Topics

- 3D – Phases of the swing – Impact
- Anatomy – Neck and Hyoid
- Coaches Questions/Swing Discussions

3D Impact

Rotational changes

1. The lower body is rotated significantly (40 degrees).
2. The sternum is also rotated significantly (30 degrees).
3. The upper body is side bent (25–35 degrees).
4. The pelvis is side bent (10 degrees).
5. The pelvis is flexed (15 degrees or more).
6. The chest is flexed about the same as it was at set up.

Linear changes

1. The lower body is closer to the target (3–6 inches).
2. Driver—the upper body is farther from the target (1–2 inches).
3. Irons—the upper body is closer to the target (1–2 inches).
4. The lower body is barely closer to the golf ball.
5. The upper body is barely moved away from the ball (about 1.5 inchs).
6. The lower body is lifted (1–2 inches).
7. The upper body is about the same height.
8. The upper body is barely moved away from the ball (less than 1 inch).

The body

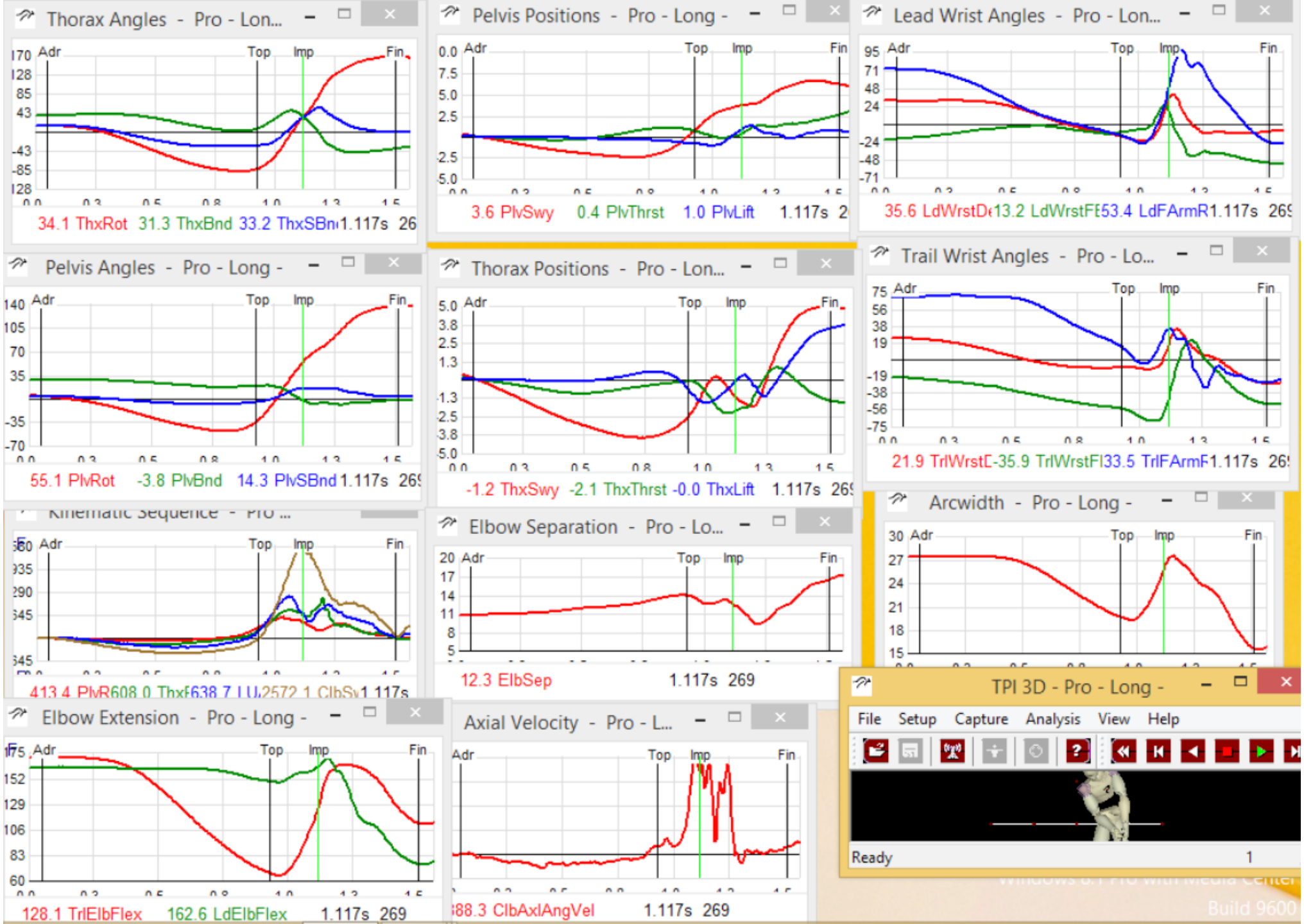
How has the body changed position compared to set up?

- The upper body is slightly closer to the ground.
- The upper body is side bent away from the target.
- Both the upper and lower body are rotated toward the target.
- The pelvis is shifted laterally toward the target, more so than the upper body.
- The lead wrist is flexed, and the trail wrist is more extended.
- The elbows are more bent (but extending); the trail arm more so.

Arms

Right elbow bent but extending (about 40 degrees).

1. Right shoulder adducting (working across the body).
2. Left wrist flat or bowed (20–40 degrees more flexed).
3. Right wrist cupped (20–30 degrees more extended).
4. Left forearm more pronated (about 30 degrees more pronated).
5. Right forearm supinating.
6. Both wrists are ulnar deviating (unhinging).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Adr
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Pelvis Positions - Pro - Long -
3.6 PlvSwy 0.4 PlvThrst 1.0 PlvLift 1.117s 2
Lead Wrist Angles - Pro - Lon...
35.6 LdWrstD 13.2 LdWrstF 53.4 LdFArmR 1.117s 269
Pelvis Angles - Pro - Long -
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Thorax Positions - Pro - Lon...
-1.2 ThxSwy -2.1 ThxThrst -0.0 ThxLift 1.117s 269
Trail Wrist Angles - Pro - Lo...
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Kinematic Sequence - Pro ...
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Arcwidth - Pro - Long -
Elbow Extension - Pro - Long -
128.1 TrlElbFlex 162.6 LdElbFlex 1.117s 269
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TPI 3D - Pro - Long -
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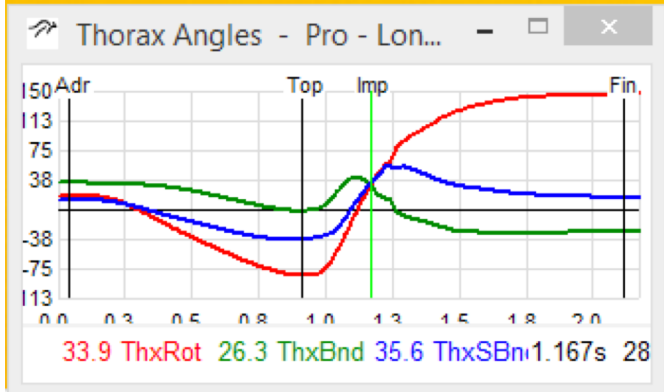
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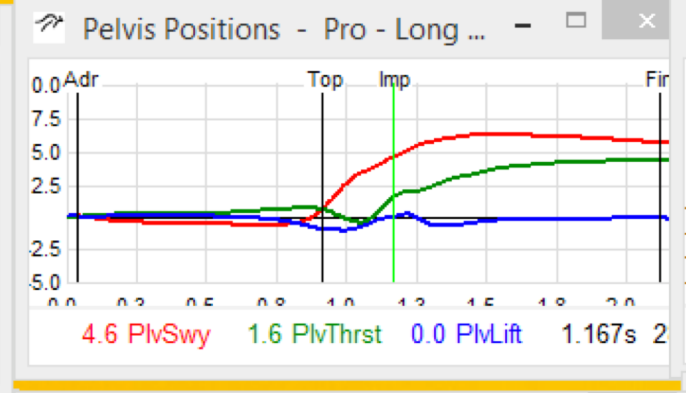
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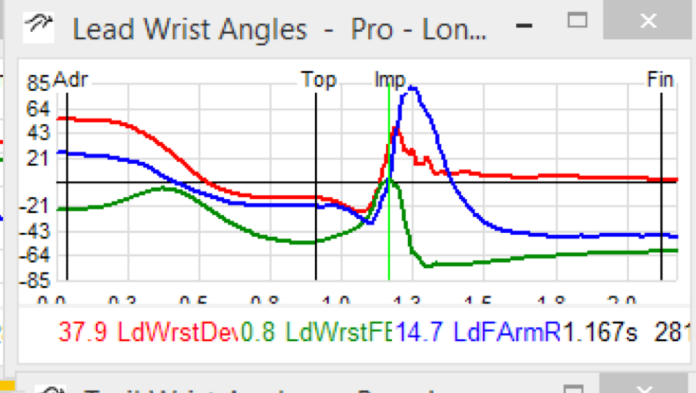
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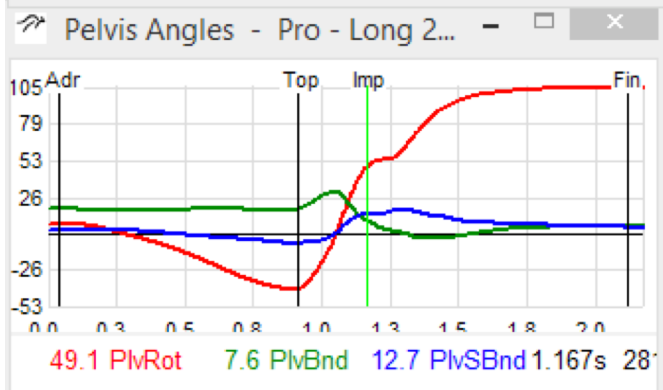
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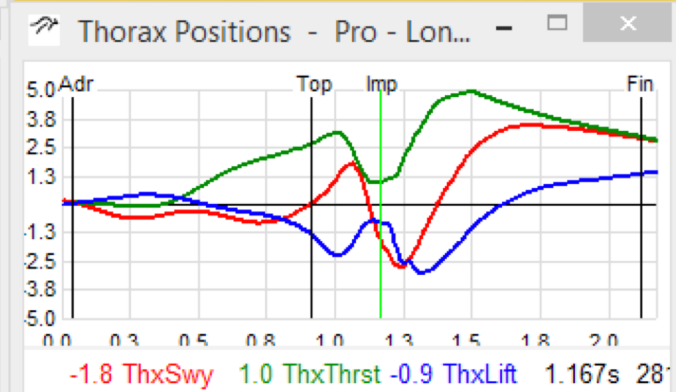
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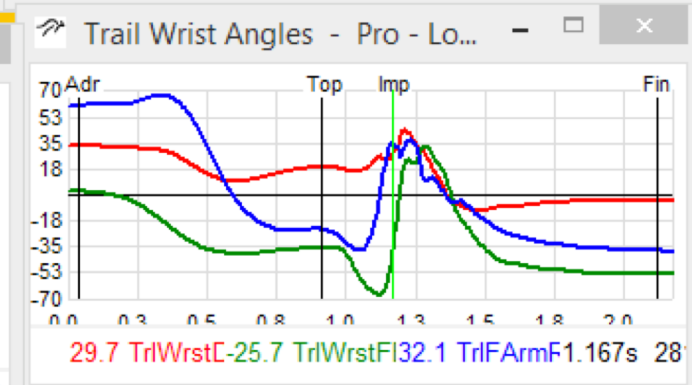
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-25.7 TrlWrstFl
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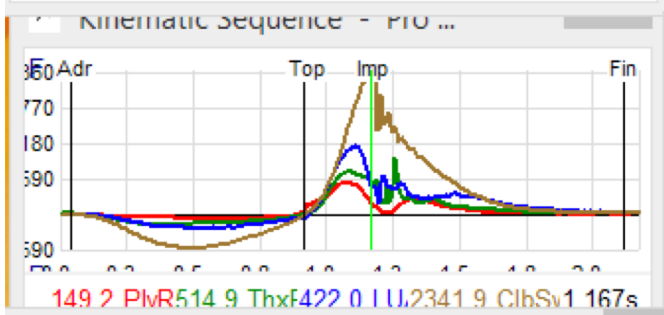
1.167s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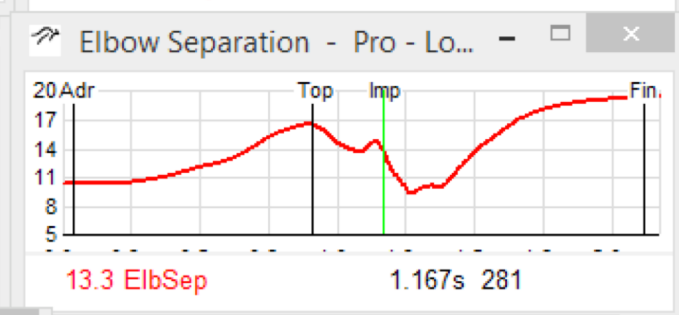
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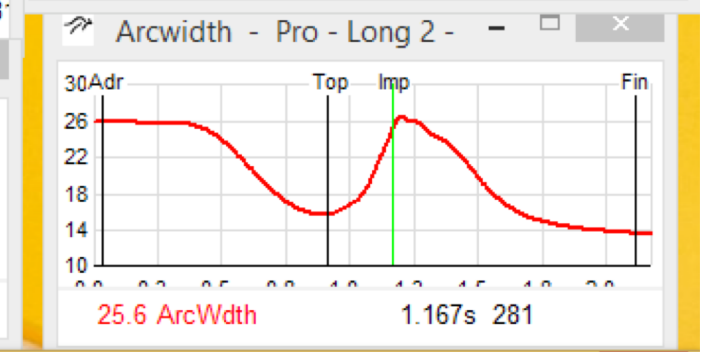
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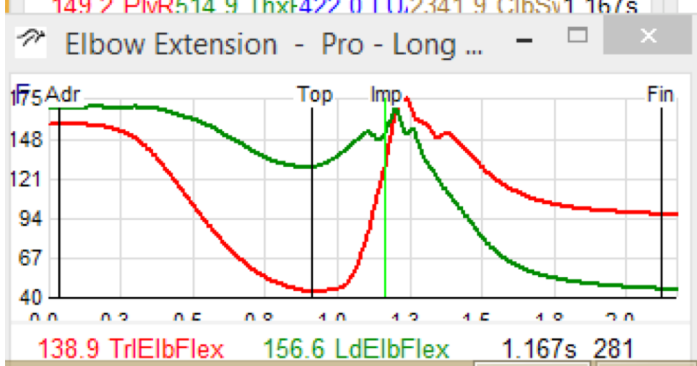
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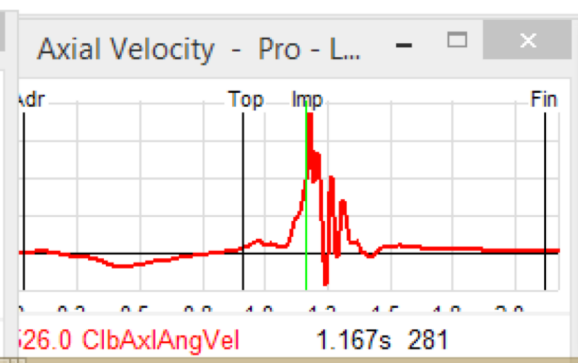
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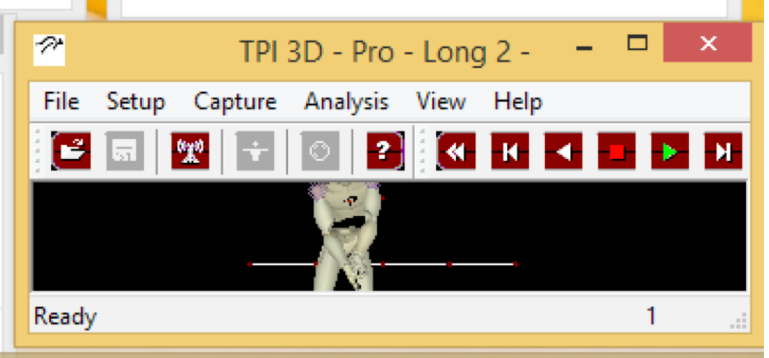
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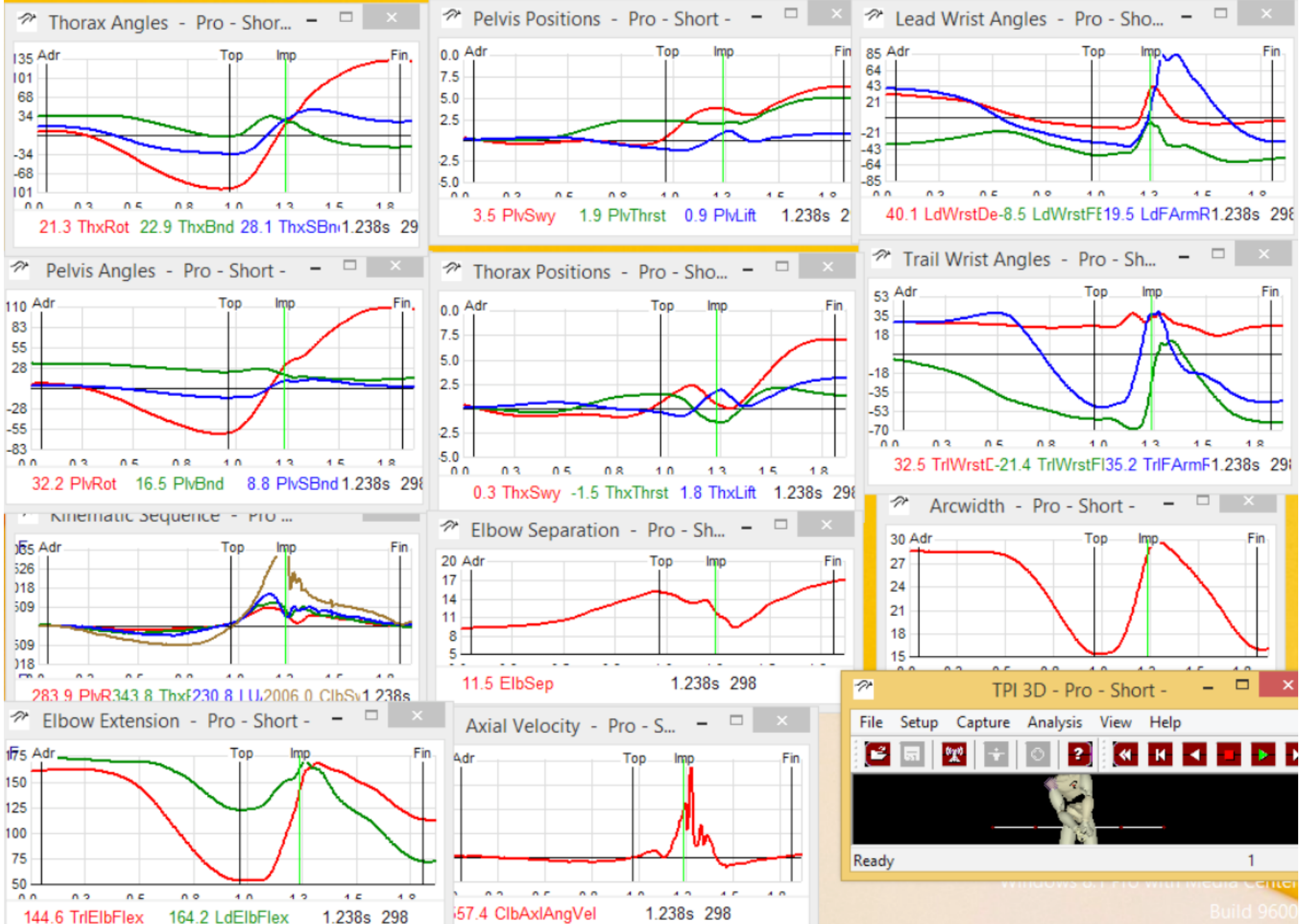
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3.5 PlvSwy 1.9 PlvThrst 0.9 PlvLift 1.238s 2
Lead Wrist Angles - Pro - Sho...
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Pelvis Angles - Pro - Short -
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Arcwidth - Pro - Short -
Elbow Extension - Pro - Short -
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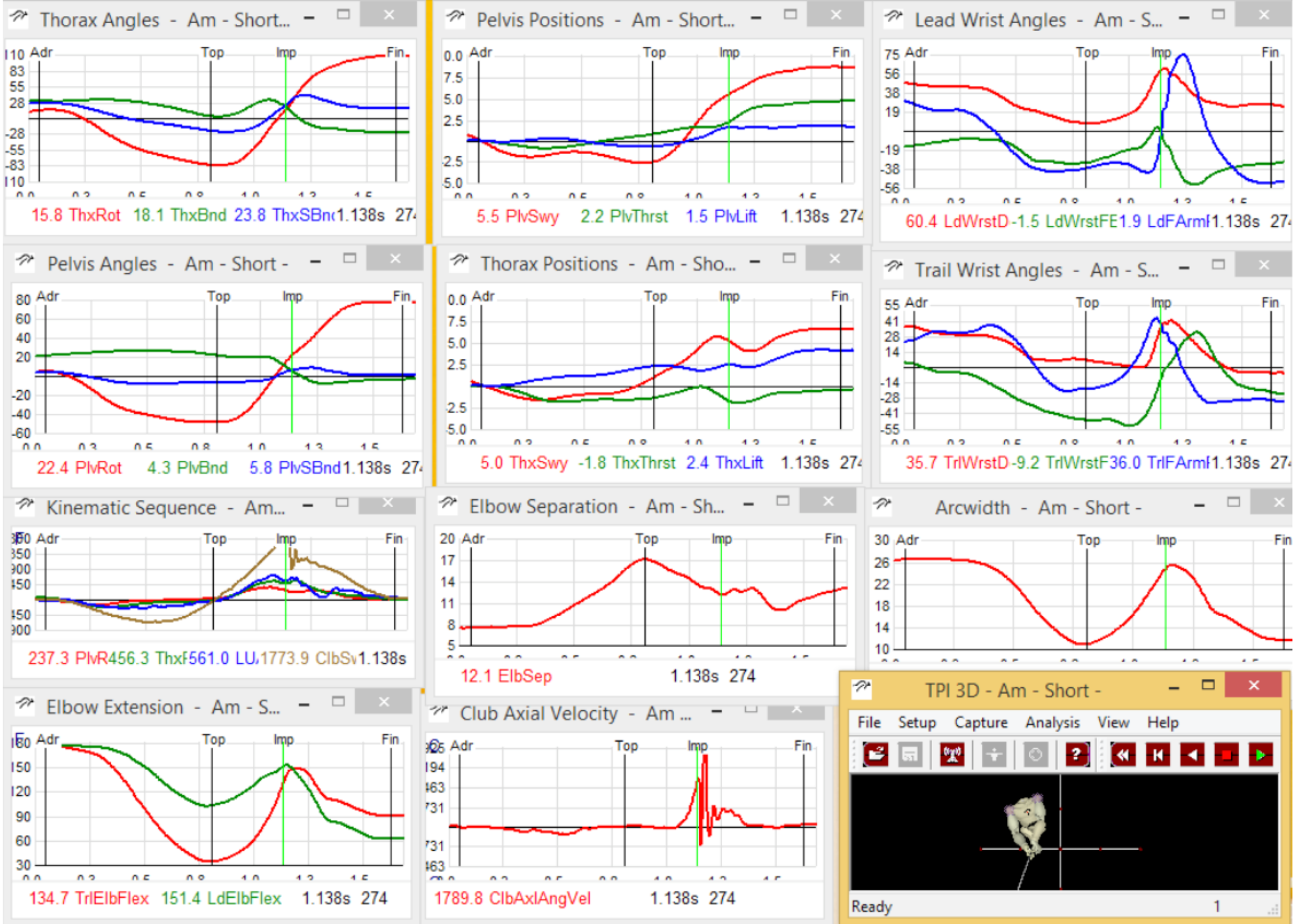
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Lead Wrist Angles - Am - S...
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Pelvis Angles - Am - Short -
22.4 PlvRot 4.3 PlvBnd 5.8 PlvSBnd 1.138s
Thorax Positions - Am - Sho...
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Trail Wrist Angles - Am - S...
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Arcwidth - Am - Short -
Elbow Extension - Am - S...
134.7 TrlElbFlex 151.4 LdElbFlex 1.138s 274
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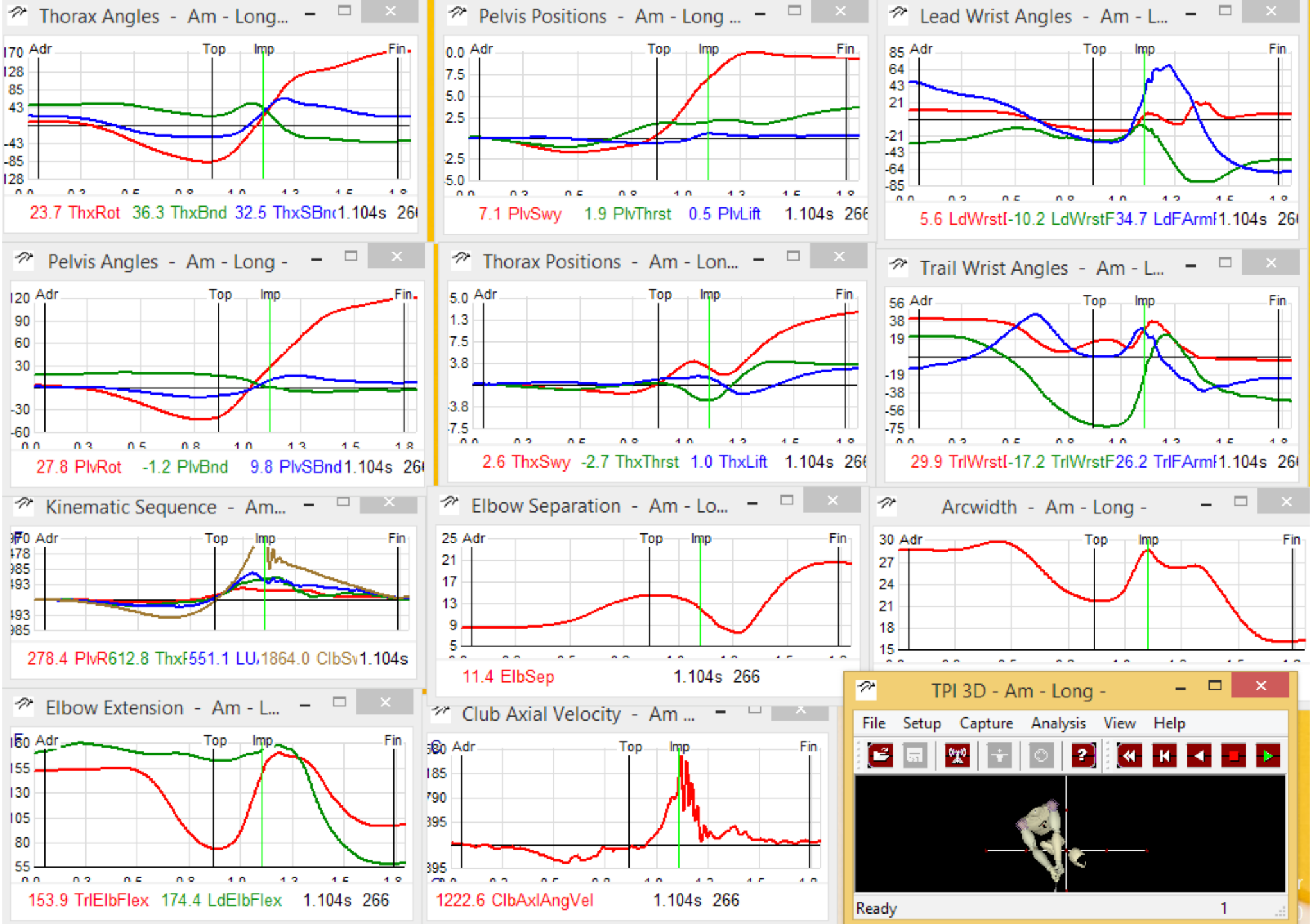
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Pelvis Positions - Am - Long ...
7.1 PlvSwy 1.9 PlvThrst 0.5 PlvLift 1.104s 266
Lead Wrist Angles - Am - L...
5.6 LdWrstI -10.2 LdWrstF 34.7 LdFArmI 1.104s 266
Pelvis Angles - Am - Long -
27.8 PlvRot -1.2 PlvBnd 9.8 PlvSBnd 1.104s 266
Thorax Positions - Am - Lon...
2.6 ThxSwy -2.7 ThxThrst 1.0 ThxLift 1.104s 266
Trail Wrist Angles - Am - L...
29.9 TrlWrstI -17.2 TrlWrstF 26.2 TrlFArmI 1.104s 266
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Elbow Separation - Am - Lo...
11.4 ElbSep 1.104s 266
Arcwidth - Am - Long -
Elbow Extension - Am - L...
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Club Axial Velocity - Am ...
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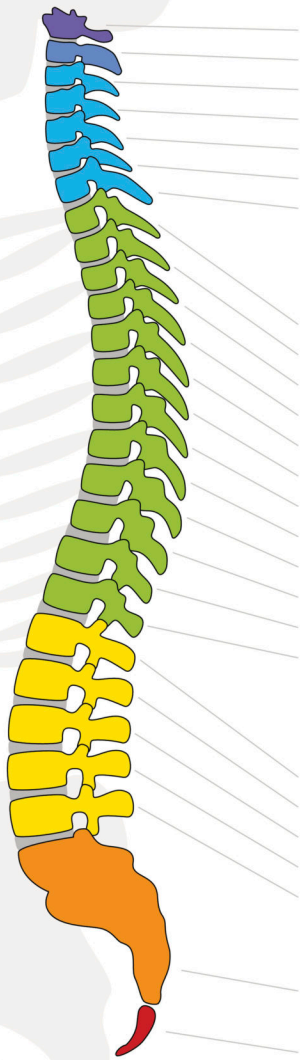
Anatomy of the neck

Vertebral Column • Reflexology Chart



Cervical spine

C 1	Atlas	Head - Brain - Inner and Middle Ears
C 2	Axis	Auditory Nerves - Sinuses - Eyes - Tongue
C 3	3. Cervical vertebrae	Teeth - Cheeks - Outer Ears
C 4	4. Cervical vertebrae	Nose - Mouth - Lips - Eustachian Tubes
C 5	5. Cervical vertebrae	Pharynx - Vocal Cords
C 6	6. Cervical vertebrae	Shoulders - Neck - Tonsils
C 7	7. Cervical vertebrae	Thyroids - Elbows

Thoracic spine

Th 1	1. Thoracic vertebrae	Trachea - Esophagus - Lower Arms - Fingers
Th 2	2. Thoracic vertebrae	Heart
Th 3	3. Thoracic vertebrae	Lungs - Chest - Breast
Th 4	4. Thoracic vertebrae	Gall Bladders
Th 5	5. Thoracic vertebrae	Liver - Blood Circulation - Solar Plexus
Th 6	6. Thoracic vertebrae	Stomach
Th 7	7. Thoracic vertebrae	Pancreas - Duodenum
Th 8	8. Thoracic vertebrae	Spleen
Th 9	9. Thoracic vertebrae	Adrenal Glands
Th 10	10. Thoracic vertebrae	Kidneys
Th 11	11. Thoracic vertebrae	Ureters
Th 12	12. Thoracic vertebrae	Small Intestines - Lymph Circulation

Lumbar spine

L 1	1. Lumbar vertebrae	Large Intestines - Inguinal Region
L 2	2. Lumbar vertebrae	Abdomen - Appendix - Upper Legs
L 3	3. Lumbar vertebrae	Bladder - Sex Organs - Knees
L 4	4. Lumbar vertebrae	Sciatic Nerves - Prostate Gland
L 5	5. Lumbar vertebrae	Lower Legs - Feet

S 1	Sacrum	Hip Bones - Buttocks
S 2	Coccyx	Rectum - Anus

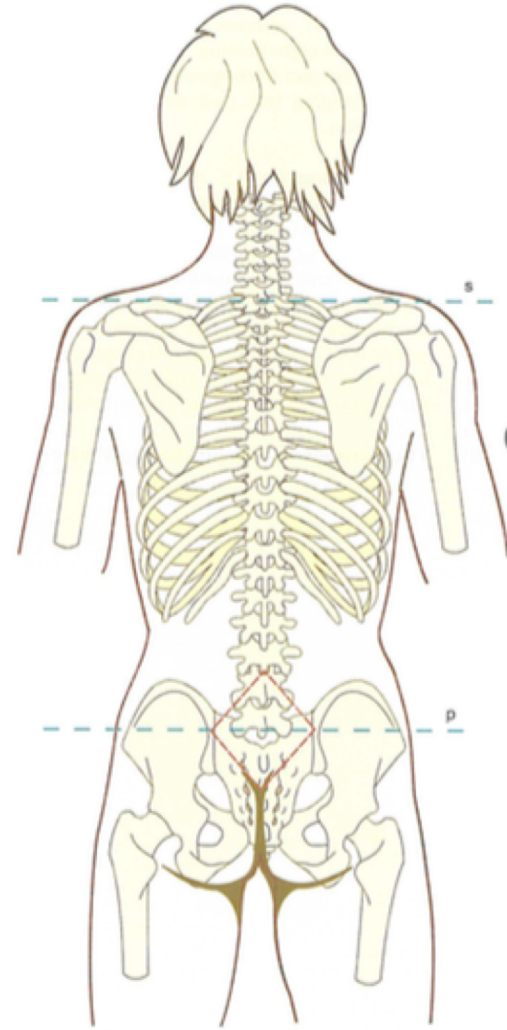


Figure 5

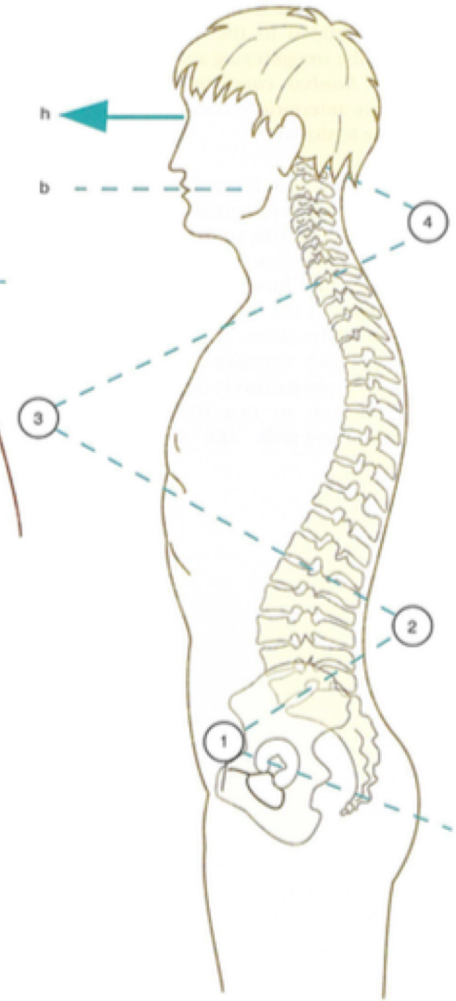


Figure 6

Table 1.0 Normal ranges of movement in the vertebral column and hips

	Cervical (°)	Thoracic (°)	Lumbar (°)	Hips (°) (excluding ab and adduction)
Flexion	0-60	0-50	0-60	0-110
Extension	0-75	0-45	0-25	0-30
Lateral Flexion	0-45	0-40	0-25	n/a
Rotation	0-80	0-30	0-18	Internal = 0-40 External = 0-50

Adapted from ACSM (2006) and Magee (2006).

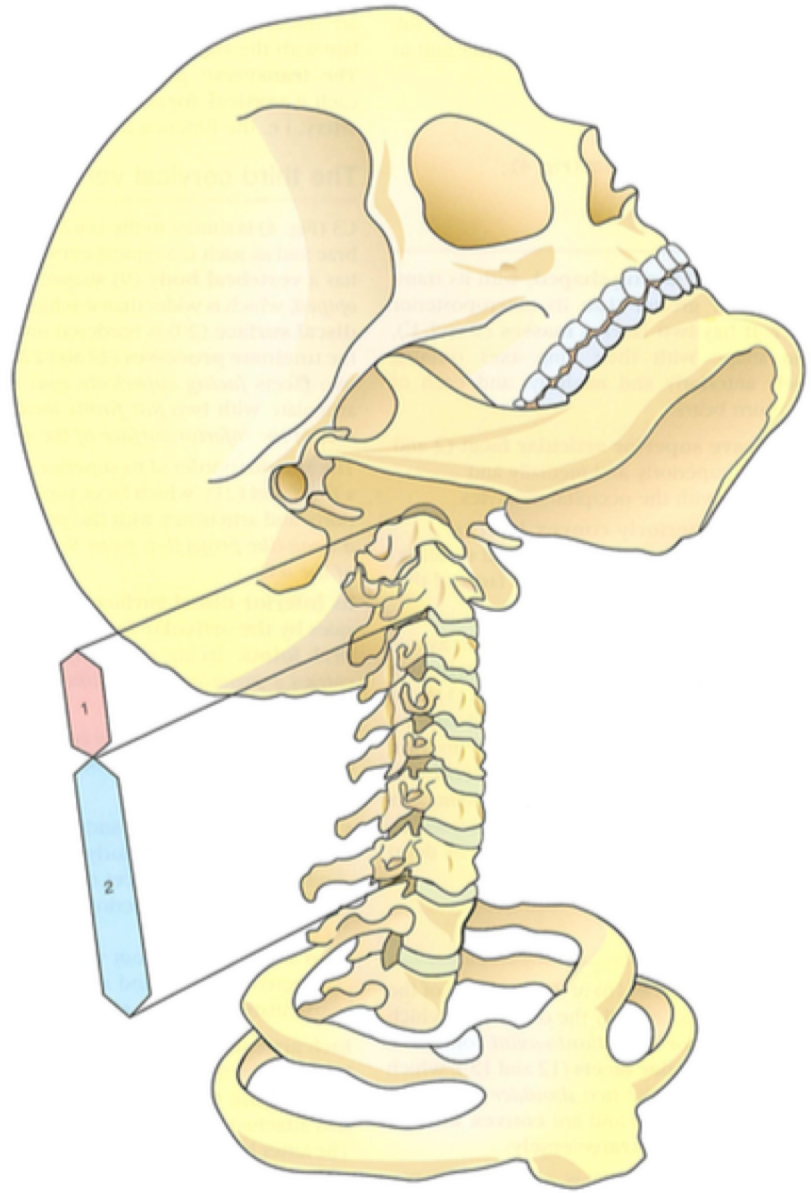


Figure 1

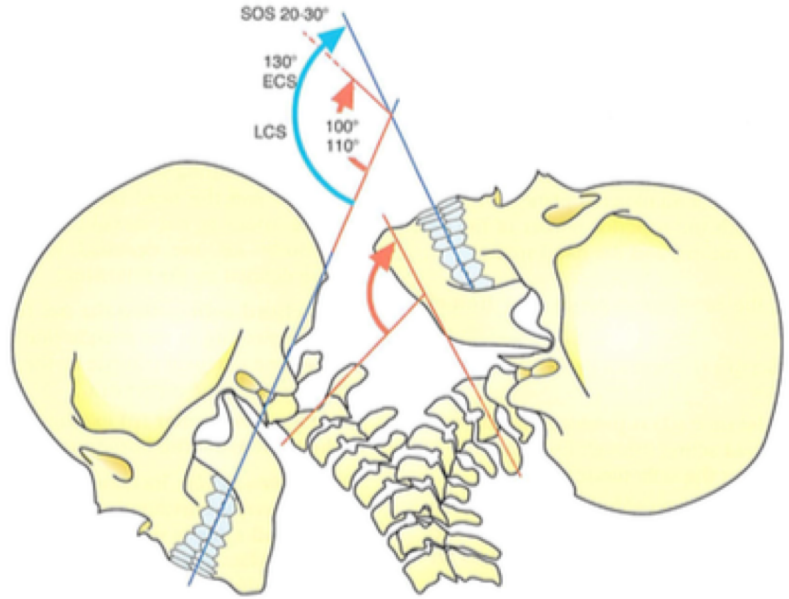


Figure 65

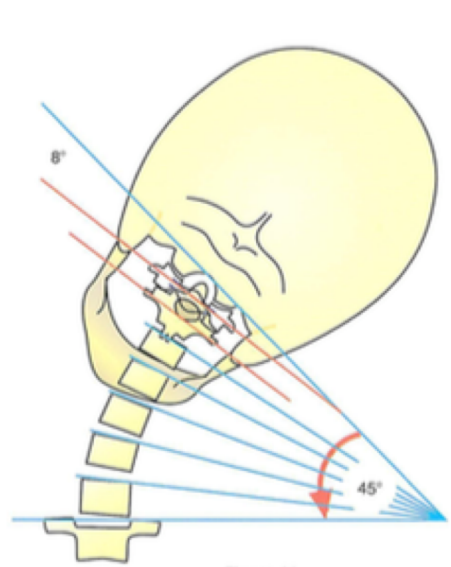


Figure 66

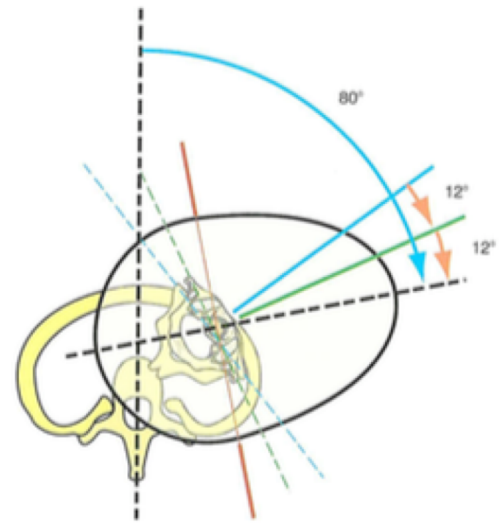
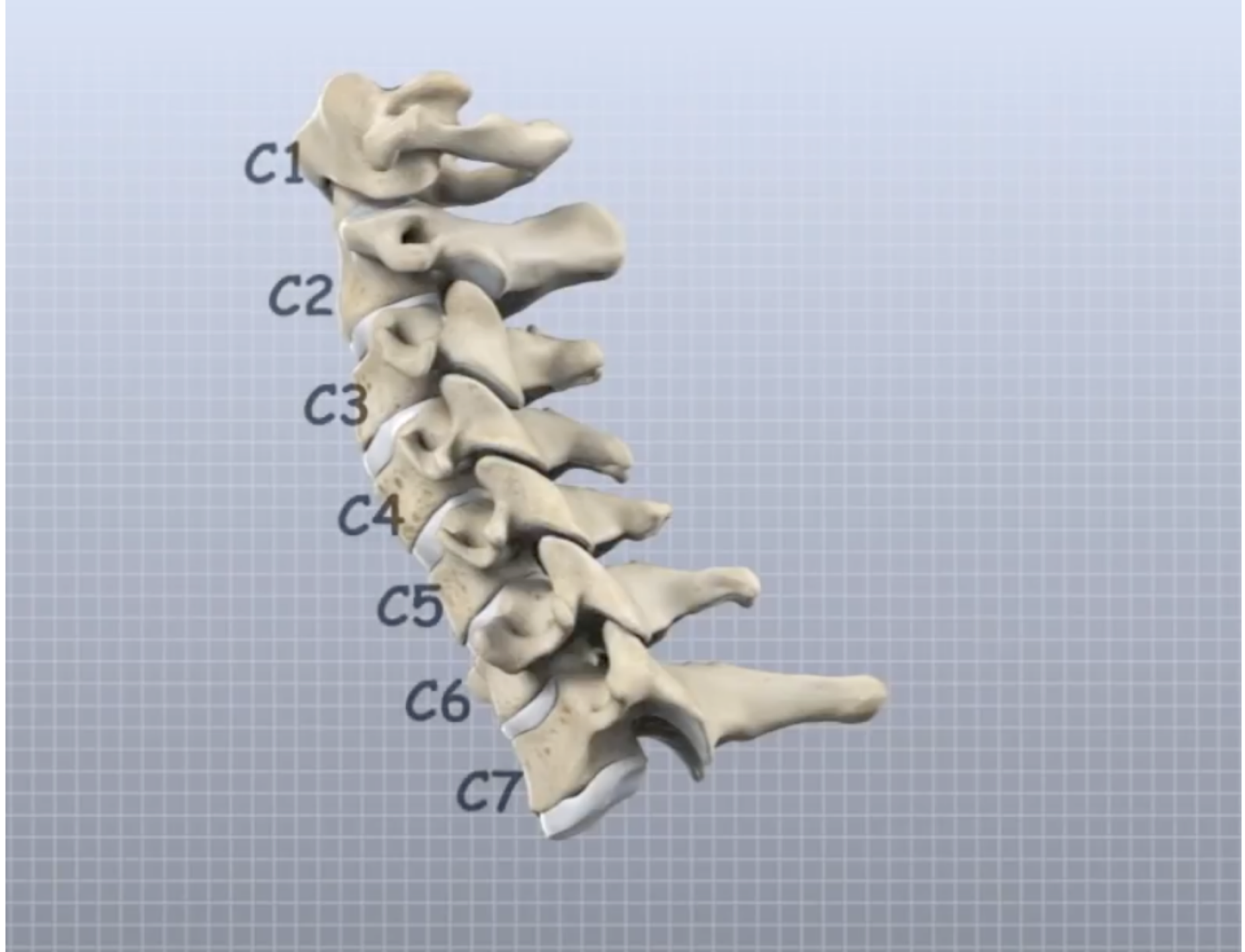
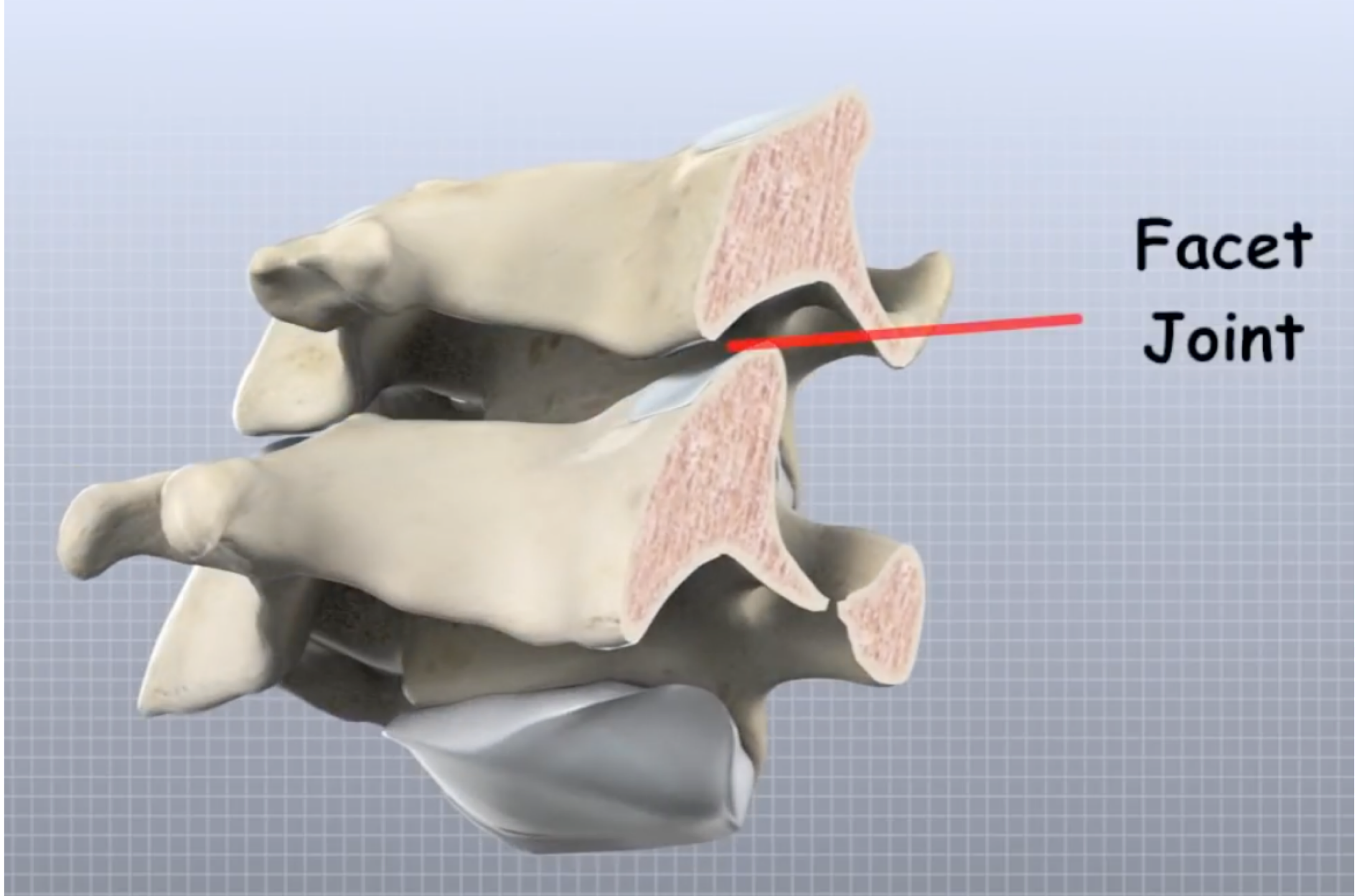
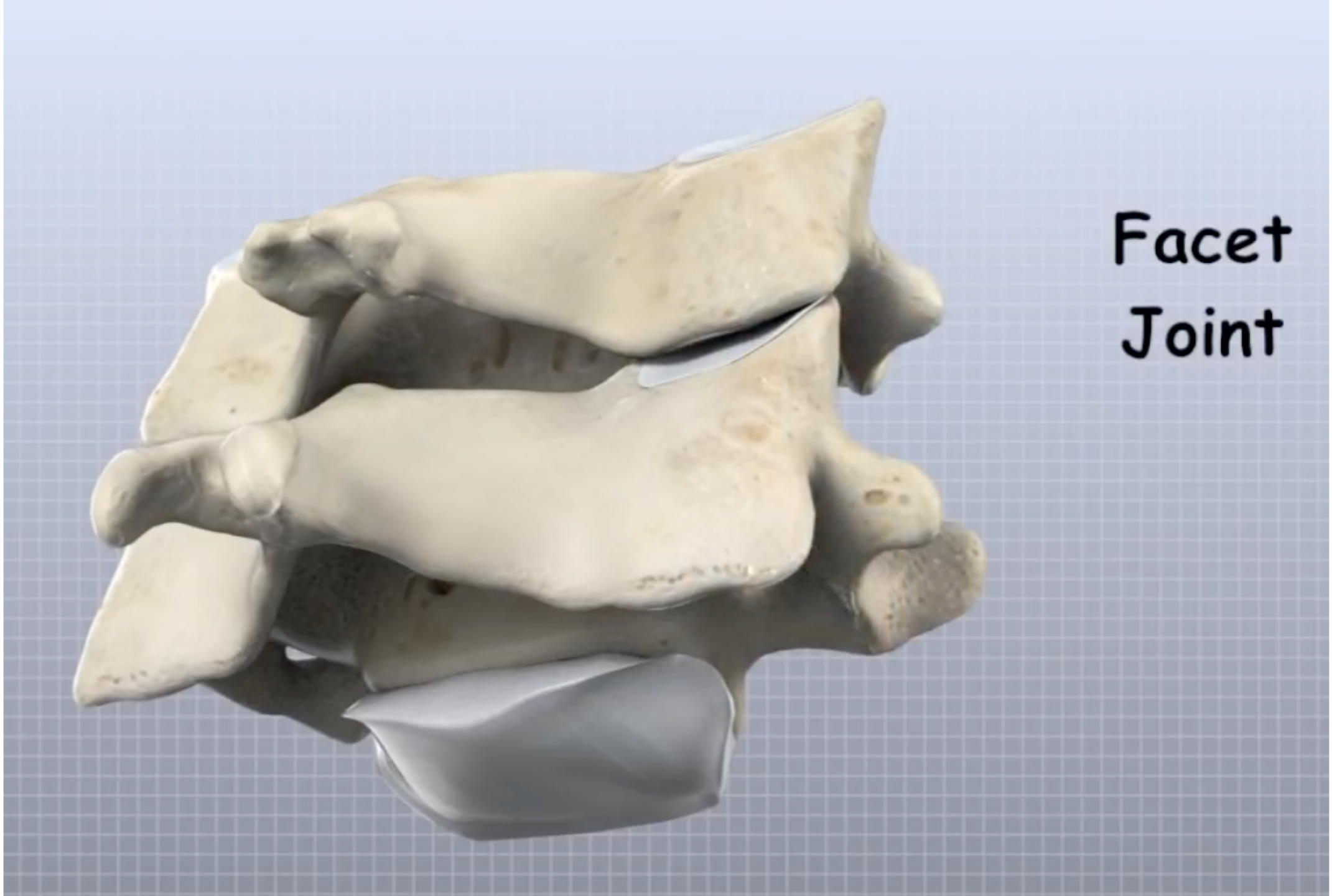


Figure 67


C1
C2
C3
C4
C5
C6
C7


Facet
Joint


Facet
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Cervical vertebrae

Typical cervical vertebra

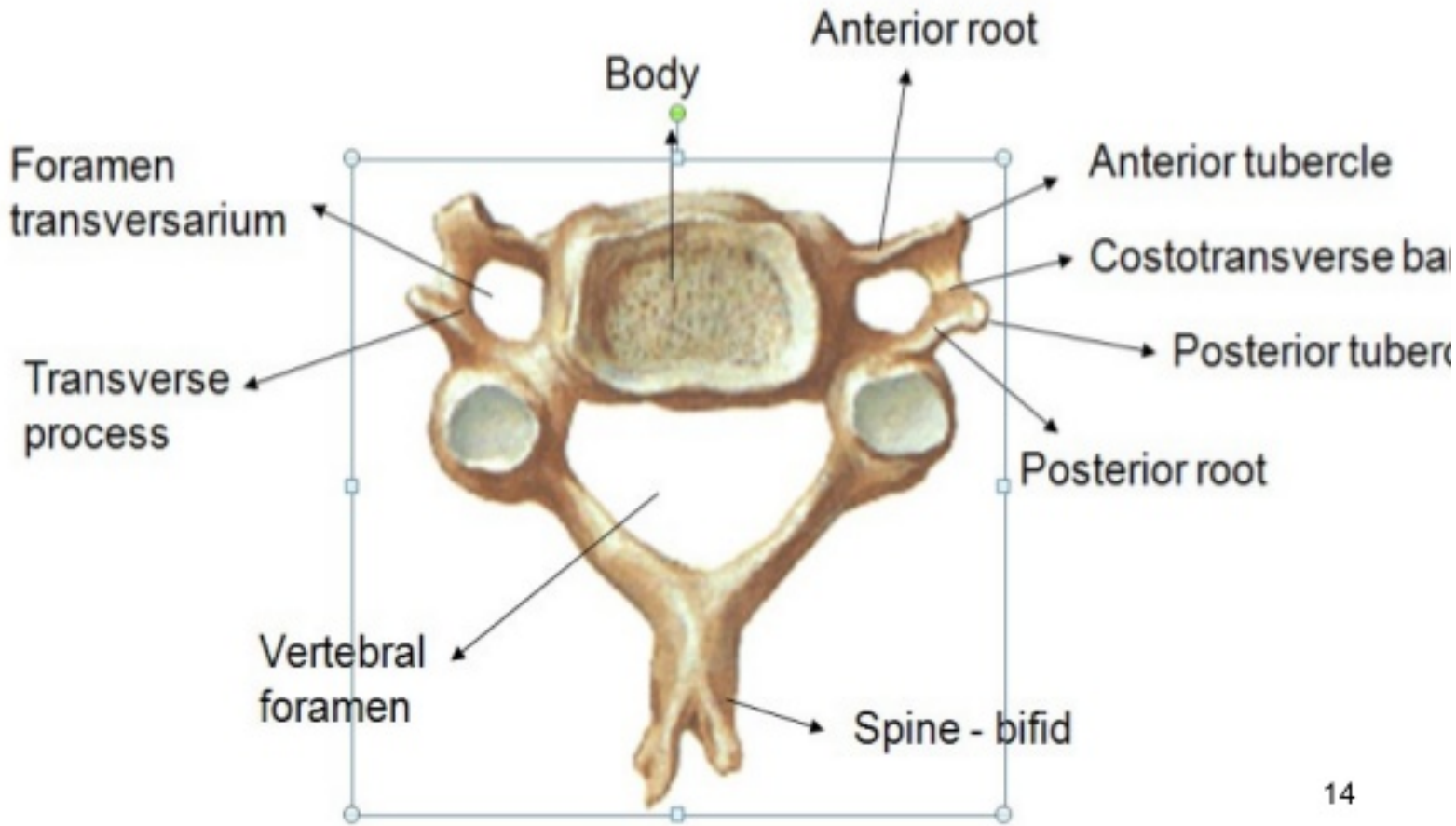
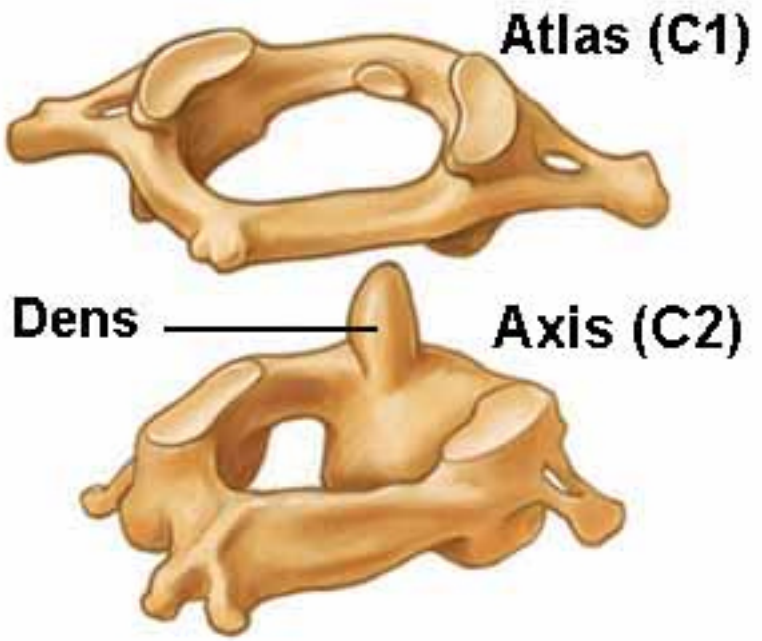
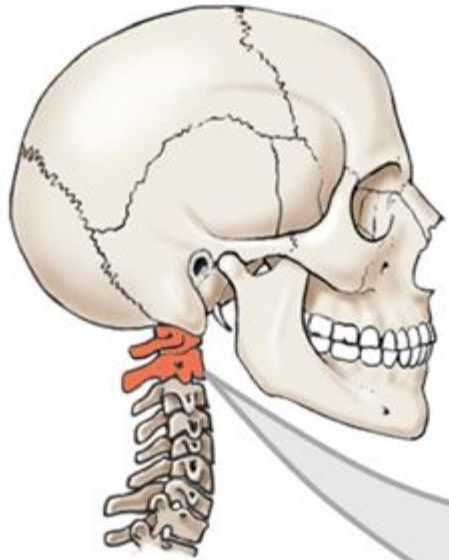


Figure 6-18 The Atlas and Axis.





Dens (odontoid process)

Transverse ligament

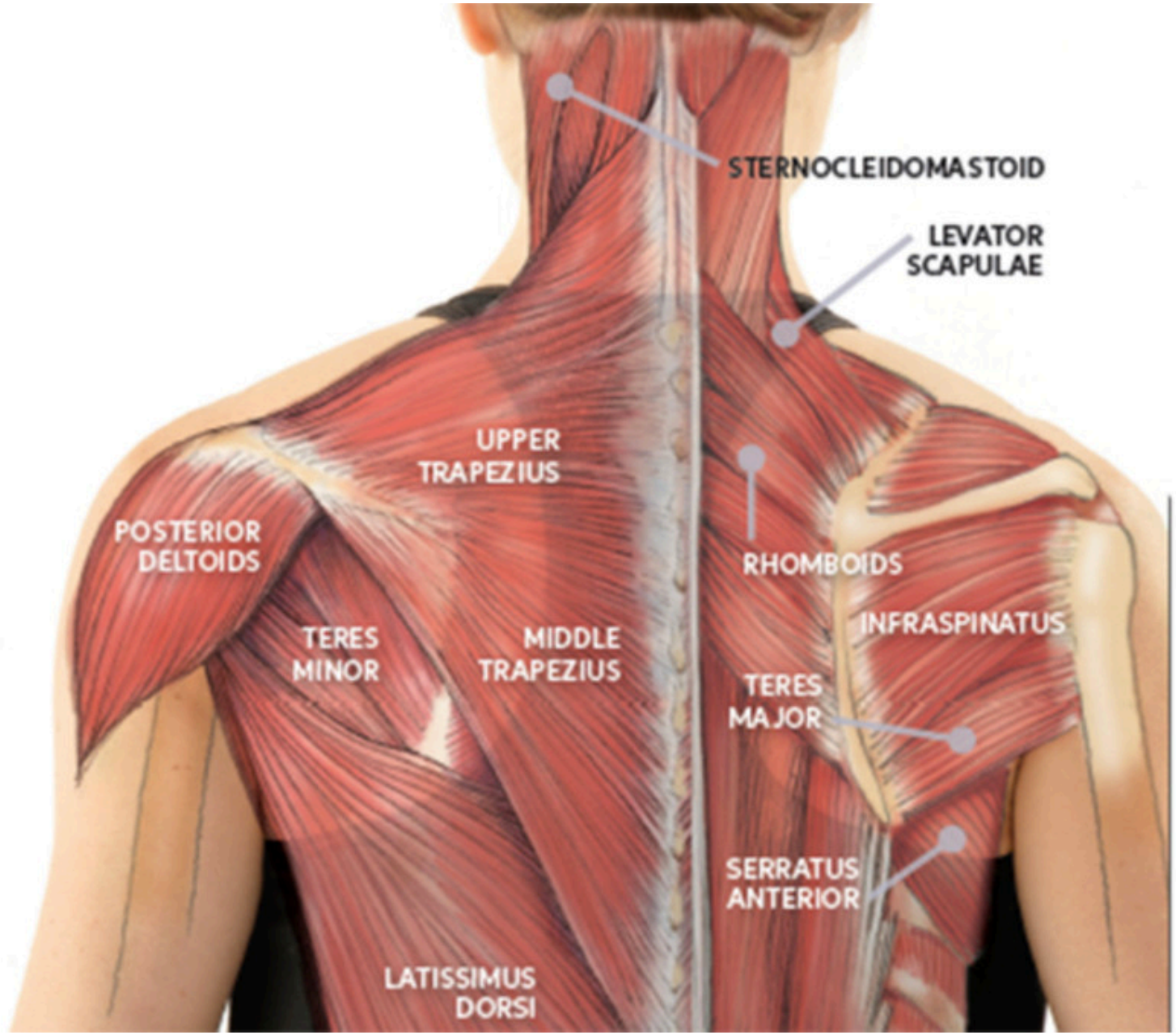
Atlas (C_1)

Articulates withoccipital condyles

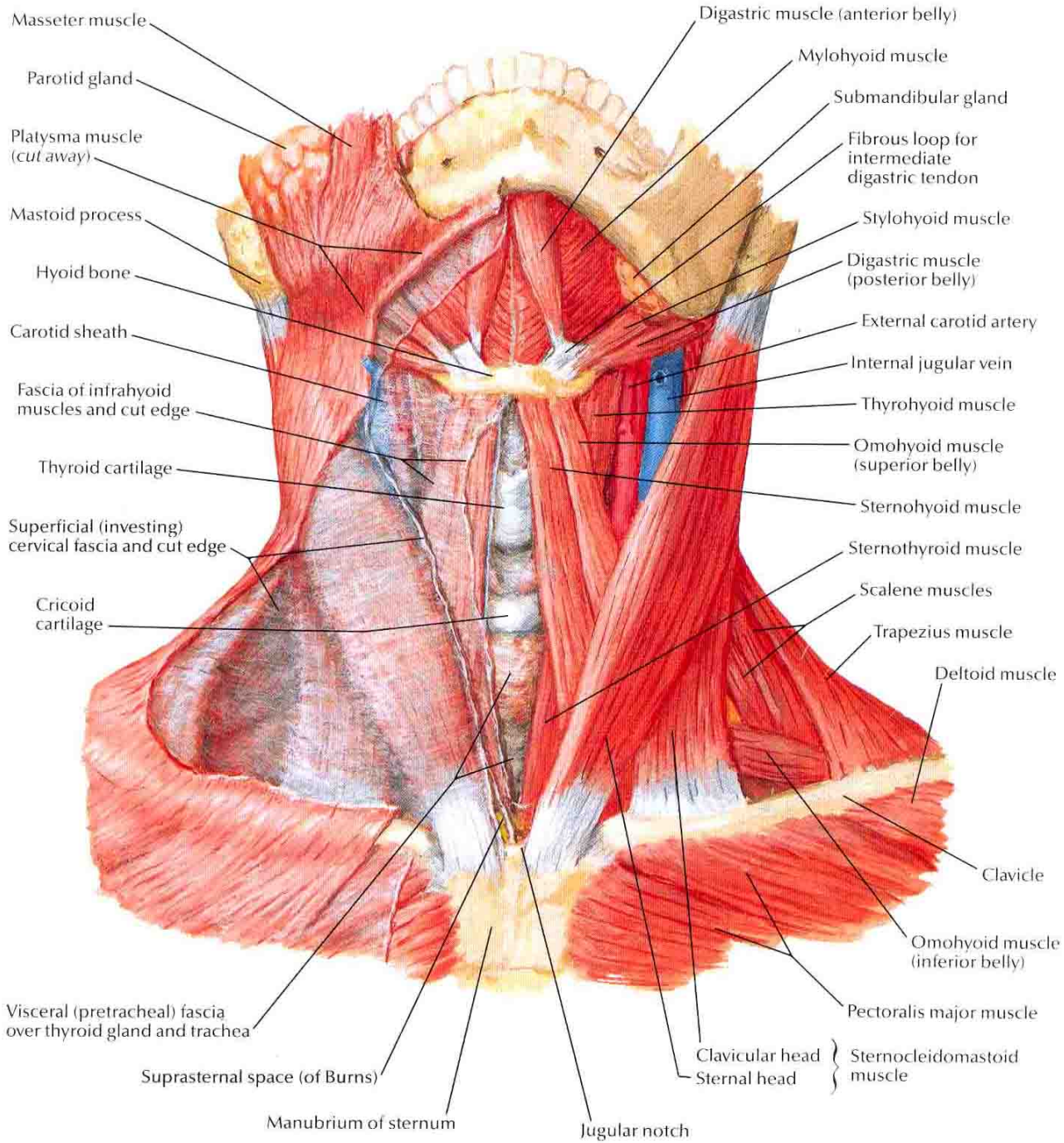
Axis (C_2)

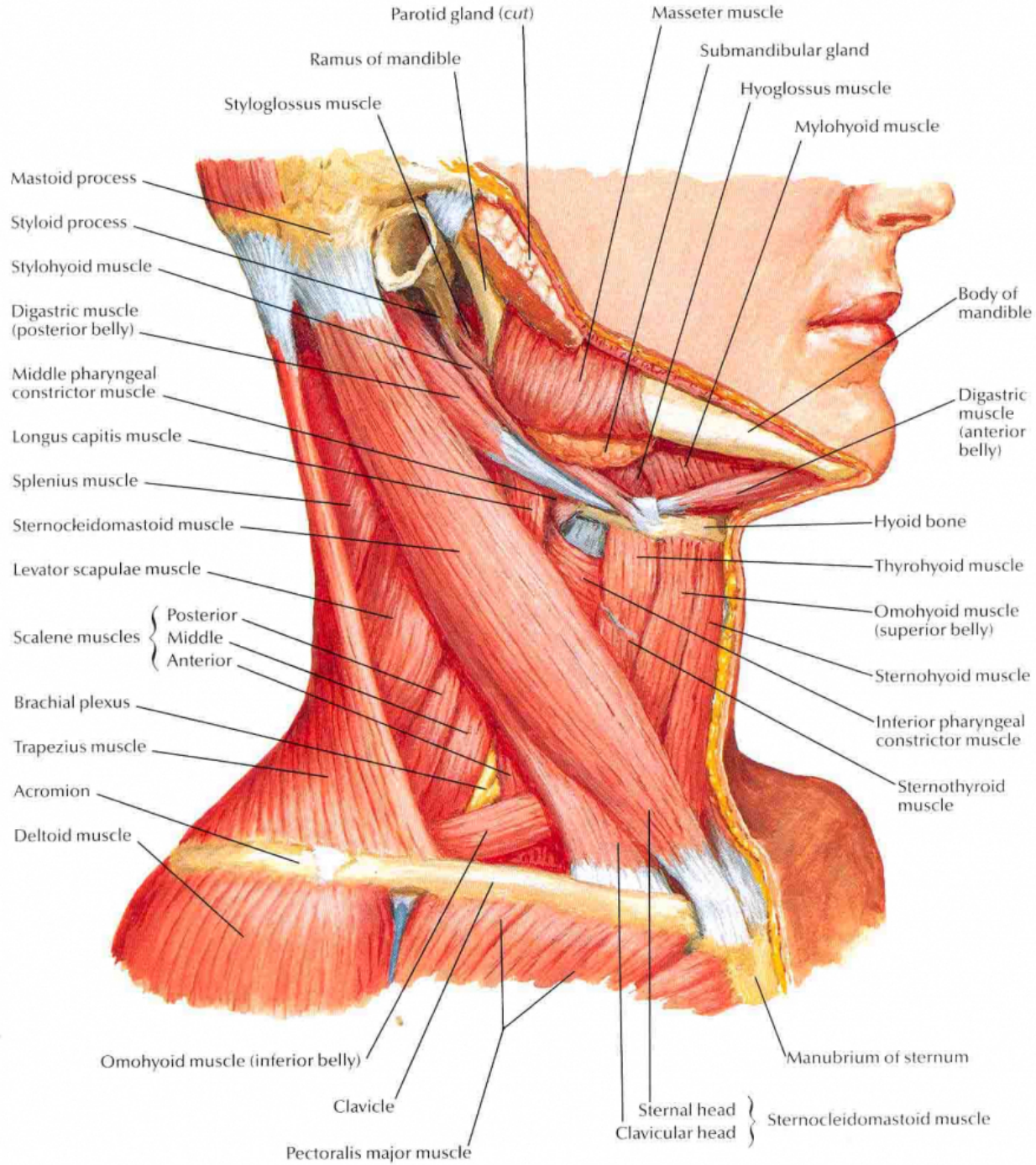
Articulates with atlas

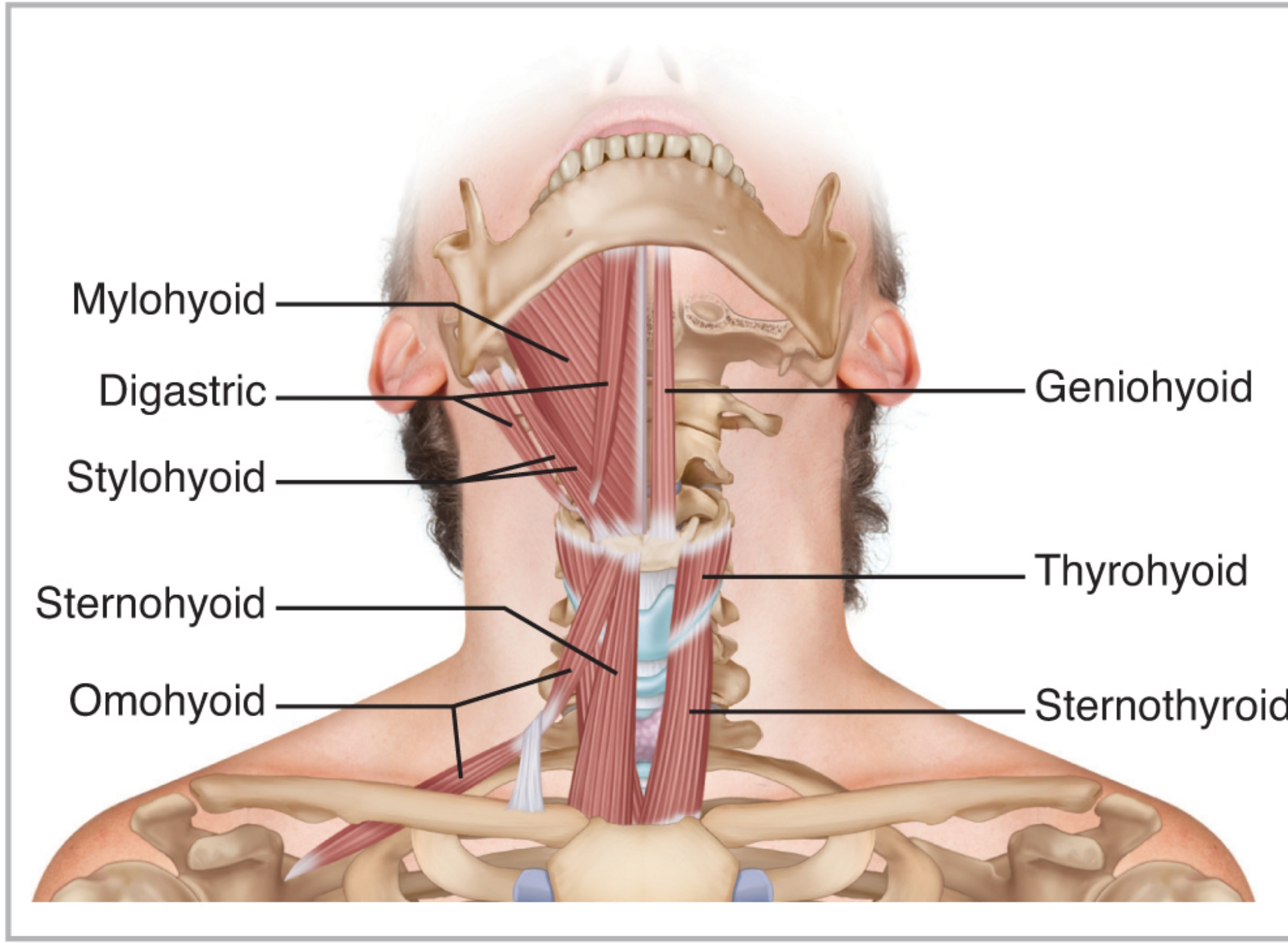
The atlas/axis complex

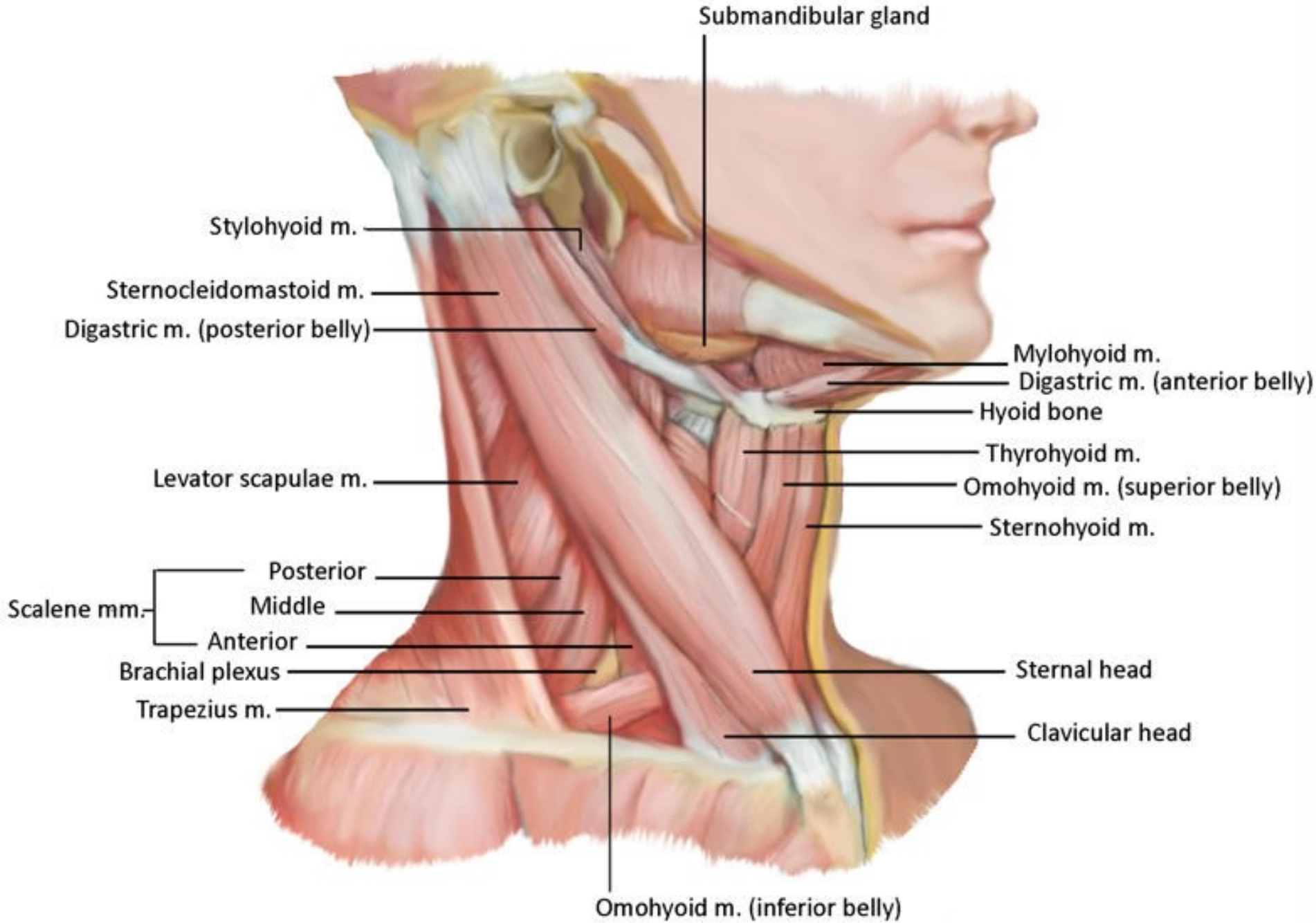


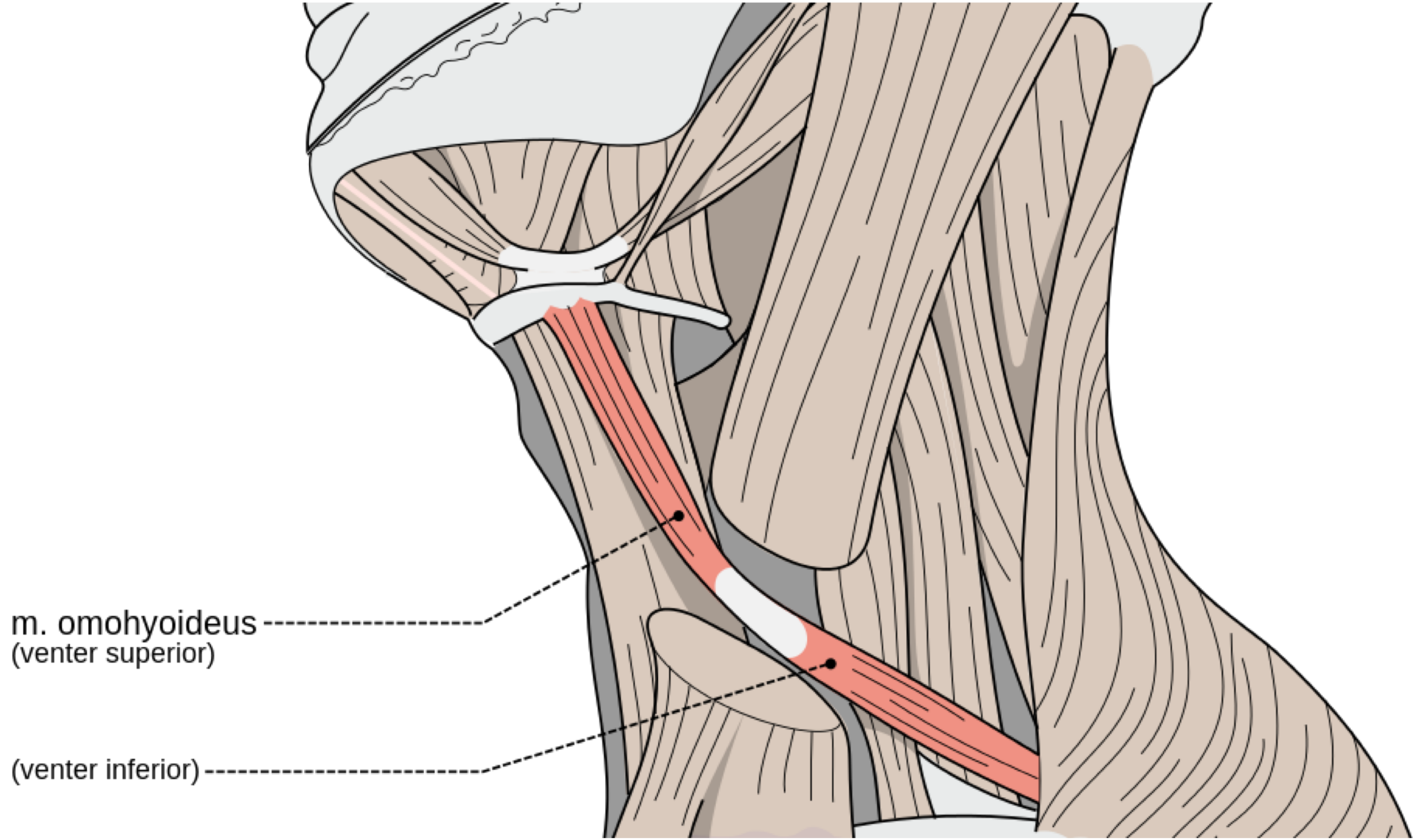
MICHELE GRAHAM

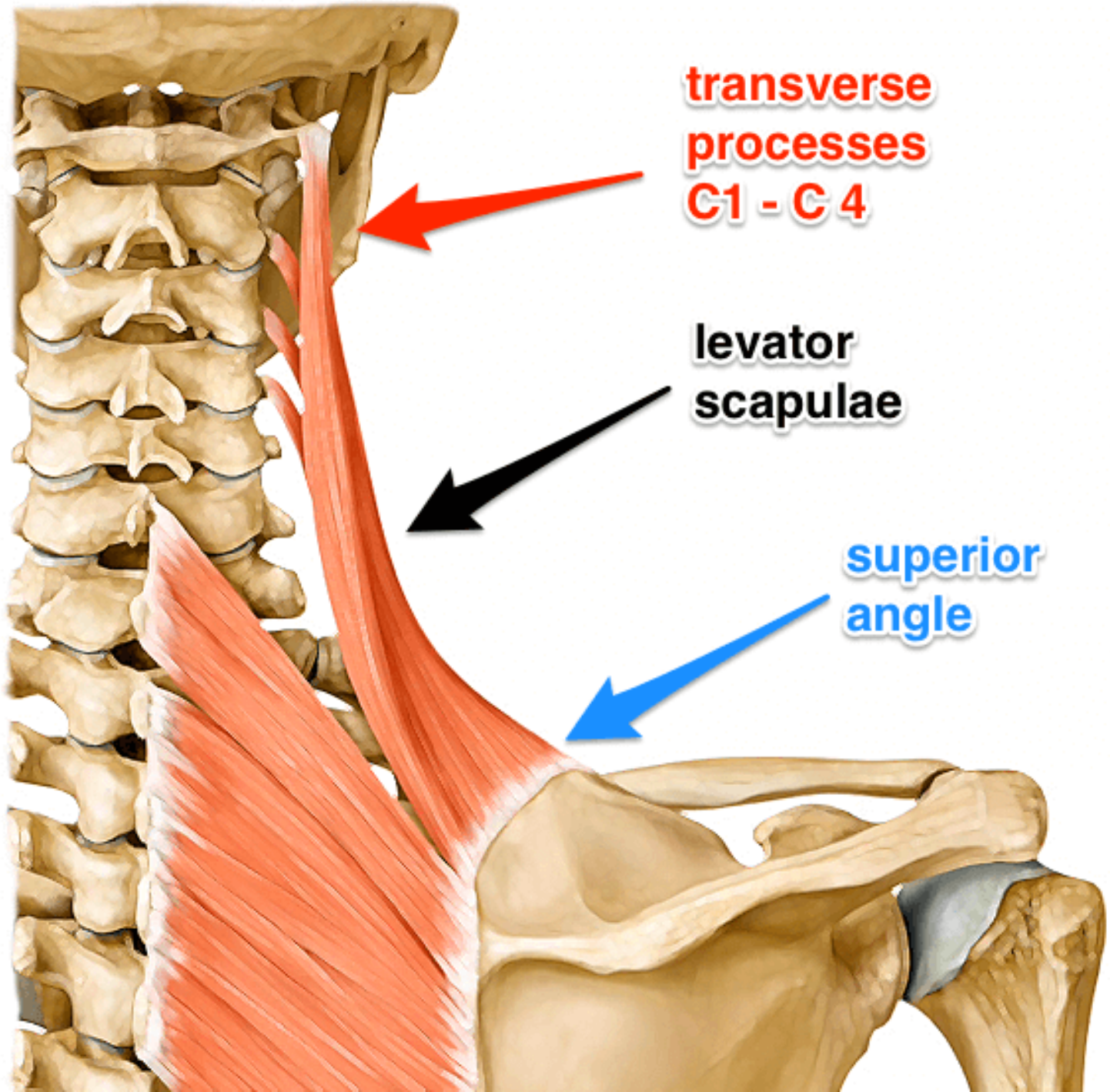

Masseter muscle
Parotid gland
Platysma muscle (*cut away*)
Mastoid process
Hyoid bone
Carotid sheath
Fascia of infrahyoid muscles and cut edge
Thyroid cartilage
Superficial (investing) cervical fascia and cut edge
Cricoid cartilage
Visceral (pretracheal) fascia over thyroid gland and trachea
Suprasternal space (of Burns)
Manubrium of sternum
Jugular notch
Digastric muscle (anterior belly)
Mylohyoid muscle
Submandibular gland
Fibrous loop for intermediate digastric tendon
Stylohyoid muscle
Digastric muscle (posterior belly)
External carotid artery
Internal jugular vein
Thyrohyoid muscle
Omohyoid muscle (superior belly)
Sternohyoid muscle
Sternothyroid muscle
Scalene muscles
Trapezius muscle
Deltoid muscle
Clavicle
Omohyoid muscle (inferior belly)
Pectoralis major muscle
Clavicular head
Sternal head
Sternocleidomastoid muscle


Parotid gland (*cut*)
Masseter muscle
Ramus of mandible
Submandibular gland
Styloglossus muscle
Hyoglossus muscle
Mylohyoid muscle
Mastoid process
Styloid process
Stylohyoid muscle
Digastric muscle (posterior belly)
Middle pharyngeal constrictor muscle
Longus capitis muscle
Splenius muscle
Sternocleidomastoid muscle
Levator scapulae muscle
Scalene muscles
Posterior
Middle
Anterior
Brachial plexus
Trapezius muscle
Acromion
Deltoid muscle
Body of mandible
Digastric muscle (anterior belly)
Hyoid bone
Thyrohyoid muscle
Omohyoid muscle (superior belly)
Sternohyoid muscle
Inferior pharyngeal constrictor muscle
Sternothyroid muscle
Omohyoid muscle (inferior belly)
Clavicle
Pectoralis major muscle
Manubrium of sternum
Sternal head
Clavicular head
Sternocleidomastoid muscle


Mylohyoid
Digastric
Stylohyoid
Sternohyoid
Omohyoid
Geniohyoid
Thyrohyoid
Sternothyroid


Submandibular gland
Stylohyoid m.
Sternocleidomastoid m.
Digastric m. (posterior belly)
Levator scapulae m.
Scalene mm.
Posterior
Middle
Anterior
Brachial plexus
Trapezius m.
Mylohyoid m.
Digastric m. (anterior belly)
Hyoid bone
Thyrohyoid m.
Omohyoid m. (superior belly)
Sternohyoid m.
Sternal head
Clavicular head
Omohyoid m. (inferior belly)


m. omohyoideus
(venter superior)
(venter inferior)


transverse
processes
C1 - C 4
levator
scapulae
superior
angle

In the starting position, place your hand behind you diagonally and rotate your head 45 degrees. Bring your head down toward your left knee without hunching over.

Resist by pressing your head into your hand.

Coaches Questions and Swings

Fred:
3D:

Can we examine the relationship between pelvic movements for long distance players vs shorter hitters?

Also can we examine the relationship between thoracic spine extension at p4 for distance hitters and shorter hitters?

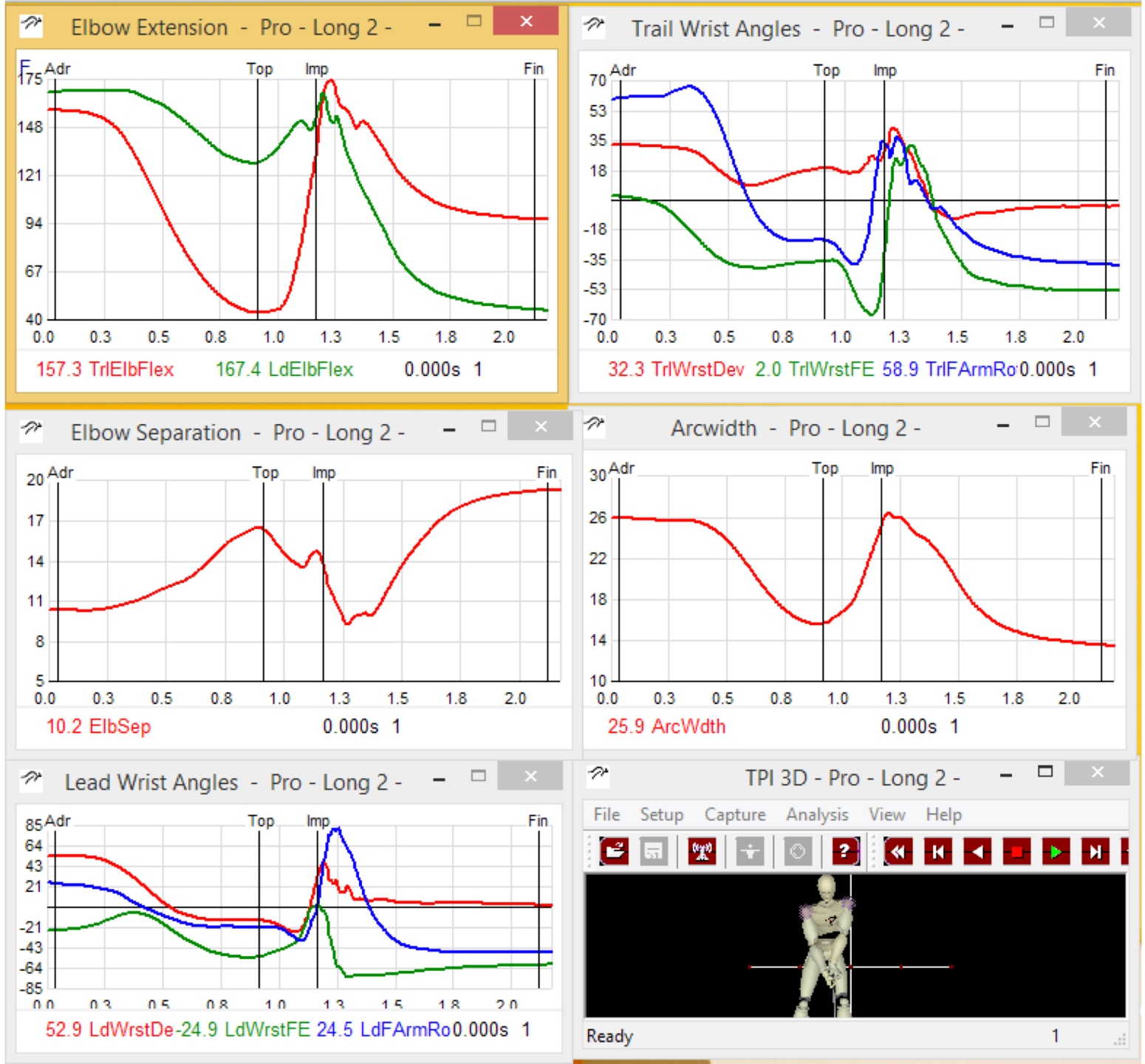
Bracing combos for ball strikers and distance players highlighted on the graphs

Questions:

From your webinar on the wipe, can you highlight the most important areas to focus for the 3-4 wipe related graphs? During your previous presentation the cursor was missing but it seems like the area is quite small.

Swing Analysis:

As spoken before I'm still inconsistent in my wedge swings due to thin, fat shots and sometimes shanks. Can you analyze both my distance and finesse wedge swings please? Thanks.


Elbow Extension - Pro - Long 2 -
Adr
Top
Imp
Fin
175
148
121
94
67
40
0.0 0.3 0.5 0.8 1.0 1.3 1.5 1.8 2.0
157.3 TrlElbFlex
167.4 LdElbFlex
0.000s 1
Trail Wrist Angles - Pro - Long 2 -
70
53
35
18
-18
-35
-53
-70
32.3 TrlWrstDev
2.0 TrlWrstFE
58.9 TrlFArmRo
0.000s 1
Elbow Separation - Pro - Long 2 -
20
17
14
11
8
5
10.2 ElbSep
0.000s 1
Arcwidth - Pro - Long 2 -
30
26
22
18
14
10
25.9 ArcWdth
0.000s 1
Lead Wrist Angles - Pro - Long 2 -
85
64
43
21
-21
-43
-64
-85
52.9 LdWrstDe
-24.9 LdWrstFE
24.5 LdFArmRo
0.000s 1
TPI 3D - Pro - Long 2 -
File
Setup
Capture
Analysis
View
Help
Ready
1

just thought about something. Have you ever discussed the Drive hold method? in relation to flipping or gaining or losing ball, clubhead speed, and consistency

So I have been using the speed bomber training (speed out front) and now i have been hitting pushes with the longer clubs. driver and 3 wood

I have been constantly looking at your release videos but I have been striking bad so far

Question for you. Is it a natural progression for over the top golfers to start hitting off the heel when they start dropping the club on plane? Seeing a lot of that with new golfers.

Larry is a 1 handicap. Early is the year, he had a bad case of the shanks. We were able to eliminate the shanks by working to keep his trail arm bent through impact. He tends to get steep on the downswing and then shallows with his body by backing up and has a shoulder shrug. We have worked on several shallowing drills from the website along with brushing the grass drill.

I sent video last month of Julia. I have sent a face on and down the line videos as a follow up. In addition to Tyler's suggestions, she had a hip sway in the backswing when she showed up. We worked on eliminating the sway, a knee bump forward rather than out to start the downswing and then a brace. The suggestions worked great.