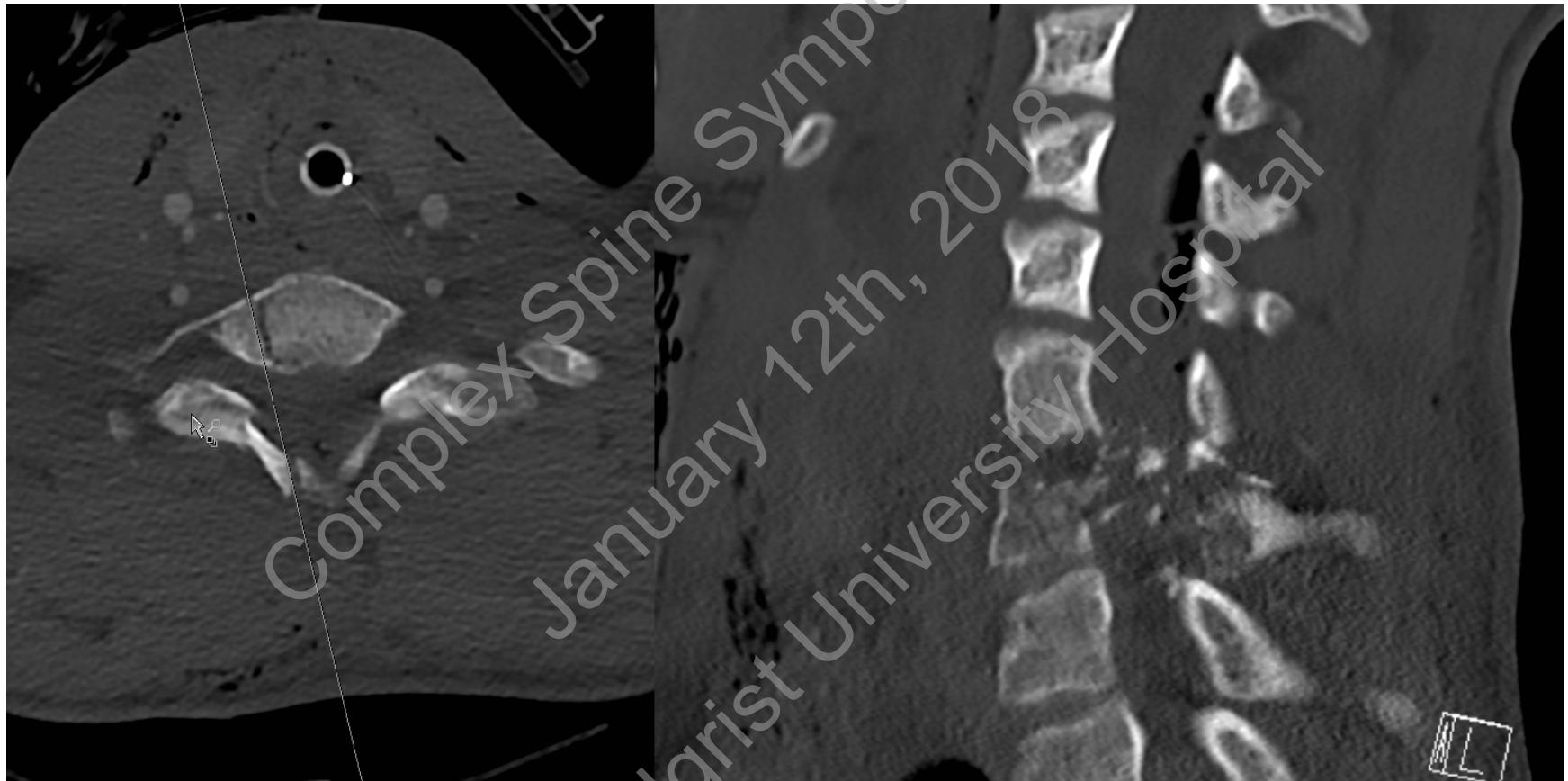


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Trajectory C6

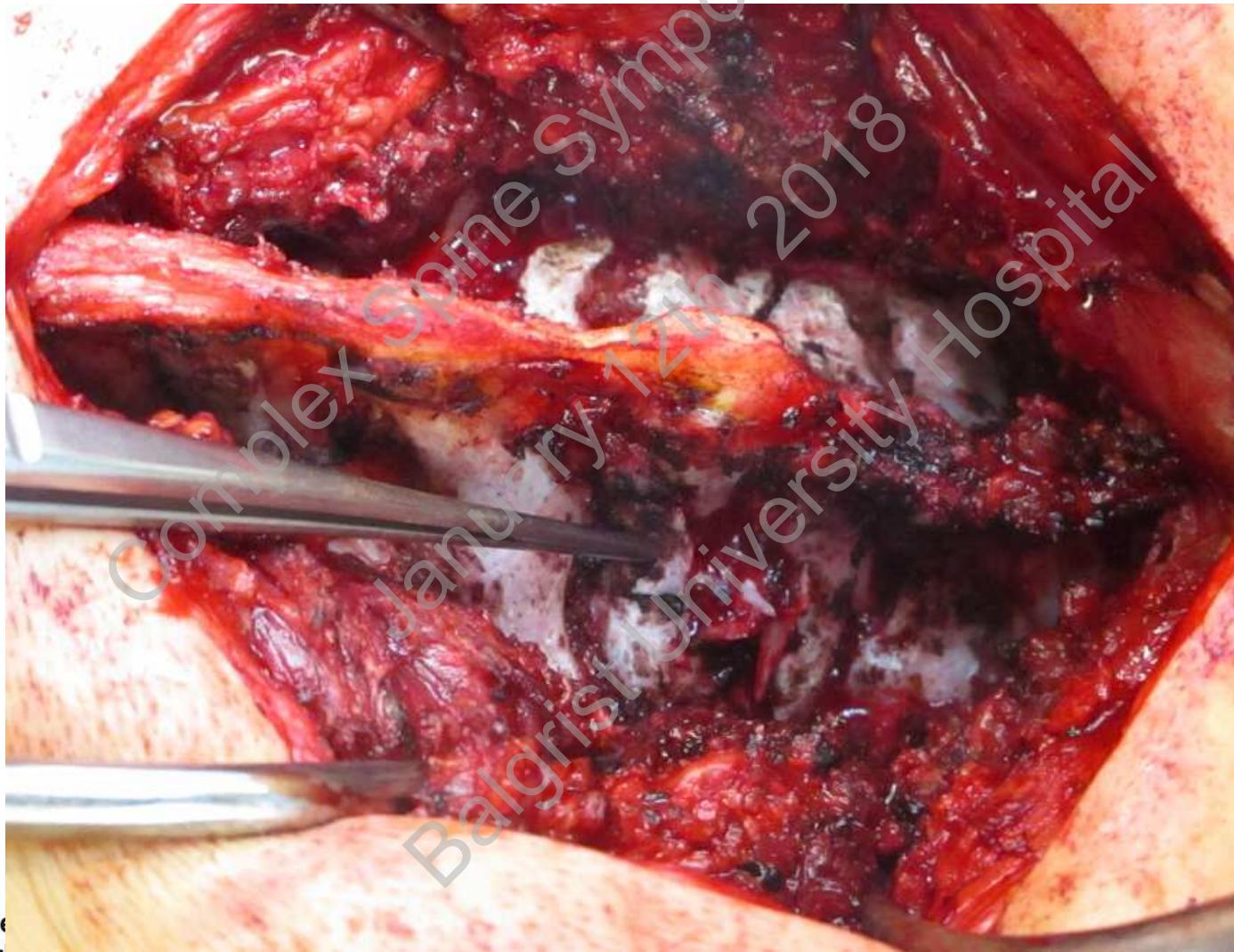


Split fx. C7



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Surgery

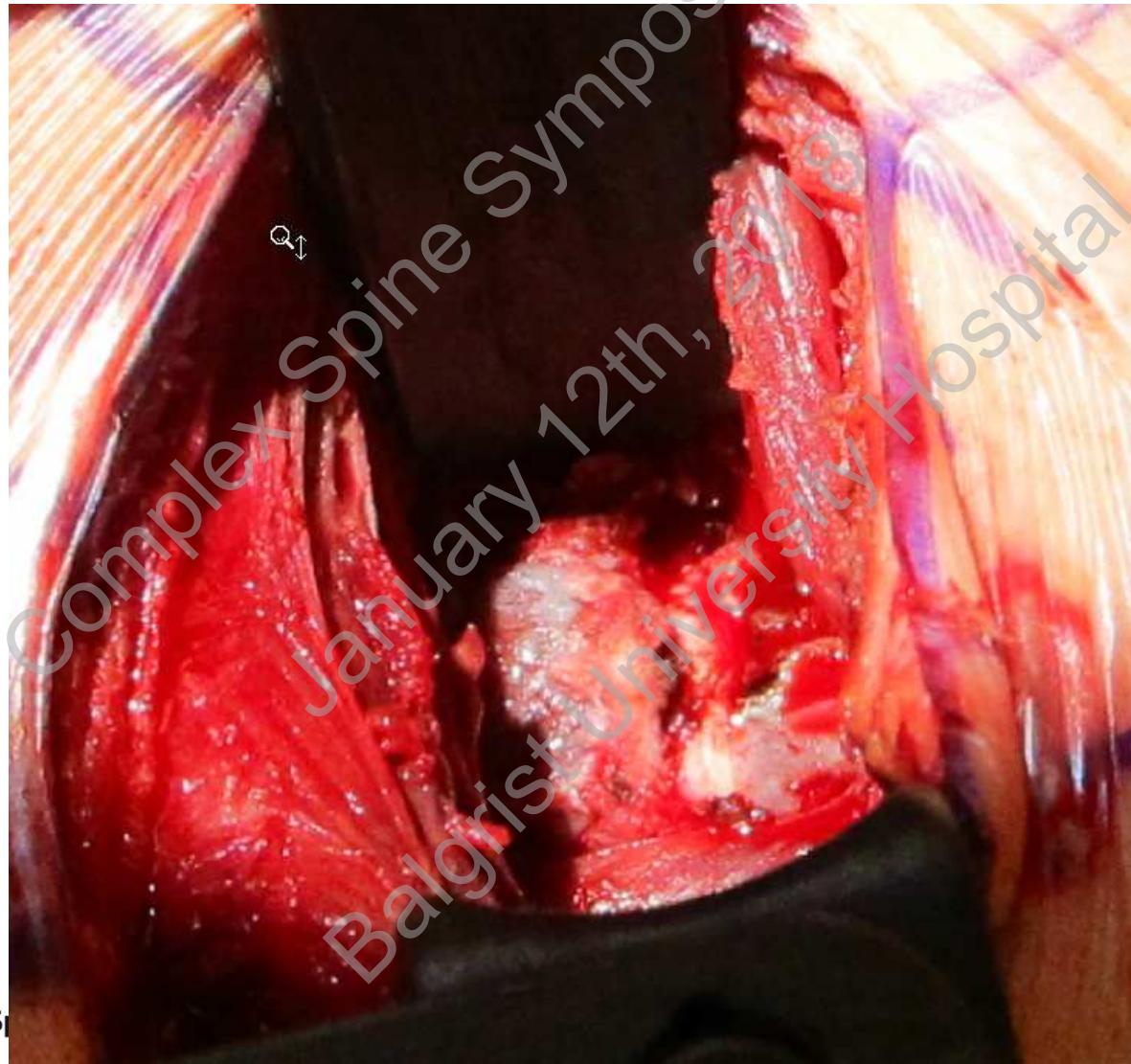


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ventral

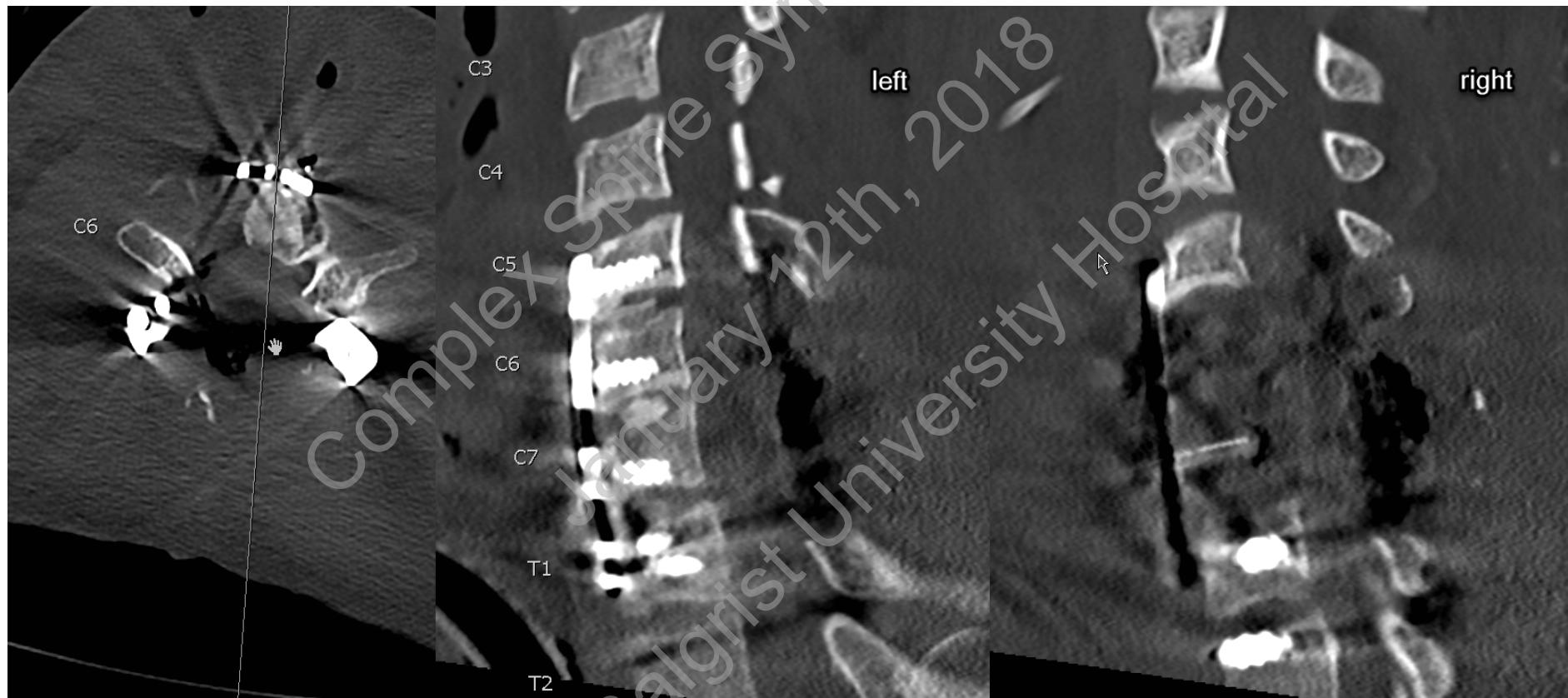


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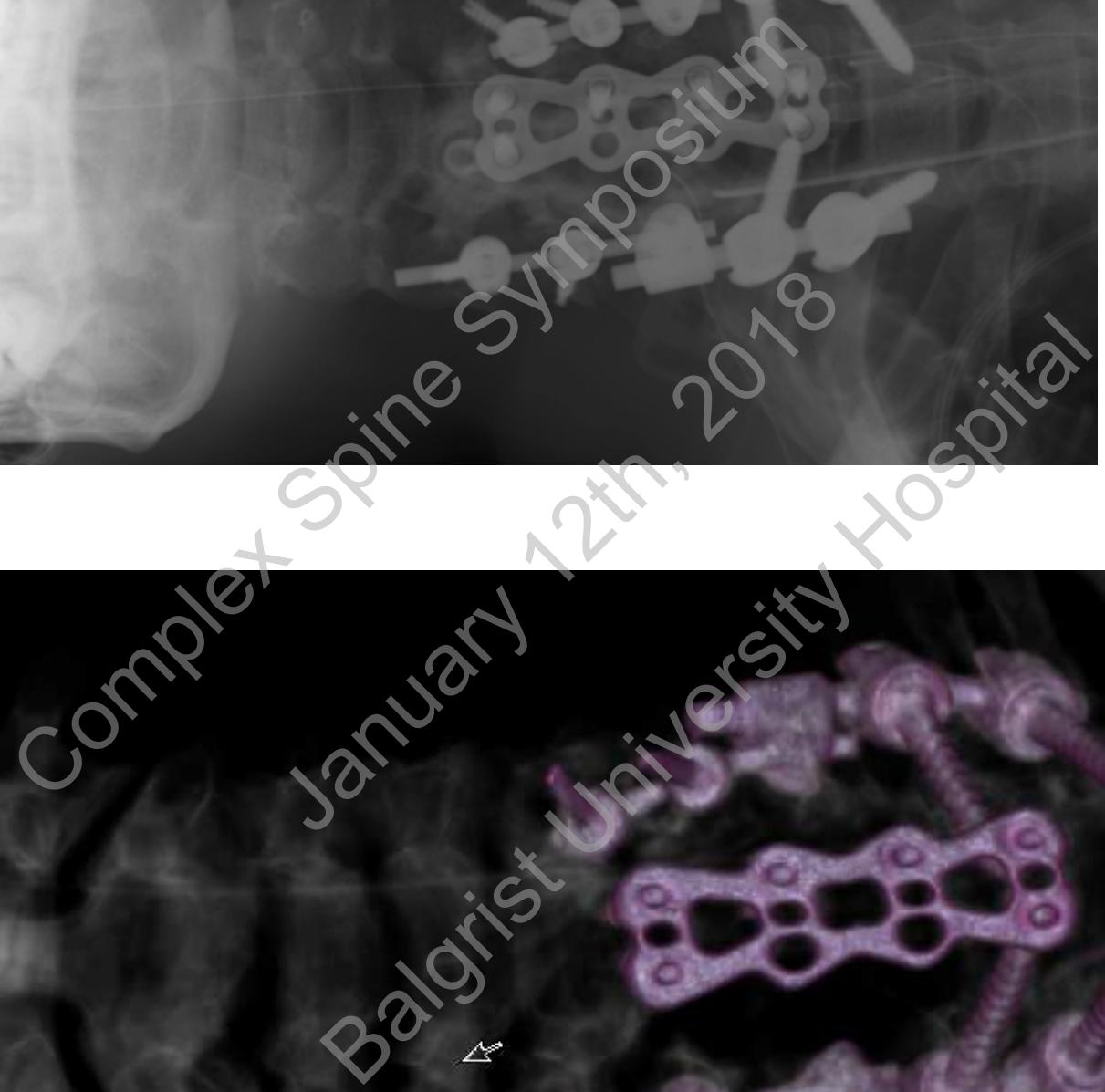
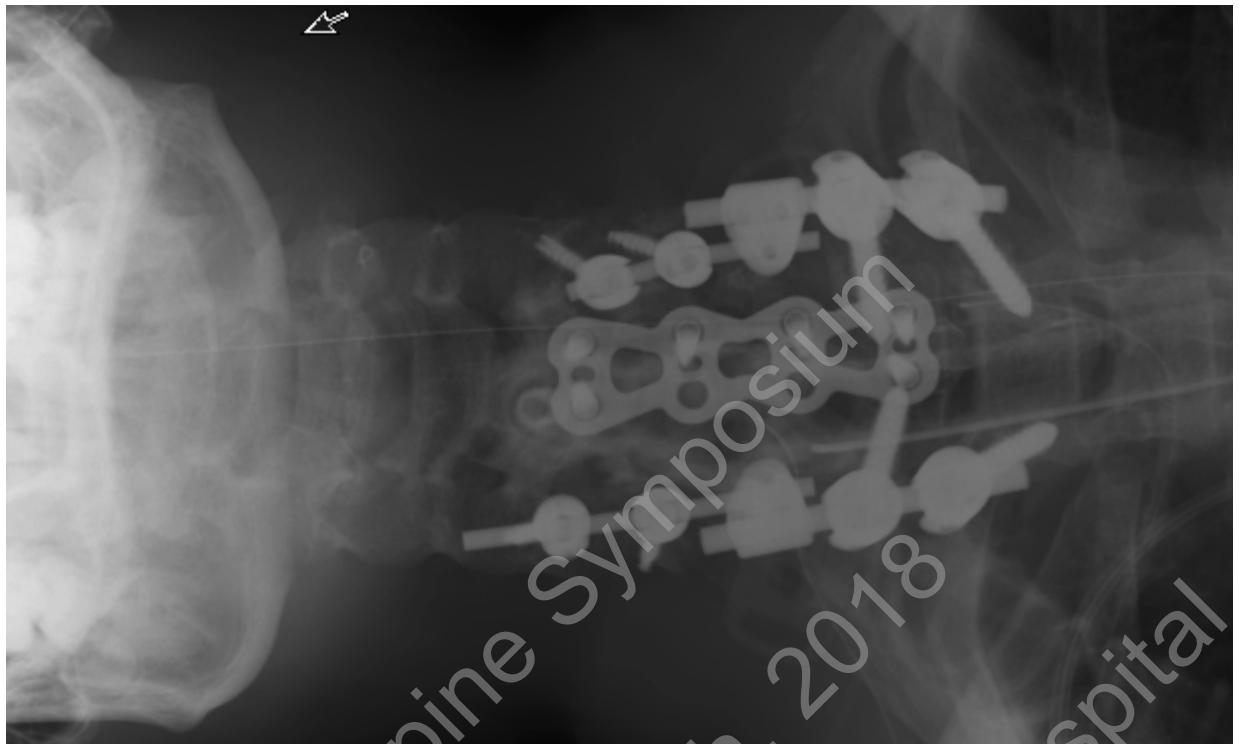


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Post OP



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Conclusions

- Complete your diagnostic procedures !
- SCI: Class II evidence suggest early (<24 hrs.) surgery can be performed safely
- Bechterew's: Beware of rigid fixation
- The real world cases: individualized surgery, based on the type of comorbidity / injury

