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Mid Cervical Spine

Assessment and Treatment

Clinical Technique Manual

Subjective Examination

- Specific
    1. What provokes
    2. What relieves
    3. Sustained postures
    4. Quick movements
- Special Questions
- History

Subjective Examination

- Kind of Disorder
- Area – body chart
- Behavior of Symptoms

  General – 1. Duration of Pain

  2. # activities

  3. Pain am/pm

  4. Effect on activities

Upper Quadrant scan examination

Subjective concerns for the upper quadrant

- Vertebral artery signs and symptoms
- Cord signs
- Mechanism of injury
- Medication use (steroids, anticoagulants, Anti-inflammatories)
- Special medical testing already performed
- Effect of cough and sneeze
- Upper respiratory tract infections
- Headaches
- Vision and speech deficits

Scanning Examination

- Designed by James Cyriax
- Medical screening exam
- Not a biomechanical exam

Upper Quadrant Scan

- Reasons for performing?
- When to do?
- When not to do and why?
- *Clinical Technique Manual : Level 1 pg 33- 36*

Scan examination

- Confirm appropriateness of referral
- Differentiation of serious or inappropriate pathology
- Demonstrate presence of contra-indications to Rx
- Rationalization of the problem
- Indicates the severity, irritability and nature of the condition
- Determine immediate management plans

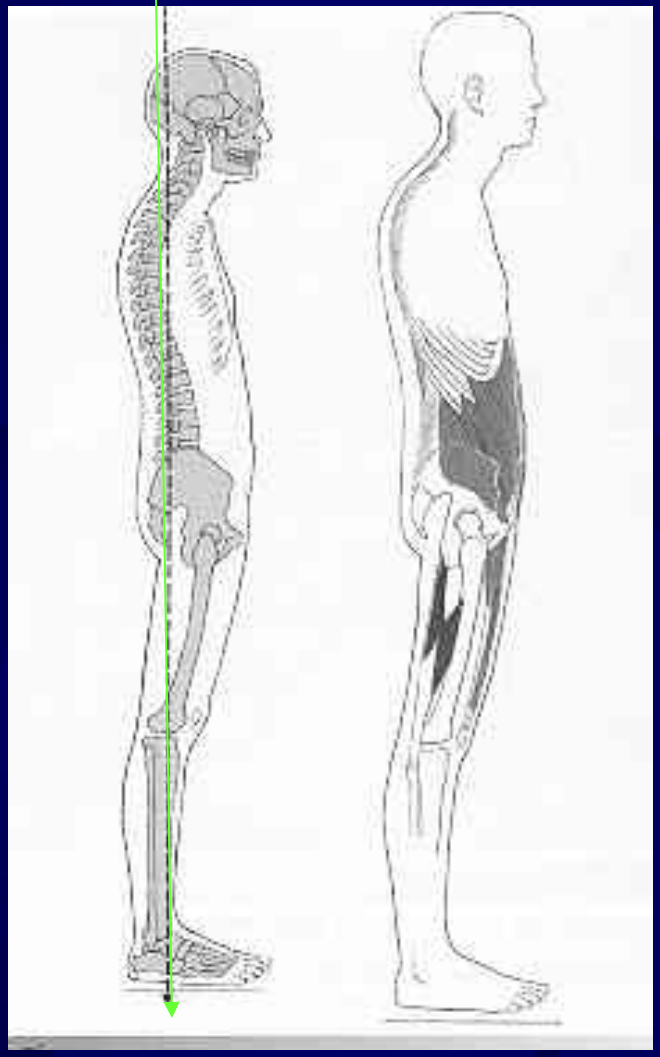
Content

- Observation
- Active ROM , passive
  Cervical, shoulder, elbow, wrist , hand
- Resisted – myotomes
- Reflexes
- Sensation(?)
- Long tract signs

Cord Signs

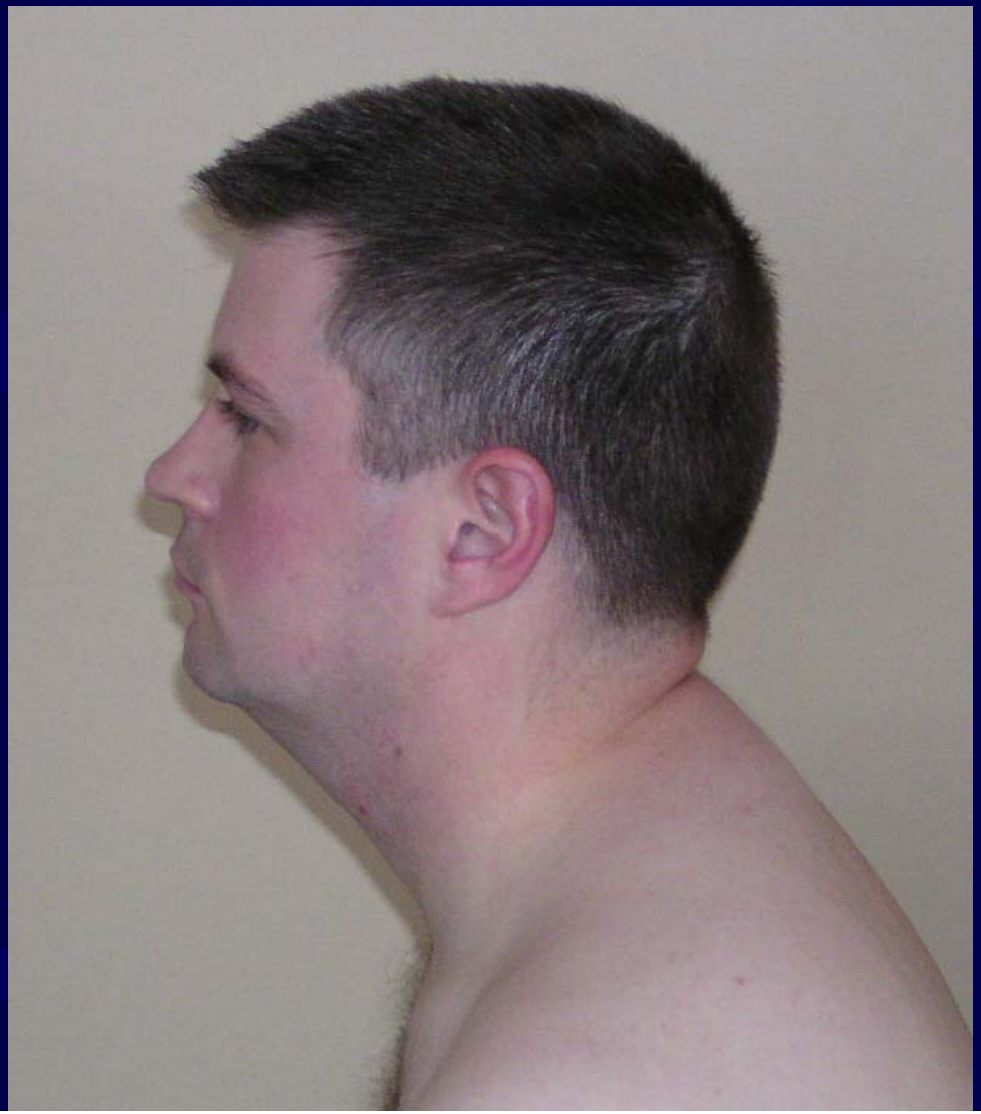
- Bilateral / Quadrilateral Paresthesiae
- Ataxic gait
- Hyperreflexia
- Hypertonia
- Non-dermatomal reference of pain
- +ve babinski, clonus, hoffmans
- Bowel and Bladder dysfunction

Posture of the upper quadrant



Theory Manual
Part 1: pg 406

Forward Head Posture



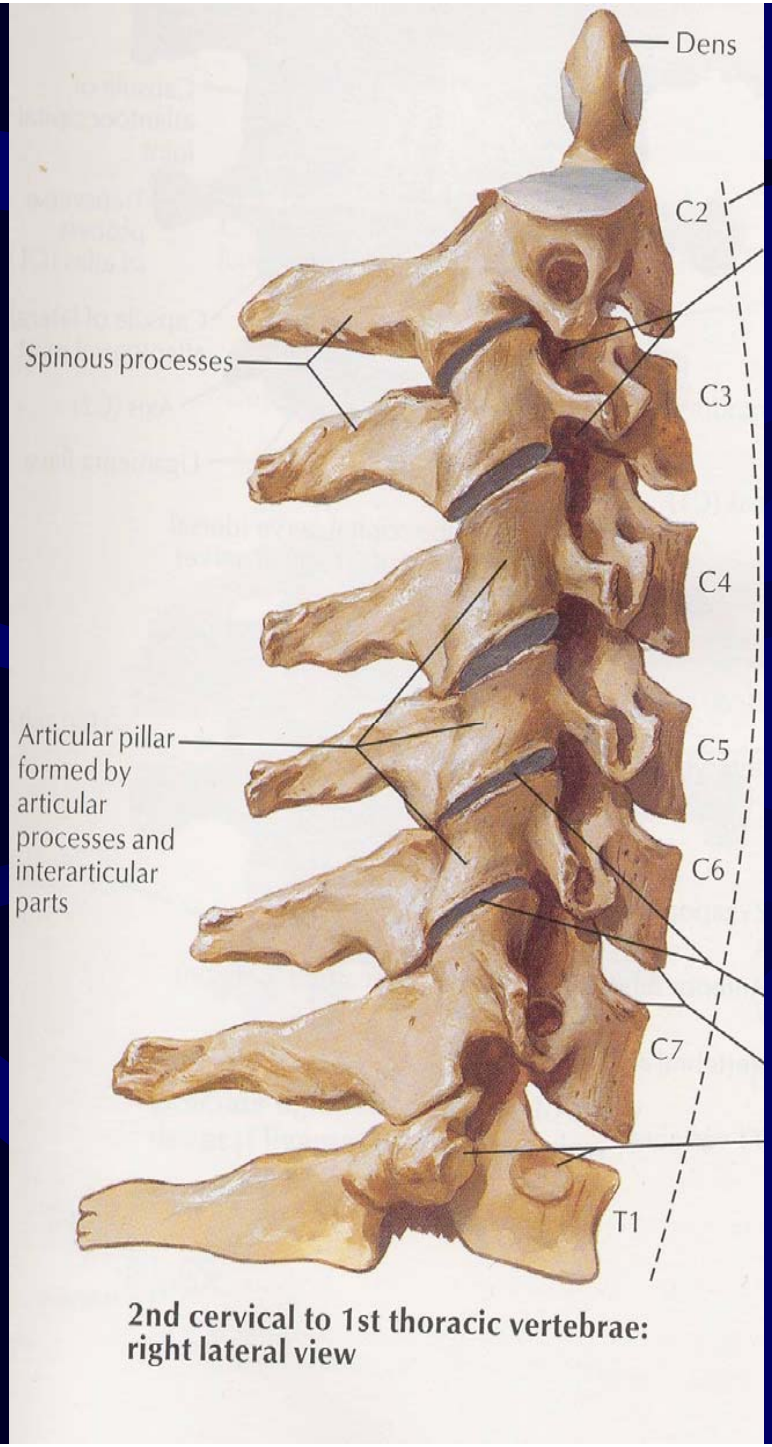
Practical

- Complete an upper quadrant scan – *Clinical Technique Manual pg 33 to36*
- Do a postural exam on the cervical spine and upper extremity
- *Theory Manual Part 1: pg 405 to 416*

References

Sahrmann, Shirley**: Diagnosis and treatment of Movement Impairment Syndromes,** St. Louis Missouri, Mosby Publishing, 2002, ISBN: 0-8016-7205-8

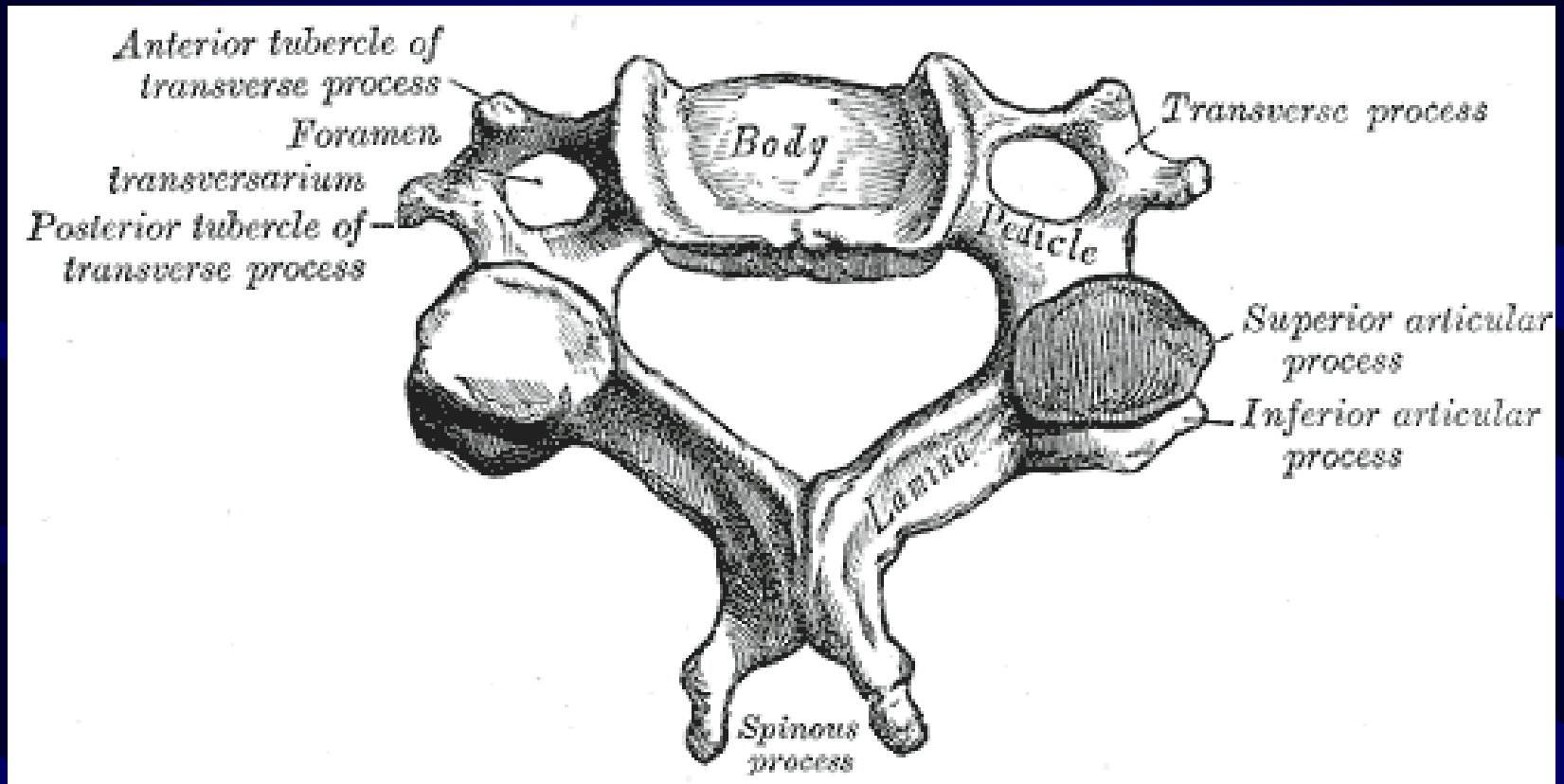
Kendall, F., & McCreary, E. (1983). **Muscles: testing and function.** (3rd ed.). Baltimore: Williams and Wilkins



2nd cervical to 1st thoracic vertebrae: right lateral view

Cervical Spine 3-7

Theory Manual Part 2:
pg 23 to 32


Anterior tubercle of transverse process
Foramen transversarium
Posterior tubercle of transverse process
Body
Transverse process
Pedicle
Superior articular process
Inferior articular process
Lamina
Spinous process

Cervical Disc

Research

Mercer S, Bogduk N, The Ligaments and Anulus Fibrosus of Human Adult Intereveretebral Discs. Spine 1999

Cervical Disc

LAFTS

Living adaptable force transducers (Butler)

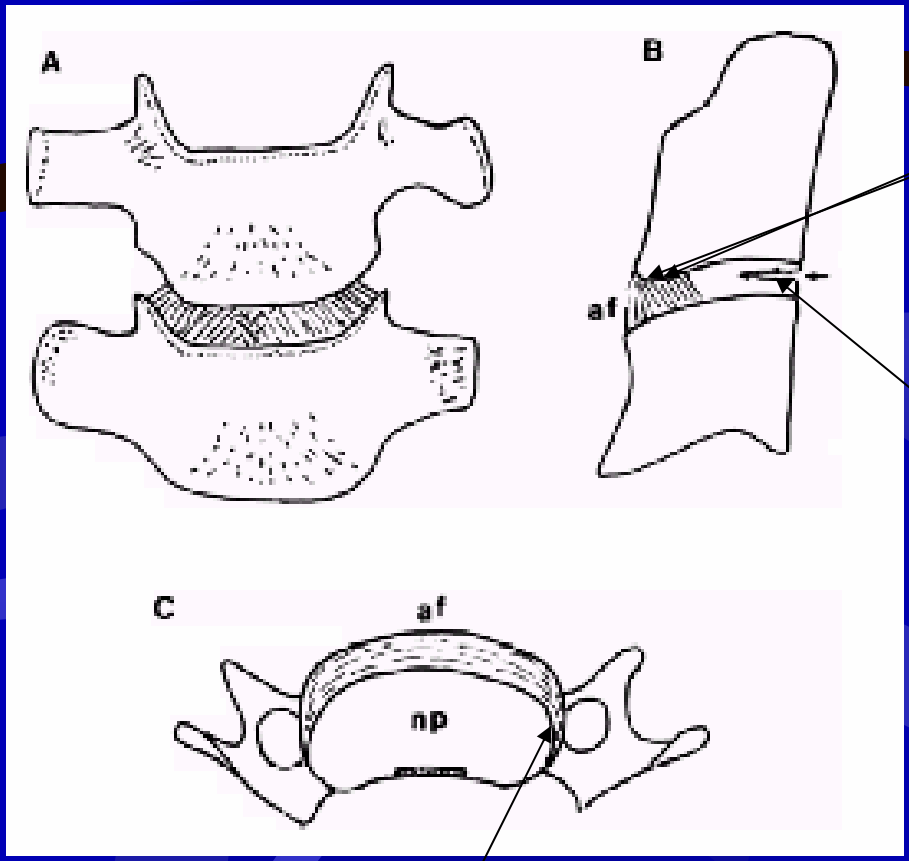
- Anulus is cresentic
- Thick anteriorly tapering laterally
- Laterally over the uncovertebral region there is no substantive anulus

Cervical disc

- No successive lamellae exhibiting alternating orientation in post , few anterior

- Anulus has structure of a dense anterior interosseus ligament with few fibres to contain the nucleus pulposus posteriorly

Ant anulus Fibrosis

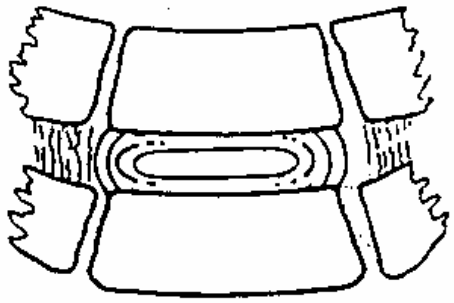


Ant inter ligament

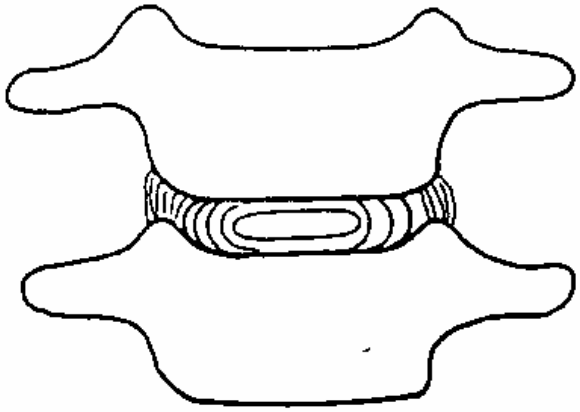
Post cleft

AF thick ant – tapers to UP

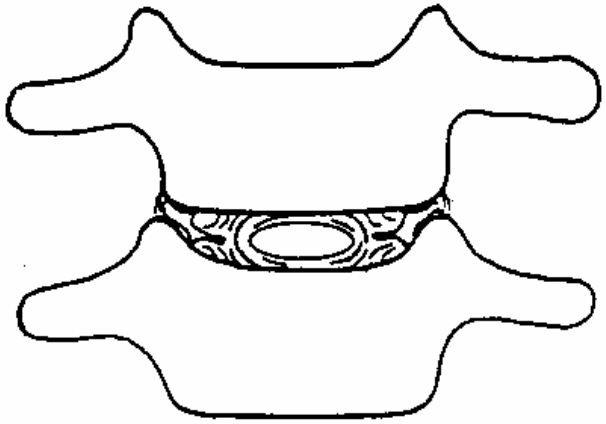
Age-related fissures in cervical discs



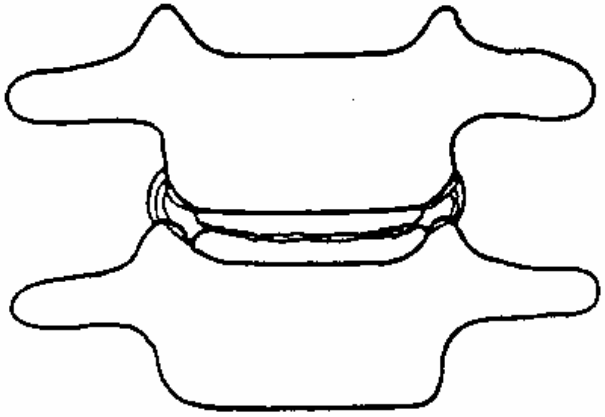
3 Years



7 – 8 Years

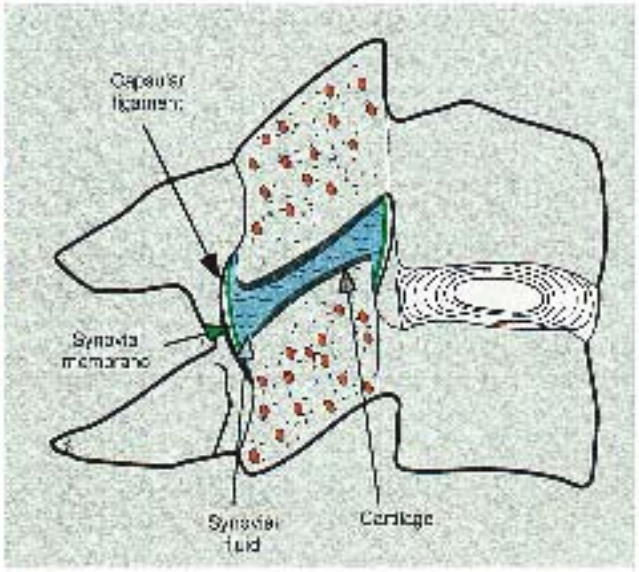


25 – Years



55 Years

Zygapophyseal Joints



Frozen section

Share load with disc

Schematic bilateral uncovertebral clefts

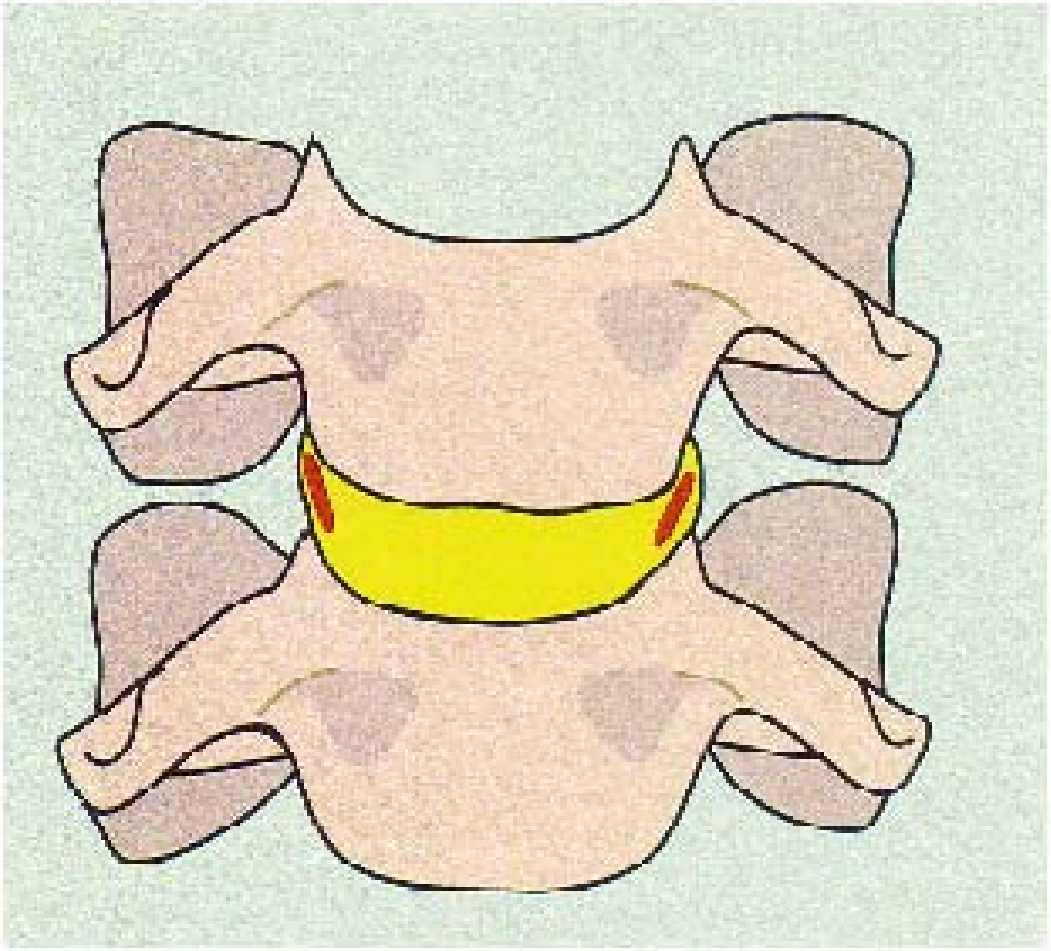


Fig. 8. Schematic of the bilateral uncovertebral (Luschka's) clefts.

Uncovertebral Clefts

- Located C 3 – C 7
- Not formed at birth do not constitute joints
- Adult increase in size and extend to meet in midline to produce a transverse fissure across back of disc – at that time constitute a joint?

Uncovertebral Clefts

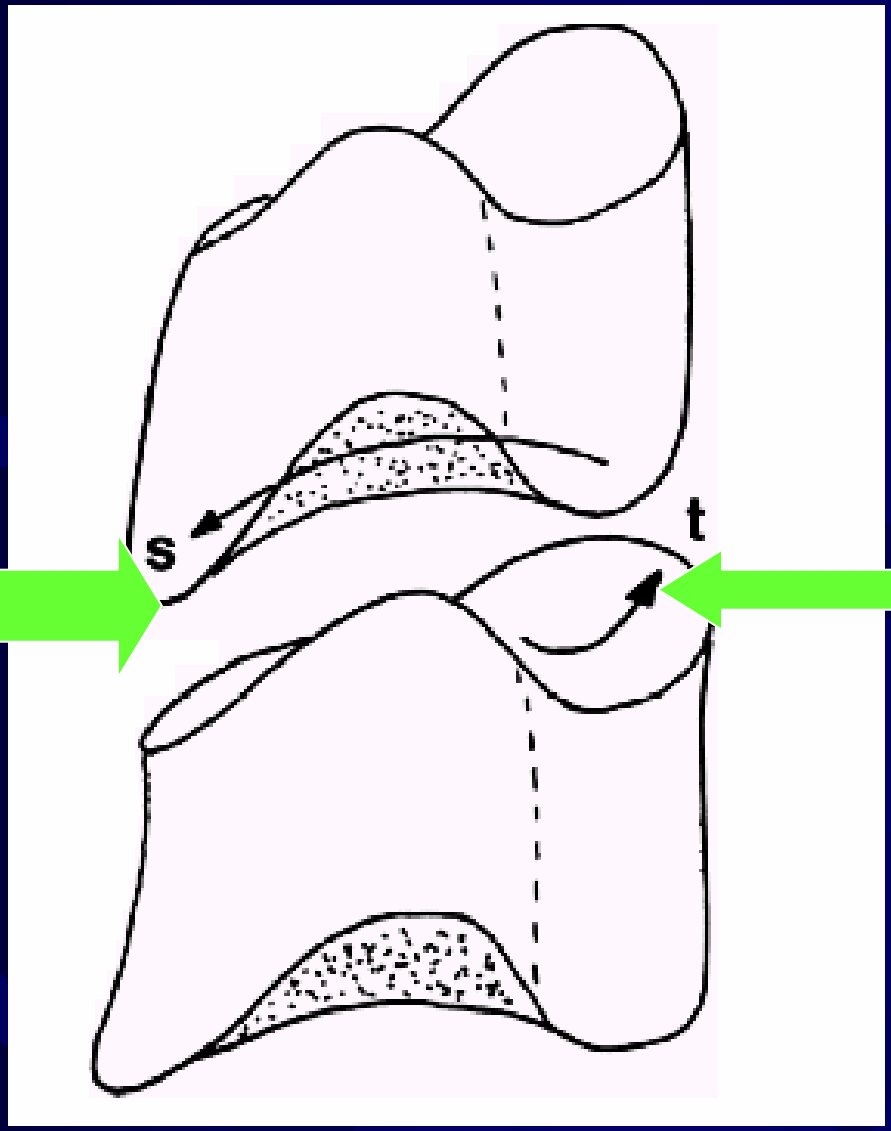
- Arise in anulus fibrosis between uncinate process of lower vertebral body laterally and saddle contour of upper vertebral body medially
- Allows for movement between bodies and thru disc particularly in axial rotation

Uncovertebral Clefts

- Clefts enable disc to couple lateral bending and axial rotation governed by the Z jts
- Facet and uncovertebral joints contribute significantly to coupled motions of the spine

Saddle shape of Cervical IV jts

Sagittal plane



Transverse plane

Flexion -Extension

Osteokinematics

Flexion

anterior sagittal rotation

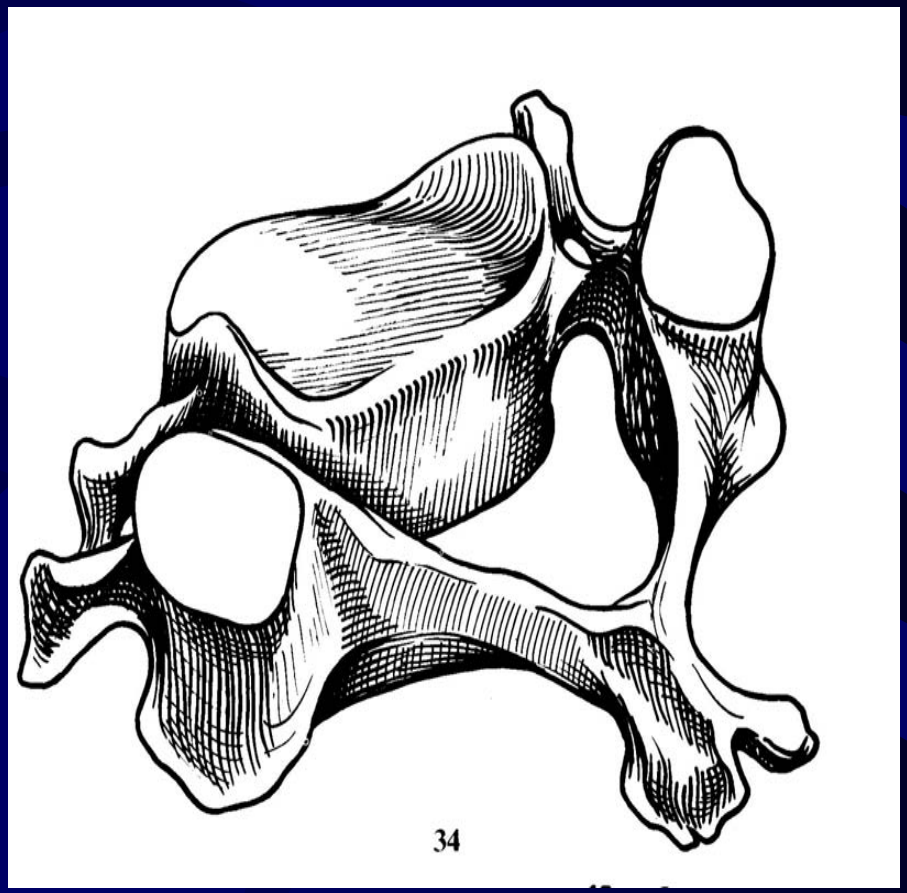
Anterior sagittal translation

Translation upper>lower (2.7)

Extension

Posterior sagittal rotation

Posterior sagittal translation



Arthrokinematics

Flexion

Z jts

anteriorsuperior glide

U jts

anterior glide

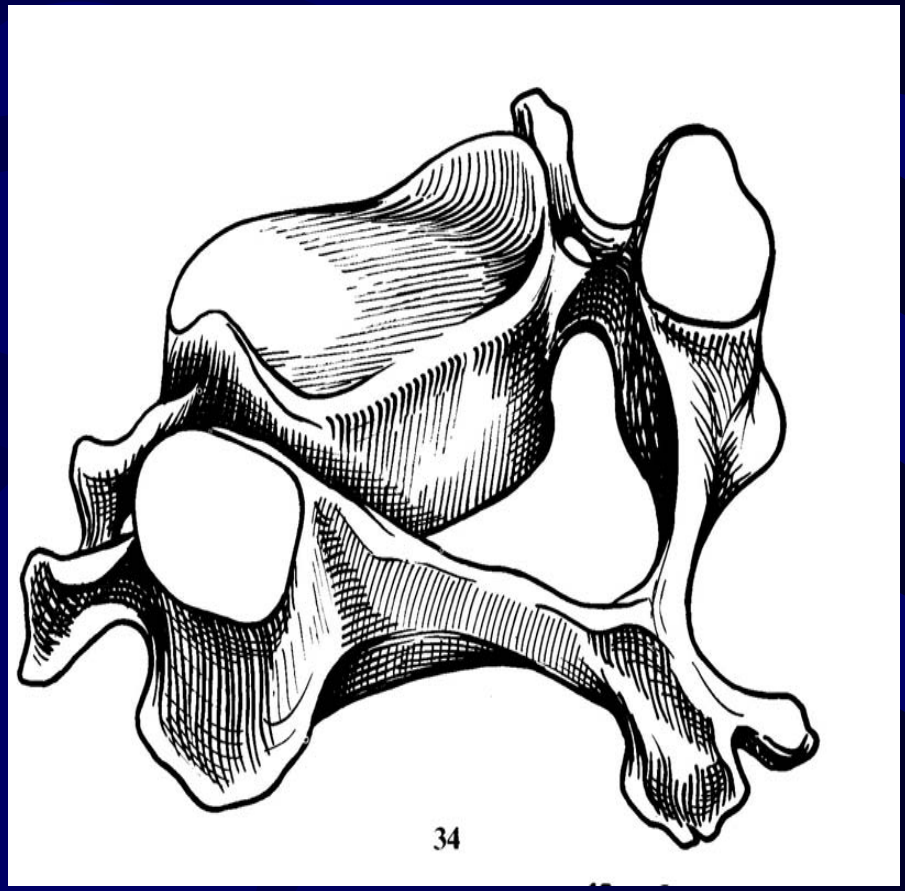
Extension

Z joints

posterior inferior glide

U joints

posterior



Axial Rotation /side bend

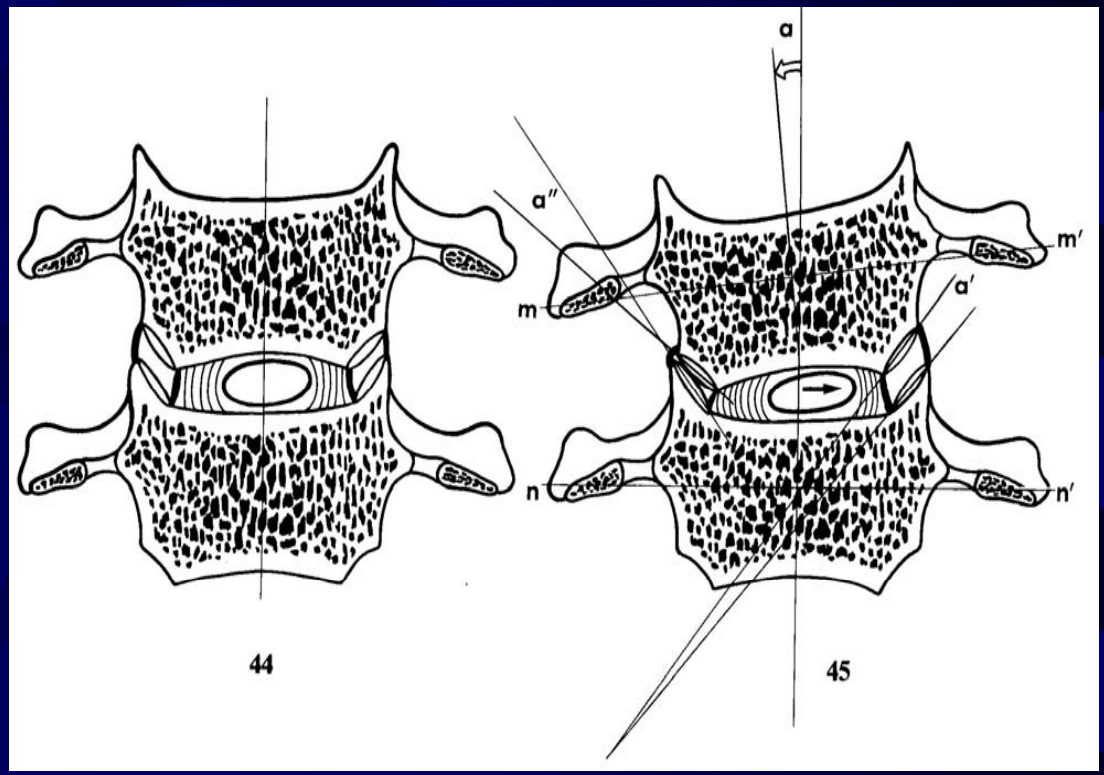
Arthrokinematics

Sidebend /rotation

U joints/ Z jts

ipsi inf, med, post (IMP)

contra sup,ant, lat (SAL)

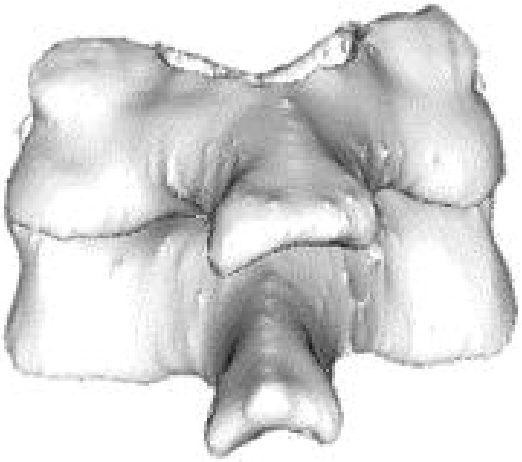


•Takahiro I et al, *Kinematics of the Cervical Spine in Lateral Bending In Vivo Three- Dimensional Analysis*, Spine Vol 31, Number 2 , 2006

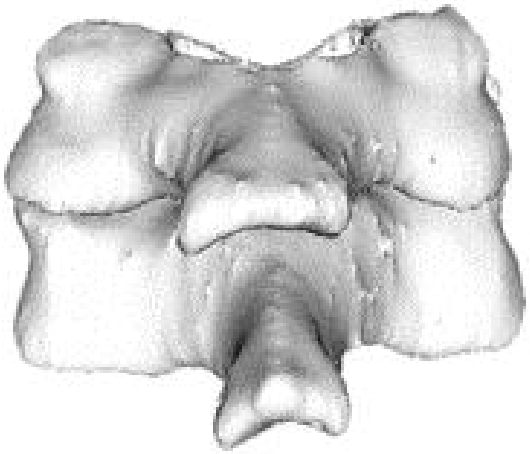
Kinematics of the Cervical Spine in Lateral Bending in vivo 3 -d analysis 2006

Segment	***ROM Mean***	
C3-4	3.5	
C4-5	3.3	
C5-6	4.3	
C6-7	5.7	
C7-T1	4.1	

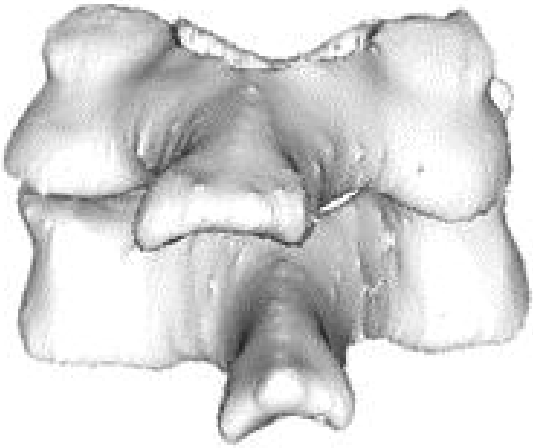
Left Lateral Bending



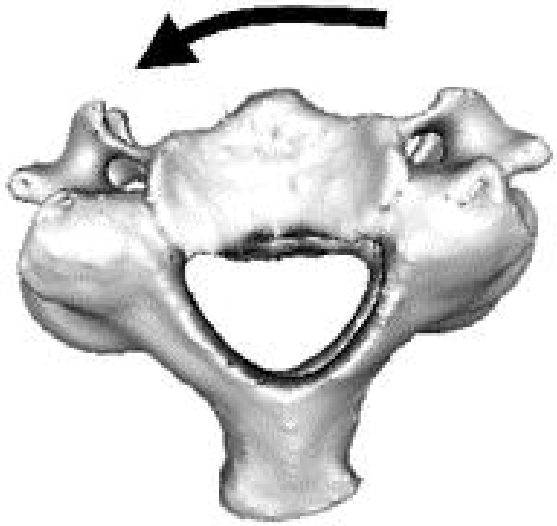
Neutral



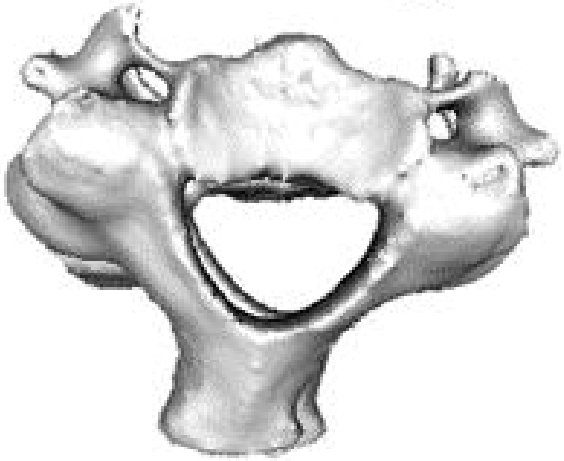
Right Lateral Bending



Left Coupled Axial Rotation

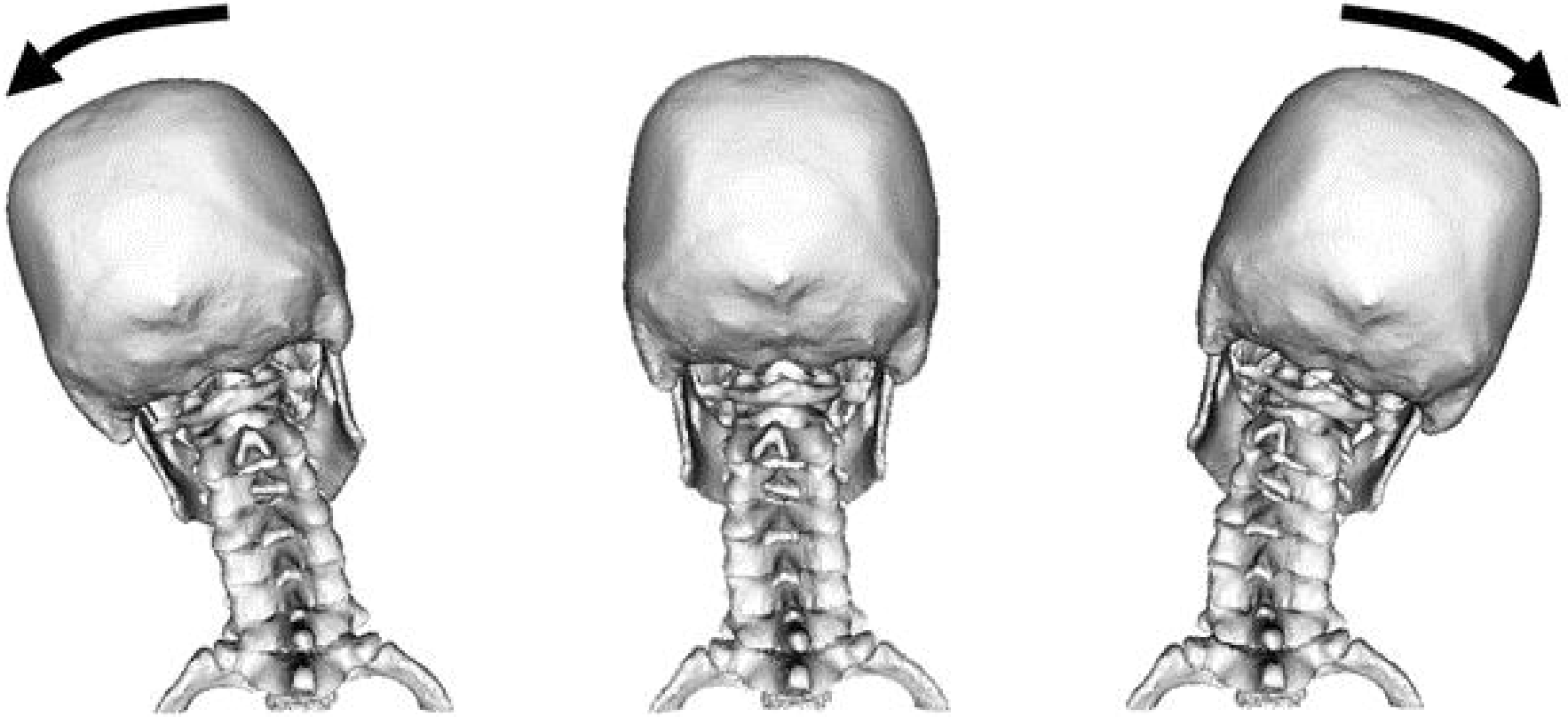


Right Coupled Axial Rotation



Right Coupled Axial Rotation — Upper Cervical Spine — Left Coupled Axial Rotation

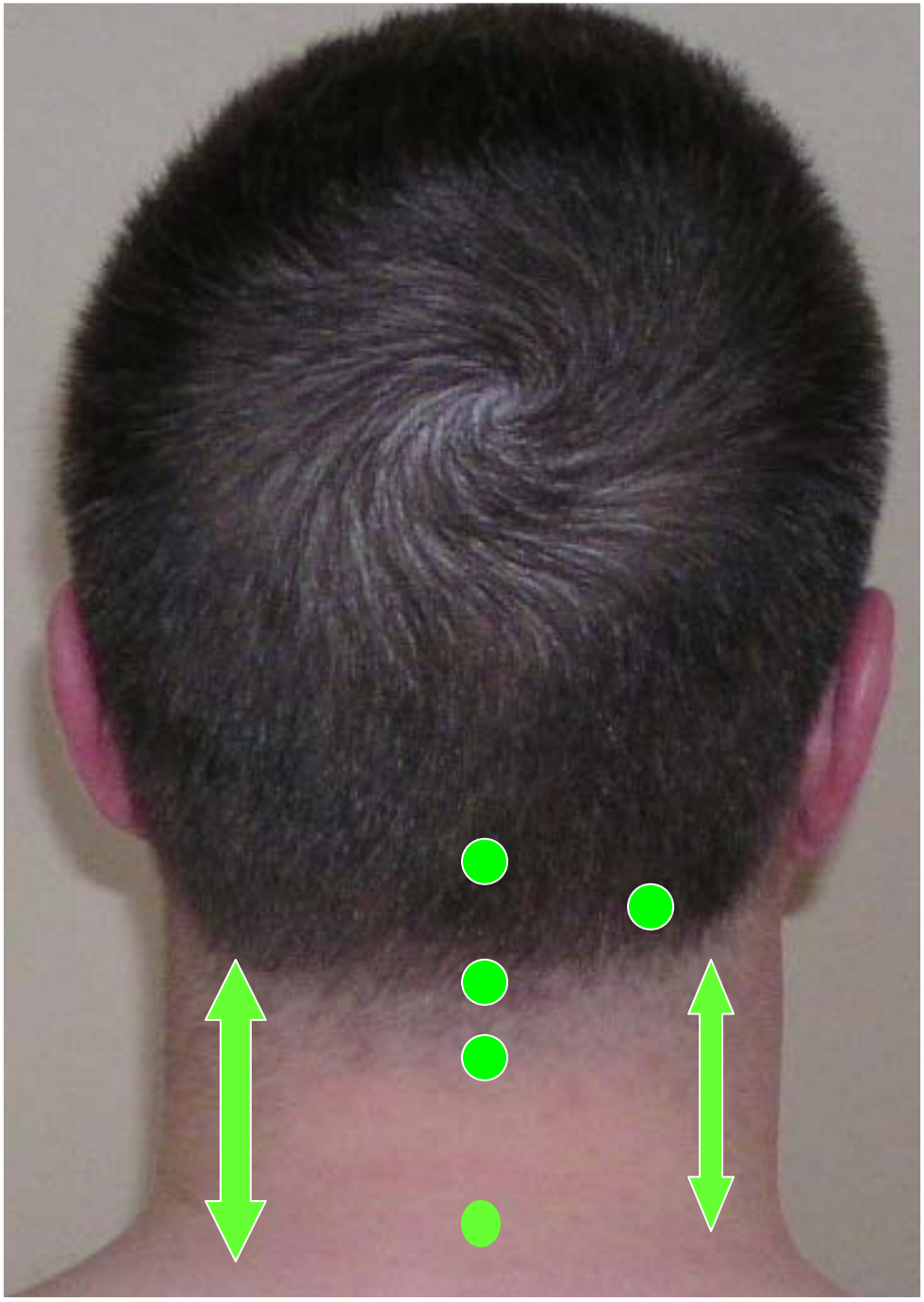
Left Coupled Axial Rotation — Subaxial Cervical Spine — Right Coupled Axial Rotation

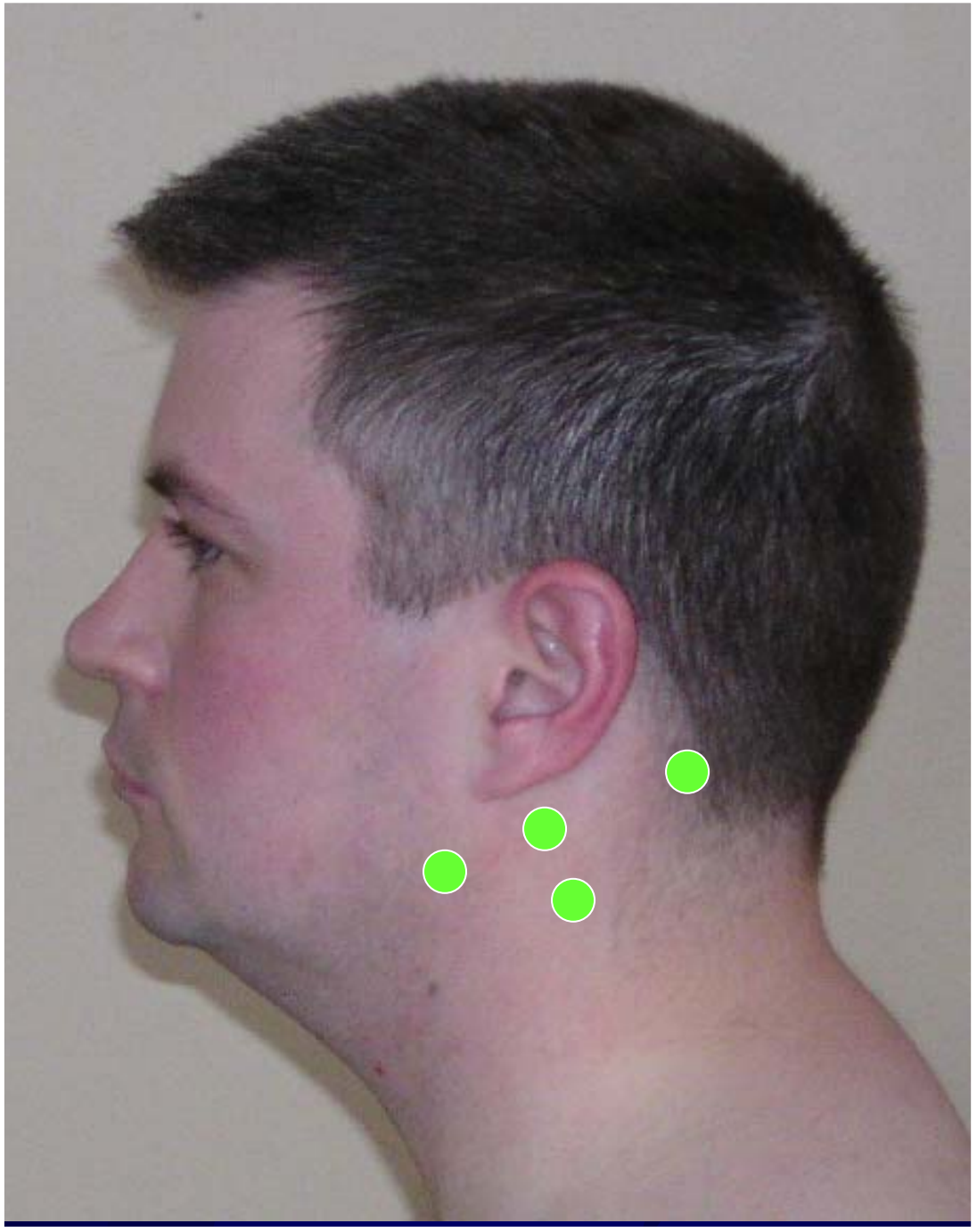


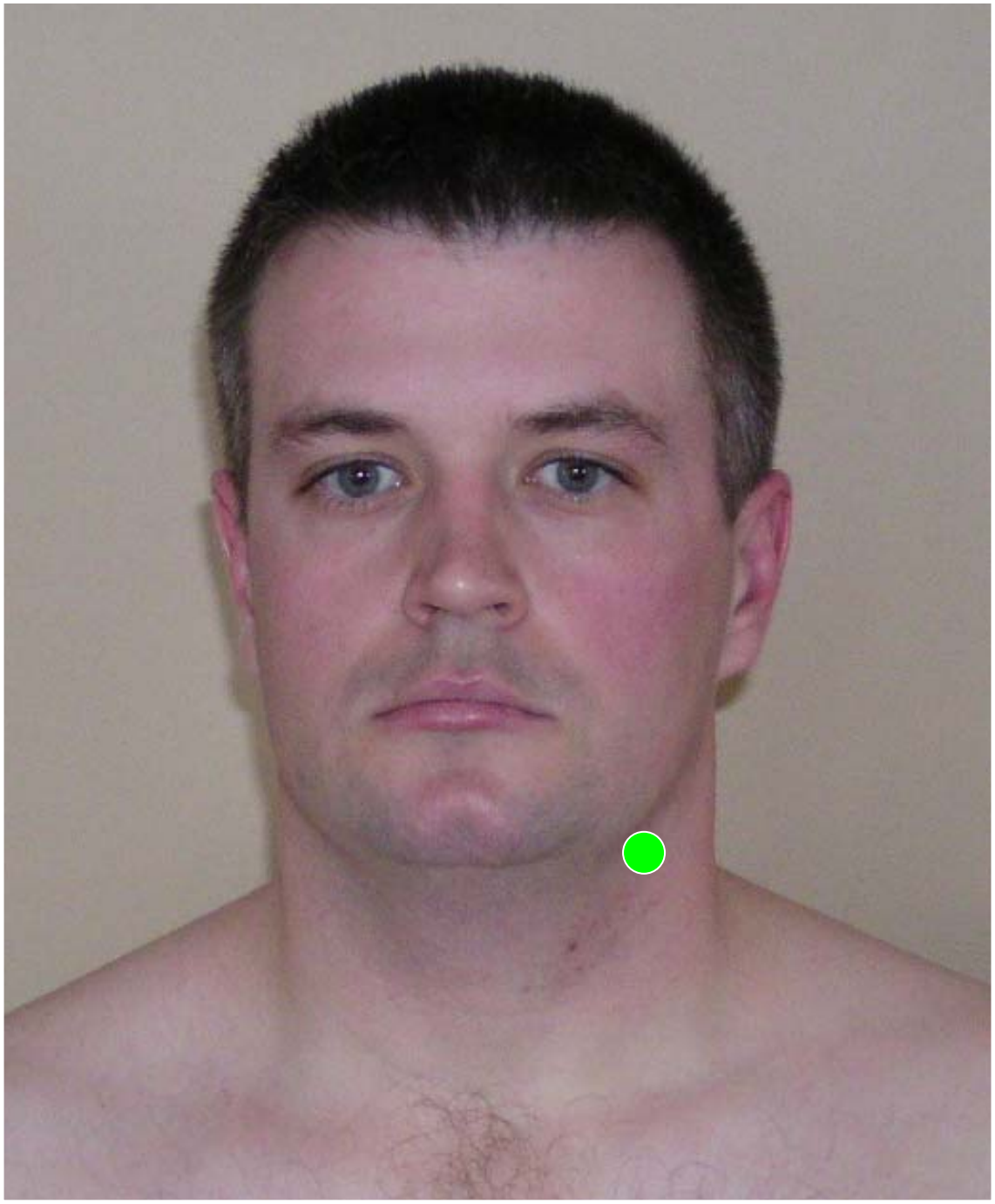
Left Lateral Bending | Neutral | Right Lateral Bending

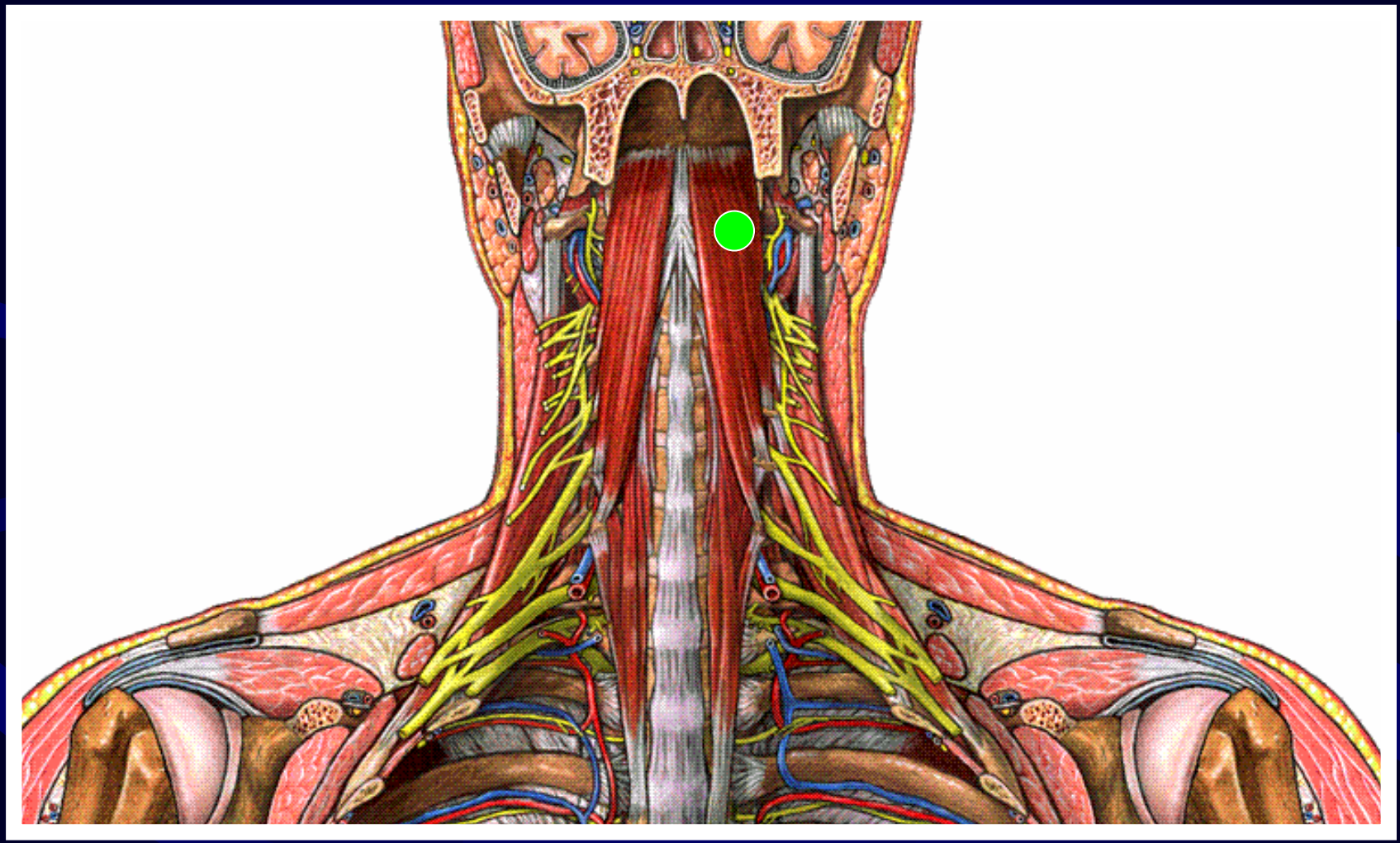
Surface Anatomy Review

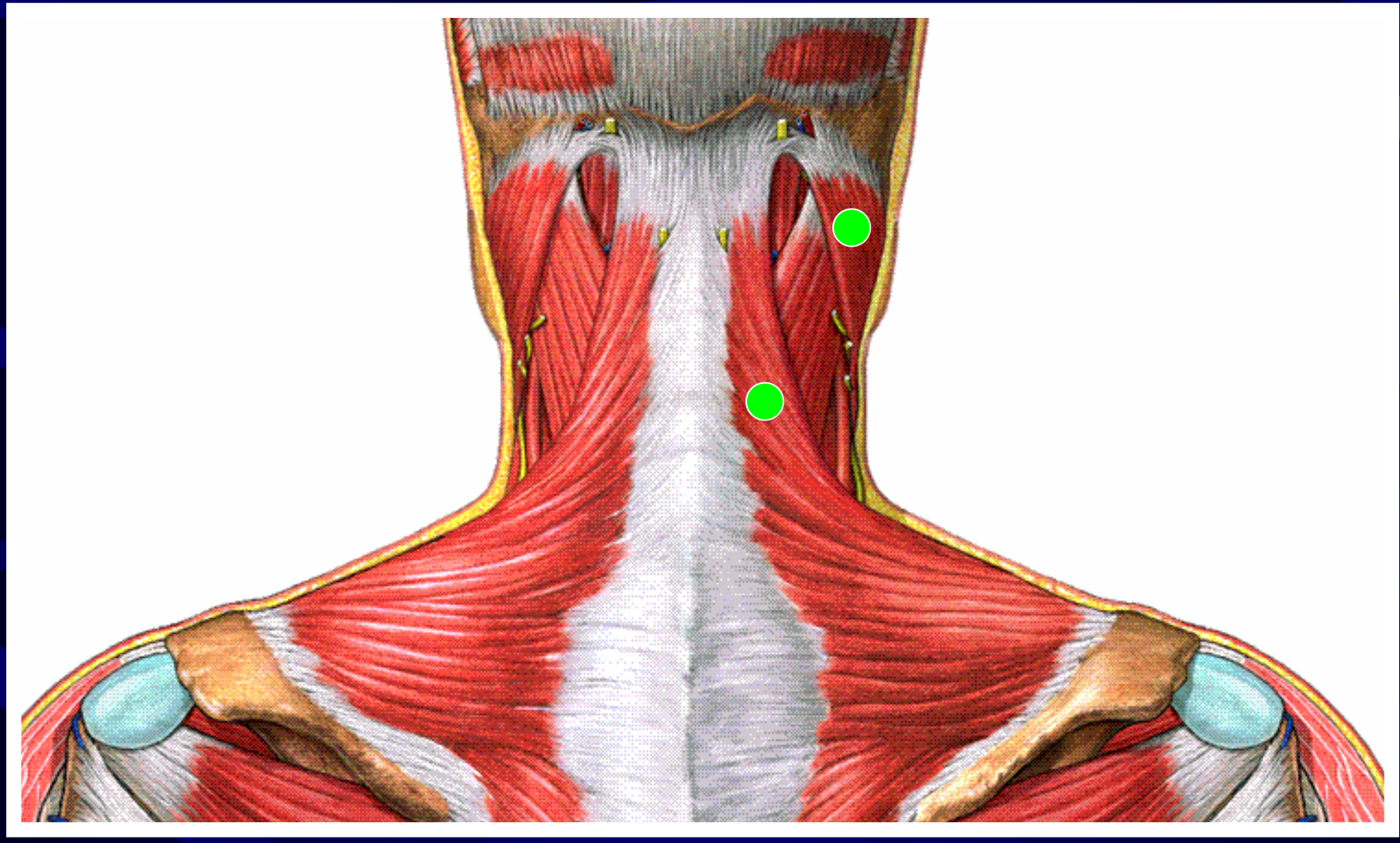
Clinical Technique Manual : Level 1 pg 38,39

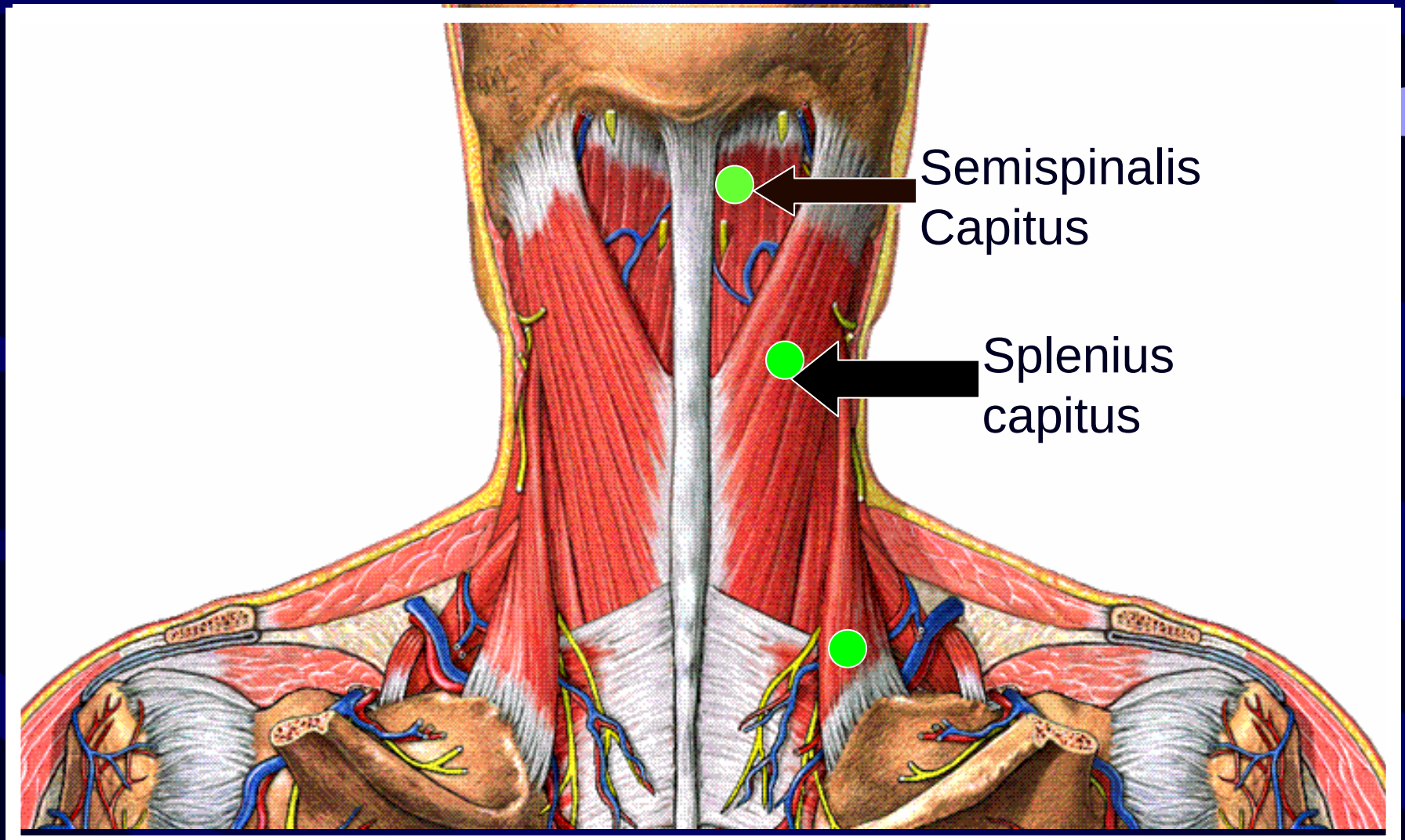


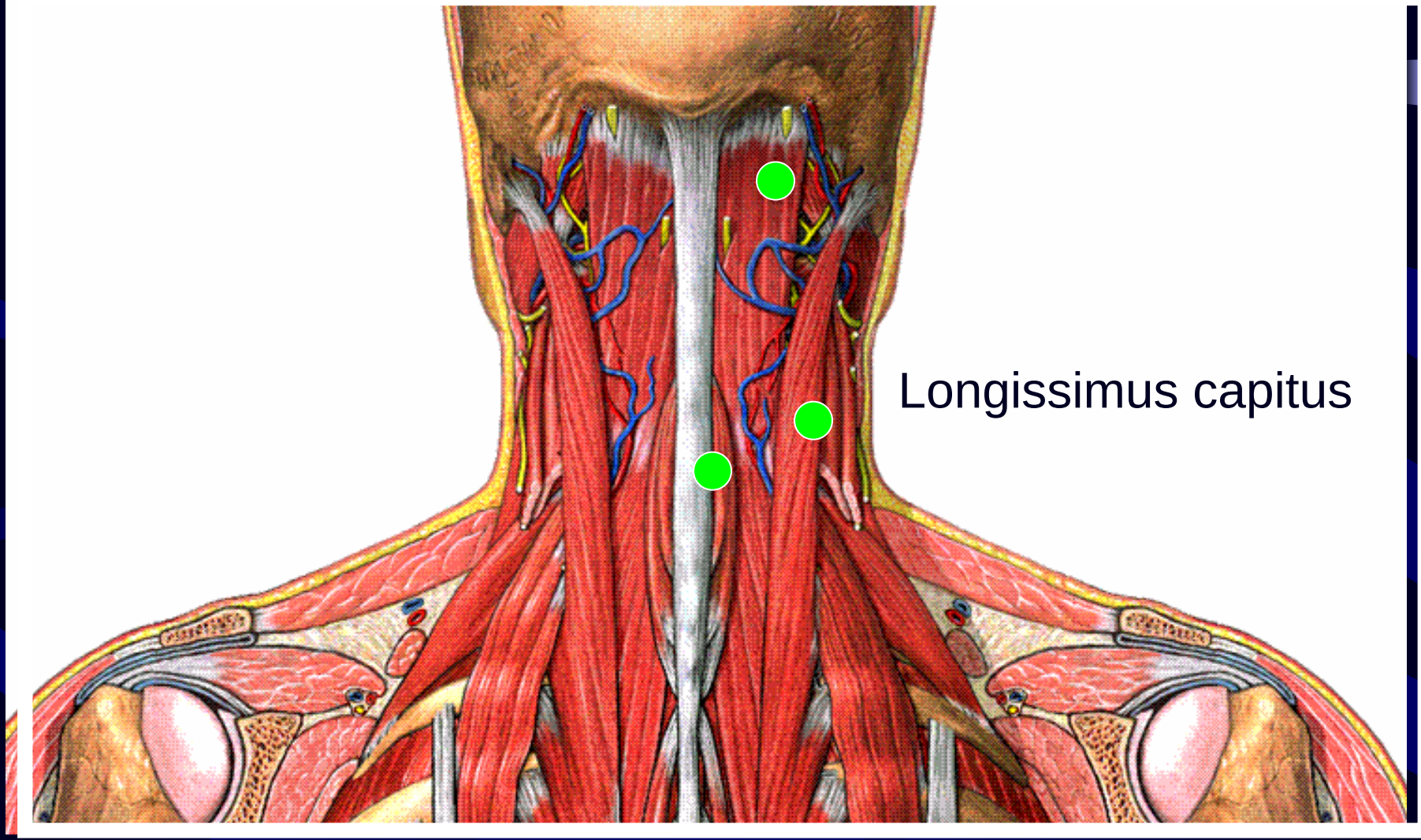


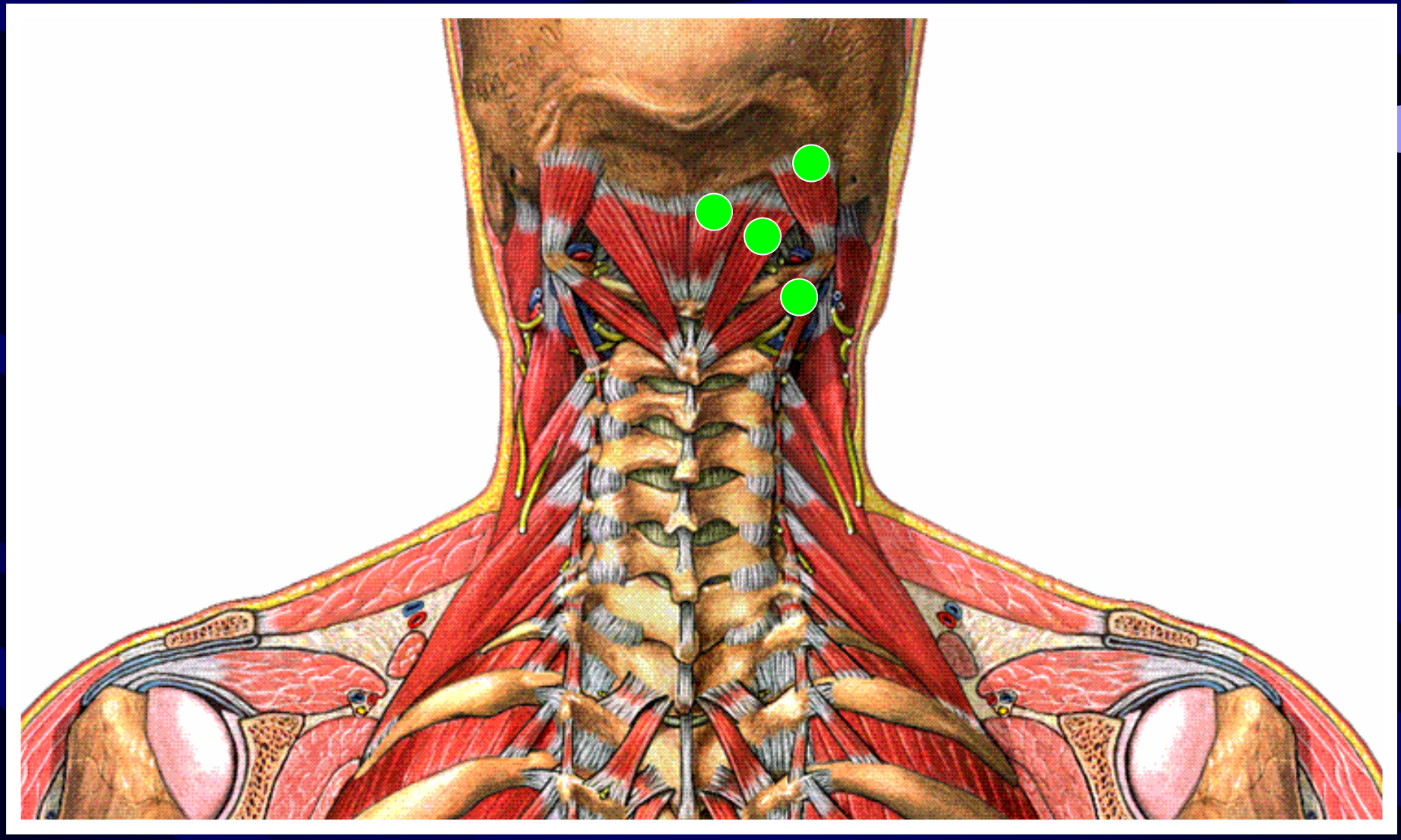







Semispinalis
Capitus
Splenius
capitus


Longissimus capitus



Lab

- Palpate surface anatomy cervical spine
- *Clinical Technique Manual pg 38 to 39*

Objective Assessment

- Active ROM – upper vs mid cervical
- Repeated Movement
- Habitual and Combined Movements
- *Upper Quadrant* ***Workbook pg 44 to 66***

Joint Play Movements

- Central PA C3-7 – what does it tell you?
- Central Angle Caudally – what movement ?
- Unilateral PA 3-7 – incline cranially and caudally

Passive Segmental Tests

PPIVMS

- Used to determine the amount and quality of passive physiological movement available at a motion segment

- Flexion, Extension, Side bending/rotation

(unilateral flexion and extension)

Segmental Compliance Test

- Has been known as PAVM test
- Assess the connective tissue compliance of the arthrokinematic motions *(rocks and slides)* associated with various physiological movements of the segment
- Clinician is attempting to appreciate the quality of the “ give” present in the CT when the segment is at R2