

Case 14 – Introduction (and a bit of anatomy)

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Consultant Spinal Surgeon

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School of Medicine
GIME Learning Technology Unit

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Welcome to Case 14

Labels: SPC, Ortho, Neuro, MaxFas

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Case 14

- The best Case there is!
- Learn about the Spine (not just back pain)
 - Probably the only time you ever will...
- Most important ways to learn
 - active engagement and have fun

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Learning Styles

- Physical: Touching, Hands, Body
- Verbal: Writing, Speech, Words
- Aural: Sound, Music
- Visual: Images, Colours
- Logical: Reason
- Social: Solitary, Group Learning

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Teaching Styles (Mason and Ashworth, 2002)

Teaching style	Interaction	Role of practitioner	Role of participant
Command (A)	Practitioner makes decisions. Participant copies and complies with decisions and instructions.	Instructing	Copying
Practice (B)	Practitioner sets up opportunities giving feedback to participant who is working at own pace on tasks set.	Establishing	Repeating and improving
Reciprocal (C)	Participants work together, receiving feedback from each other. Practitioner provides reference points for feedback.	Supporting	Performing and peer assessing
Self-check (D)	Practitioner sets criteria for success. Participants check own performance against these.	Directing	Self assessing
Inclusion (E)	Practitioner sets out a variety of tasks/opportunities. Participants select which task is most appropriate for their abilities and/or motivations.	Facilitating	Selecting
Guided discovery (F)	Practitioner uses questions and tasks to gradually direct participants towards a pre-determined learning target.	Questioning	Uncovering
Convergent discovery (G)	Practitioner sets or frames problems. Participant attempts to find most appropriate solutions.	Guiding	Finding out
Divergent discovery (H)	Practitioner sets or frames problems. Participant attempts to create possible solutions.	Prompting	Creating
Learner designed (I)	Practitioner decides on area of focus. Participants develop within this area, drawing on practitioners' expertise.	Advising	Initiating
Learner initiated (J)	Participant decides on how and what they are aiming for. Practitioner draws on for support as needed.	Mentoring	Deciding
Self teach (K)	Participant engages in development on their own.	N/A	Self-determined

SUMMARY – NO ONE SIZE FITS ALL OPTION...

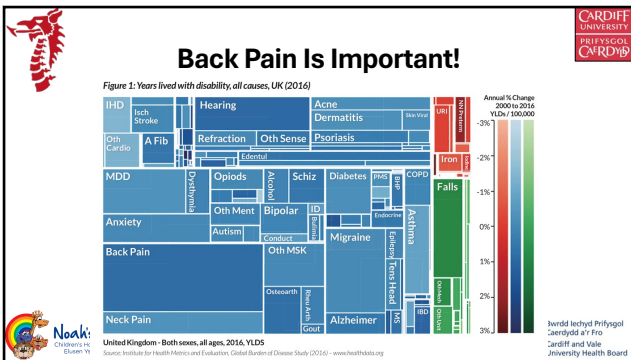
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Evidence mounts that laptops are terrible for students at lectures

Time to reconsider the role of laptops in the classroom

By The City Editor | Nov 20, 2014 6:58 AM

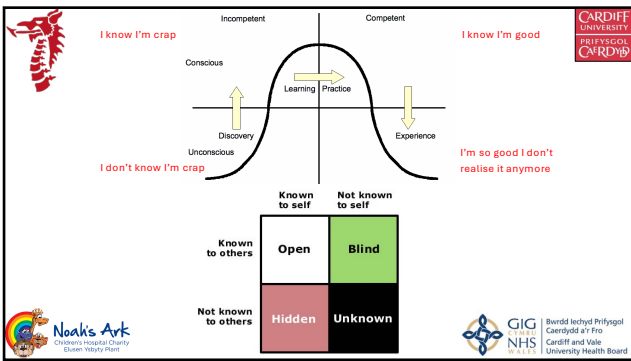
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• Be prepared: you will NOT find all of the answers

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Case-Based Learning Dysgu ar sail adheulion

My back is killing me and I can't get out of bed!
Mae fy ngefn i' fy had i a dai'n methu codi o'r gawdy!

STUDENT HANDBOOK

Year / Yr	23 / 24
Unit / Yr	Adhysg Deoriol
Year / Yr	04
Unit / Yr	04

BUSINESS HOURS
Monday to Friday 0800 to 1800




RULES OF ENGAGEMENT

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What I have cancelled to teach you...

- Mon - 10 Outpatient Appointments (OPAs)
- Weds - 4 spinal injections and 2 OPAs
- Thurs - 3 Spinal operations
- Fri - MDT

- Mon - 10 OPAs and 2 operations
- Wed - 4 spinal injections and 2 OPAs
- Thurs - 15 paediatric OPAs and 10 OPAs
- Fri - 10 OPAs

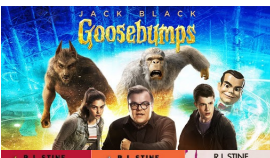

  




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The Case

- The beginning
- The middle
- And finally the ...Twist...

- CSI Spine
- Escape Room




  

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Plenaries aka Lectures

- Lectures
 - Introduction Case 14
 - Neurophysiology
 - Bone Pathophysiology
 - Anatomy Lecture
 - Spinal Radiology
 - Spinal Pathology 1, 2 and 3
 - Examination Skills and Wrap Up

• Please turn up to the live lectures – you will get higher marks in the exam...

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Clinical Examination Practical




- Wednesdays
 - Learn to take a history, examine the spine and neurology
 - Small group sizes and standardized
- Thursdays
 - Examine patients

• Watch the video lecture before you come!

• Watch the 4 new essential videos

• Be prepared to examine each other




• Wear scrubs / appropriate clothing on Thursday

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Community Clinical Learning




- Thursdays
 - Pharmacy Session
 - Pain management
 - Get the electronic BNF app
 - People First Learning Disabilities

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Practicals / Tutorials

- Anatomy
- Lumbar Puncture
- Cord Syndromes

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Understanding People

- **Workbook**
- **Low Back Pain eModule**
- Very IMPORTANT in low back pain / spinal complaints

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"I'm in the den mom, reading the newspaper for my social studies class."

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SDL aka Reading

- What do I need to know? – to pass the exam or become a good doctor?

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Reading List

- Learning central / E-Learning / Evidence Based Learning and Numeracy
- Don't need to read everything – unfortunately not one single book that covers everything
- Don't forget the web resources, examination videos, Deanery pain page, Flashcards and ASIA chart
- <https://cardiffandvaleclassic.communityhealthpathways.org/>

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FACEPALM

When words fail to describe the dismay, there is always Facepalm.

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NIALL McCANN
 EXPLORER

Optional Guest Lecture
 Monday 9th March 1700

Bloody but Unbowed

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Spinal Anatomy SBAs

- At what level does the spinal cord end in an adult?

- T11/L2
- T12/L1
- L1/2
- L2/3
- L3/4

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Spinal Anatomy SBAs

- Which of the following muscles is a strong stabiliser of the spine?

- Longissimus
- Spinalis
- Erector spinae
- Multifidus
- Psoas major

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Spinal Anatomy SBAs

- Which structure(s) pass through the transverse foramen of C7?

- Vertebral artery and fat
- Vertebral vein and fat
- Vertebral artery, vein and fat
- Vertebral artery and sympathetic trunk
- Vertebral vein and sympathetic trunk

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Spinal Anatomy

- So what?...

WHO THE HELL CARES?

- Feel the pulse in your neck...

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Doctors MUST know Anatomy to know what they are treating

LOW BACK PAIN

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Growth

- Horizontal Growth by **periosteal ossification** mainly first 7 years (AP 5-10x, Lat 3-5x)
- Vertical Growth by superior and inferior **growth plates** mainly first 5 years (2-4x height)

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Cervical Anatomy

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Cervical Anatomy

- 7 Bones 8 Nerves
- Typical
 - C3-6
 - Bifid spinous processes + foramen transversum
- Atypical
 - Atlas and Axis
 - C7 (vertebra prominans)
- Flexion / Extension / Lateral Bend / Rotation

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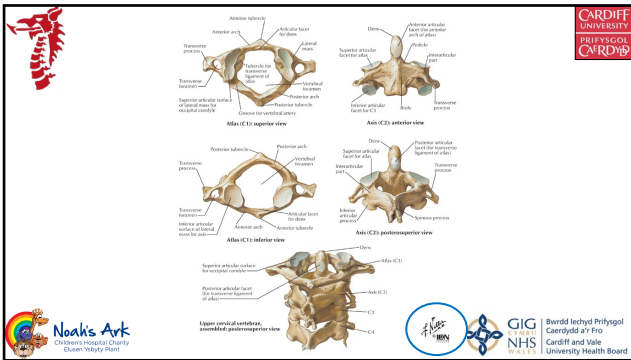
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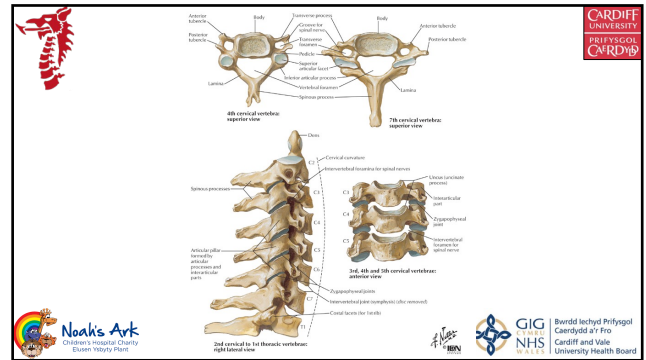
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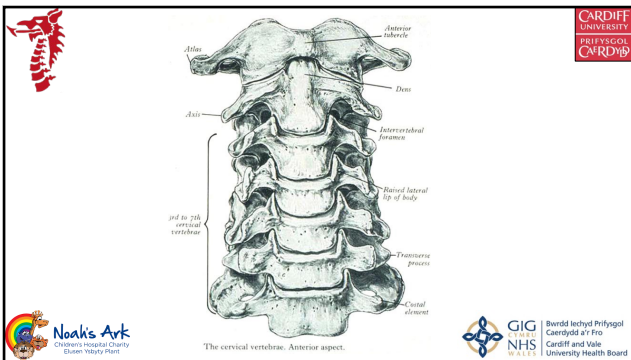
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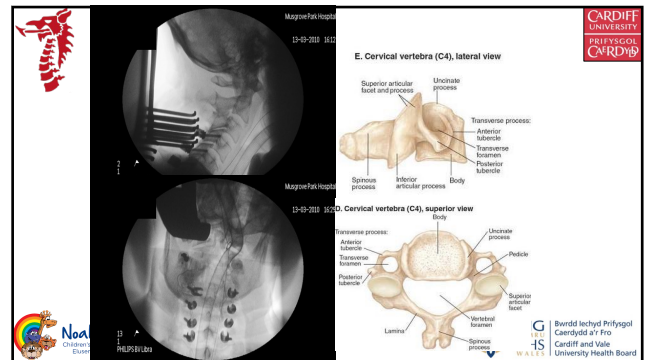
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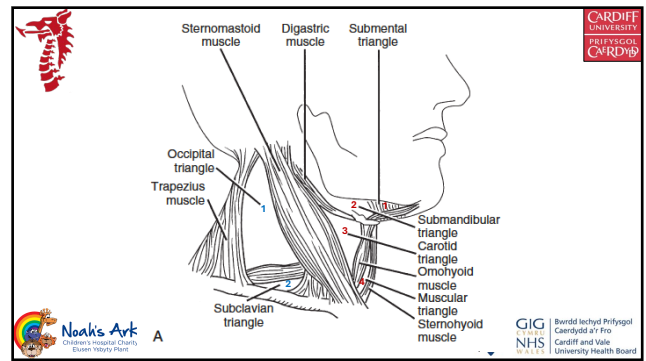


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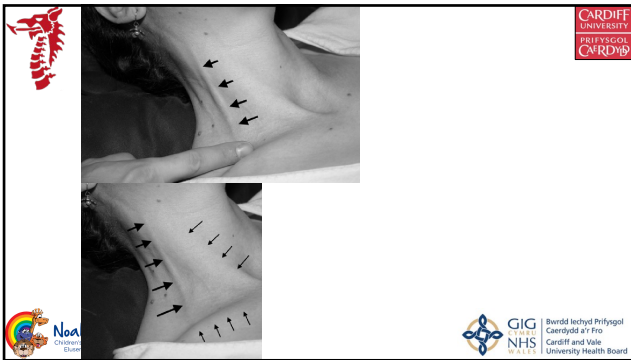
Anatomy – Anterior Neck

- Superficial and Deep Fascia:
 - Superficial
 - surrounds platysma
 - Deep
 - Superficial – SCM + Trapezius
 - Middle – pretracheal + carotid sheath
 - Deep – prevertebral
- Anterior and Posterior Triangles

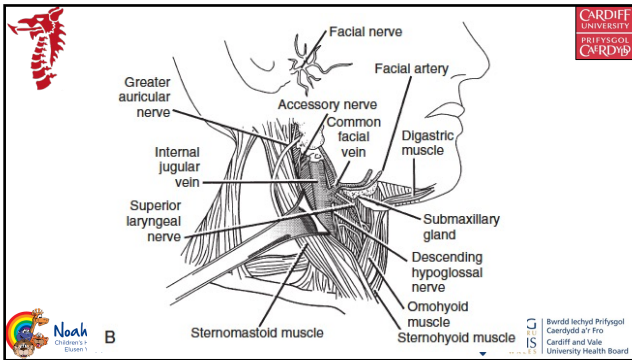
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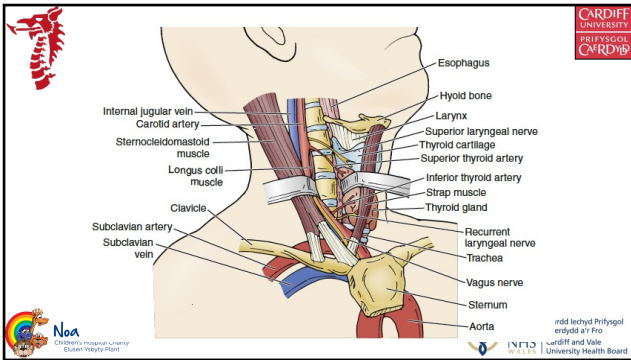
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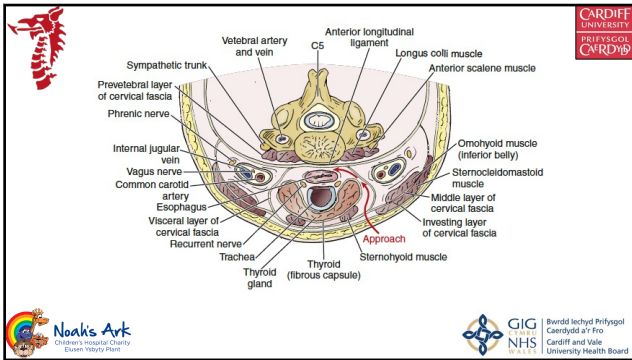
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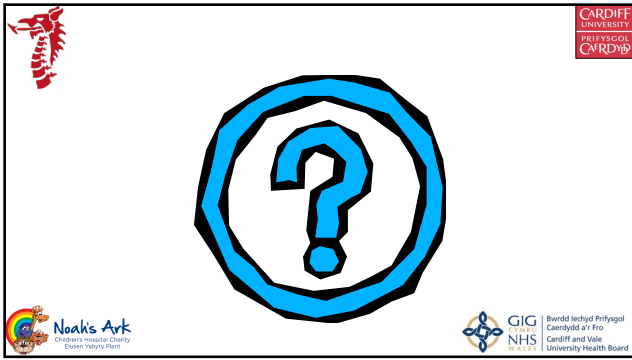


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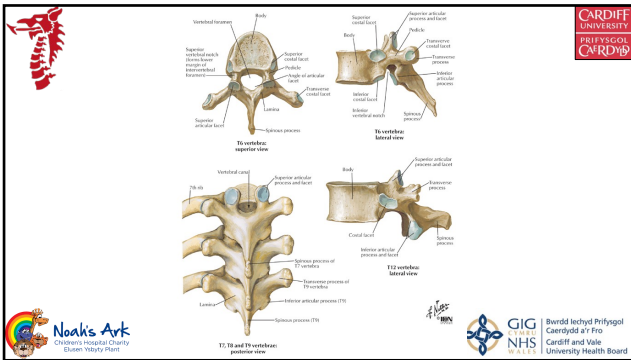
VERTEBRAL LEVELS OF STRUCTURES

- C1
 - Spinal root of accessory nerve crosses transverse process of atlas
 - Open mouth and dens
- C2
 - Superior cervical ganglion
- C3
 - Body of hyoid bone
- C4
 - Upper border of thyroid cartilage
 - Bifurcation of common carotid arteries
- C6
 - Cricoid cartilage
 - Larynx becomes trachea
 - Pharynx becomes oesophagus
 - Middle cervical ganglion
 - Vertebral artery enters foramen transversum of C6
 - Carotid tubercle of Chassaignac
 - Inferior thyroid artery crosses to thyroid gland and passes behind sympathetic chain
- C7
 - First clearly palpable spinous process (Vertebra prominens - C7)
 - Stellate/inferior cervical ganglion

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Thoracic Anatomy

- 12 Vertebrae
- Smaller than Lumbar
- Facets Frontally Orientated in A-P View
- Spinous Processes Longer, Distally Orientated
- Transition at Thoracolumbar Junction T9-12

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Thoracic Anatomy

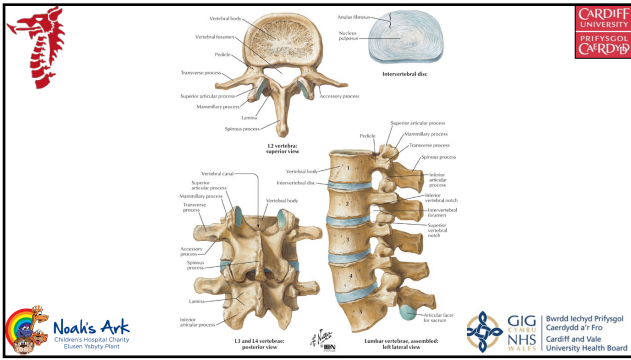
- Left side flattened due to aorta
- Heart shaped
- 1st, 11th and 12th ribs articulate solely with named vertebra
- 2-10 with rostral neighbour
- Articulate with anterior part transverse process and vertebral body (costovertebral and costovertebral joints)

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Chest Wall and Stability

- Stability from bony anatomy, soft tissues and chest wall
- Rib Cage and sternum increase stability
- Removal of sternum or rib heads decreases thoracic stiffness
- Removal 1 or 2 ribs has little effect

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Lumbar Spine

- L1 to L4 'Typical' Lumbar Vertebrae
- Wide strong kidney shaped bodies with parallel endplates
- Wide posterior arch fusing to form a horizontally projecting spinous process
- Superior facets face posteromedially
- Inferior facets face anterolaterally
- Flexion / extension mostly, some lateral bend, minimal rotation

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Multifidus

Multifidus

Multifidus

- Multifidus originates from spinous process and inserts on mammillary process 1 level below

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Intervertebral Disc

- **NUCLEUS PULPOSUS**
 - GAGS. Hydrated Aggrecans
 - Hydrostatic structure
- **ANNULUS FIBROSUS**
 - fibrocartilagenous structure with different "mesh-type" layers

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A
B
C
D
E

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ANATOMY SESSION

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Biomechanics

Normal Cervical Lordosis

Normal Thoracic Kyphosis

Normal Lumbar Lordosis

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Disc

Pedicle

Nerve Root

Transverse Process

Lamina

Spinous Process

Spinal Canal:
Containing Spinal Cord
(above L1/2 Level)
or Nerve Roots /
Cauda Equina
(below L1/2 Level)

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SEE SPINAL CORD LECTURE

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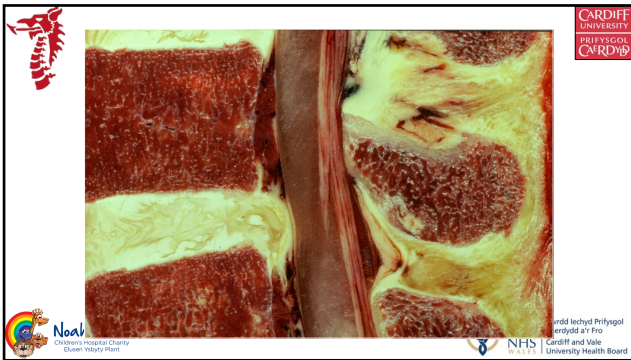
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Muscle Function Grading

- 1 = Flaccid or no motor contraction
- 2 = Trace contraction
- 3 = Active contraction
- 4 = Active contraction

ASIA Impairment Scale (AIS)

A - Complete: No sensory or motor function is preserved in the sacral segments S4-S5.

B - Sensory incomplete: Sensory but not motor function is preserved in the sacral segments S4-S5.

C - Motor incomplete: Motor function is preserved in the sacral segments S4-S5.

D - Motor incomplete: Motor function is preserved in the sacral segments S4-S5.

E - Normal: No sensory or motor deficits are present in the sacral segments S4-S5.

When to Test Non-Key Muscles:

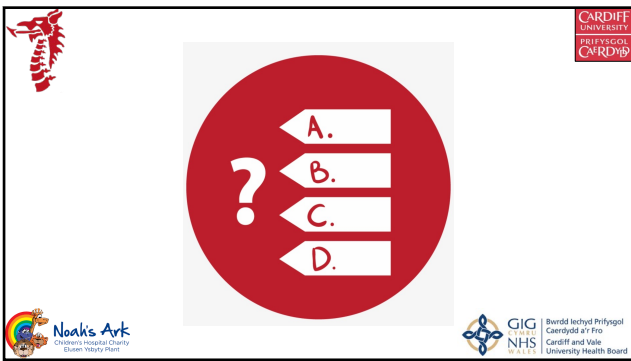
Steps in Classification

1. Determine sensory levels for right and left sides.
2. Determine motor levels for right and left sides.
3. Determine the neurologic level of injury (NLI).
4. Determine whether the injury is Complete or Incomplete.
5. Determine AIS Impairment Scale (AIS) Grade.

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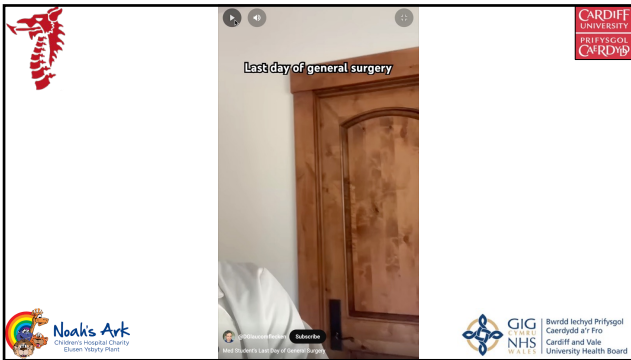
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