

The background of the slide features three CT scan images of the cervical spine. On the left is an axial view showing a cross-section of a vertebra. In the center and on the right are two sagittal views showing the full length of the cervical spine from the skull base to the thoracic inlet. The text 'Cervical Spine' is overlaid on a semi-transparent blue box at the top center.

Cervical Spine

UNC Radiology Residency Educational Scholarship

University of North Carolina School of Medicine
Department of Radiology 2020

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SCHOOL OF MEDICINE
Radiology

Learning objectives

By the end of this activity, participants will be able to:

1. Understand cervical spine anatomy
2. Know what test to expect and order in the setting of trauma
3. Relay mechanisms of cervical spine injury

Module Outline

I. Background

II. Anatomy

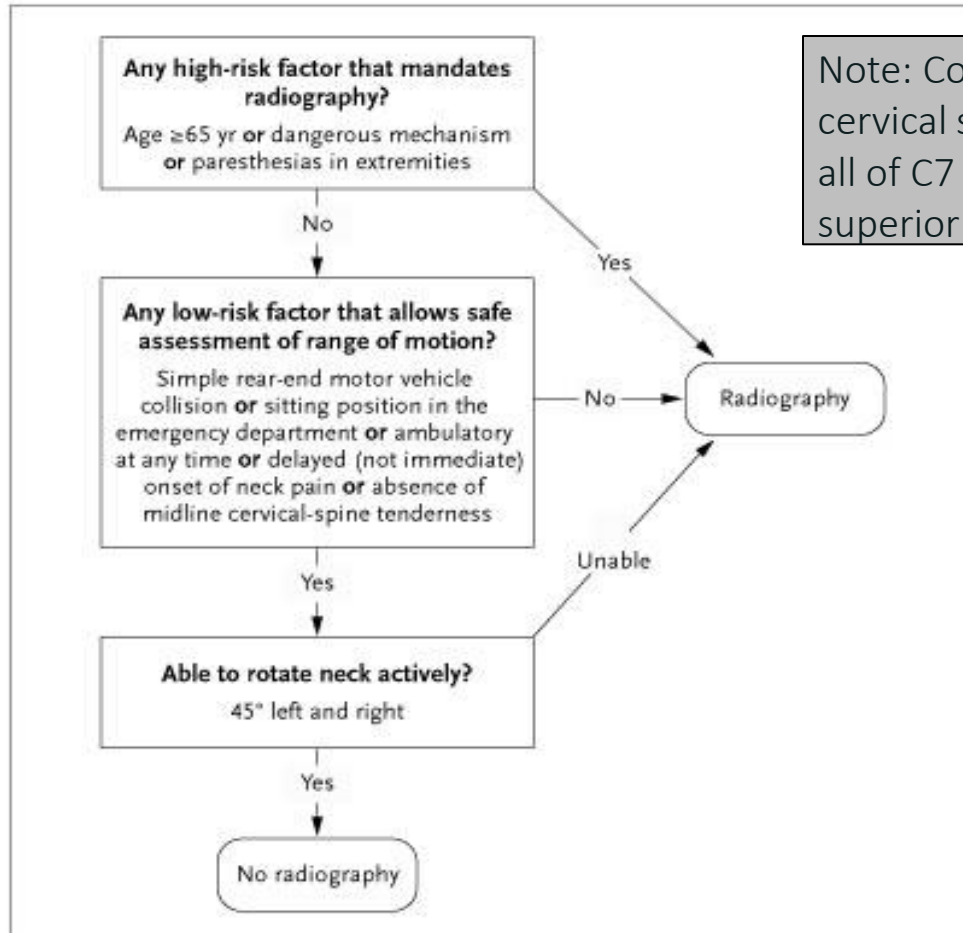
III. Cases

III. Wrap up/Questions

Background

- 7-10k cervical spine injuries in US annually
- ~50% have associated spinal cord trauma
- Alert stable patients without distracting injuries
 - Clinical decision rules to guide imaging
 - NEXUS: National Emergency X-Radiograph Utilization Study
 - CCR: Canadian C-Spine Rule
- Symptomatic, disoriented, obtunded patients

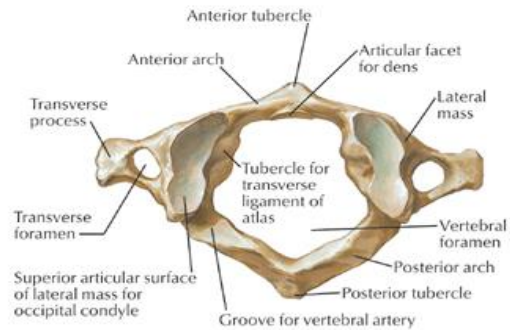
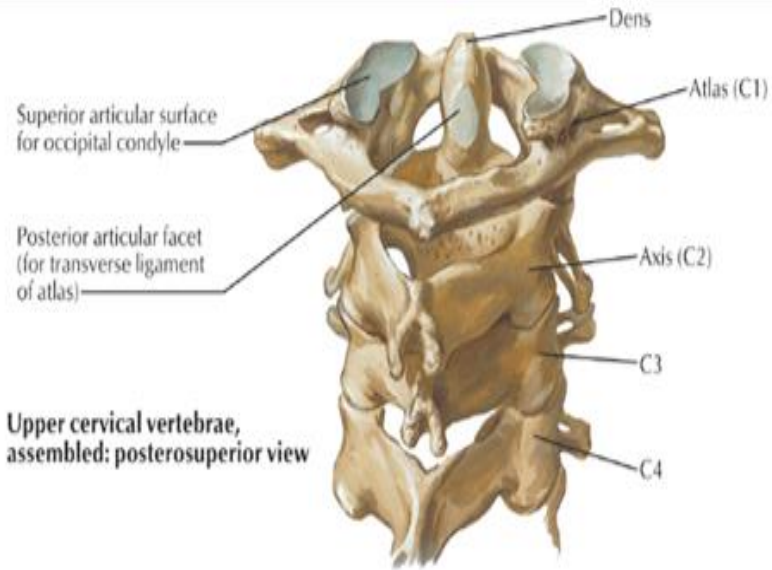
IMAGING NECESSARY



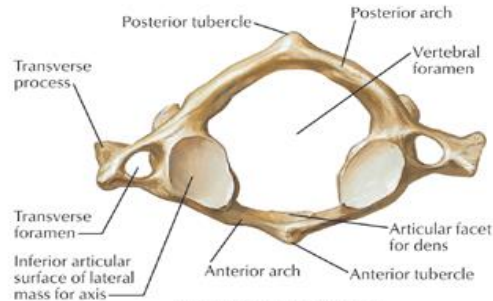
Note: Complete exam of the cervical spine MUST include all of C7 and at least superior endplate of T1



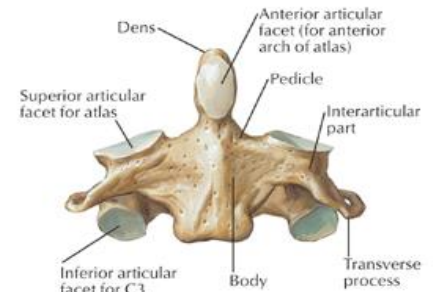




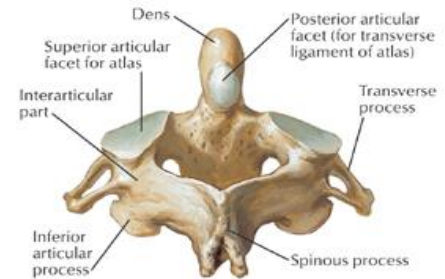
Atlas (C1): superior view



Atlas (C1): inferior view

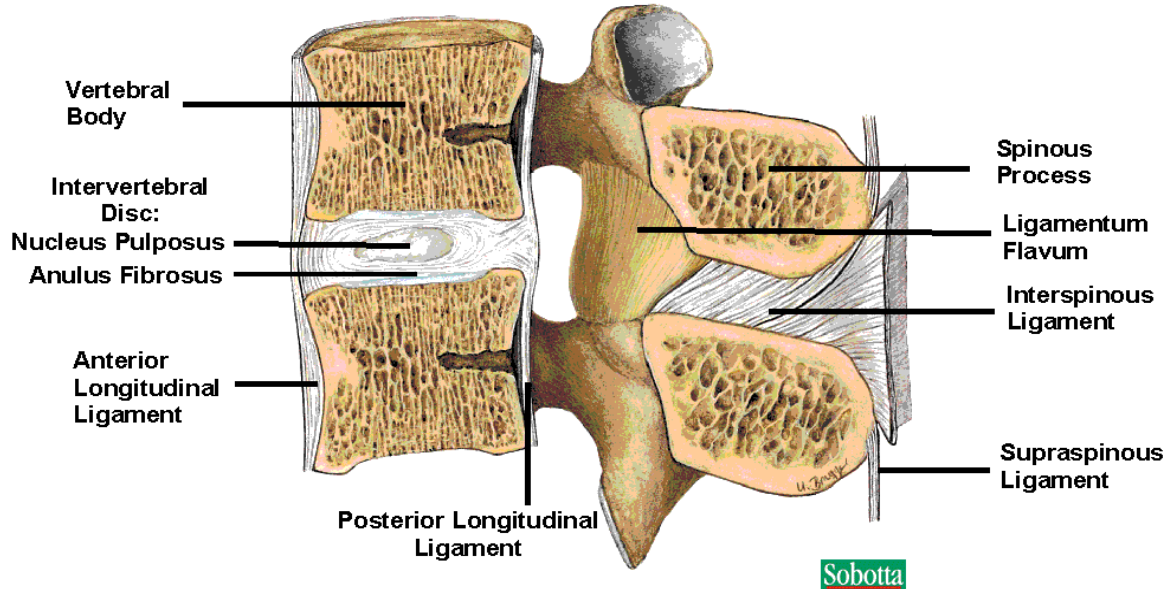


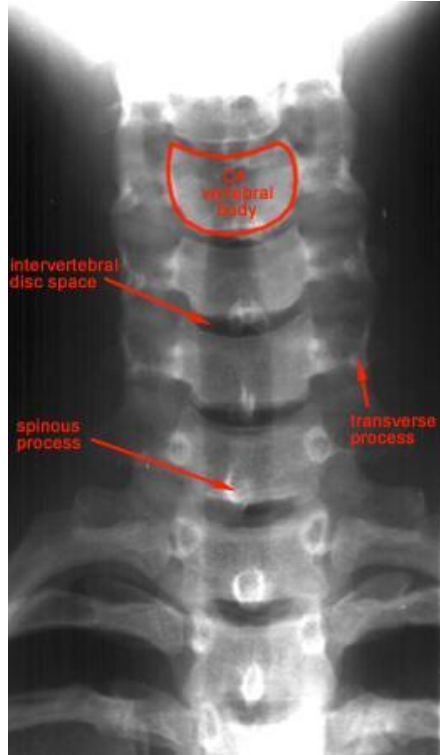
Axis (C2): anterior view

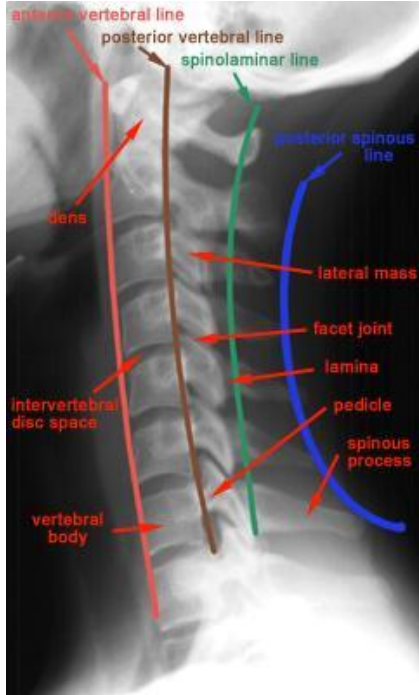


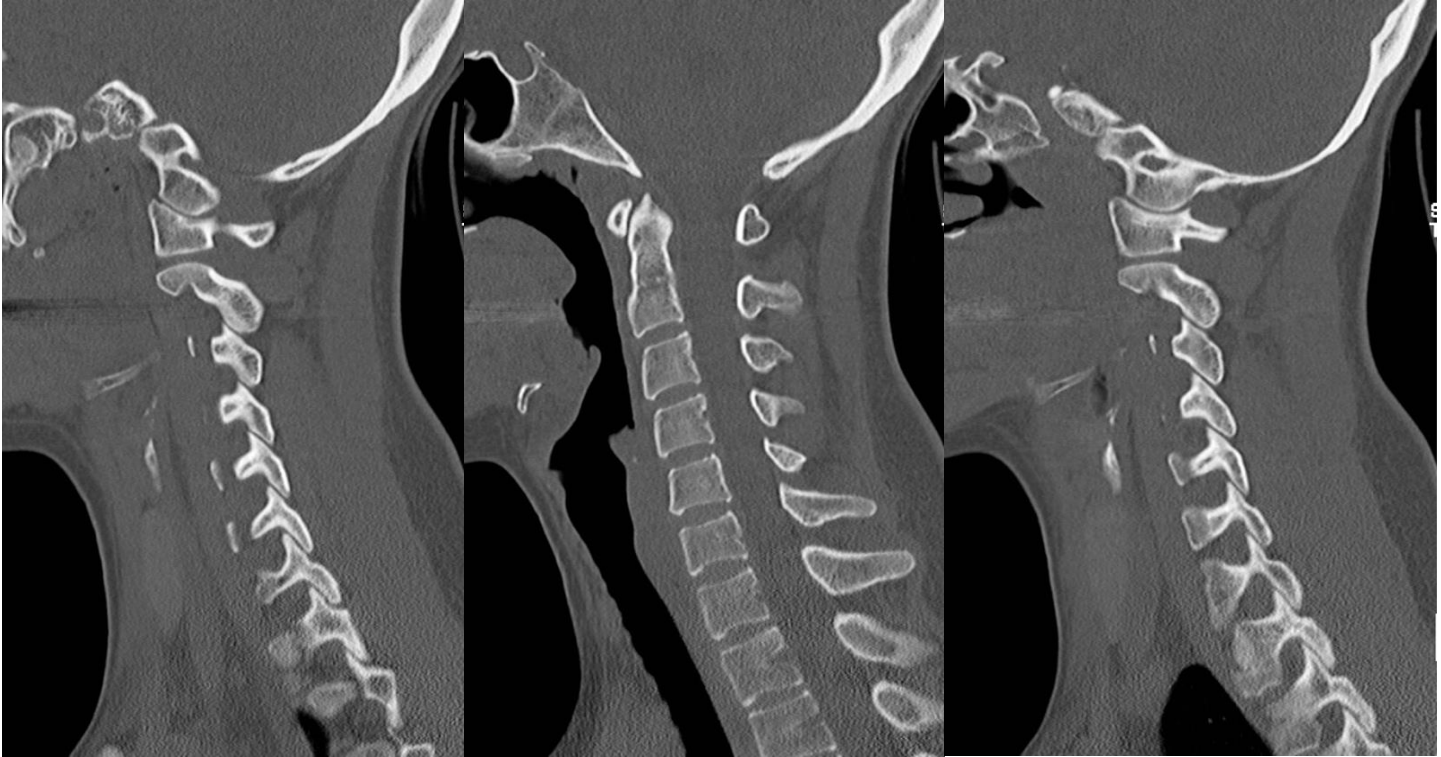
Axis (C2): posterosuperior view

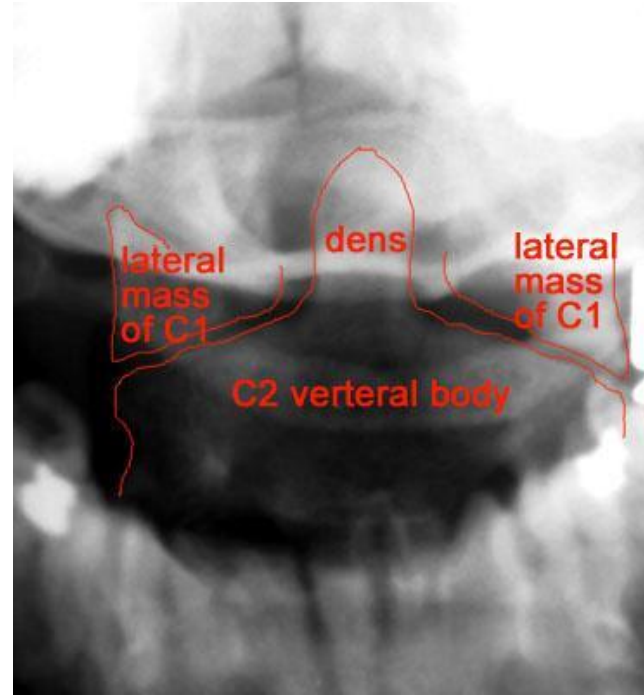
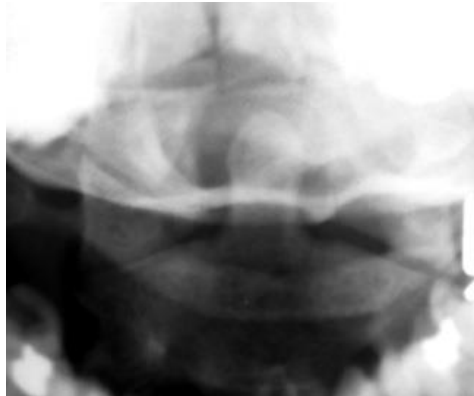
Ligaments of Spine -- Median





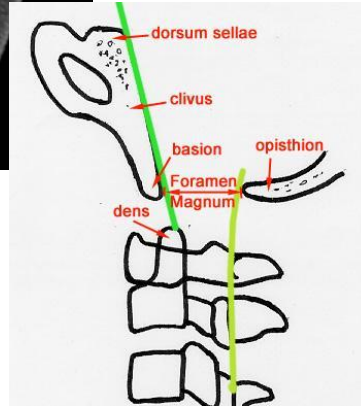








Normal Anatomy:
Axial CT image of C1
ring



Atlanto-occipital alignment:
Anterior margin of foramen
magnum should line up
with dens
Basion to dens interval <10
mm (BDI)

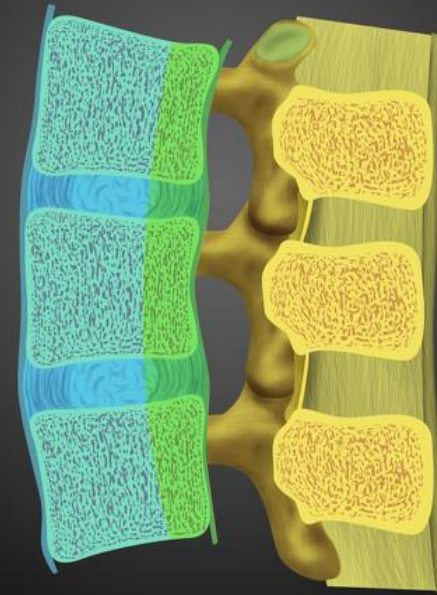


THREE COLUMN CONCEPT
Anterior, Middle, and Posterior
columns as indicated

UNSTABLE: fracture of middle
column and *either* anterior or
posterior column

Denis spinal columns

Three column concept in spinal fracture



Anterior middle posterior

A. Skalski



Module Outline

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II. Anatomy

III. Cases 

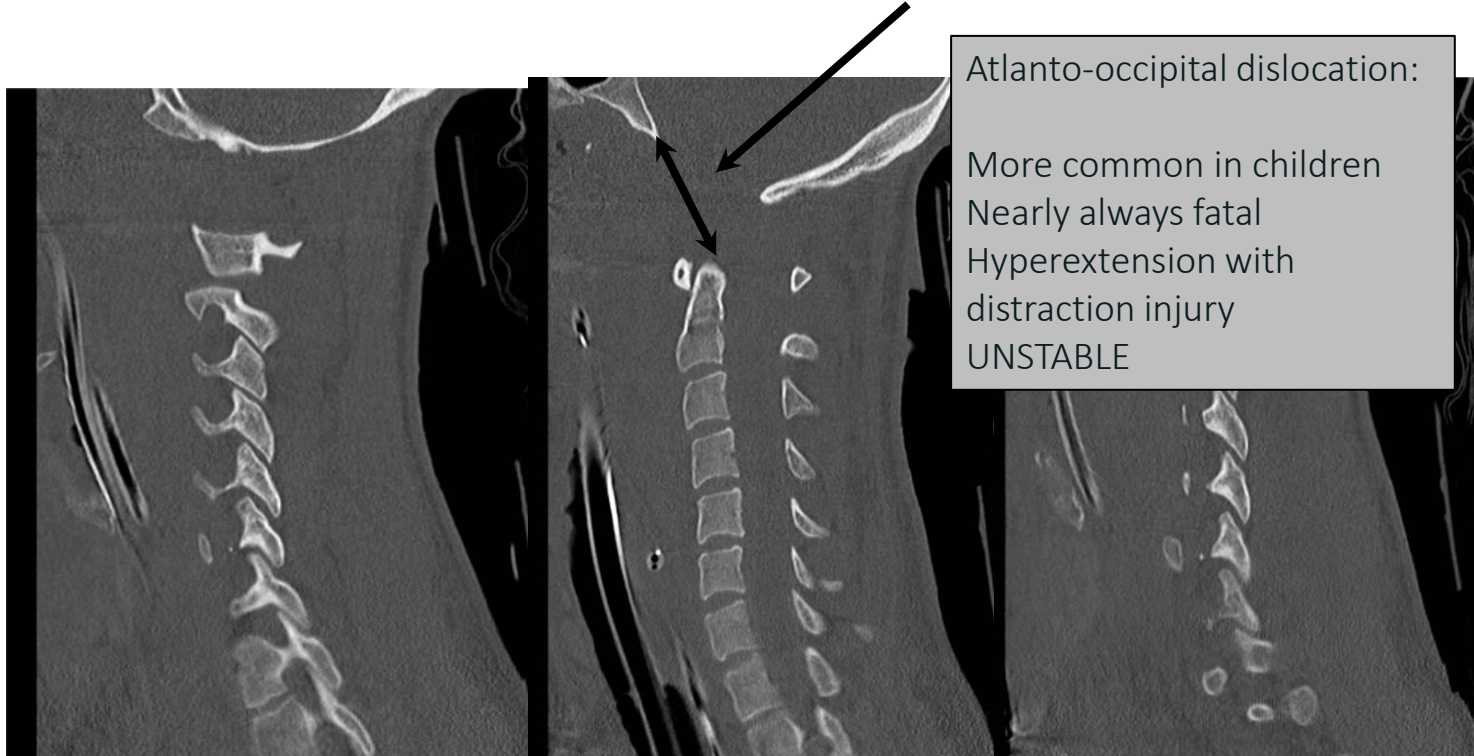
III. Wrap up/Questions

34yoM riding an ATV, lost control and crashed

Cervical spine CT ordered as part of trauma CT series



Findings: On 3 sagittal CT images, there is Basion-dens interval excessive, >10 mm, in this case almost 5 cm = Atlanto-occipital dislocation



Pediatric patient in MVA

Extreme example of . . . Atlanto-occipital
dislocation



27yoM single vehicle MVC vs tree, neck pain

CT cervical spine ordered



Findings: On axial and sagittal cervical spine CT, postero-inferiorly displaced fractures of C6 and C7 spinous processes = Clay Shoveler fractures

Clay Shoveler fracture:

Hyperflexion injury

Most commonly C6, C7, or T1

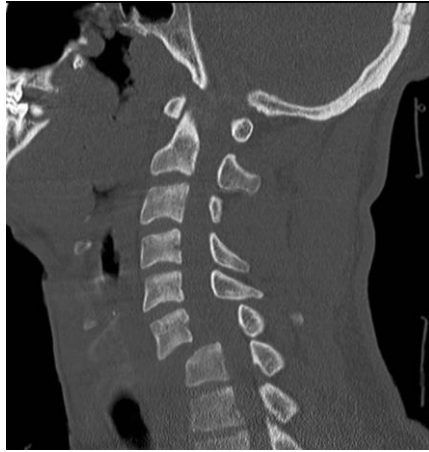
Usually with contraction of paraspinous muscles pulling on spinous processes

STABLE

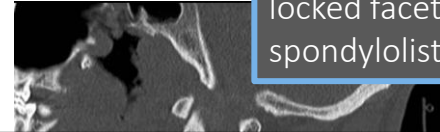


31yoM head on MVC, neck pain

Cervical spine CT ordered



On 3 sagittal and 1 axial cervical spine CT, grade II-III anterolisthesis of C6 on C7, posterior elements fractures (C6), bilateral jumped and locked facets with fractures = Traumatic C6-7 spondylolisthesis with bilateral locked facets



Bilateral Locked Facets:

Anterior dislocation of vertebral body

Jumping of inferior articular process over the superior articular process of vertebral body below – locked in this position

Can be uni- or bilateral

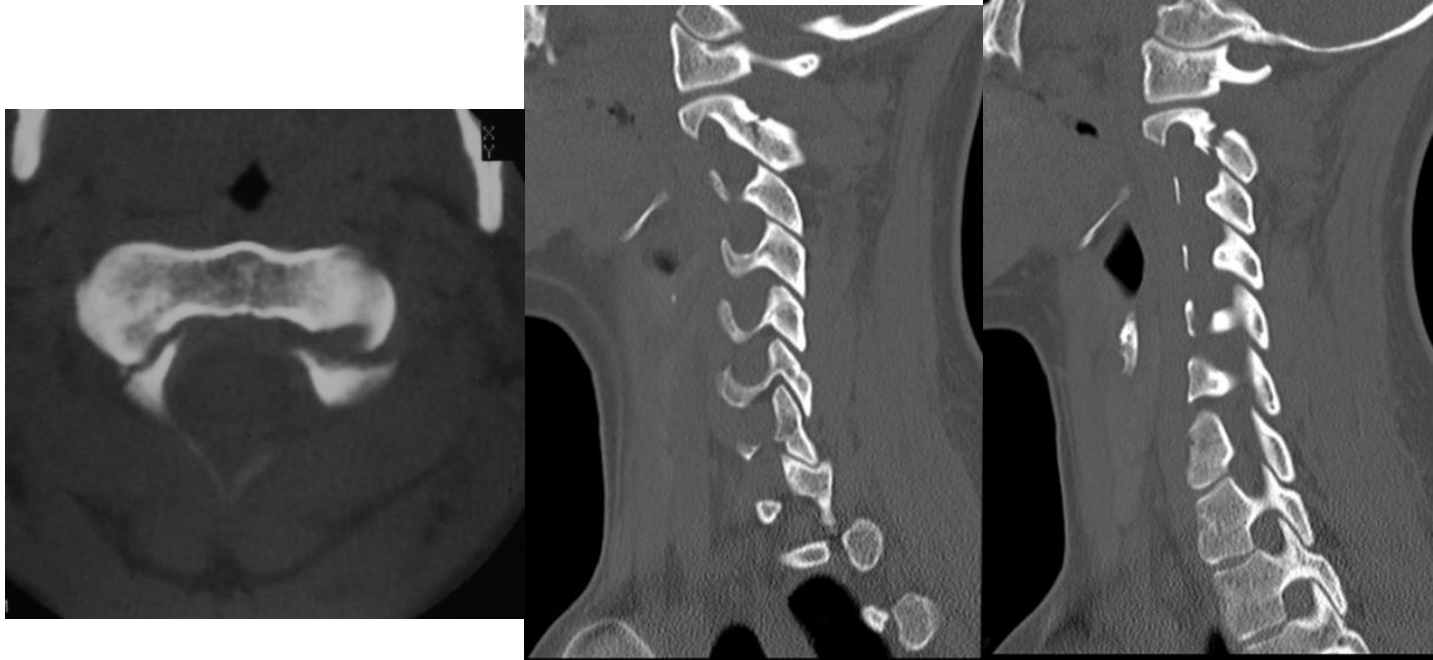
Extreme flexion type injury of head/neck

High risk of cord damage

UNSTABLE

45yoF brought in by EMS following high speed motorcycle collision

Cervical spine CT ordered as part of trauma protocol



On 1 axial and 2 sagittal cervical spine CT images, fractures of the bilateral pars interarticularis of C2 = Hangman fracture



Hangman fracture:

Also known as traumatic spondylolisthesis of the axis

Result of hyperextension and distraction, classically after high speed MVC with chin hitting dashboard
STABLE

(Despite name, not commonly seen in hangings - more likely cause of death in that case = asphyxiation)

19yoF boating at a lake with friends, dove head first into shallow water and now with neck pain

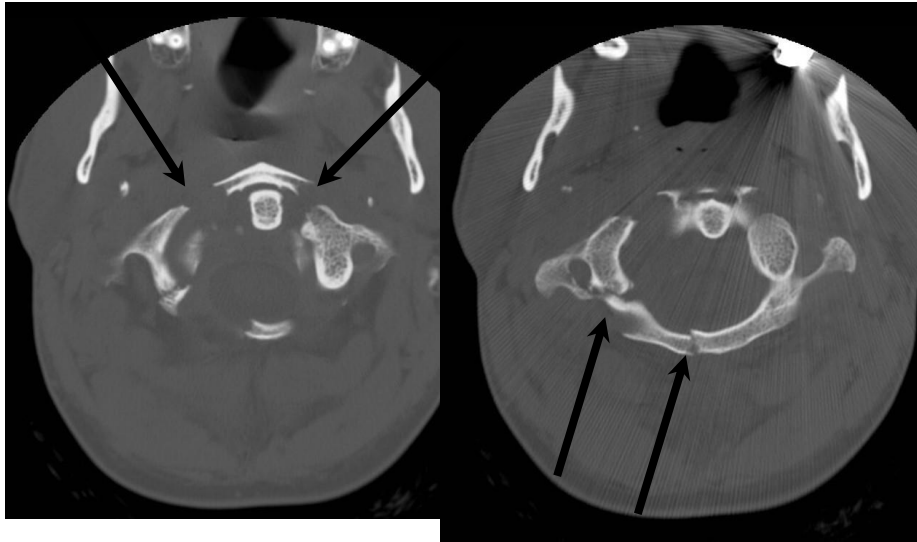
Radiographs were ordered (before you saw the patient)



Findings: On open mouth odontoid and lateral radiographs, lateral masses of C1 do not line up appropriately and there is a posterior C1 arch fracture



Findings: On CT there are C1 anterior and posterior arch fractures (normal is intact C1 ring)
= Jefferson fracture



Jefferson fracture:

Compression fracture of bony C1 ring involving both anterior and posterior C1 arches

Axial loading injury

Transverse ligament may also be injured

Treatment is conservative with hard collar

STABLE

Exception: transverse ligament disrupted (unstable)

Wrap Up

- If C-spine trauma -> think CT!
- If ligamentous or spinal cord injury -> think MR!
- 4 spinal lines: anterior & posterior vertebral, spinolaminar, posterior spinous
- UNSTABLE: middle column + either anterior or posterior
- Named fractures: Jefferson, Clay Shoveler, Hangman

Welcome to the UNC Radiology Residency Education Website!

UNCRADRES

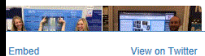
Tweets by @UNCRadRes

UNC Rad Residency
@UNCRadRes
Neuroradiology resident field trip to the art museum to check out the beautiful brain art. #RadioActivity @THHMD @DavidMauroMD @SJordanMD



Mar 28, 2019

UNC Rad Residency
@UNCRadRes
We had a blast presenting all of our work at #IRATX19! Thanks to @UNCRadiology for the opportunity. #RadioActivity @BDixonMD @JessieStewartMD @mcreamy @CharlesBurkeMD @SJordanMD @THHMD



Embed View on Twitter

We are pleased to provide this educational resource for our residency program!

UNC Rad Q&A, subspecialty block ed resources, Phone Numbers, HSL custom build e-books, helpful hints can be found on this site.

ABR Core exam intel

Block 10 Schedule

Chief's Survey

RadExam

RSNA Physics Modules

UNC Radiology Conference schedule 18-19

Today	March 2019	Print	Week	Month	Agenda	
Sun	Mon	Tue	Wed	Thu	Fri	Sat
24	25	26	27	28	Mar 1	2
	7am Cardiac Cases - 12pm Body: US Reni	7am Hot Seat - Phys 12pm Health Care Ec	7am Hot Seat - Phys 12pm Neuro - Pediat			
3	4	5	6	7	8	9
	12pm Body: Modern 7am Hot Seat - Whit 12pm Peds Interacti	8am CVI Family Med 12pm Breast - Kuzm	7am Hot Seat - Whit 12pm MSK: Maetani	7am Hot Seat - Whit 12pm Chest: Sakthiv		
10	11	12	13	14	15	16
	7am Chest Cases - E 7am Hot Seat - Phys 12pm Body: Solid an	7am Hot Seat - Phys 12pm Body: HSG - C 8am CVI Family Med 12pm Resident Conf	7am Grand Rounds - 12pm NH: Oldan - N 12pm Neuro - White			
17	18	19	20	21	22	23
	12pm Body: MRI/MR 7am Hot Seat - Core 12pm Peds: Fordhan	12pm VIR: Dixon - R	7am Hot Seat - Core 7am Grand Rounds: 12pm MSK: Nissman 12pm MSK: Robert J			
24	25	26	27	28	29	30
	7am Chest Cases - E 7am Hot Seat - Core 12pm Fellow Panel: 12pm Body: US Live: 8am CVI Family Med 12pm Breast - Fello	7am Hot Seat - Core 12pm Fellow Panel: 12pm Body: US Live: 8am CVI Family Med 12pm Breast - Fello	7am Hot Seat - Core 12pm Cardiac: Hyslop 12pm Neuro - Neuro			

Home



Welcome to our UNC Medical Student Radiology website!

Custom built HSL website for Radiology - e-Anatomy, UpToDate, PubMed and reference books

UNC Radiology Teaching Files

URMC Radiology Teaching Files

ACR Appropriateness Criteria: What Test Applies?

Department career goal advisers are available to counsel radiology-bound students!

RADY Formal Didactic Curriculum

Today	February 2020	Print	Week	Month	Agenda	
Sun	Mon	Tue	Wed	Thu	Fri	Sat
26	27	28	29	30	31	Feb 1
	10am RADY 401 Cas 2pm Best of Breast 11pm Meet Aunt Minn 1pm Intro to VIR Dr 4pm Ms Cluck Sim L				TEC Block 11 Ends 10am RADY 401 Fine	
2	3	4	5	6	7	8
	TEC Block 12 begin 11am RADY 401 Intro	RADY Symposium 8am Intro and Apprc 9am CXR #1 in the \ 10am Emergency Ra 11am Head CT Dr Rc	1pm Intro to Cardiol 1pm CXR Unknowns			
9	10	11	12	13	14	15
	1pm Intro to Abdom 2pm Approach to the 8am Cervical spine E 9am Body CT Dr Dec	RADY Symposium		1pm Intro to Muscul 2pm Radiologic Eval	10am RADY 401 Mid	

More at www.rads.web.unc.edu www.msrad.web.unc.edu

and @UNCRadRes

Thank you!



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