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Mid Cervical Spine
Assessment and Treatment

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

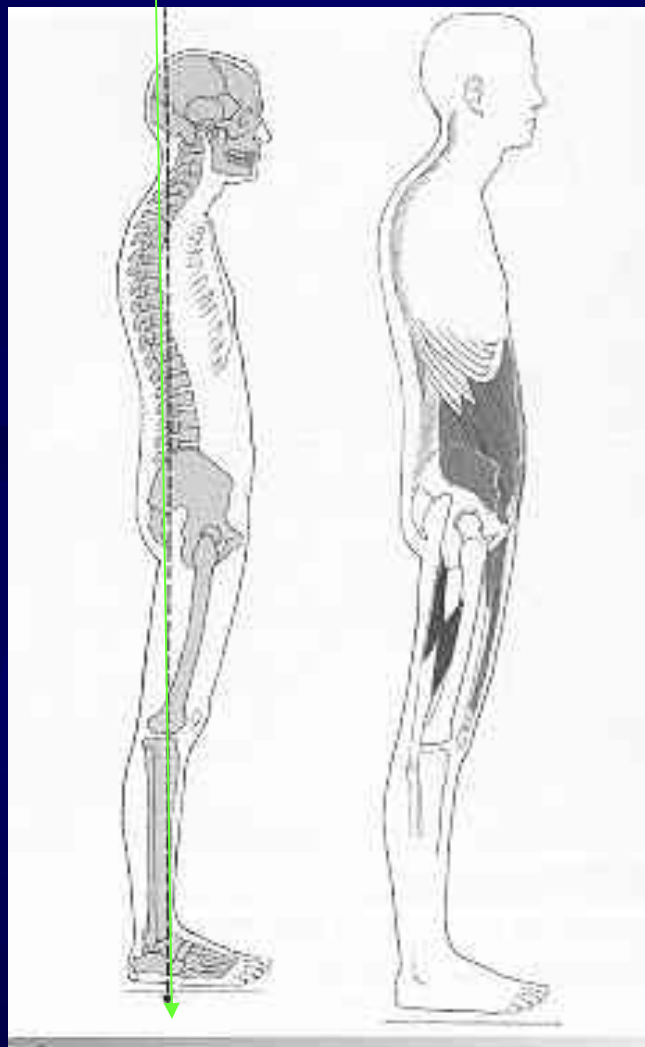
Content

- 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



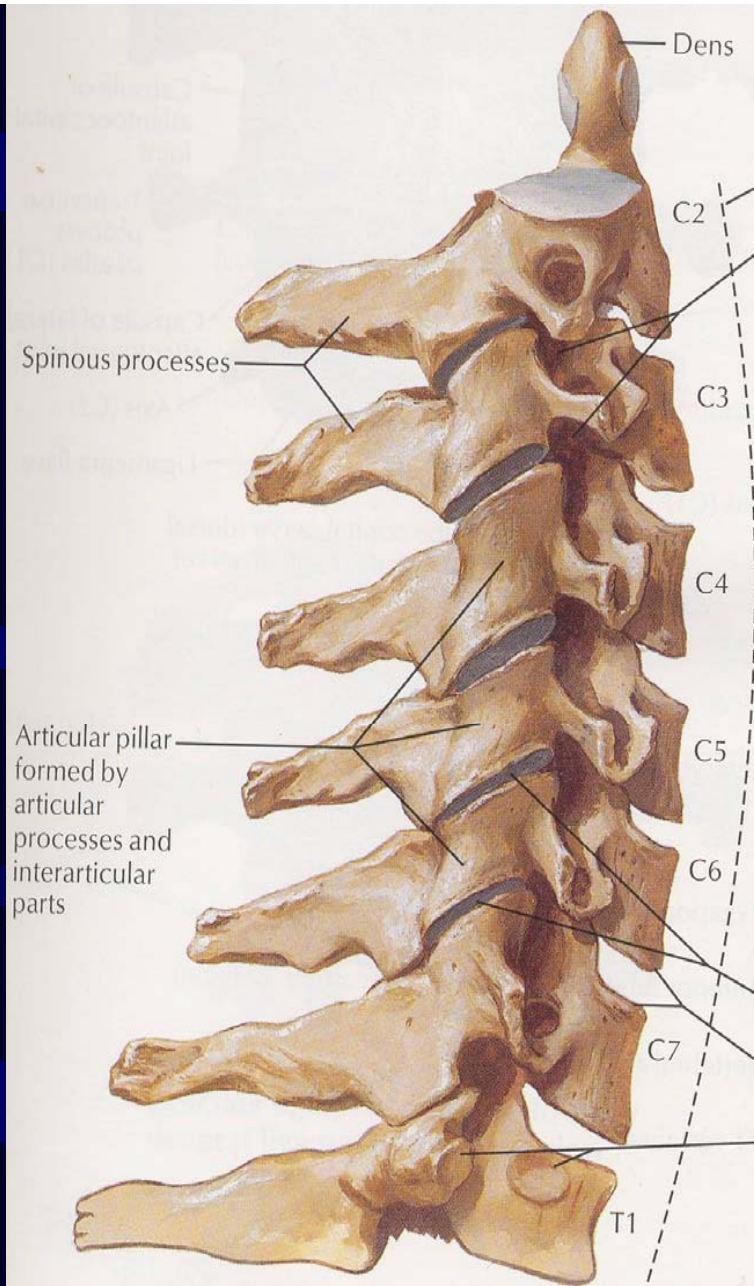
Practical

- Complete an upper quadrant scan –
Clinical Technique Manual pg 33 to 36
- Do a postural exam on the cervical spine and upper extremity
- *Theory Manual Part 1: pg 405 to 416*

References

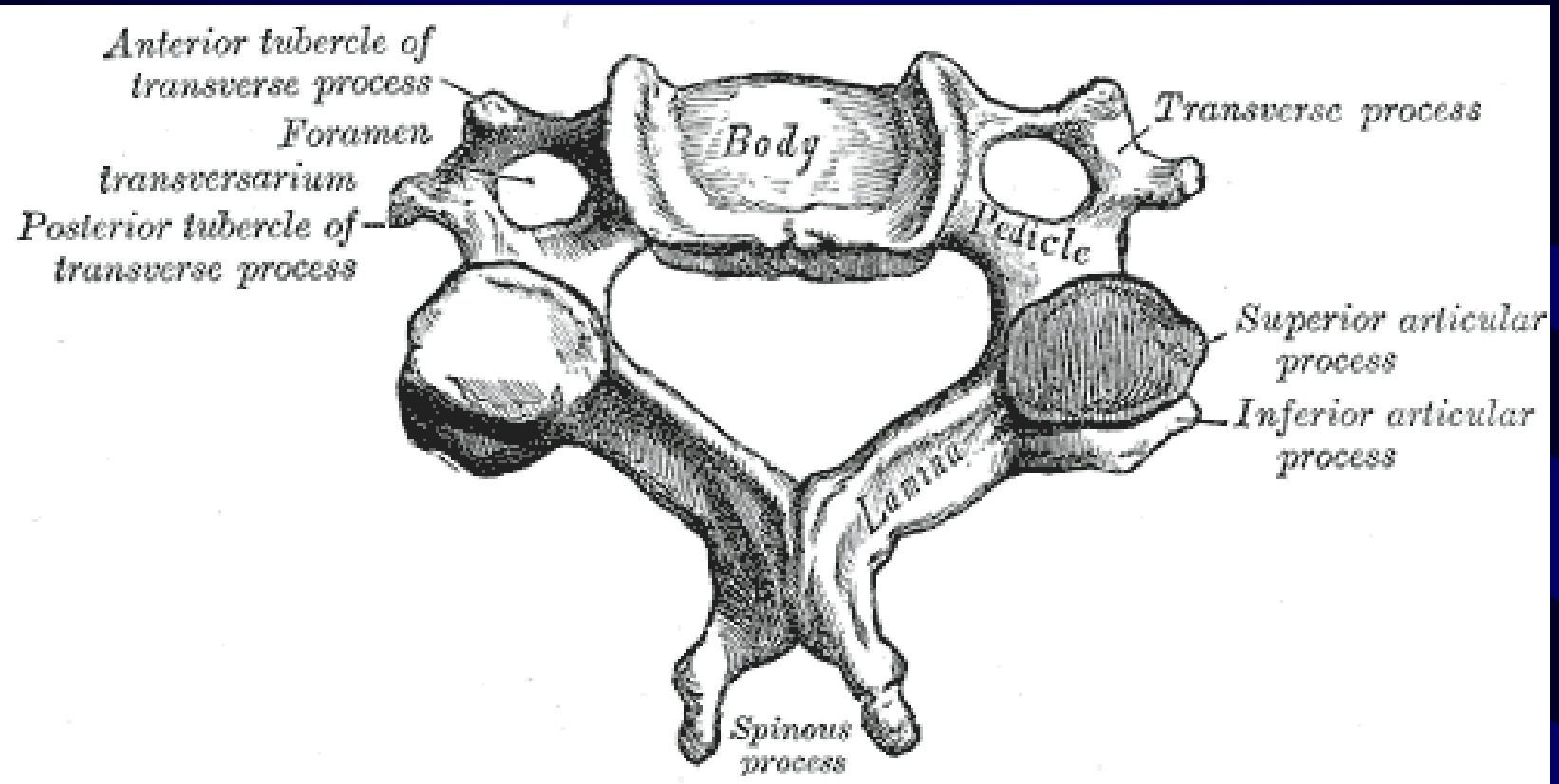
Sahrmann, Shirley: **Diagnosis and treatment of Movement Impairment Syndromes**, St. Louis Missouri, Mosby Publishing, 2002, ISBN: 0-8016-7205-8

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 3-1





Cervical Disc

Research

Cervical Disc

LAFTS

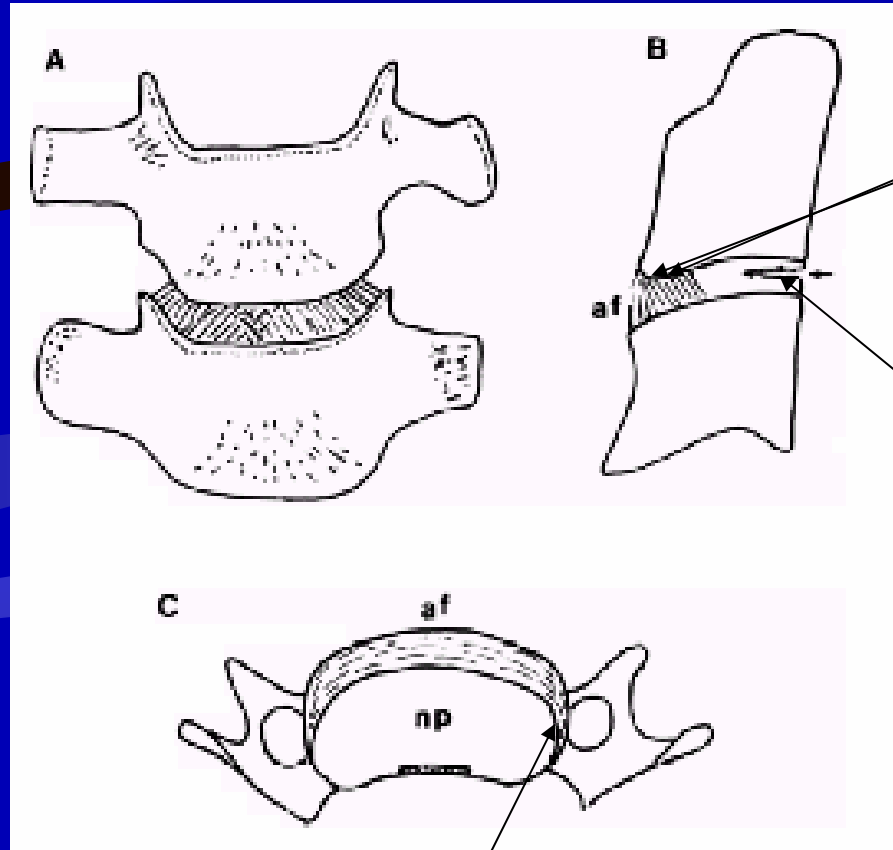
Living adaptable force transducers (Butler)

- Anulus is crescentic
- 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 annulus Fibrosis

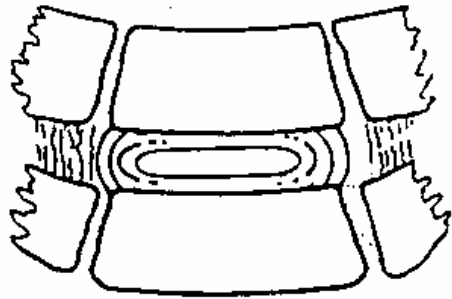


Ant inter
ligament

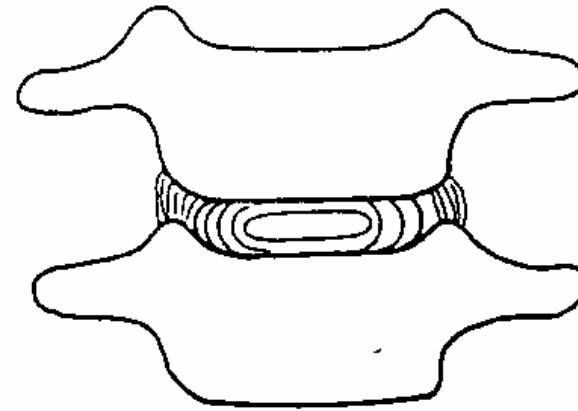
Post cleft

AF thick ant –
tapers to UP

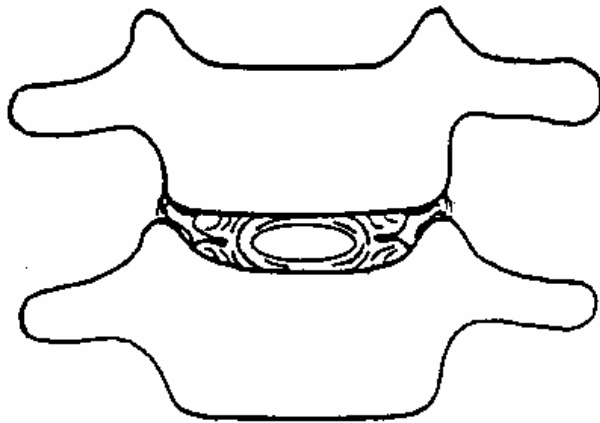
Age-related fissures in cervical discs



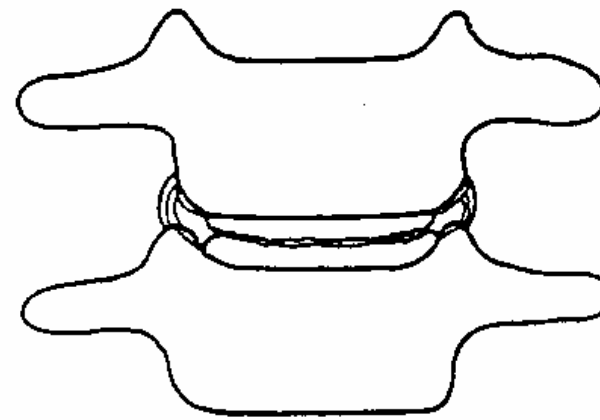
3 Years



7 - 8 Years



25 - 30 Years

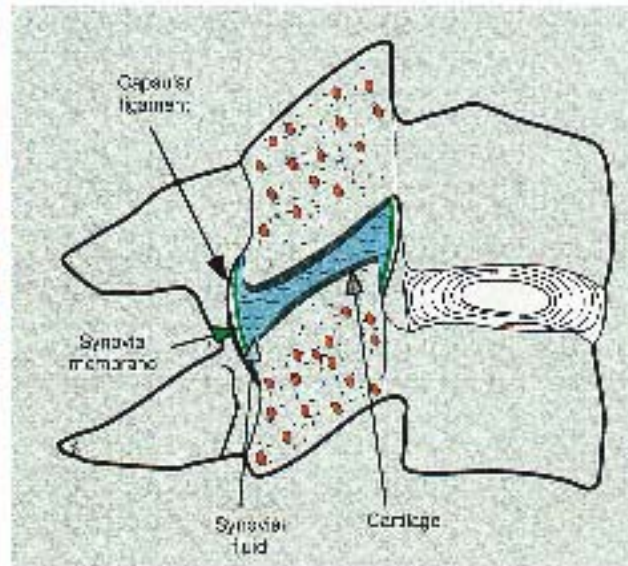


55 Years

Zygapophyseal Joints



Frozen
section



Share load with
disc

Schematic bilateral uncovertebral clefts

N. Yoginandan et al. / Clinical Biomechanics 16 (2001) 1-27

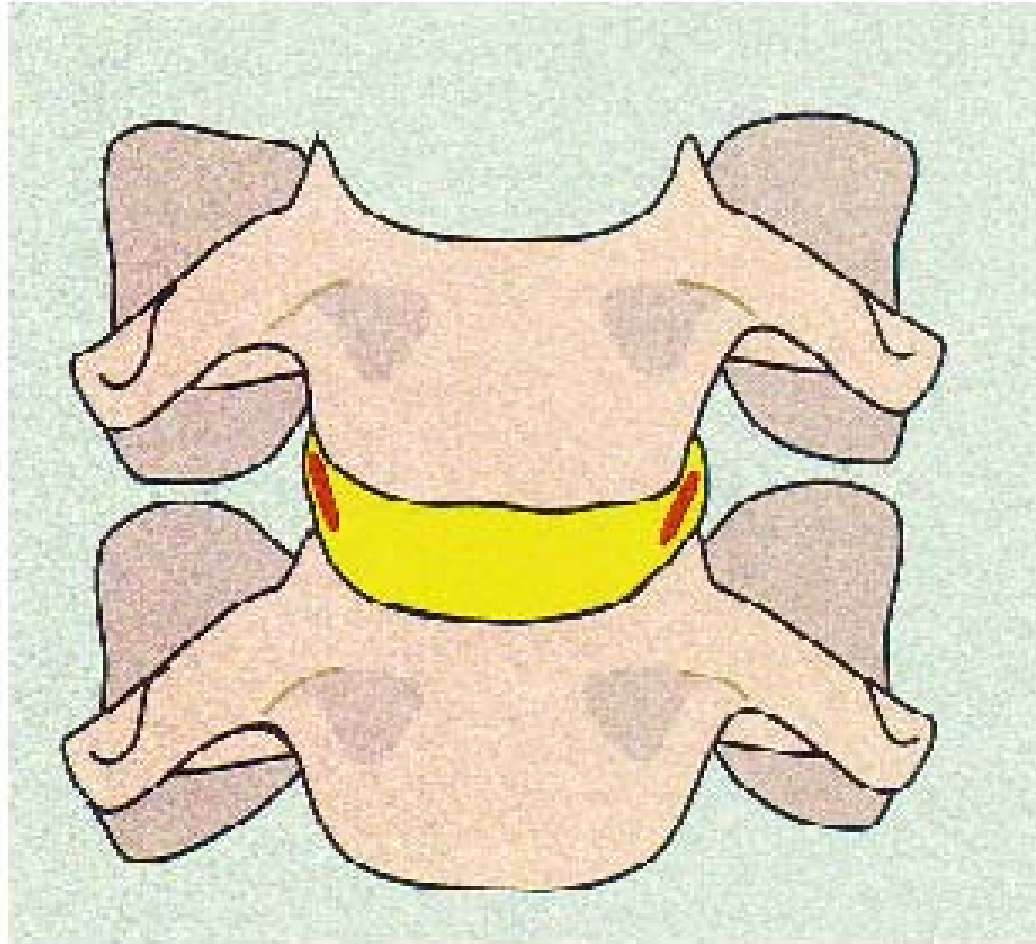


Fig. 8. Schematic of the bilateral uncovertebral (Luschka's) clefts.

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

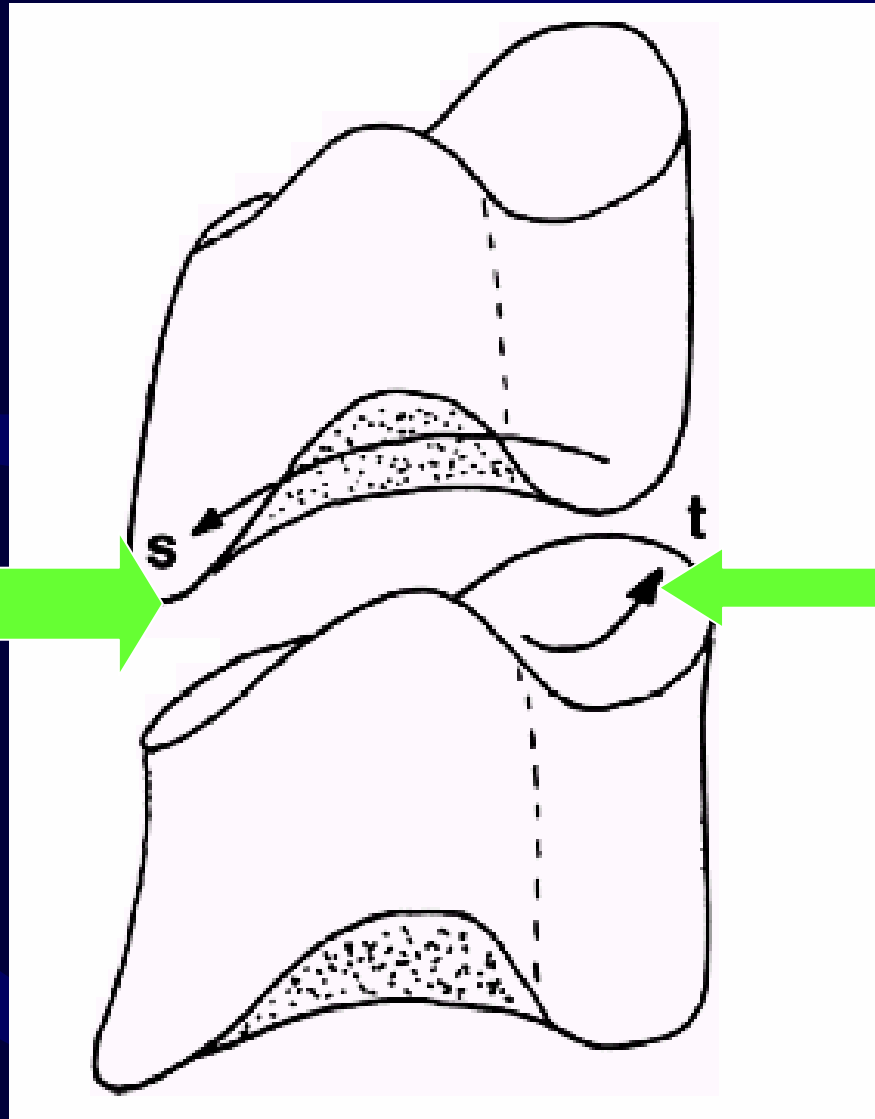
- Arise in anulus fibrosis between unciniate process of lower vertebral body laterally and saddle contour of upper vertebral body medially
- Allows for movement between bodies and thru disc particularly in axial rotation

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

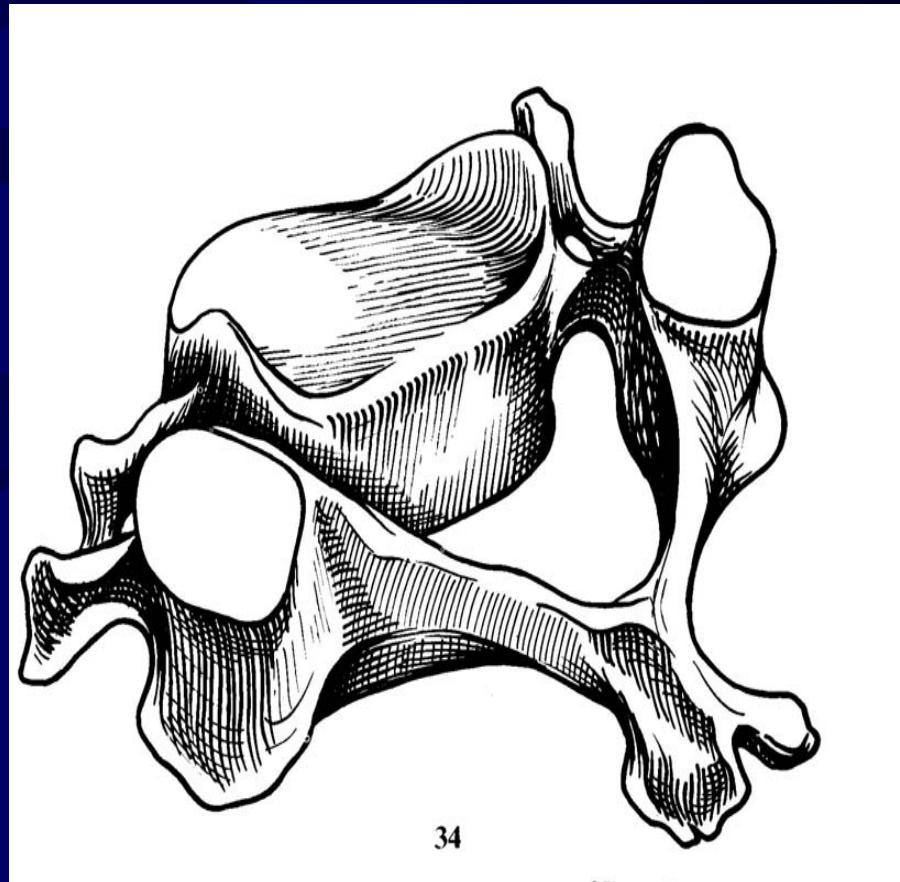
Anterior sagittal translation

Translation upper > lower (2.7)

Extension

Posterior sagittal rotation

Posterior sagittal translation



Arthrokinematics

Flexion

Z jts

anterior superior glide

U jts

anterior glide

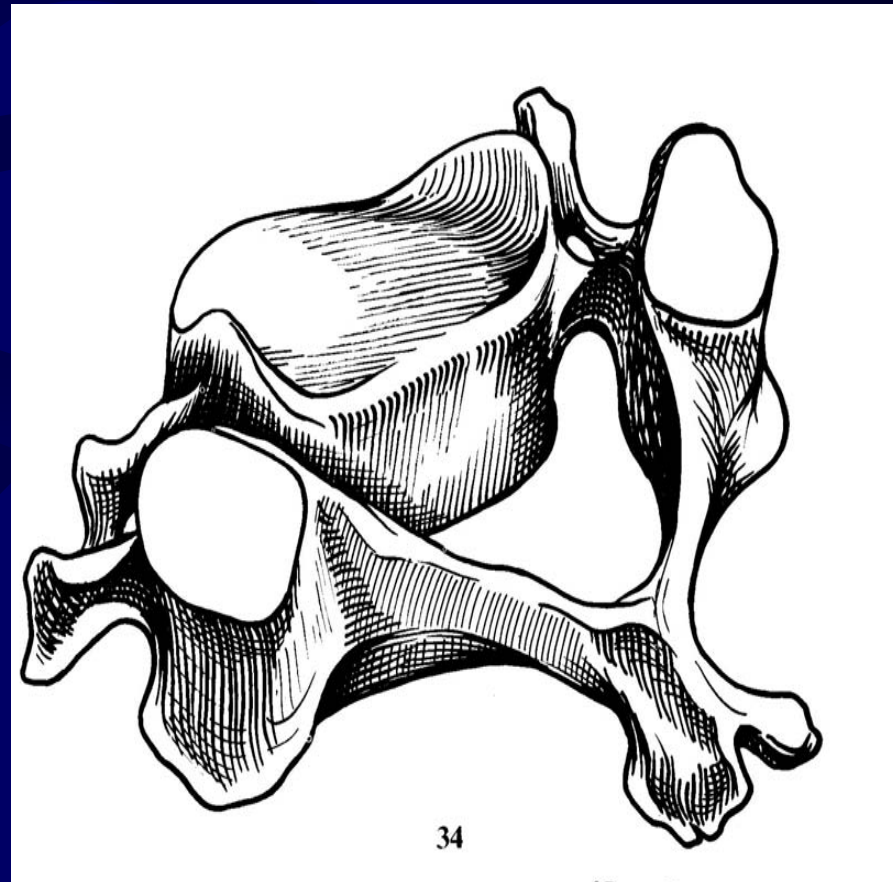
Extension

Z joints

posterior inferior glide

U joints

posterior



Axial Rotation /side bend

Arthrokinematics

Sidebend /rotation

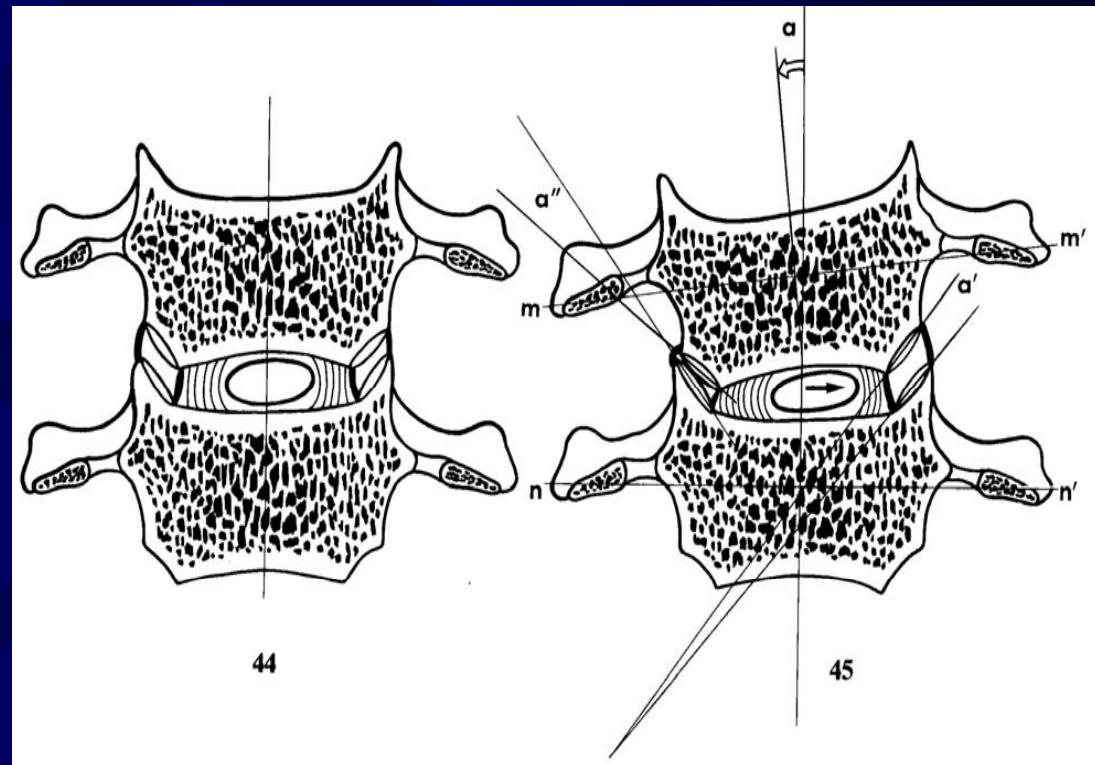
U joints/ Z jts

ipsi inf, med, post

(IMP)

contra sup, ant, lat

(SAL)

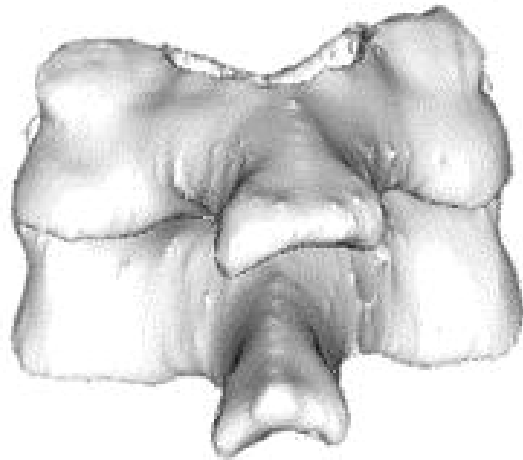


- Takahiro I et al, *Kinematics of the Cervical Spine in Lateral Bending In Vivo Three- Dimensional Analysis*, Spine Vol 31, Number 2 , 2006

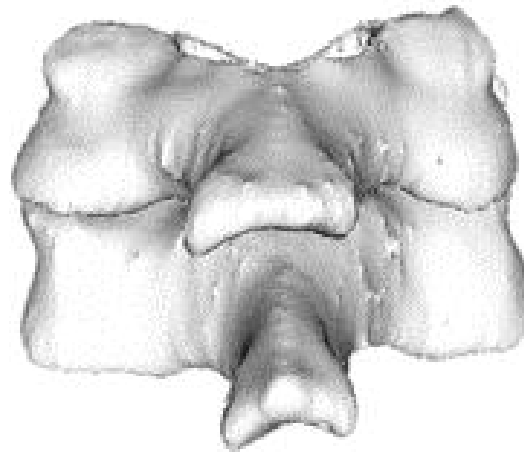
Kinematics of the Cervical Spine in Lateral Bending in vivo 3 -d analysis 2006

<i>Segment</i>	<i>ROM Mean</i>	
C3-4	3.5	
C4-5	3.3	
C5-6	4.3	
C6-7	5.7	
C7-T1	4.1	

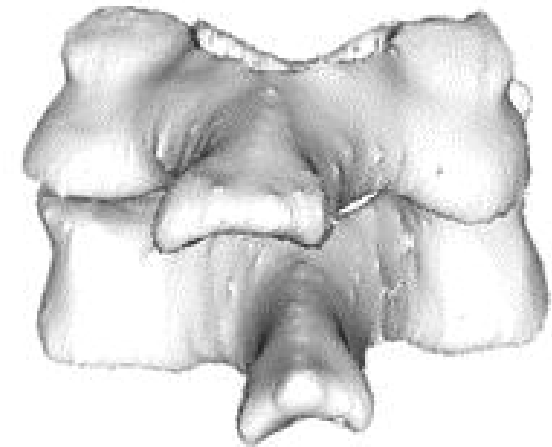
Left Lateral Bending



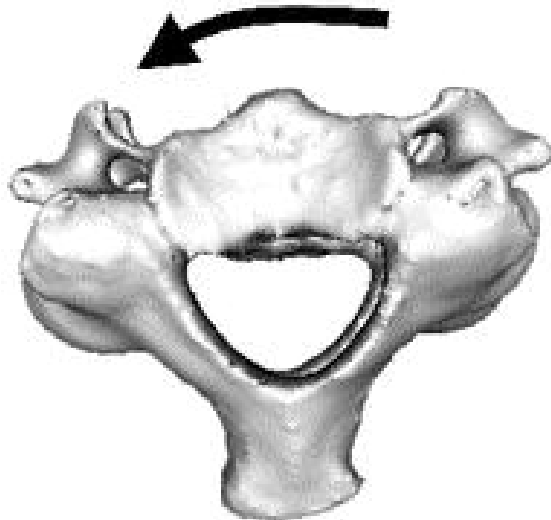
Neutral



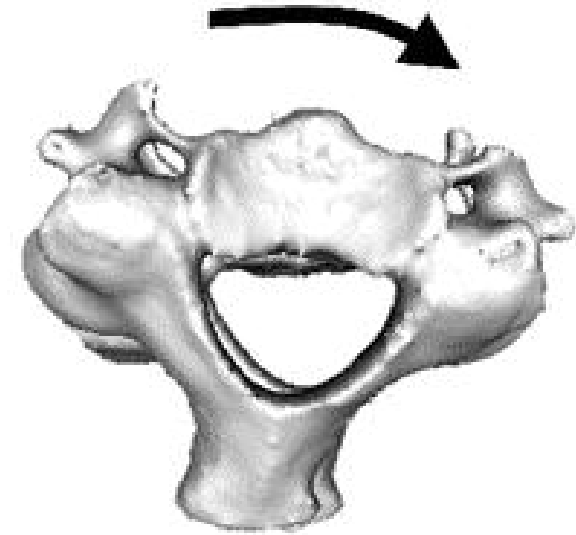
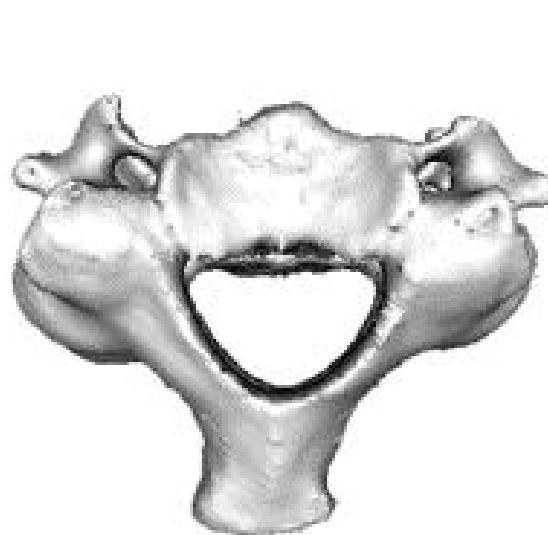
Right Lateral Bending



Left Coupled Axial Rotation

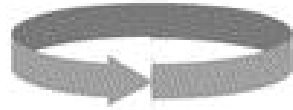


Right Coupled Axial Rotation

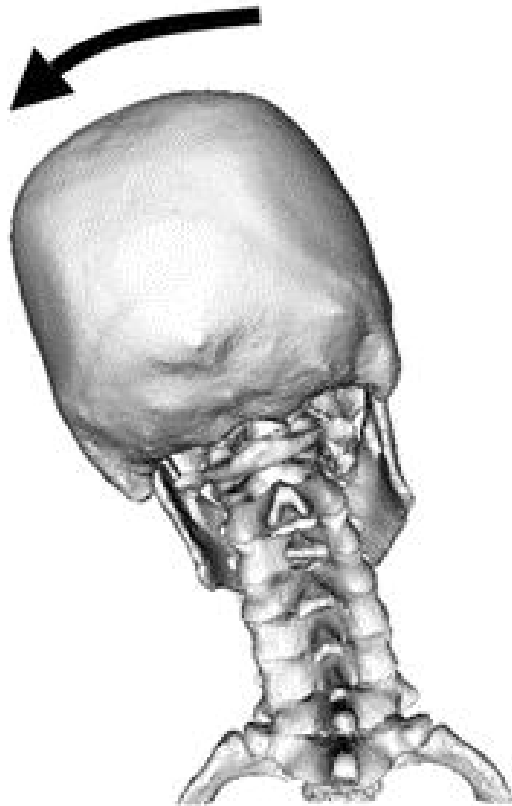
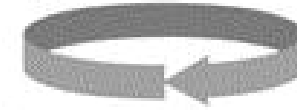




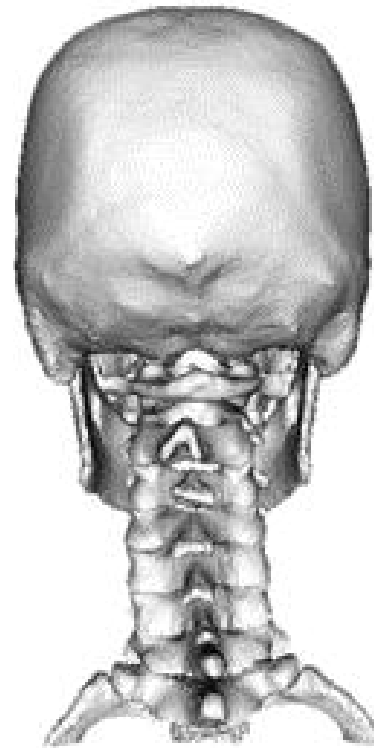
Right Coupled Axial Rotation — Upper Cervical Spine — Left Coupled Axial Rotation



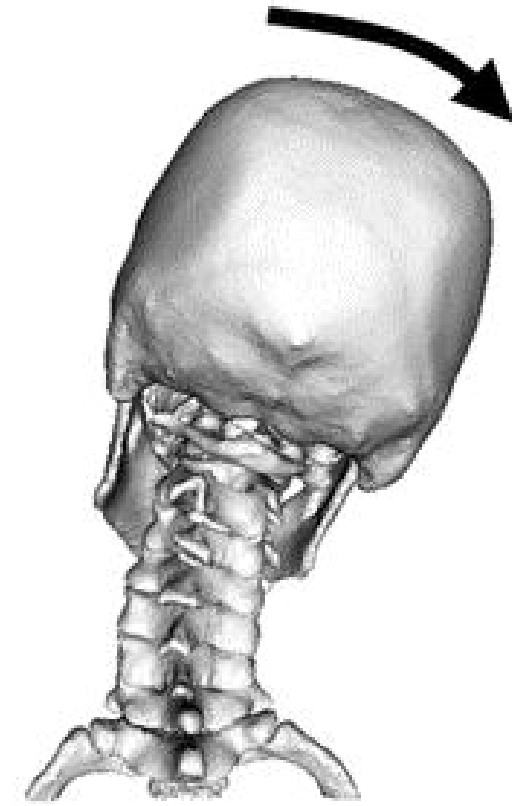
Left Coupled Axial Rotation — Subaxial Cervical Spine — Right Coupled Axial Rotation



Left Lateral Bending



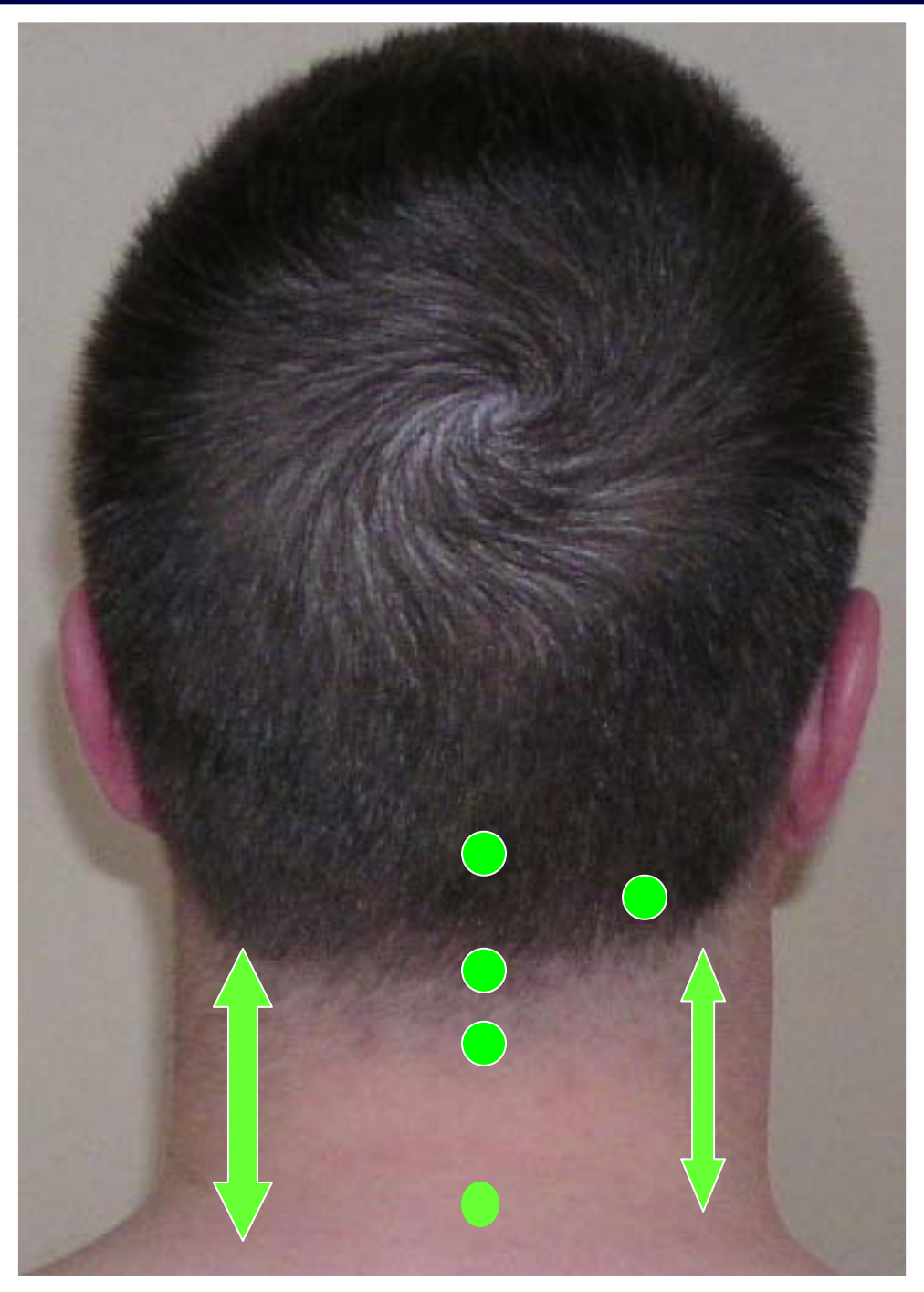
Neutral

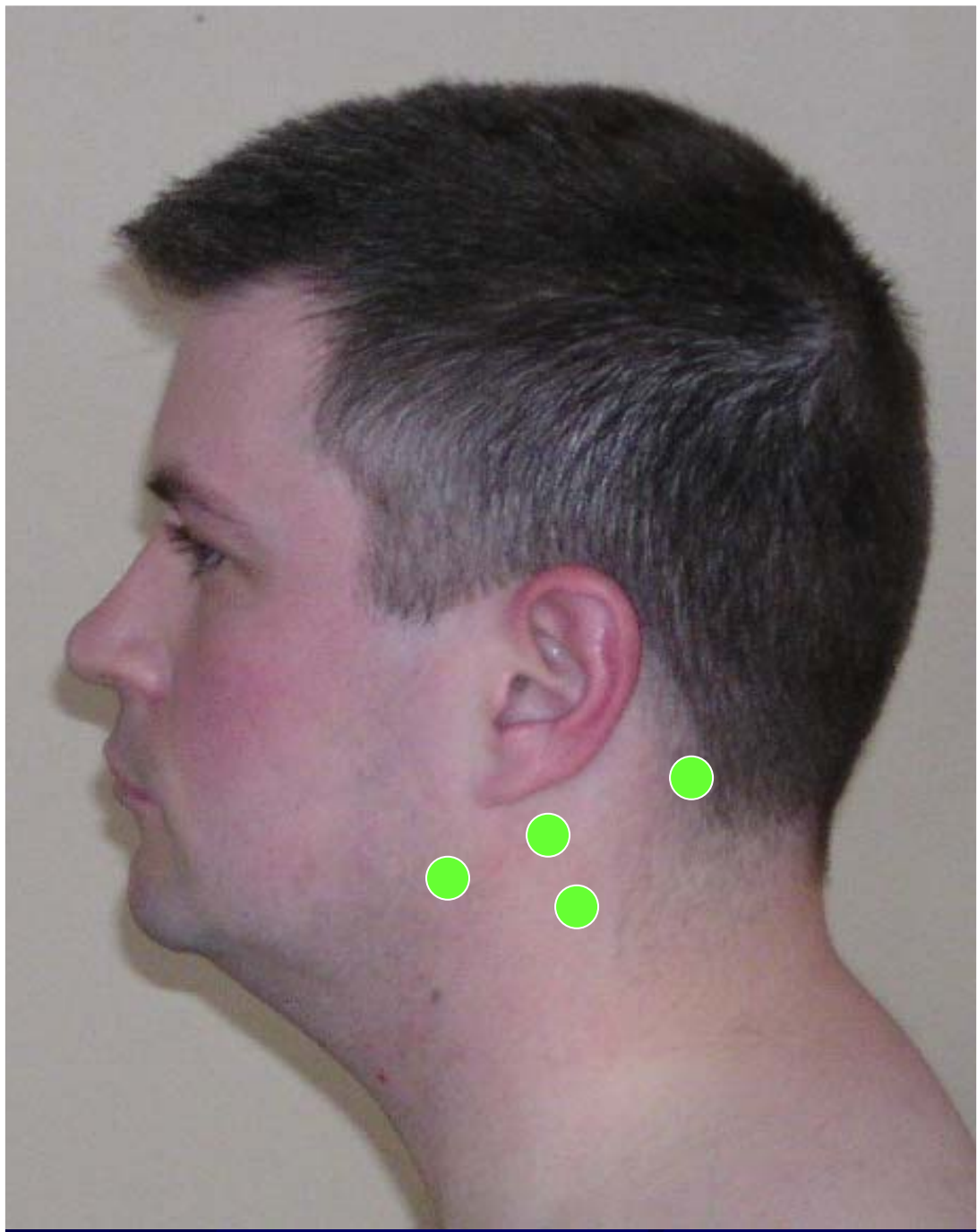


Right Lateral Bending

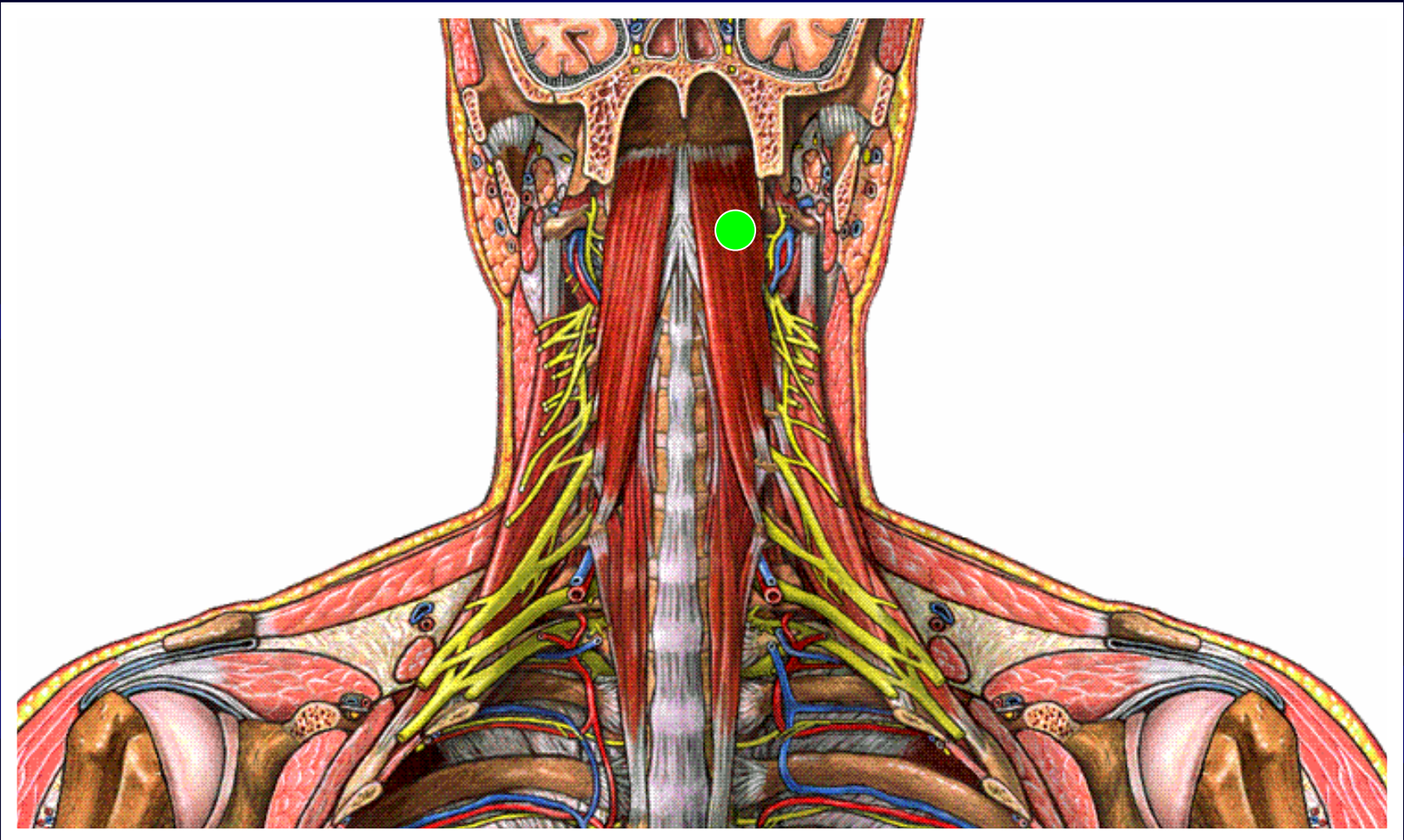
Surface Anatomy

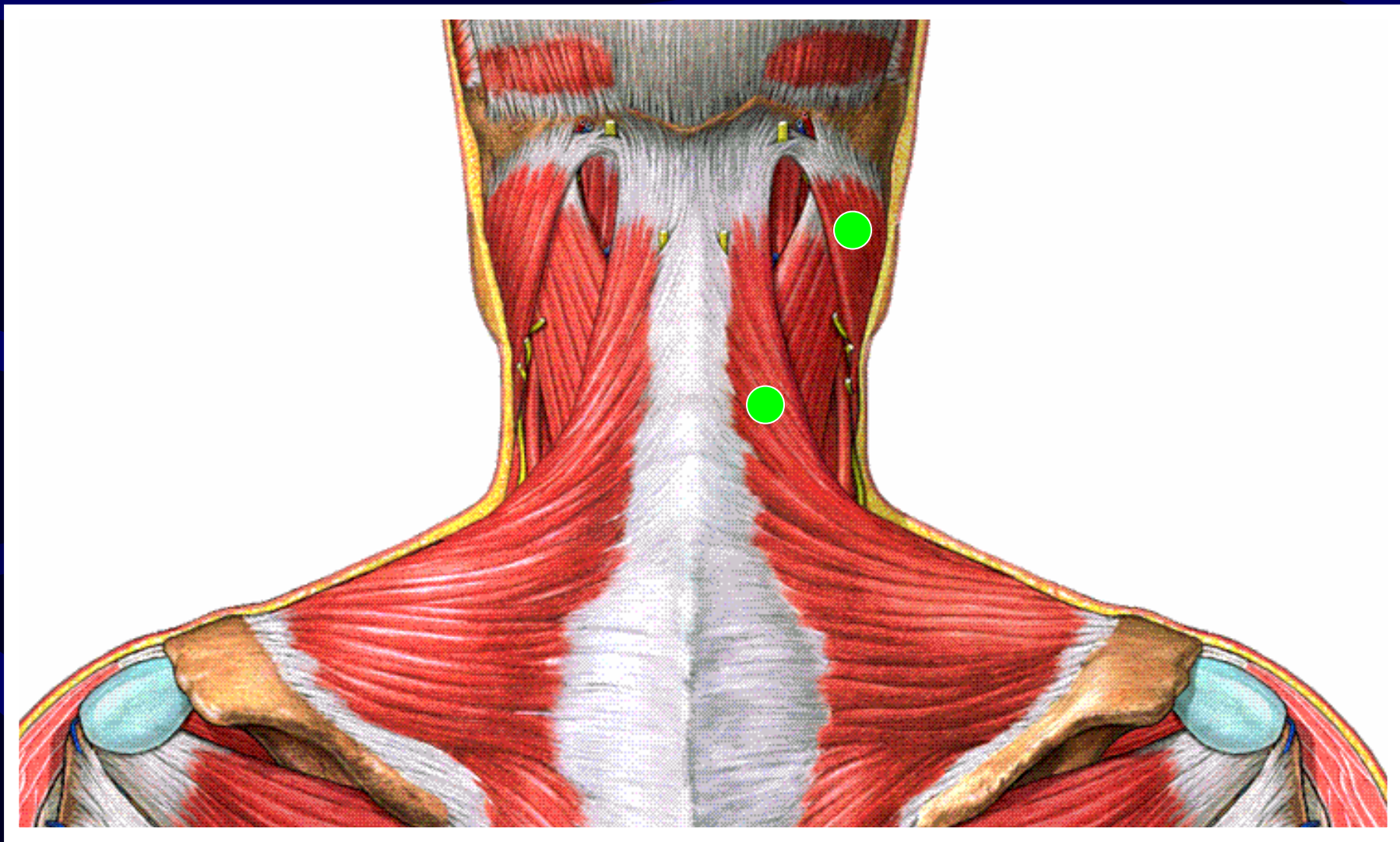
Review

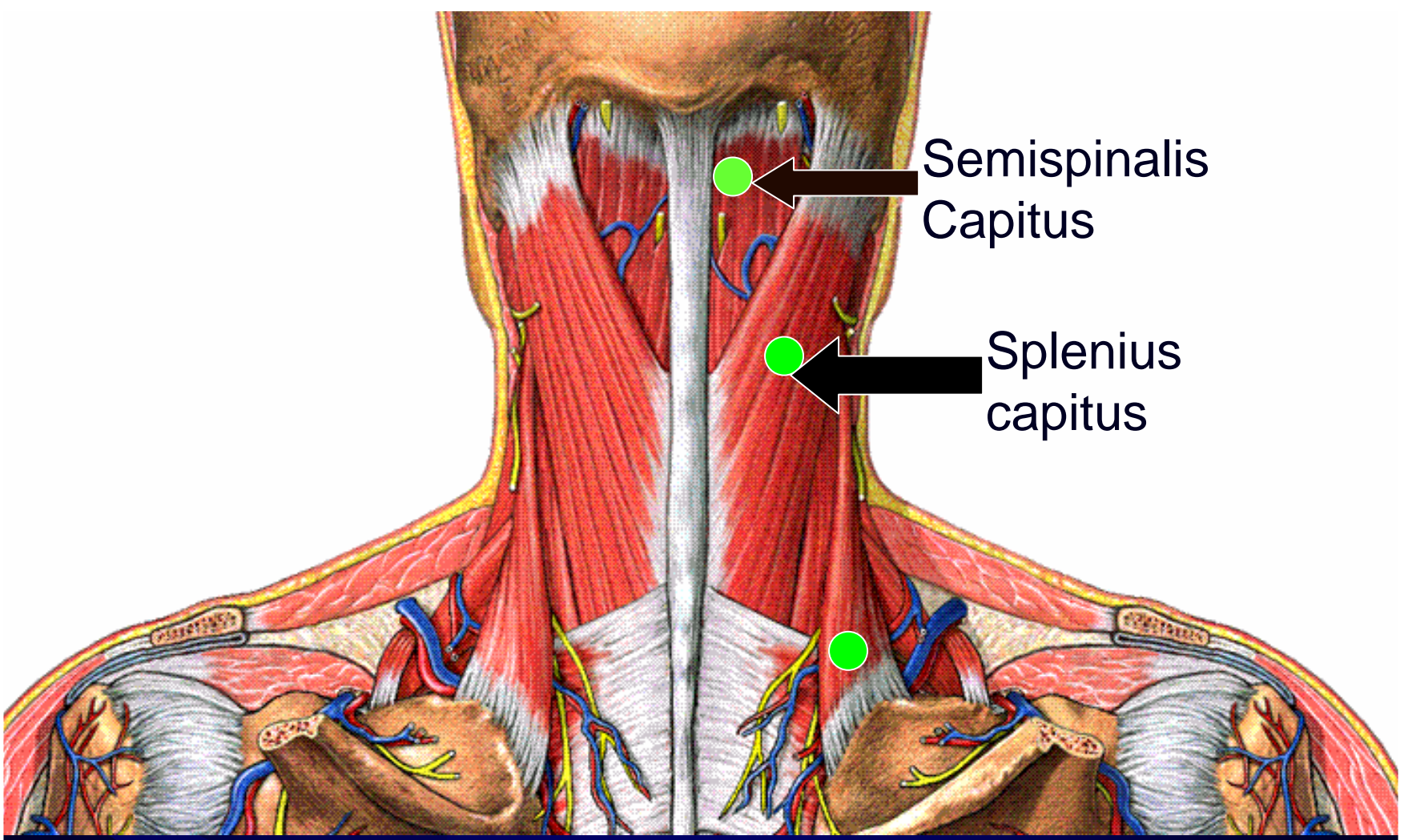






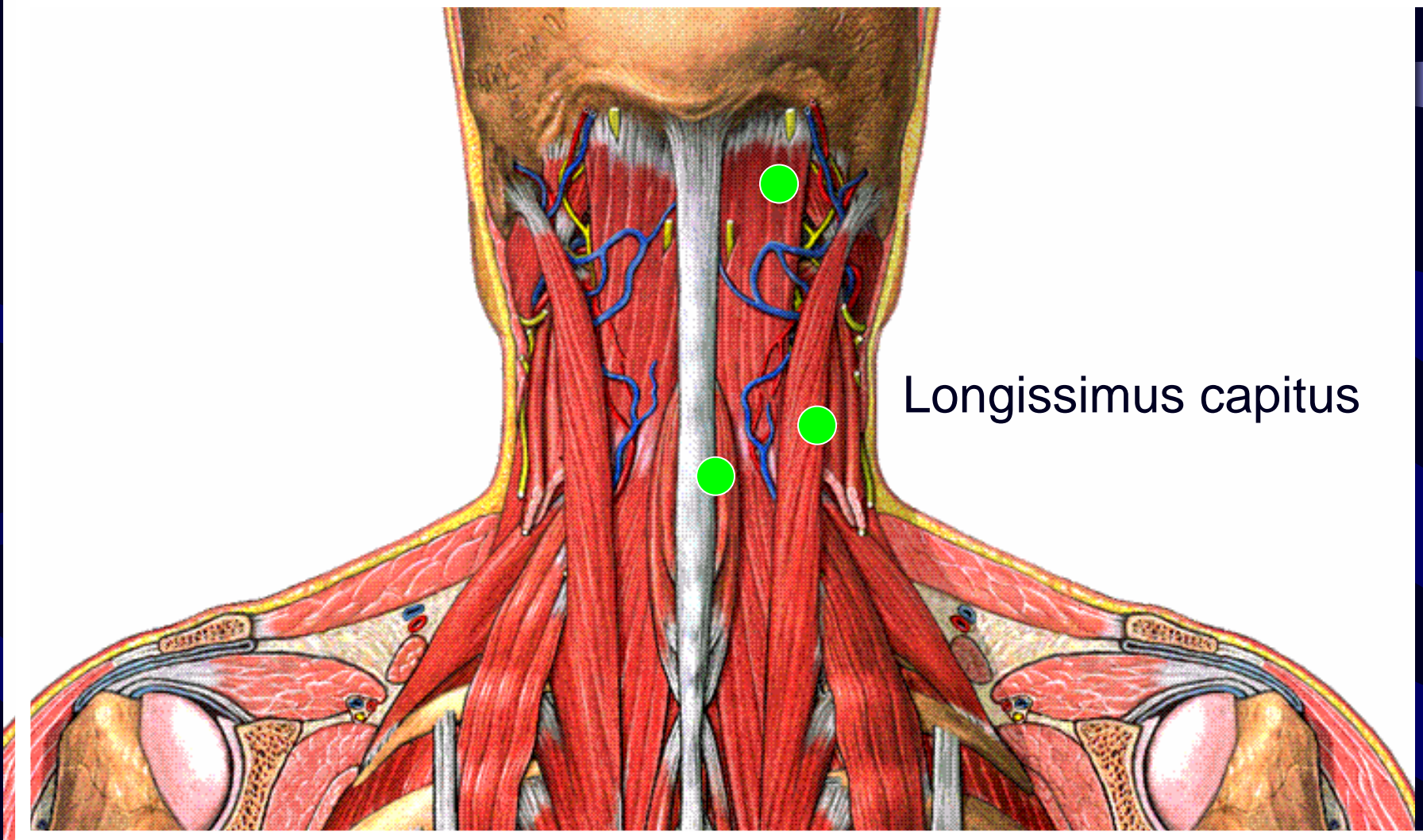




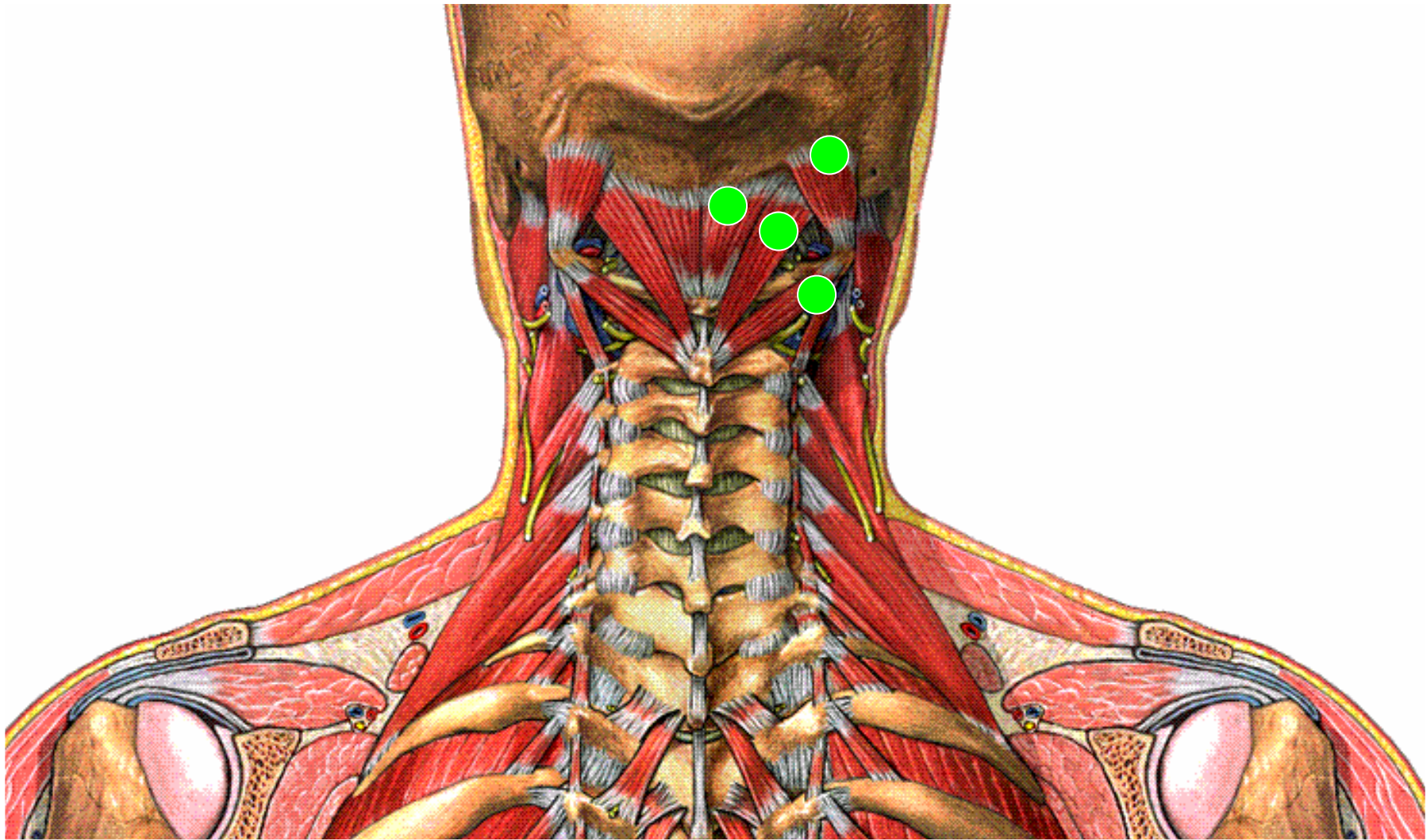


Semispinalis
Capitus

Splenius
capitus



Longissimus capitus



Lab

- Palpate surface anatomy cervical spine

Objective Assessment

- Active ROM – upper vs mid cervical
- Repeated Movement
- Habitual and Combined Movements

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