

THE OSTEOPATHIC WORKSHOP: NECK PAIN

Trevine R. Albert, D.O. M.S.
Family Medicine | Neuromusculoskeletal Medicine | PGY-3

2018 FSACOFPP Convention



A TEACHING HOSPITAL

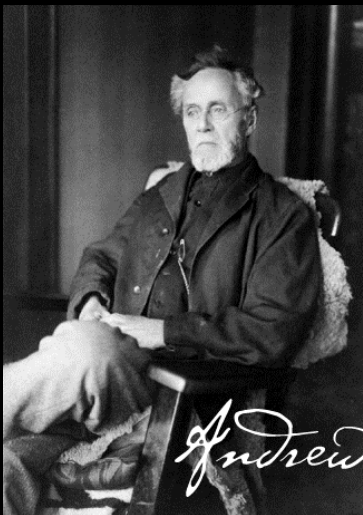
DISCLOSURES

There are no actual or potential personal, financial or legal conflict of interest in relation to this program or presentation



LEARNING OBJECTIVES

- Reflect on the Background to Neck Pain
- Review Cervical Region Anatomy
- Discuss the Evaluation of Patients with Neck Pain
- Participate in the Osteopathic Workshop



"A student of life must take in each part of the body and study its uses and relations to other parts and systems"

Andrew Taylor Still

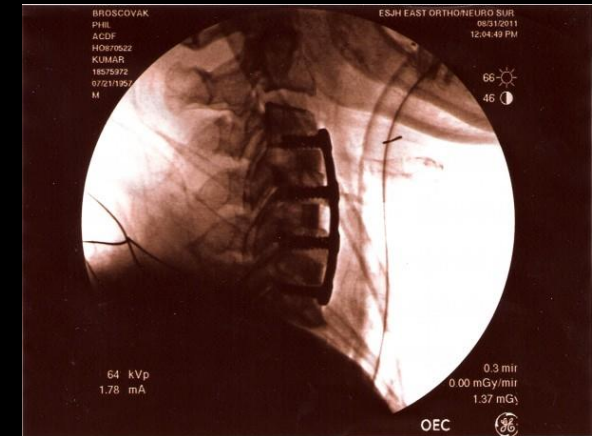


Background to Neck Pain

BACKGROUND TO NECK PAIN

“Neck pain is **one of the most common complaints** of patients seeking a primary care physician... it is 1st for MVA victims and only 2nd to low back pain for patient's seeking manual treatment”

“Accurate, *gentle* diagnosis & treatment of the cervical spine is an **important** aspect of patient care”



BACKGROUND TO NECK PAIN

Neck pain can be due to many factors:

Cervical Somatic Dysfunction [M99.01]

Cervical Muscle Strain [S16.1]

Cervical Ligament Sprain [S13.4]

Cervical Spondylosis [M47.812]

Cervical Spondylotic Myelopathy [47.12]

Cervical Radiculopathy [M54.12]

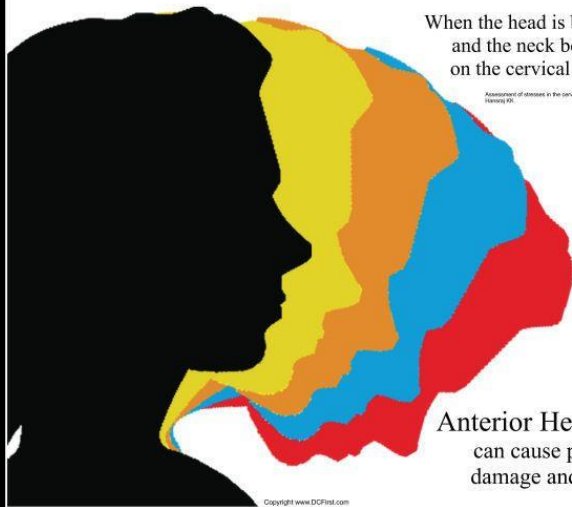


BACKGROUND TO NECK PAIN

Text Neck Syndrome Not Just a Neck Problem

Assessment of stresses in the cervical spine caused by posture and position of the head.
An increase in forward head position increases the weight on the cervical spine.

0°	15°	30°	45°	60°
12lb	27lb	40lb	49lb	60lb



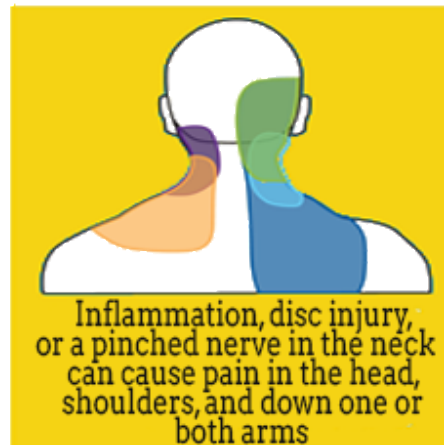
When the head is brought forward and the neck bends, the weight on the cervical spine increases.

Assessment of stresses in the cervical spine caused by posture and position of the head.
Herning 90.

Anterior Head Position
can cause permanent
damage and result in:

Headaches
Back Pain
Muscle Damage
Nerve Damage
Spinal Disc Herniation

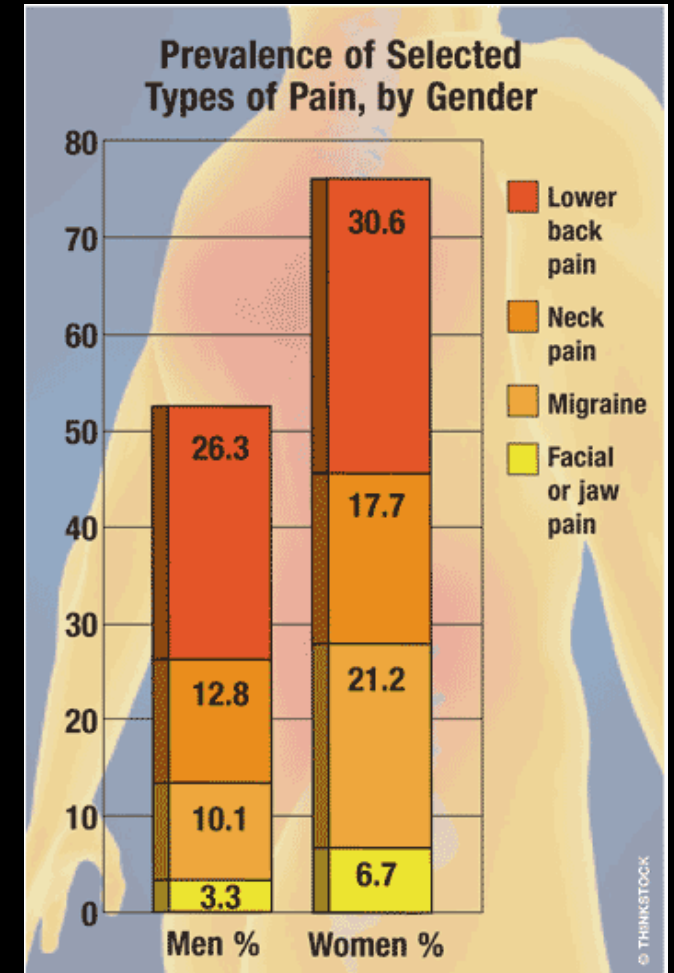
Spinal Disc Compression
Decrease in Spinal Curve
Loss of Lung Volume Capacity
Gastrointestinal Problems
Onset of Early Arthritis
Image Copyright www.DCFirst.com



Inflammation, disc injury,
or a pinched nerve in the neck
can cause pain in the head,
shoulders, and down one or
both arms



15 % of the American population
reports that neck pain is their
most common medical complaint





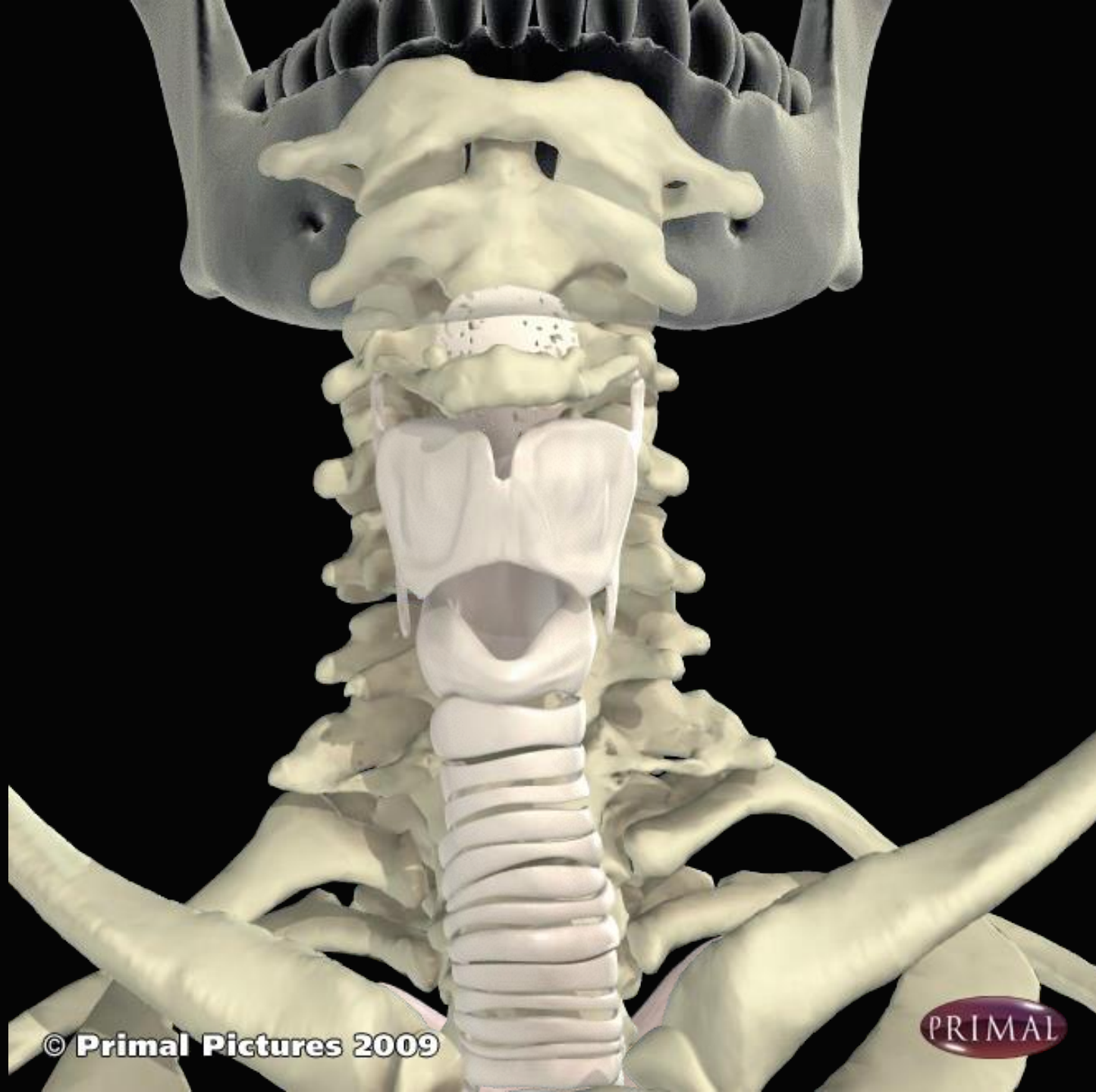
Cervical Region Anatomy

TERMINOLOGY

Vertebral motion of the superior vertebrae on inferior vertebrae: Rotation (R)
Ex: C2 refers to C2 in relation to C3



Anatomic Position: Neutral (N)
Forward bending: Flexion (F)
Backward bending: Extension (E)
Lateral Flexion: Sidebending (S)



© Primal Pictures 2009



CERVICAL SPINE

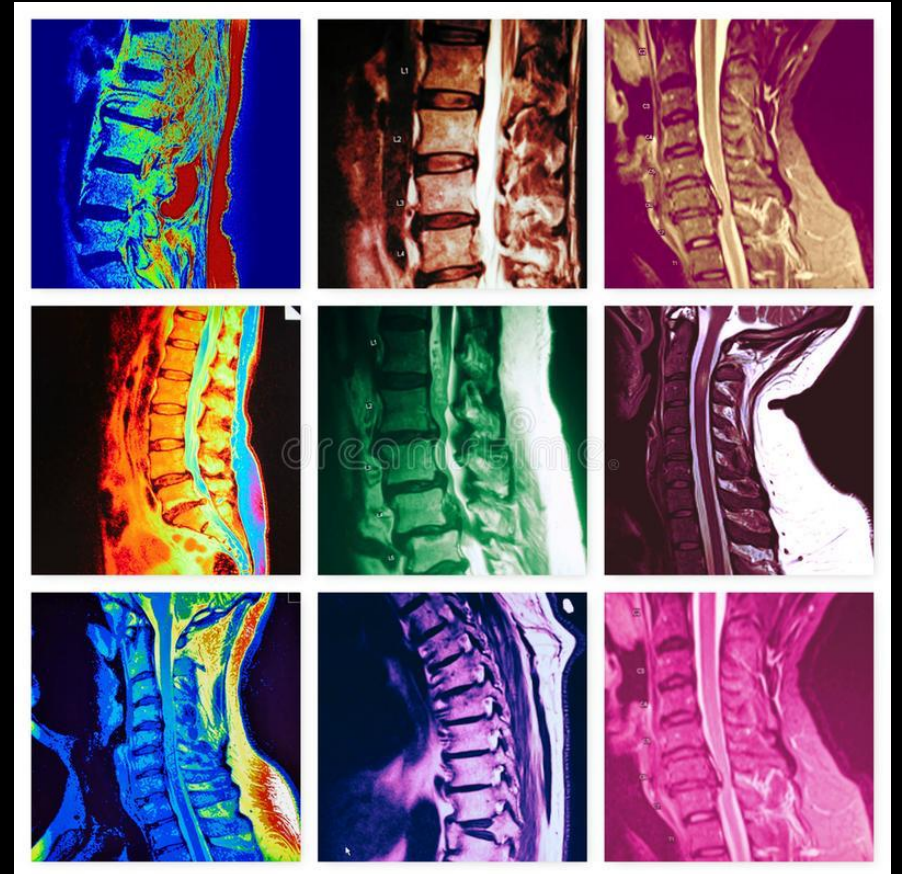
7 Cervical Vertebrae

Atypical Cervical Spine

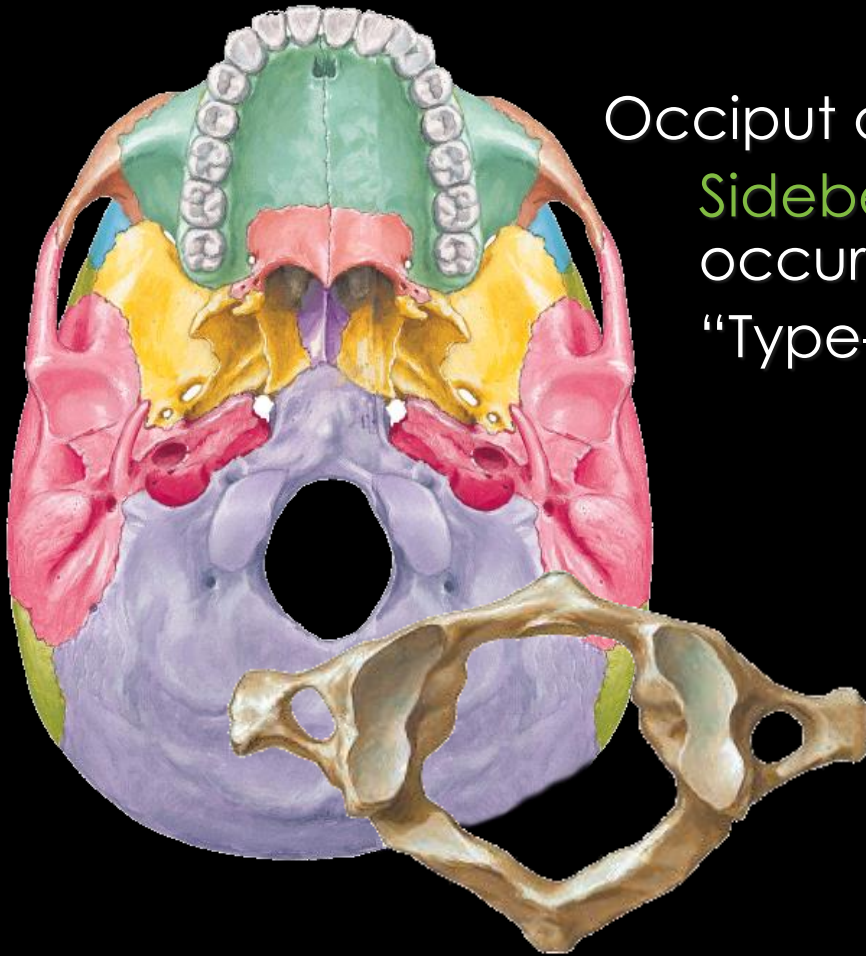
- C1, C2, C7

Typical Cervical Spine

- C3-C6



OCCIPITO-ATLANTO (OA) JOINT



Occiput on C1 "Atlas"

Sidebending and rotation
occur to opposite sides
"Type-1-like"



ATLANTO-AXIAL (AA) JOINT



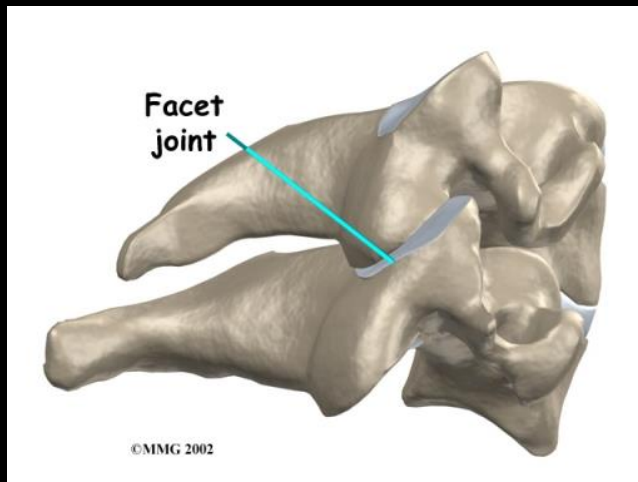
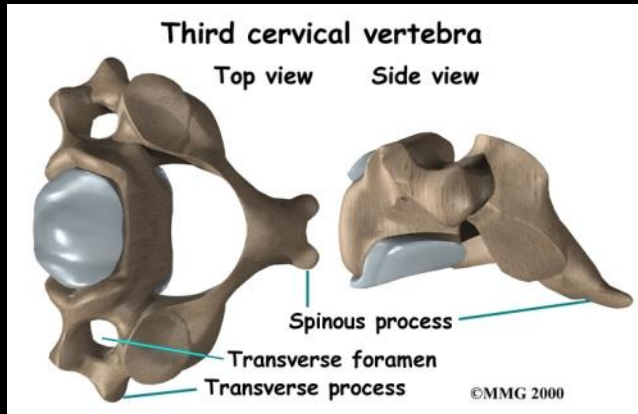
Articulation of C1 on C2

- C1 - "Atlas"
- C2 - "Axis"

Primary motion: **Rotation**

C1 "Atlas" articulates with
Dens of C2 "Axis"

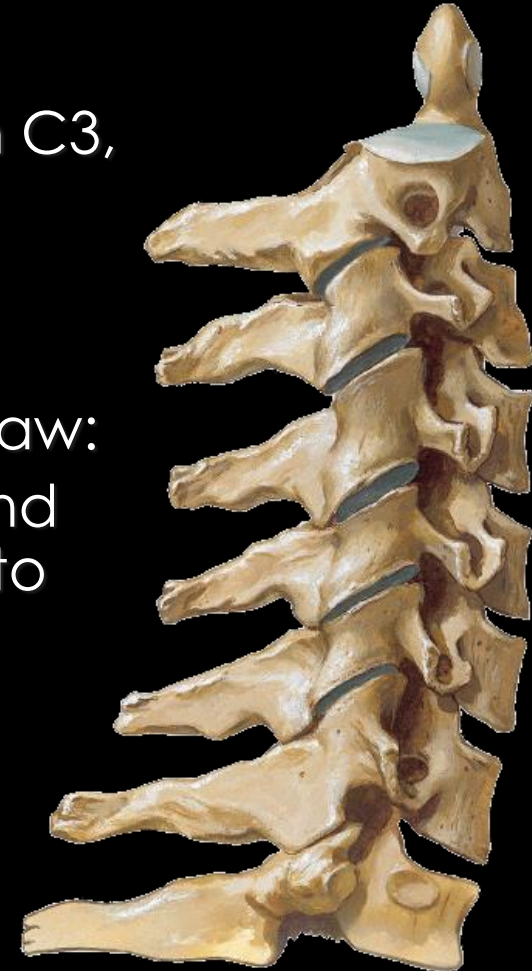
C2 - C7 CERVICAL VERTEBRAE



Articulations of C2 on C3,
C3 on C4...
C7 on T1

Obeys Fryette's 2nd Law:

- Sidebending and rotation occur to same sides



POSTERIOR NECK MUSCLES

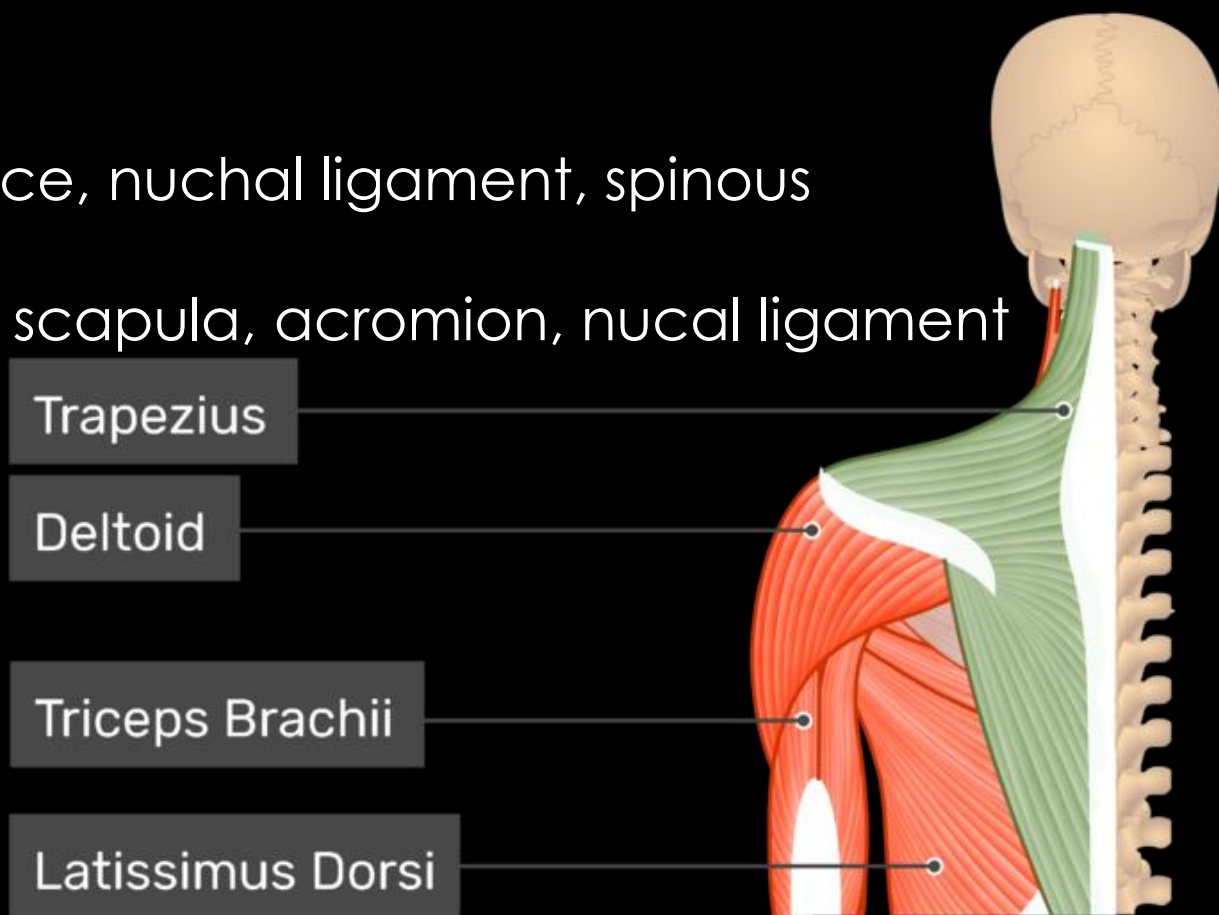
Trapezius

Origin: External occipital protuberance, nuchal ligament, spinous processes of C7-T12, occipital bone

Insertion: Lat 1/3 of clavicle, spine of scapula, acromion, nuchal ligament

Function:

- Elevate shoulder, depress & retract scapula
- Steadies scapula on thorax
- Extend, laterally flex & contralaterally rotate head



POSTERIOR NECK MUSCLES

Levator scapulae

Origin: Transverse processes of C1-C4

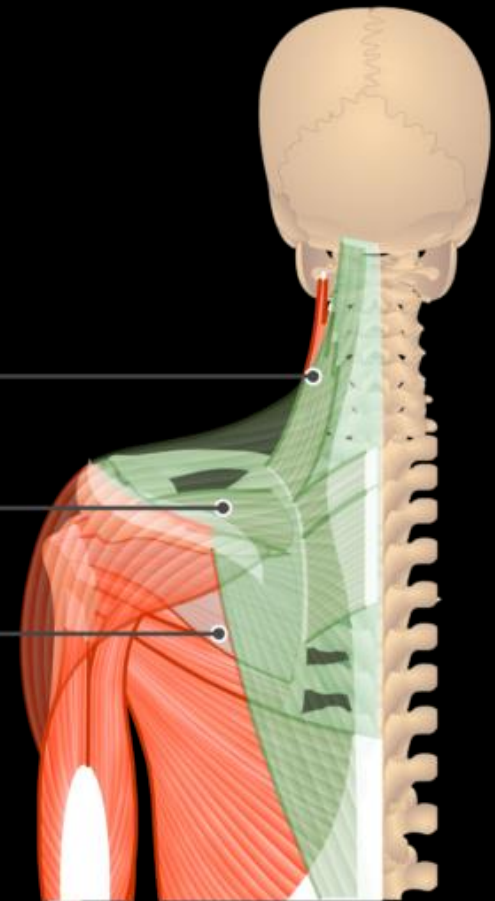
Insertion: Superior border of scapula

Function: Elevates scapula

Levator Scapulae

Supraspinatus

Infraspinatus



POSTERIOR NECK MUSCLES

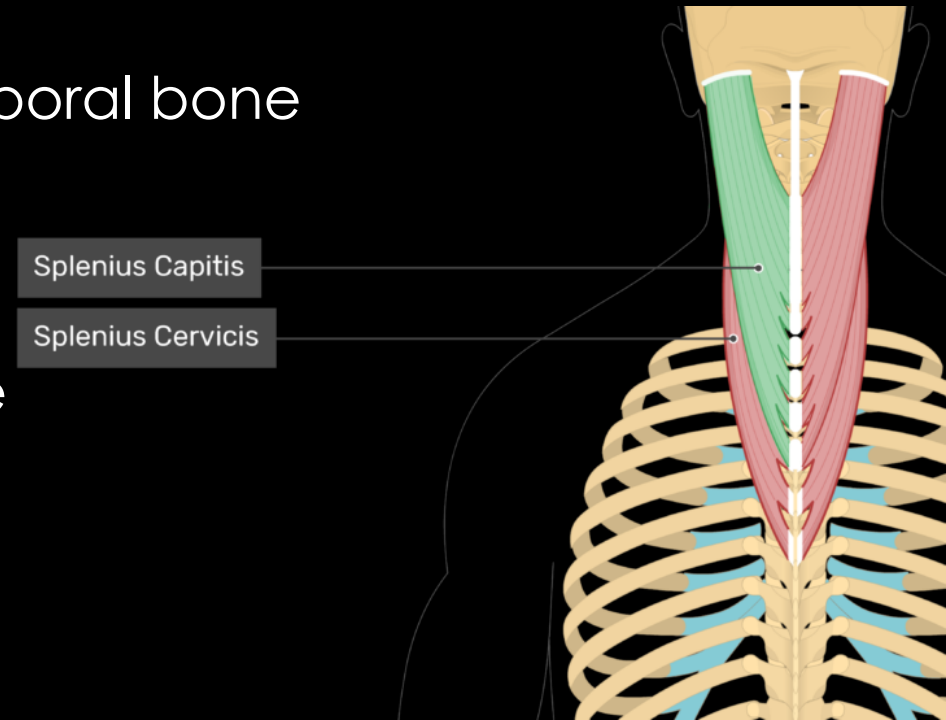
Splenius Capitis

Origin: Nuchal ligament and spinous processes of C7-T3

Insertion: Occipital and mastoid process of temporal bone

Function:

- Extend head
- Laterally flex and rotate head to same side



ANTEROLATERAL MUSCLES

Sternocleidomastoid

Origin: Manubrium and medial clavicle

Insertion: Mastoid process of the temporal bone, superior nuchal line

Function:

- Tilt head to ipsilateral shoulder
- Rotates head to opposite shoulder
- Cervical flexion



ANTEROLATERAL NECK MUSCLES

Scalenes

Anterior

Origin: TP of C3-C6, **Insertion:** 1st rib

Function: Flex and SB ipsilaterally, rotate to opposite side

Middle

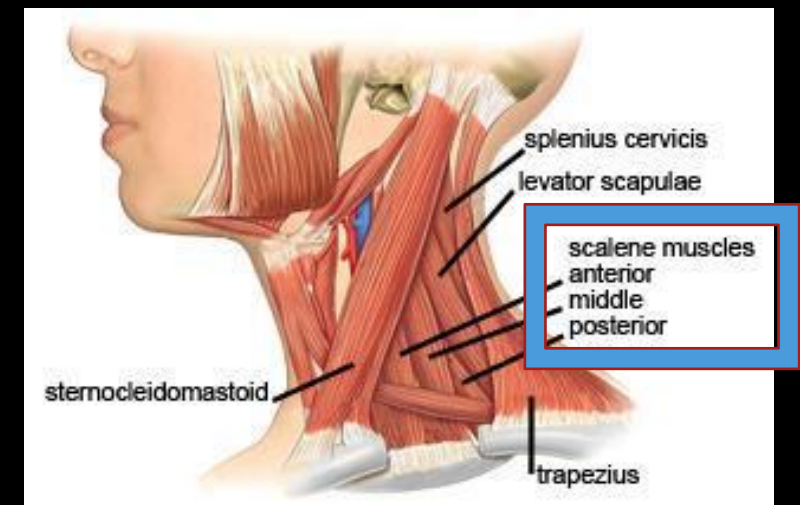
Origin: TP of C2-C6, **Insertion:** 1st rib

Function: SB ipsilaterally, elevates 1st rib

Posterior

Origin: TP of C4-C6, **Insertion:** 2nd rib

Function: SB ipsilaterally, elevates 2nd rib





Evaluation of Neck Pain

EVALUATION OF NECK PAIN

- Obtain a good HPI
- Visually inspect patient from different angles
- Use passive/active range of motion and orthopedic tests to determine restricted motion
- Palpate all accessible portions of the muscles involved
- Correlate findings with knowledge of anatomy and palpatory exam
- Obtain appropriate imaging



EVALUATION OF NECK PAIN

OSTEOPATHIC STRUCTURAL EXAM

With a focus on... Cervical Spine

1st

SCREENING

Is there a
problem?

“BIG PICTURE”



2nd

SCANNING

Where is the
problem?

“REGIONAL”

CERVICAL SCREENING

BIG PICTURE - “Is there a problem?”

Look for anatomical asymmetry:

- Gait
- Eye/Ear Lobe Levels
- Position of the Head in Relation to the Shoulders
- Cervical Lordotic Curve
- Overall Posture
- Skin Color
- Active Range of Motion

CERVICAL SCREENING

ACTIVE RANGE OF MOTION ASSESSMENT

BIG PICTURE - “Is there a problem?”

Motions:

- Flexion/Extension
- Sidebending
- Rotation

Where should you stand to observe the motions?

- To the **side** of the patient for flexion & extension
- **Behind** the patient for sidebending & rotation

CERVICAL SCREENING

“LISTEN” THROUGH YOUR HANDS

BIG PICTURE - “Is there a problem?”

Palpate

- Tissue Texture Changes
- Temperature
- Tenderness
- Paravertebral Fullness
- Quality of Motion Assessment (Passive ROM)



CERVICAL SCREENING

PASSIVE RANGE OF MOTION ASSESSMENT

REGIONAL- “Where is the problem?”

Motions:

- Flexion/Extension
- Sidebending
- Rotation

Where should you stand to observe the motions?

- Maintain **light** touch
- Use the **head** as a lever

CERVICAL SCREENING

PEARLS

Important to place patient in proper position for control

- Remember **operator ergonomics**

Active Motion

- Important to **observe movement** from correct point of view

Passive Motion

- Essential to **palpate** region during range of motion





IMAGING

X-ray of the C-spine help rule out fracture or dislocation as well as diagnose osteoarthritis

CT scan for occult fractures, some soft tissues

MRI to diagnose soft tissue injuries and herniated discs

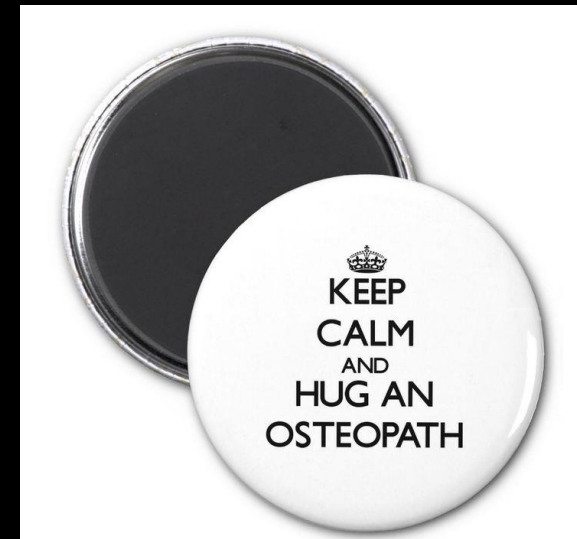


The Osteopathic Workshop

DIAGNOSIS OF SOMATIC DYSFUNCTION

T.A.R.T. is used in diagnosing somatic dysfunction. The following signs are assessed during the osteopathic examination:

- T – Tenderness
- A – Asymmetry (static finding)
- R – Restricted range of motion (dynamic finding)
- T – Tissue texture changes



BARRIERS TO MOTION

Anatomic Barrier

- The limit of motion imposed by anatomic structure (limit of passive motion)

Physiologic Barrier

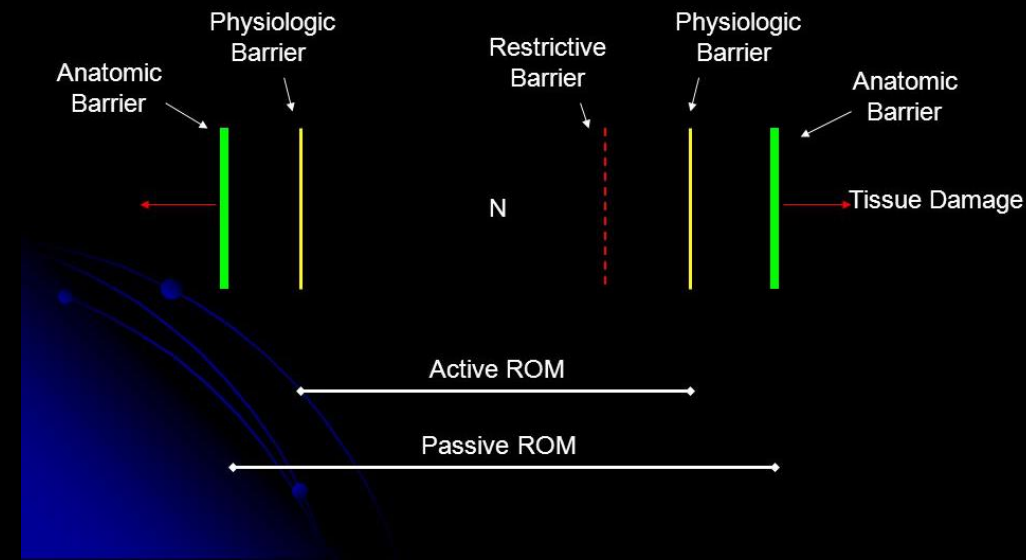
- The limit of active motion

Restrictive Barrier

- The functional limit within the anatomic and physiologic range of motion which abnormally diminishes the normal physiologic range of motion

Pathologic Barrier

- Permanent restriction of joint motion associated with pathologic changes of tissues (i.e. Osteophyte)



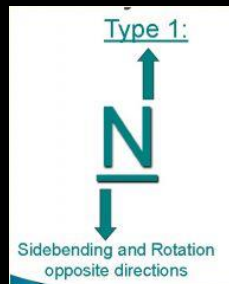
FREYETTE'S LAWS OF PHYSIOLOGIC MOTION

1st Law: Type I

Neutral
Several Segments (3 or more)
Sidebending/rotation opposite
Rotation into the convexity
Postural

2nd Law: Type II

Hyperflexion/hyperextension
1-2 Segments
Sidebending/rotation to the same side
Rotation into the concavity
Traumatic



FE.

FREYETTE'S LAWS OF PHYSIOLOGIC MOTION

3rd Law

Inducing motion in one plane reduces or modifies the motion in the other two planes

OA DIAGNOSIS

Positioning: grasp the patient's head with both hands, with the fingertips of the index and middle fingers over the **occipital articulations**

- The **OA** joint will be assessed in the **neutral**, **flexed** and **extended** positions
- Perform **translation**
 - Right translation = Left sidebending
 - Left translation = Right sidebending
- Diagnosis = position of ease (e.g., OA **FRLSR**)



MUSCLE ENERGY FOR OA

Diagnosis: OA XRLSR or XRRSL (where X = flexed or extended)

- Position patient against the **restrictive barrier**
- Support the patient's head the same hand positioning as diagnosis
- Have the patient **sidebend their head away** from the direction you are sidebending them for 3-5 seconds
 - Complete relaxation
- Establish **new barrier**
- Repeat 3-5 times
 - Final stretch then retest



MUSCLE ENERGY FOR FLEXED OA

Diagnosis: OA ERLSR or ERRSL

- Position patient against the **restrictive barrier**
- Support the patient's head with one hand and position the other's fingers **beneath their chin**
- Have the patient nod their **chin into your fingers** for 3-5 seconds
 - Complete relaxation
- Establish **new barrier**
- Repeat 3-5 times
 - Final stretch then retest



MUSCLE ENERGY FOR EXTENDED OA

Diagnosis: OA ERLSR or ERRSL

- Position patient against the **restrictive barrier**
- Support the patient's head with one hand and position the other's fingers on the **front of their chin**
- Have the patient nod their **chin into your fingers** for 3-5 seconds
 - Complete relaxation
- Establish **new barrier**
- Repeat 3-5 times
 - Final stretch then retest



AA DIAGNOSIS

Positioning: markedly **flex** patient's head forward to reduce rotation in lower vertebrae

- Passively **rotate** patient's head to the motion barrier on each side
- Compare **degree of restriction** in rotation to **right** and **left**
- Diagnosis = position of ease (e.g., AA **R_L** or **R_R**)



MUSCLE ENERGY FOR AA

Diagnosis: AA RL or RR

- Position patient against the **restrictive barrier**
- Support the patient's head using the same hand positioning as diagnosis
- Have the patient **rotate their head away** from the direction you are rotating them for 3-5 seconds
 - Complete relaxation
- Establish **new barrier**
- Repeat 3-5 times
 - Final stretch then retest



MUSCLE ENERGY AND THE OCULOCEPHALOGYRIC REFLEX

Eye movements reflexively affect the cervical musculature as the body attempts to follow the lead provided by eye motion

Diagnosis:

OA FRLSR or FRRSL
AA RL or RR



- Position patient against the **restrictive barrier**
- Have the patient look to the **opposite** of the barrier for 3-5 secs
 - Complete relaxation
- Establish **new barrier**
- Repeat 3-5 times
 - Final stretch then retest

MUSCLE ENERGY FOR C2-C7

Diagnosis: C2 FRSR

- Position patient against the **restrictive barrier**
- Have the patient **rotate their head away** from the direction you are rotating them for 3-5 seconds
 - Complete relaxation
- Establish **new barrier**
- Repeat 3-5 times
 - Final stretch, retest



COUNTERSTRAIN

Demo

- Find **tenderpoint**
- Position of **comfort** (70-100%)
- Hold for **90 secs**
- Slow, passive **return to neutral**
- **Recheck** tenderpoint
 - **Anterior** points usually treated with flexion
 - **Posterior** points usually treated with extension



COUNTERSTRAIN

Tender Point	Location	Treatment Position
AC1	Posterior surface of mid-ramus	RA
AC2 – AC6	Anterior transverse process	F SA RA
AC7	Clavicular attachment of SCM	F ST RA
AC 8	Sternal attachment of SCM	F SA RA

Tender Point	Location	Treatment Position
PC1 Inion	On Inion	F
PC1 lateral	Midway between inion and mastoid	E SA RA
PC2 lateral	Within semispinalis capitis muscle	E SA RA
PC2 midline	Superior aspect of spinous process	E SA RA
PC3 midline	Infero-lateral to C2 spinous process	F SA RA or F ST RAw
PC4 – PC8 midline	Inferior aspect of spinous process	E SA RA

REFERENCES

- Greenspan, Adam, Orthopedic Imaging: A Practical Approach, LWW 1st edition 2011
- Hoppenfeld, Stanley, MD; Physical Exam of the Spine and Extremities; 1976. pp105-132
- Netter, Frank, MD; Atlas of Human Anatomy; CIBA 1989. plates 23-30. • Greenman, Philip E. DO; Principles of Manual Medicine, 3rd edition. 2003. pp 540-544
- Seffinger, Michael, Raymond Hruby, Evidence-Based Manual Medicine: a problem oriented approach, Saunders Elsevier 1st edition 2007 • Thieme Atlas of Neck and Visceral Organs, 2006. • Ward, DO; Foundations of Osteopathic Medicine 3rd edition. 2003. pp1046
- Mitchell, Fred L. Jr., D.O., F.A.A.O., Mitchell, Kai, The Muscle Energy Manual, vol. 1, MET Press, 1998.
- Ward, Robert C., D.O., Ed., Foundations for Osteopathic Medicine, 2nd Ed., Lippincott Williams and Wilkins, 2003, pp. 684-689.
- Chila, Anthony G., D.O., Ed., Foundations for Osteopathic Medicine, 3rd Ed., Lippincott Williams & Wilkins, 2010, pp. 518-522