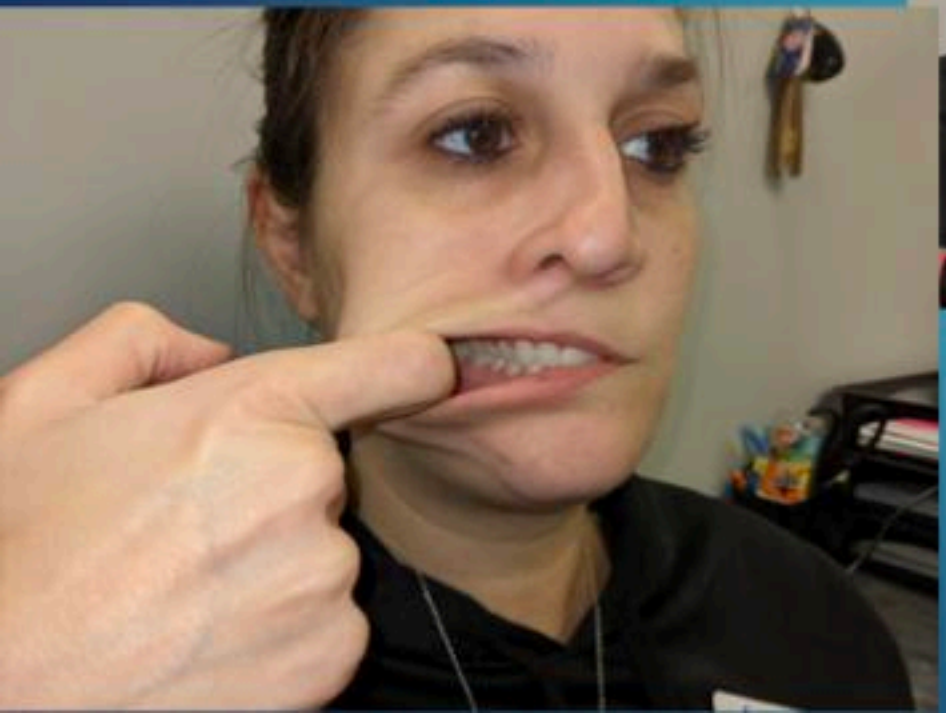
Lecture 1: Basic Postural Considerations Affecting Occlusion

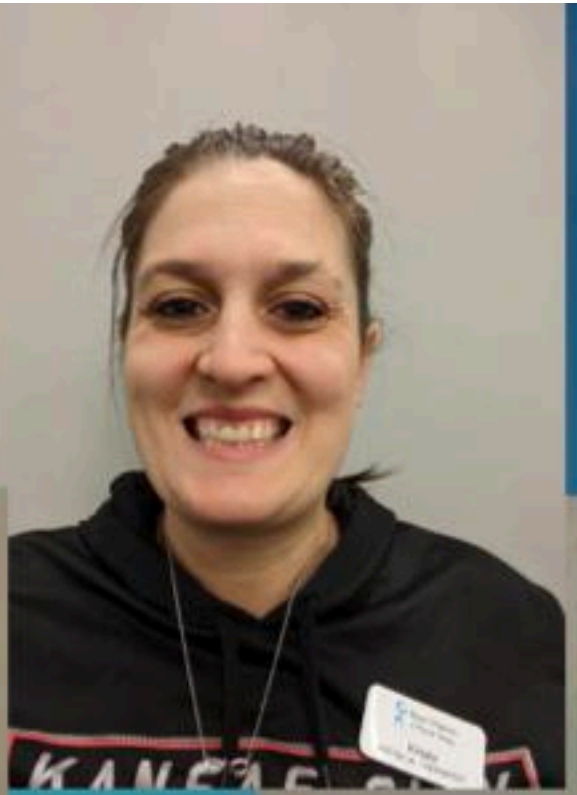
MATTHEW STENSRUD, DPT
KANSAS CITY STRENGTH AND CONDITIONING
OLATHE, KANSAS
GOLFINGMATT82@GMAIL.COM

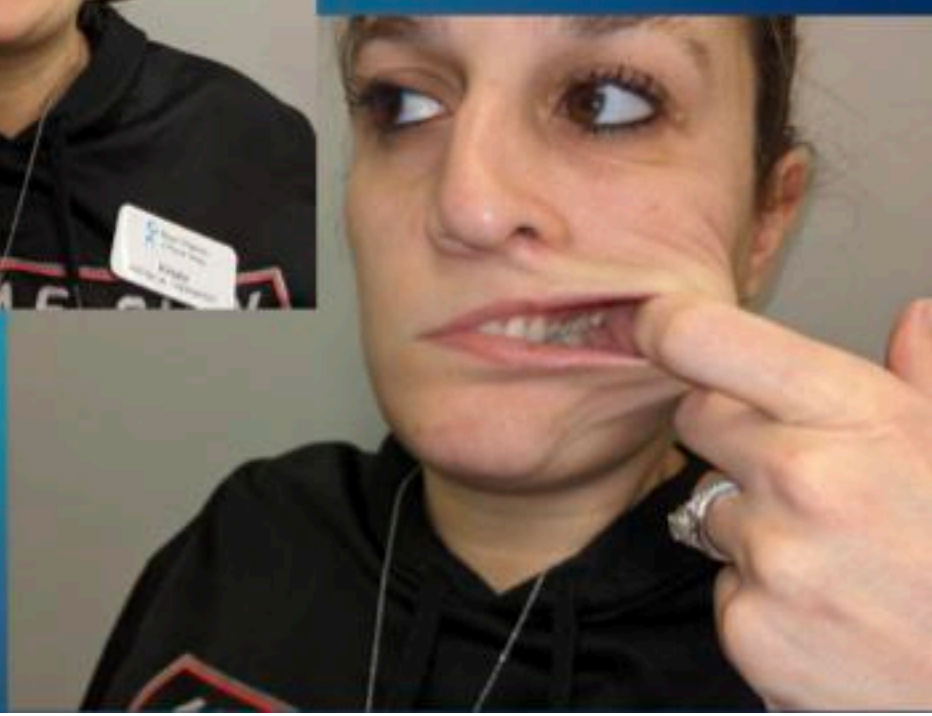
Postural Restoration Institute®

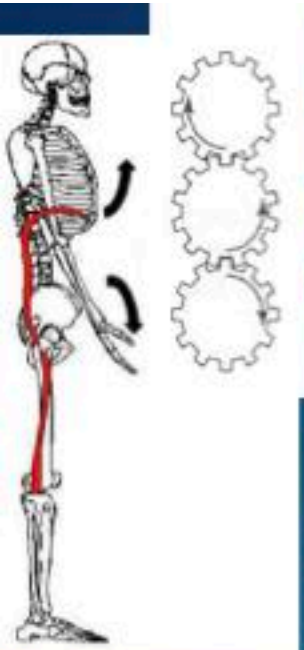
Krista

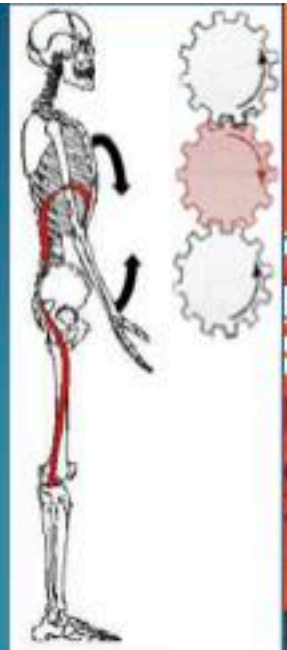
Krista

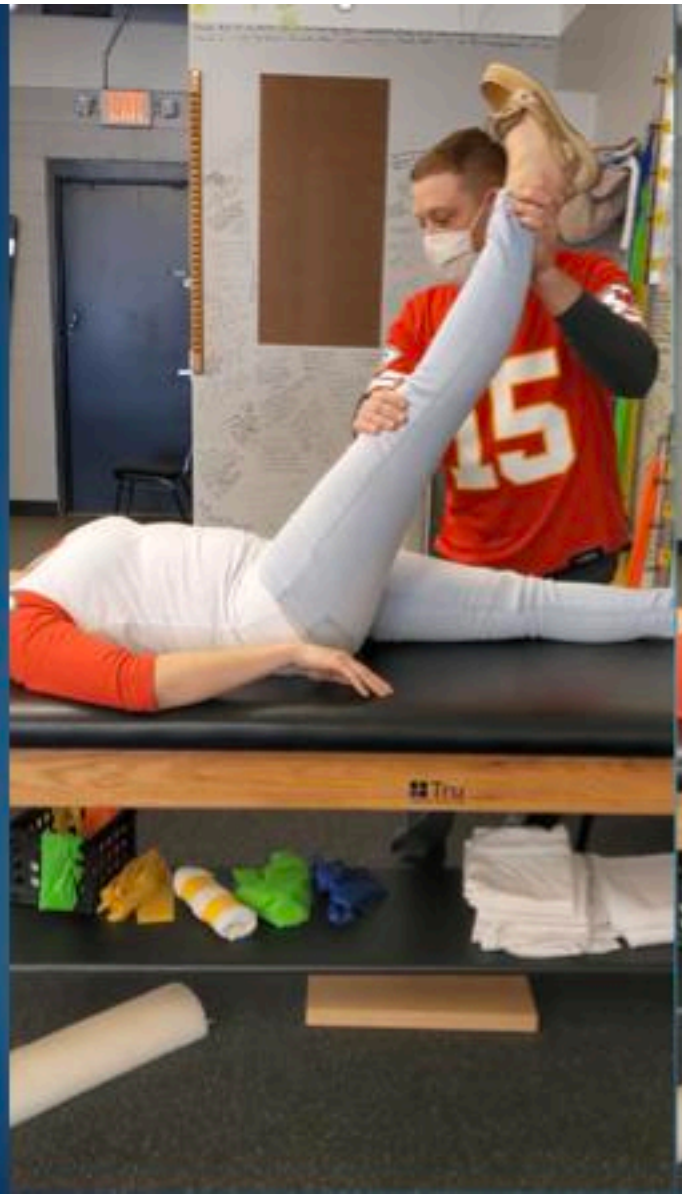




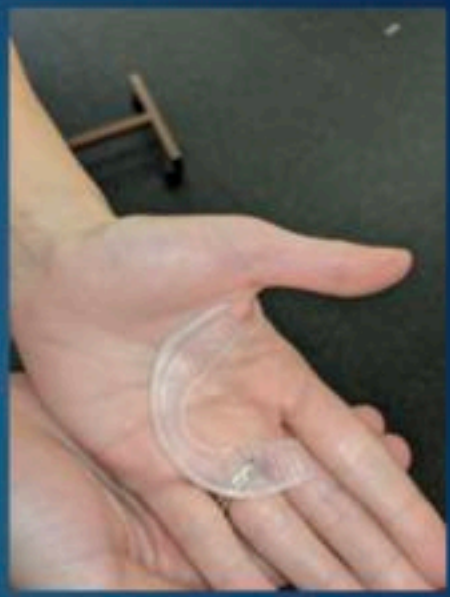







15


15



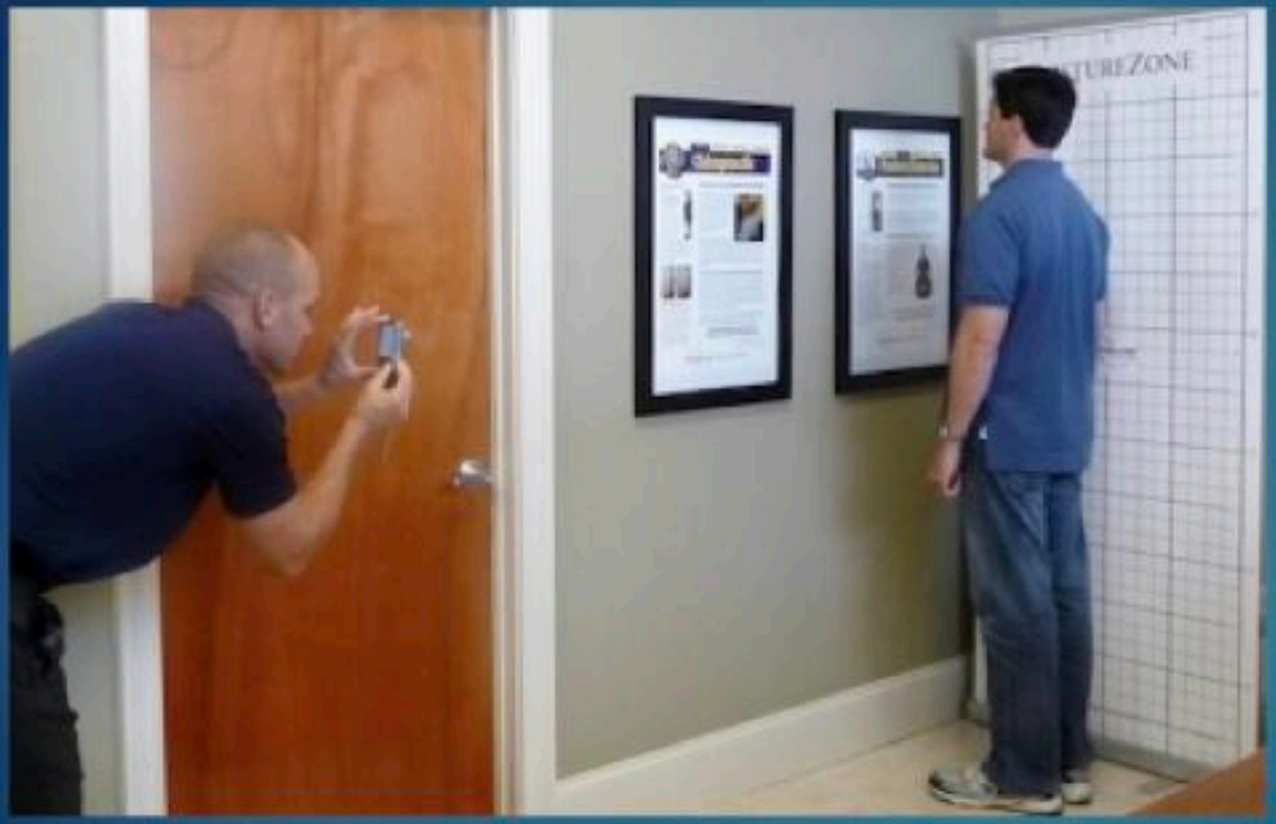
What is Posture?

- Is it static or dynamic?
- How do we assess posture?
- Why is looking at posture important as a dentist?

Posture Photos

What do you see?

- Center of mass shifted to the right (rear view)
- R hand closer to side than the L
- Uneven shoulders
- Deep low back/increased lordosis (extension posture)
- Body mass over the balls of feet (fight or flight?)
- How does posture affect occlusion?



Many styles available on Amazon starting at $80.00

Questions that stimulate co-discovery

A technique where individuals work collaboratively to solve problems

What do you see?

Why do you think it's that way?

Do you think this has an affect on how your teeth come together?

or - how your joint feels

or – the tightness that you have described in your muscles

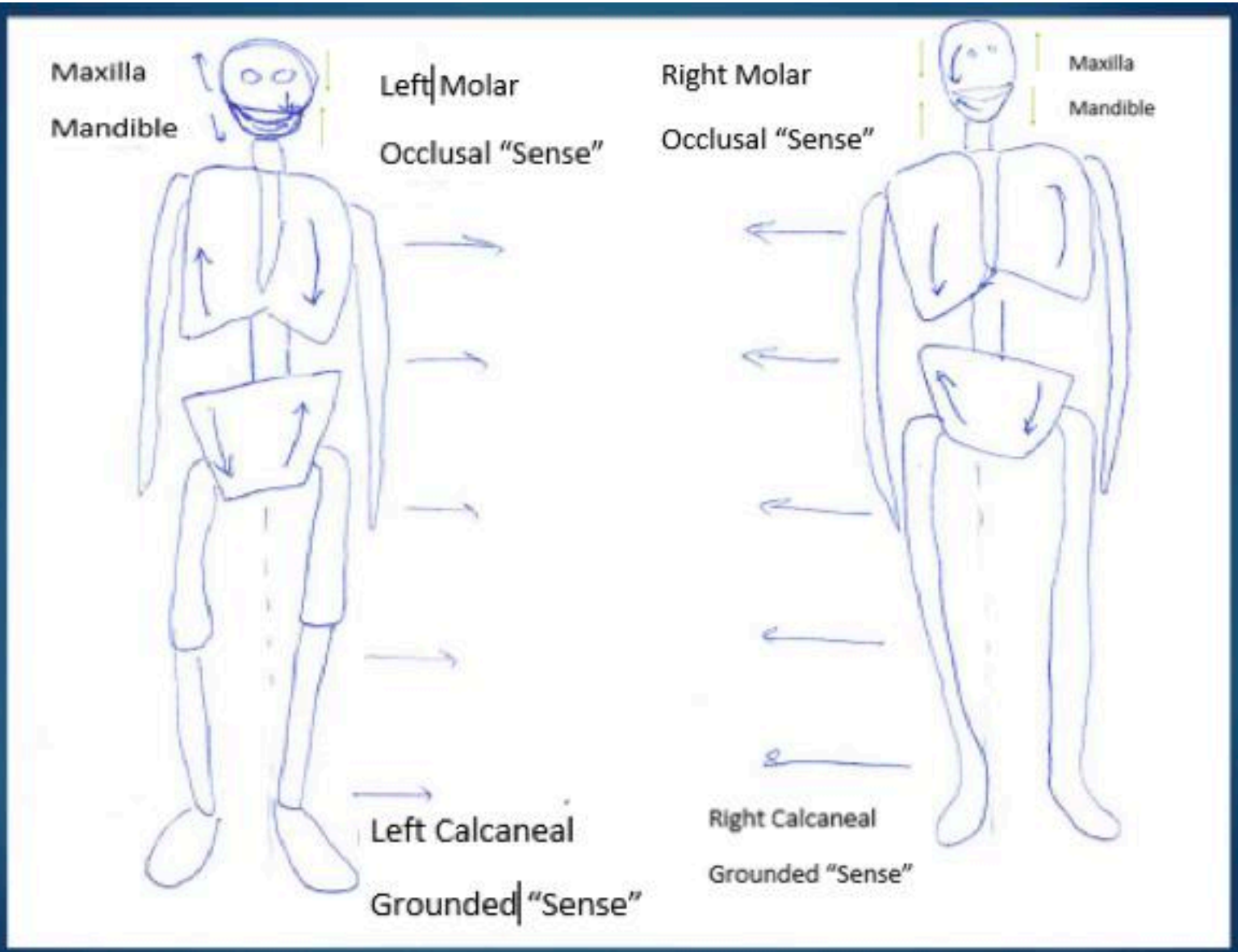
What do you see?

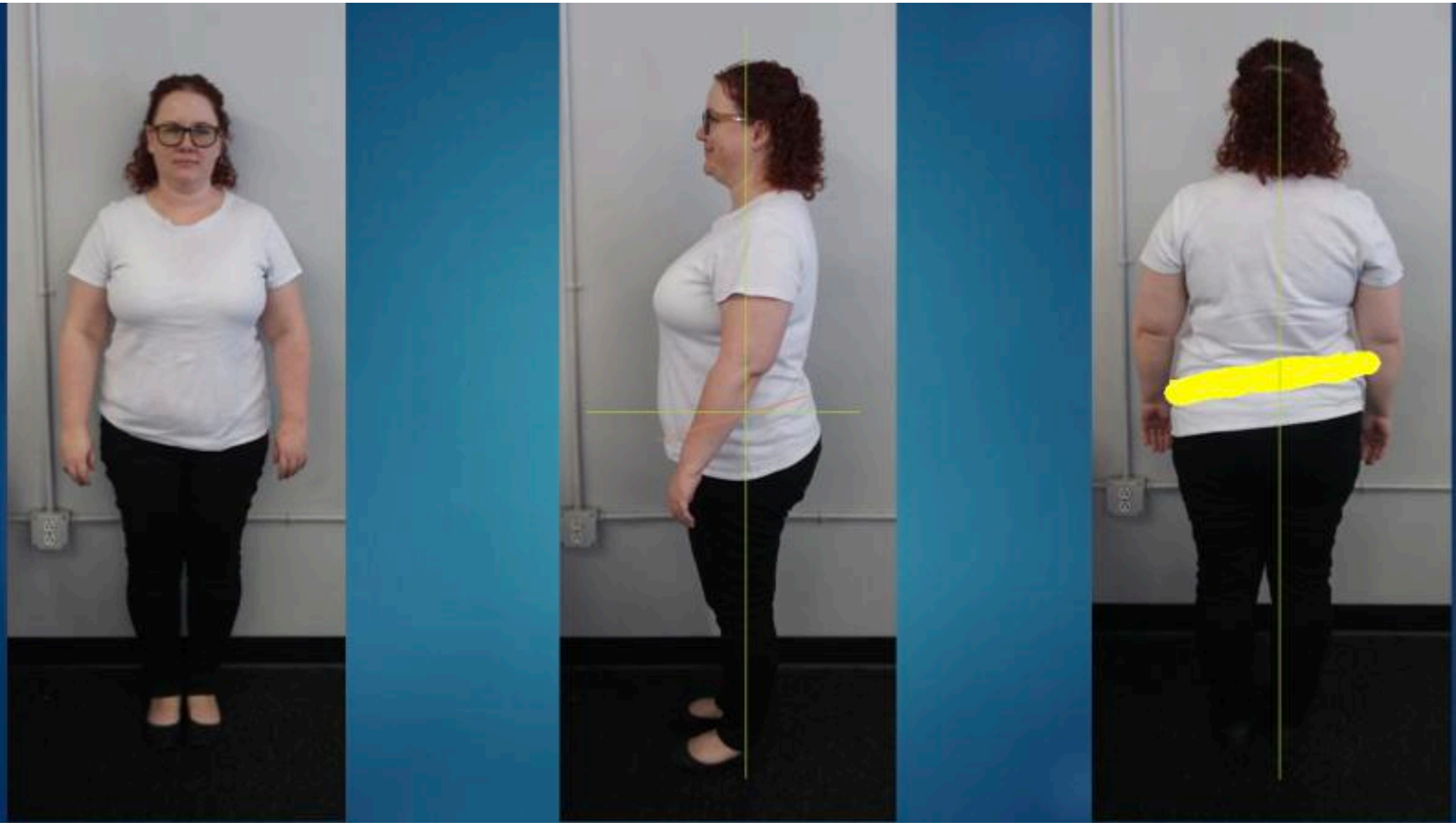
- Tipped pelvis / more weight on one leg
- FHP
- Head tilt

Leg length discrepancy/Tipped Pelvis

"Examination of the Relationship Between Mandibular Position and Body Posture"

- Kiwamu Sakaguchi [1], Noshir R Mehta, Emad F Abdallah, Albert G Forgione, Hiroshi Hirayama, Takao Kawasaki, Atsuro Yokoyama
- When subjects used a heel lift under the right foot, occlusal forces shifted to the right side compared to no heel lift ($p < 0.01$). Based on these findings, **it was concluded that changing mandibular position affected body posture. Conversely, changing body posture affected mandibular position.**


Maxilla
Mandible
Left Molar
Occlusal "Sense"
Left Calcaneal
Grounded "Sense"
Right Molar
Occlusal "Sense"
Maxilla
Mandible
Right Calcaneal
Grounded "Sense"

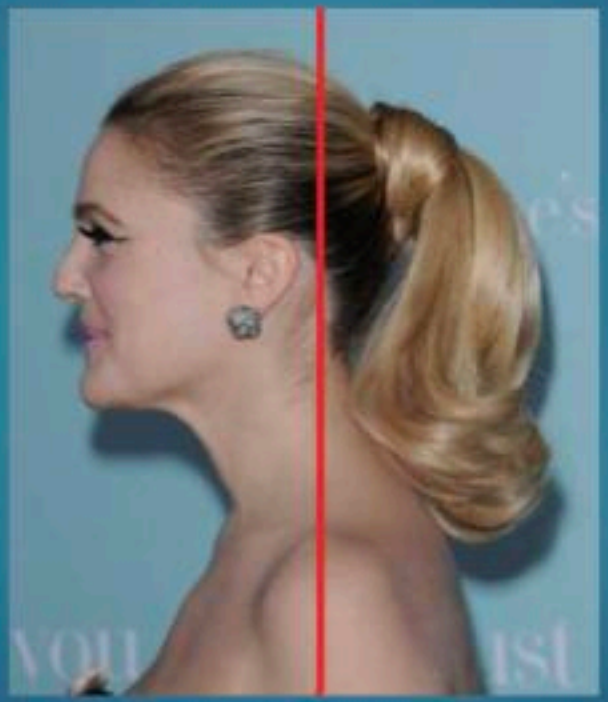


Unilateral Occlusal Sense

Oie E, Horiuchi M, et al. Effects of occlusal contact and its area on gravity fluctuation. Angle Orthod. 2010 May; 80(3):540-546

- Authors suggest that unequal posterior occlusion may cause postural disharmony and lateralized gravitational challenge
- In other words, your feet and teeth communicate!

Forward head posture

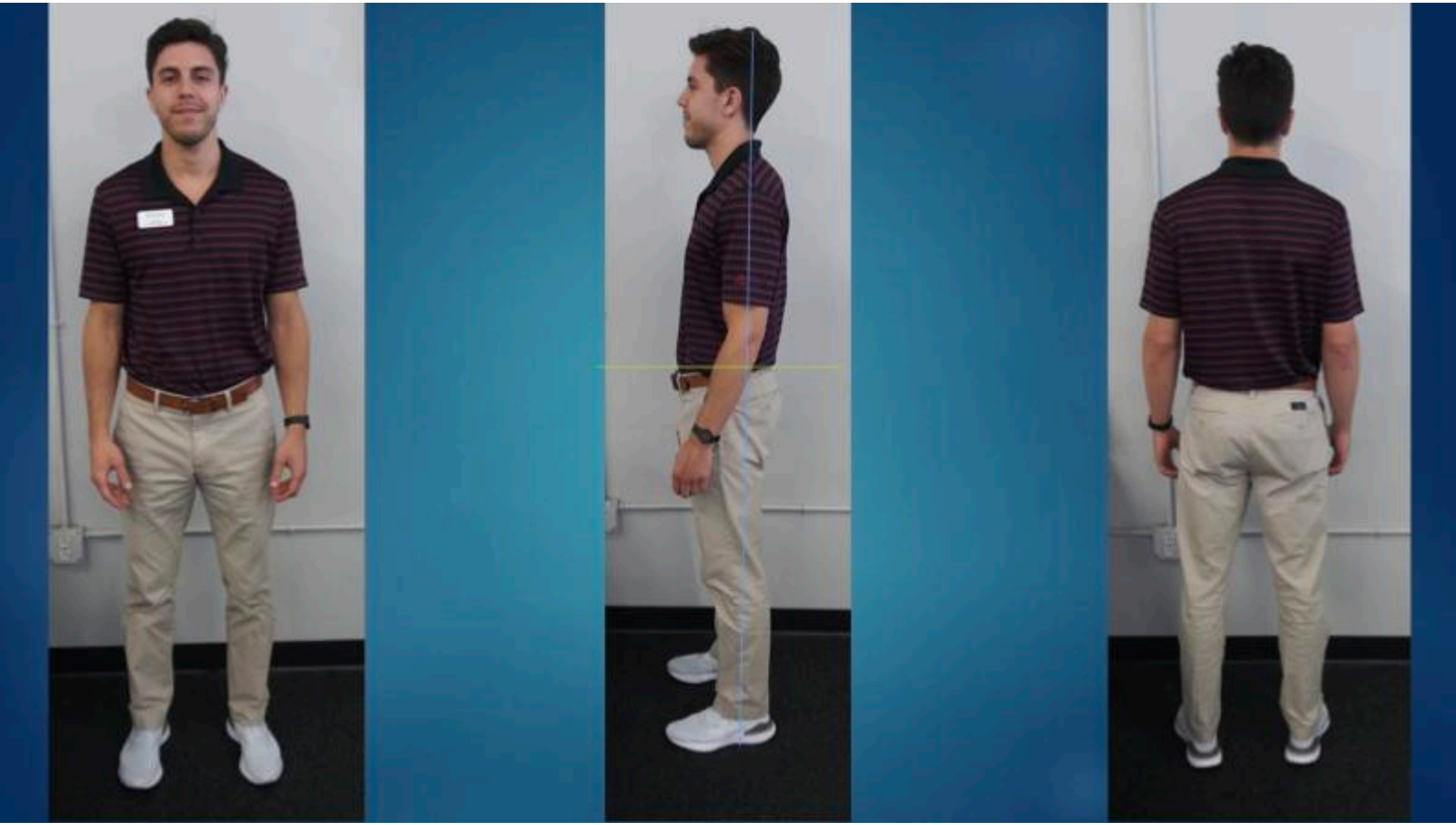


"Preliminary report on head posture and muscle activity in subjects with class I and II"

- I. C. GADOTTI, F. BÉRZIN, D. BIASOTTO-GONZALEZ
- The results indicated that the EMG responses of temporal and masseter muscles tend to be modified by occlusion alteration class II. **Subjects with class II occlusion tended to present more occurrence of forward head posture** with alterations in the muscle activity pattern between masseter and temporal muscles.

Class II Occlusion and FHP

- "According to published data in 70% of cases, a correlation exists between Class II occlusion and FHP. Many of these patients show symptoms of disturbances in their temporomandibular joint (TMJ)."
  - Gonzalez H, Manns A. Forward head posture: Its structural and functional influence on the stomatognathic system, a conceptual study. J of craniomandibular practice. Jan 1996, Vol 14(1):71-80



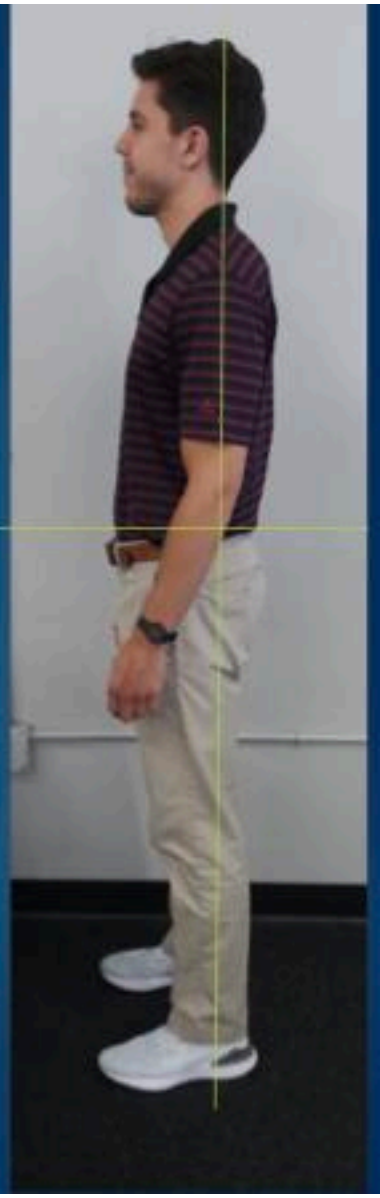
What happens to him if we were to focus on moving his head back?

Head and Jaw move back

- No change in occlusion
- Airway size decreases
- His head will move forward again to improve breathing mechanics

Head moves back only

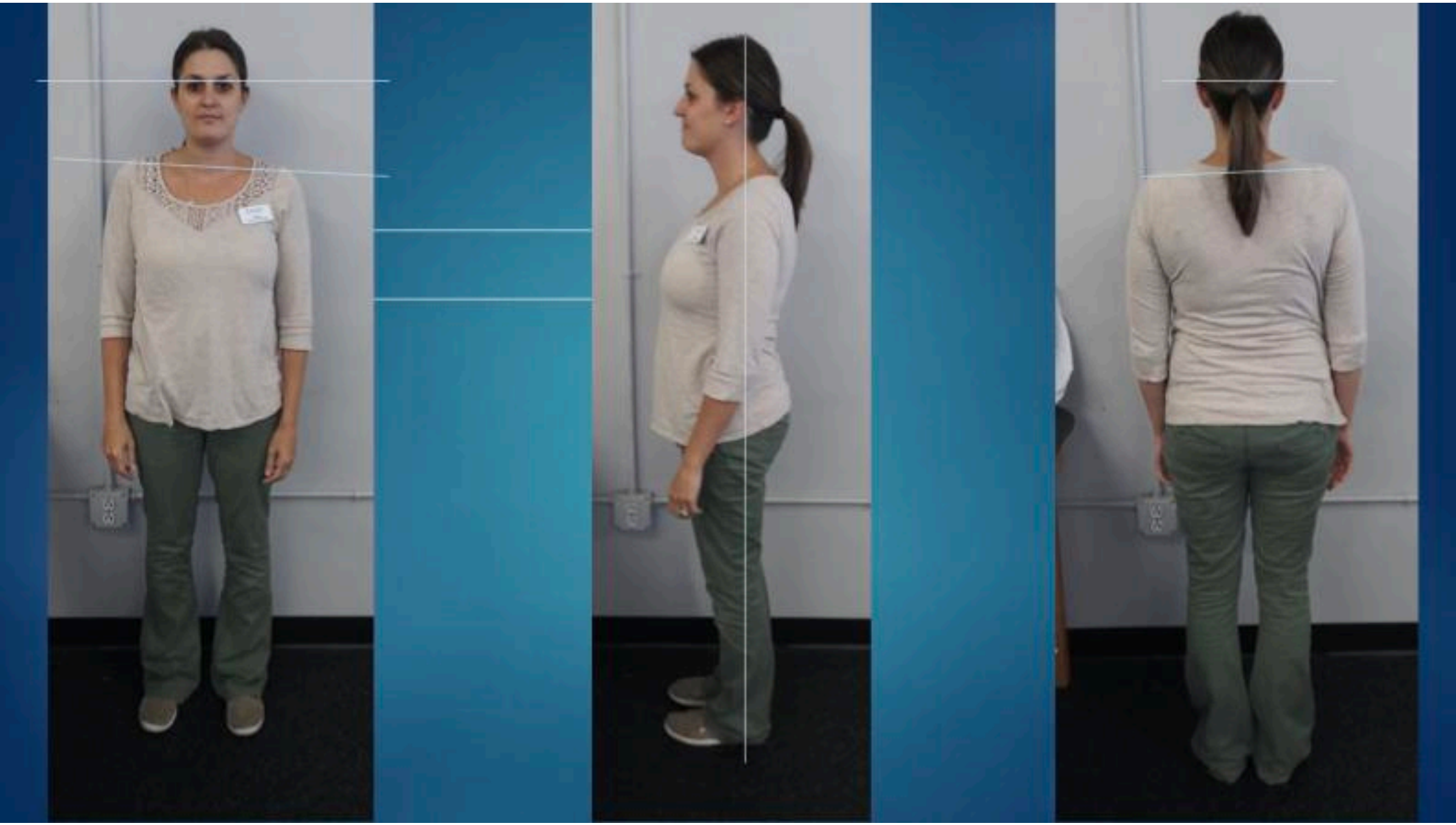
- Posterior movement of the maxilla on mandible
- Airway size increases
- His head will move forward again to improve occlusion



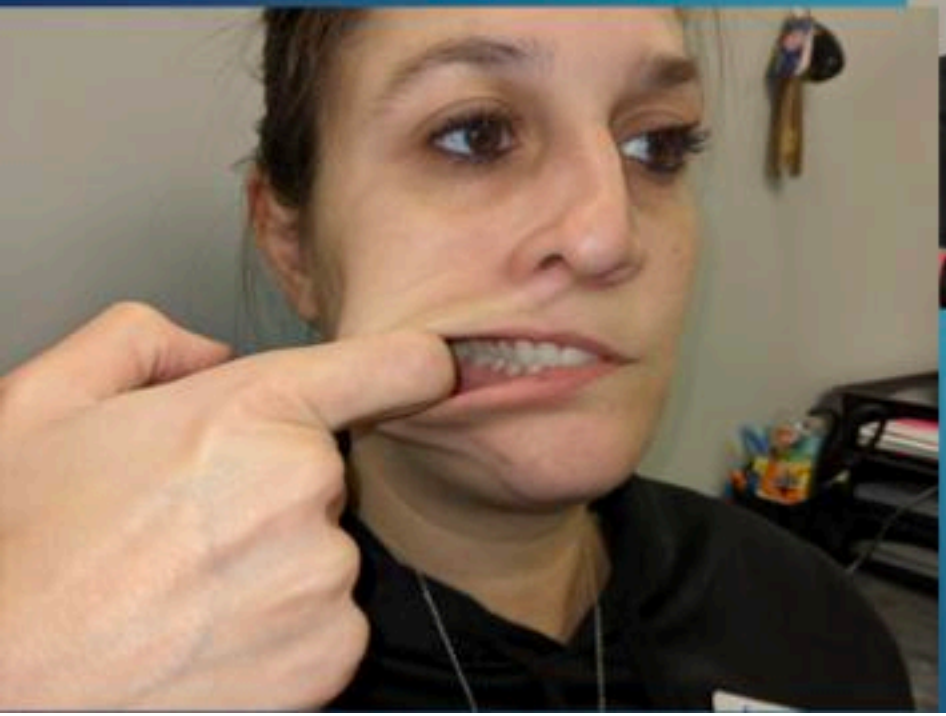
Head Tilt

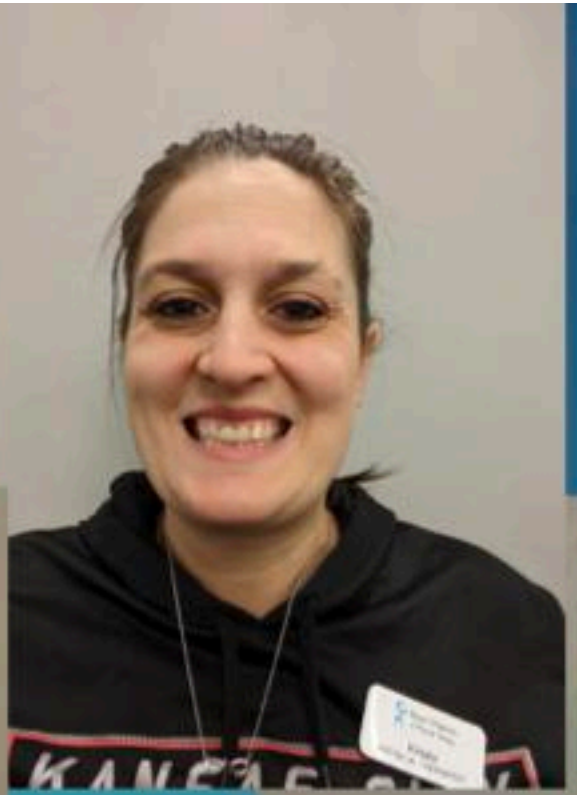
"Occlusal support and head posture"

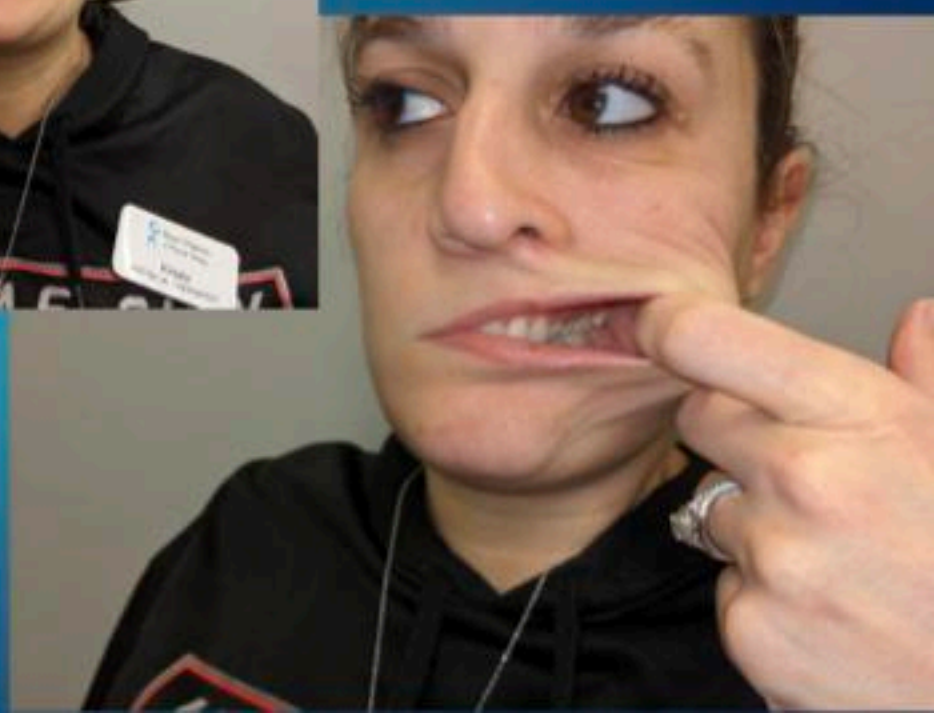
- Y. Kibana, T. Ishijima, T. Hirai
- **From these results, it can be said that lateral imbalance of the occlusal support could promote imbalance in sternocleidomastoid muscle activity, causing lateral bending of the neck**. From this study, it is suggested that there is a close relationship between occlusal support and head posture.



Krista's occlusion

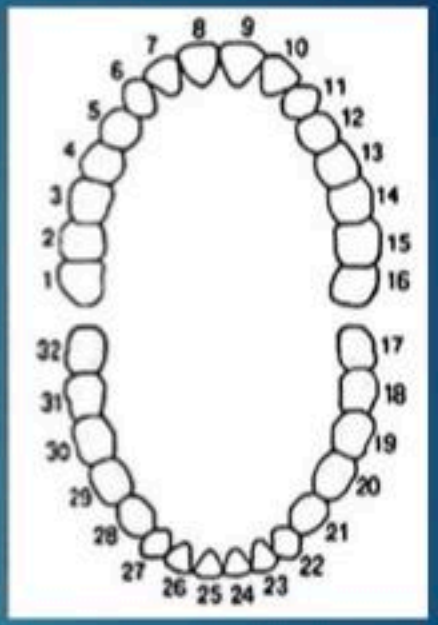






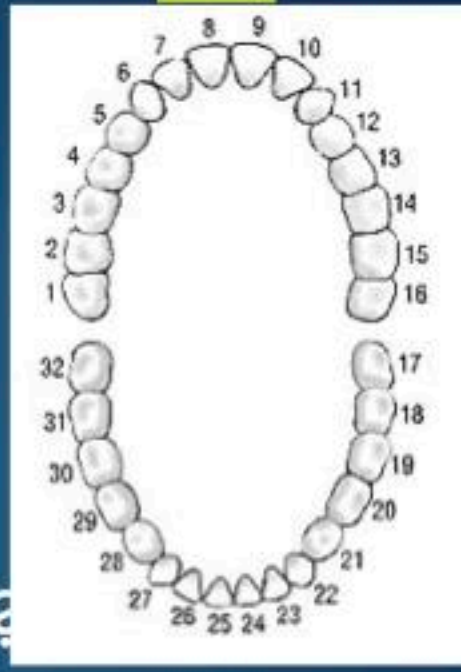
Let's discover together!

1. Seated
2. Standing
3. Standing/left shoe off
4. Seated left shoe off
5. FHP
6. Right head tilt



What did you sense?

- Is there a correlation between your posture and the teeth you sense in standing or sitting?
- Did you sense more of your right occlusion with the left shoe off in standing? Was this the same in sitting with the left shoe off? Why or why not?
- How do you think this affects your patients during their normal daily life?



Take Pictures- 5 minutes with a partner

We will be using these tomorrow in our small groups

Email to golfingmatt82@gmail.com

Face on

Both sides

Face away

Face/neck/shoulder only

Make sure to put hair up

Find a picture frame, doorway, etc that references the horizontal and vertical

Adjusting the oral appliance

- In the Dental Chair

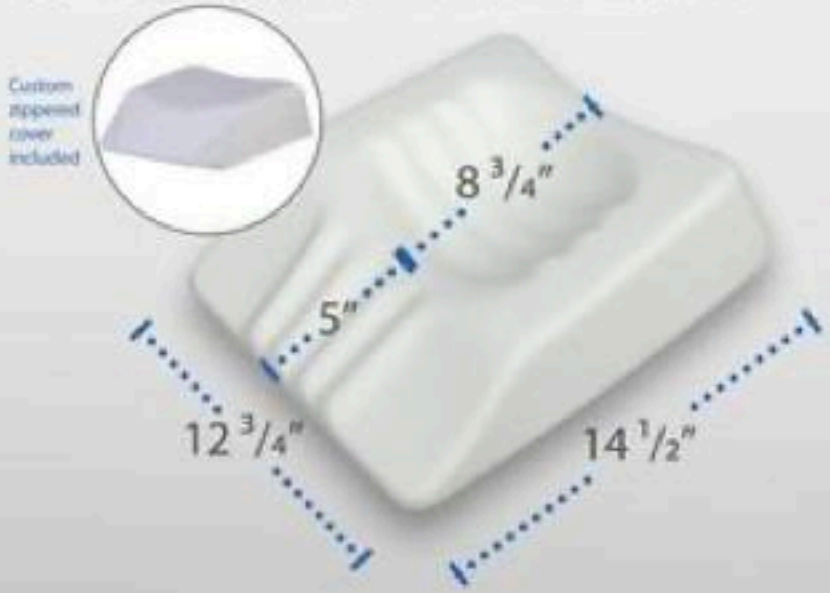
- 2 inch towel under mid neck for neutral 30 degrees of lordosis
- Bolster under knees to relax/flatten lower back

- Sensory check list:
  - 1. Left canines (disoccluded right occlusion)
  - 2. Left molars and cuspids only
  - 3. Right canines (disoccluded left occlusion)
  - 4. Right molars and cuspids only
  - 5. Anterior incisors only

Dental chair

THERAPEUTICA® TRAVEL SLEEPING PILLOW - AVERAGE SIZE

- Great for travel or home
- Helps restore the natural curve of the neck
- Helps reduce symptoms of neck pain and stiffness



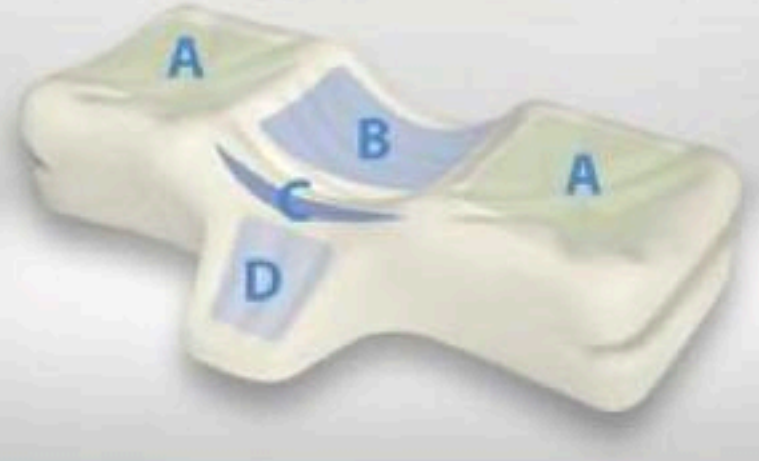
Bed pillow

THERAPEUTICA® SLEEPING PILLOW

Back Sleeping: Gently lay head in the center cradle (B) with the neck supported by the cervical contour (C), and the upper back supported by the wedge extension (D).

Side Sleeping: Use the raised side panel to gently lay head into contoured head rest (A), to accommodate for shoulder height.

IMPORTANT: Use fitting guide to determine proper pillow size.



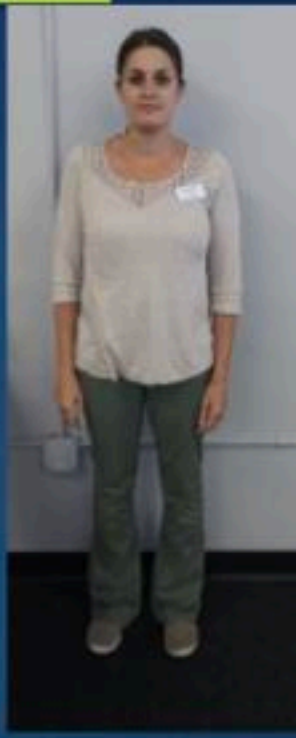
Does the appliance still feel the same when the person is sitting? Standing? What do you check in these pos

Sitting- Heels, Sit bones, Molars (1st rule of occlusion)

- Knees at or slightly above hip level "sensing" feet flat and heels on the floor. May need a block under their feet.
- Sense "sit bones" in the chair and the mid to lower back against the back of the chair.
- Ideally the ribs should be down in the front, not up in "military posture" to improve diaphragmatic breathing
- Sense molars as a reference for resting cranial positioning

Standing

- **"Provoked manipulated occlusion positions led to directly measured deviations of the spine position during standing and walking."**
  - Ohlendorf D, Seebach K, et al. The effects of a temporarily manipulated dental occlusion on the position of the spine: a comparison during standing and walking. Spine J. 2014 Oct 1; 14(10):2384-91.
  - Do you check the splint in standing or sitting the same as in the dental chair?
  - How can splint therapy help affect a person's posture?



PRI "Standing Lateral Shift Unilateral Occlusal Test"

- Ask the patient to stand with their feet hip width apart and toes straight ahead
- Feet remain flat on the floor as you ask the patient to sense the ground under each foot
- Have them attempt to touch their posterior teeth together on one side
- Note if their body shifts to the same side, ask if the sense their weight of their body move over to the side they are trying to establish posterior occlusion on
- They should sense their unilateral posterior occlusion, sense their weight shift to that side and you see their center of mass shift to the same side
- All 3 things must occur to be a "negative" test

Lecture 2: Neurology, Respiration and Integration Concepts

- MATTHEW STENSRUD, DPT
- KANSAS CITY STRENGTH AND CONDITIONING
- OLATHE, KANSAS
- GOLFINGMATT82@GMAIL.COM

Postural Restoration Institute®

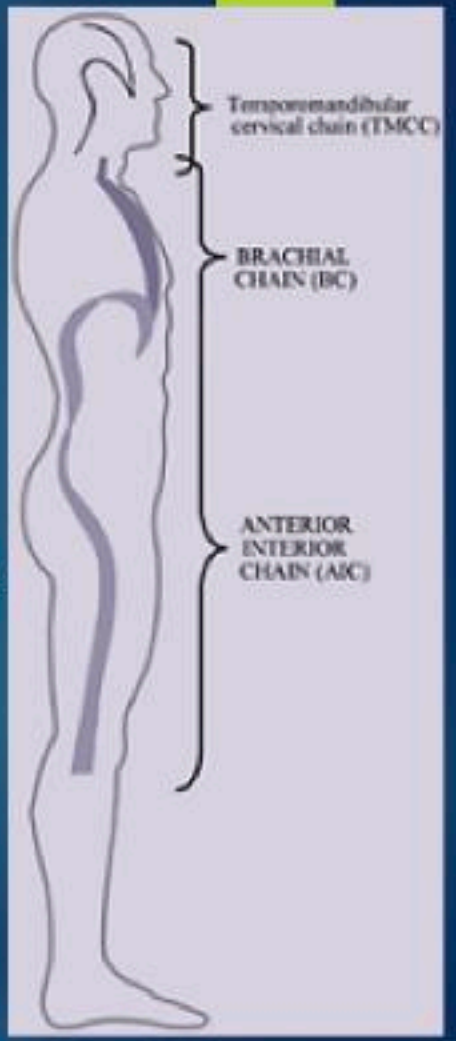
PRI Mission (www.posturalrestoration.com)

PRI'S MISSION

- The Postural Restoration Institute® (PRI) was established to explore and explain the science of postural adaptations, asymmetrical patterns and the influence of polyarticular chains of muscles. Our mission is based on the development of an innovative treatment that addresses the primary contributions of postural kinematic movement dysfunction.
- We are committed to the ongoing search for improved pathways of physical medicine. PRI creates resources, educational opportunities, patient-care programs and research to assist those who wish to maximize their knowledge and skill in respiration, myokinematics, neuromuscular applications and postural imbalances.

Basic Concepts of PRI

- The human body is not symmetrical
- The human body is balanced through the integration of system imbalances
- This system asymmetry is a good thing and an amazing design
- The neurological, respiratory, circulatory, muscular and vision systems are not the same on the left side of the body as they are on the right, and vice versa
- Examples of imbalances
  - Torso is balanced with the liver on the R and the heart on the L
  - Extremities are balanced through reciprocal function (R arm with L leg)

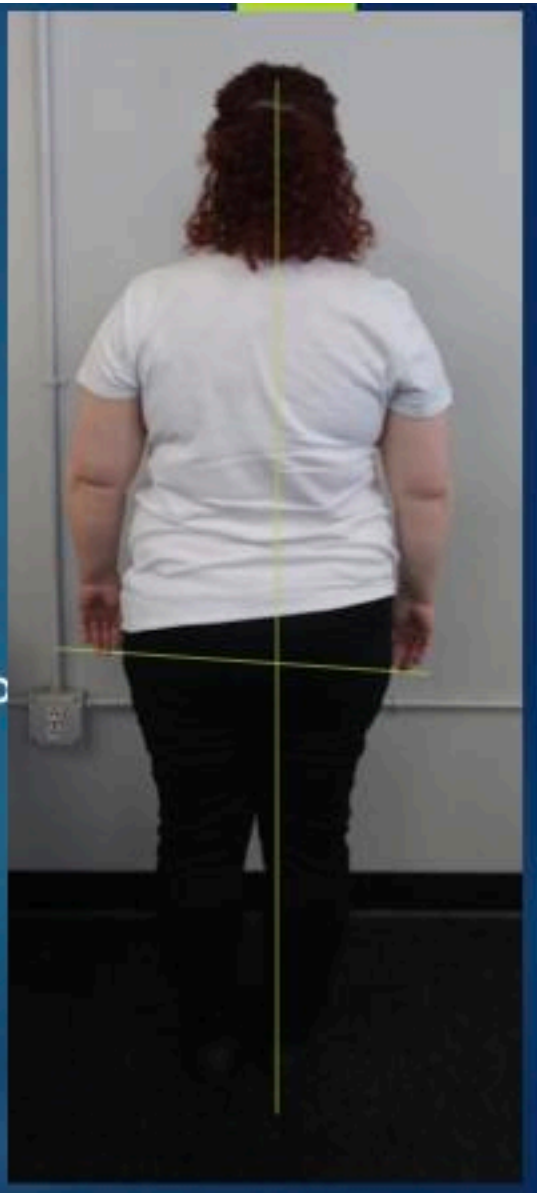


When are these imbalances a problem?

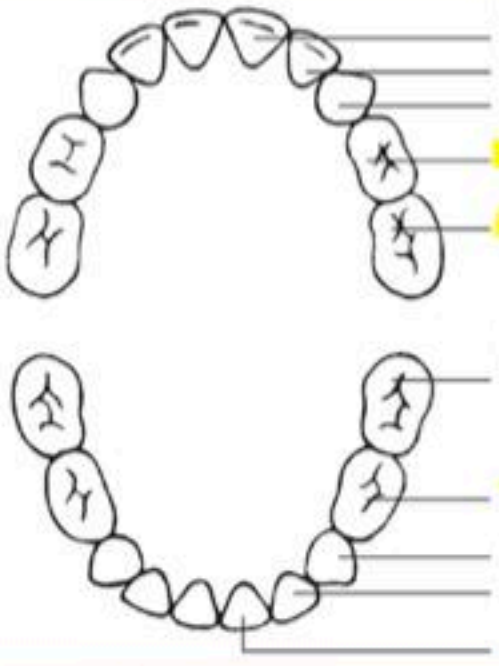
- Dominant overuse
  - (PRI) professionals recognize these imbalances and typical patterns associated with system disuse or weakness that develops because of dominant overuse
  - Example would be a roofer constantly hammering with his R arm,
  - Or a dentist always using their R arm when working with patients
- Vision, occupational demands, in-uterine position, etc. can all influence asymmetrical tendencies and patterns.

Neurology/Development

- The right and left sides of the brain have specialty functions
- These functions are complimented by the asymmetries of the body below the brain
  - Humans like to stand on their R leg to offset the heavier L upper torso
    - How does this affect our occlusal sense?
  - This moves the pelvis forward on the left and the shoulder down o the right
- Left side of the brain
  - More responsible for speech and language
  - Right upper extremity becomes a dominant extremity in communication, growth and development
  - 90% of people are R handed for a reason



Neurology/Development



Upper Teeth	Erupt	Shed
Central incisor	8-12 mos.	6-7 yrs.
Lateral incisor	9-13 mos.	7-8 yrs.
Canine (cuspid)	16-22 mos.	10-12 yrs.
[redacted]		9-11 yrs.
[redacted]		10-12 yrs.

Lower Teeth	Erupt	Shed
[redacted]		10-12 yrs.
[redacted]		9-11 yrs.
Canine (cuspid)	17-23 mos.	9-12 yrs.
Lateral incisor	10-16 mos.	7-8 yrs.
Central incisor	6-10 mos.	6-7 yrs.

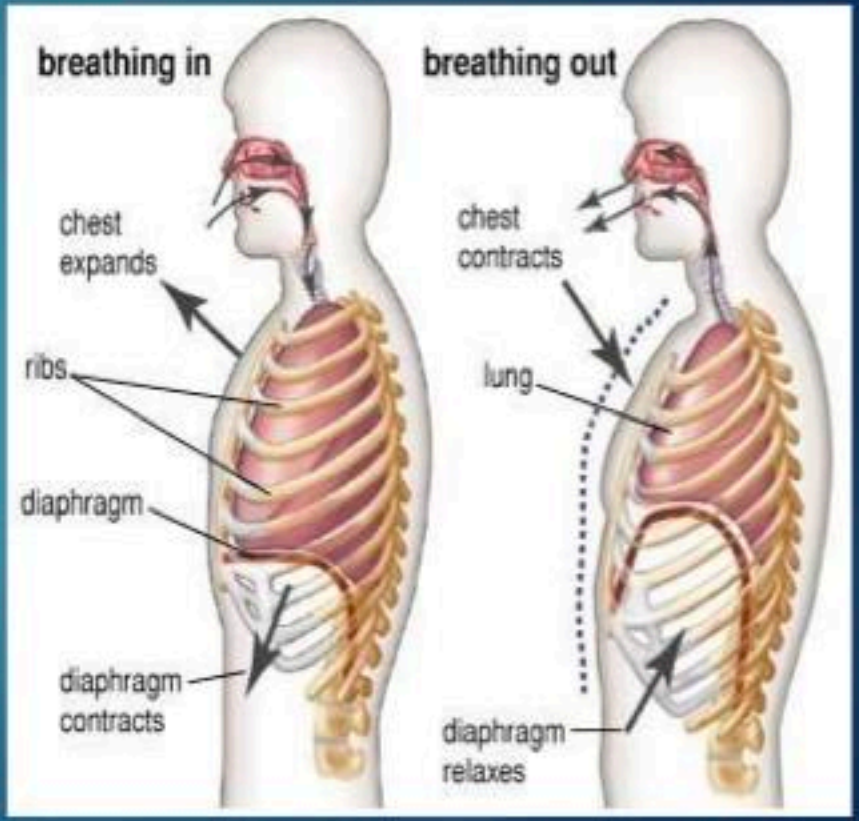
Normal motor milestones	
Sit without support	6 to 8 months
Creep on hands and knees	9 to 11 months
Cruise or bottom shuffle	11 to 12 months
Walk independently	12 to 14 months
Climb up stairs on hands and knees	15 months
Run stiffly	16 months
[redacted]	
[redacted]	
Hop on one foot, broad jump	4 years
Skipping	5 years
Balance on one foot, 20 seconds	6 to 7 years

Neurology/Development

- It is important to know that our locomotive system incorporates teeth proprioceptive receptors for integrated feet (heel, arch, and toes) plantar oriented proprioception, when upright balance and orientation is challenged
- Our system learns to move and perform more single leg activities in and beyond our 3rd and 4th years of life after the eruption of the 2nd molars
- Study confirmed increased upright postural sway when masticatory malocclusion and disharmony occur
  - Ferrario VF, Sforza C, et al. Occlusion and center of foot pressure variation: is there a relationship? J Prosthet Dent. 1996 Sep; 76(3)302-308

Respiration- an imbalanced system

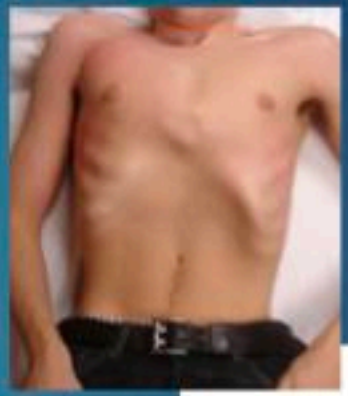
- The Diaphragm
  - Is made up two hemi-diaphragms
  - Is domed when it is relaxed and flattens out during inspiration
  - The L side is smaller and is placed at a disadvantage for respiration due to the heart on top flattening out the dome
  - The R side is larger and is always in a better position for respiration because the liver is below it helping give it structural support/dome

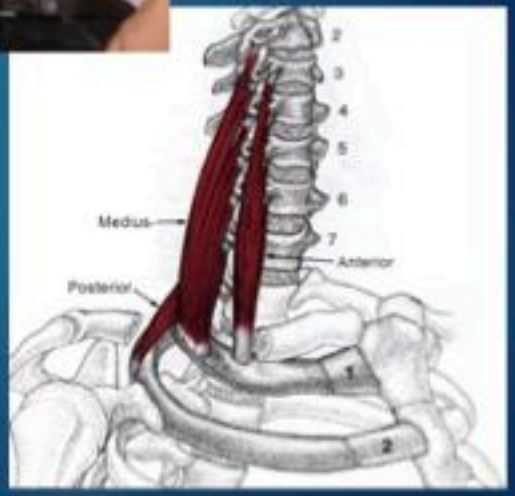


Respiration- an imbalanced system

- Asymmetry of diaphragm and torso creates more demand on cervical accessory muscles on the R to assist with filling of R apical chest wall
- This includes scalenes, pec minor, SCM, etc.
- When an individual is unable to keep balanced respiratory function this accessory overuse can lead to chronic torque on the spine

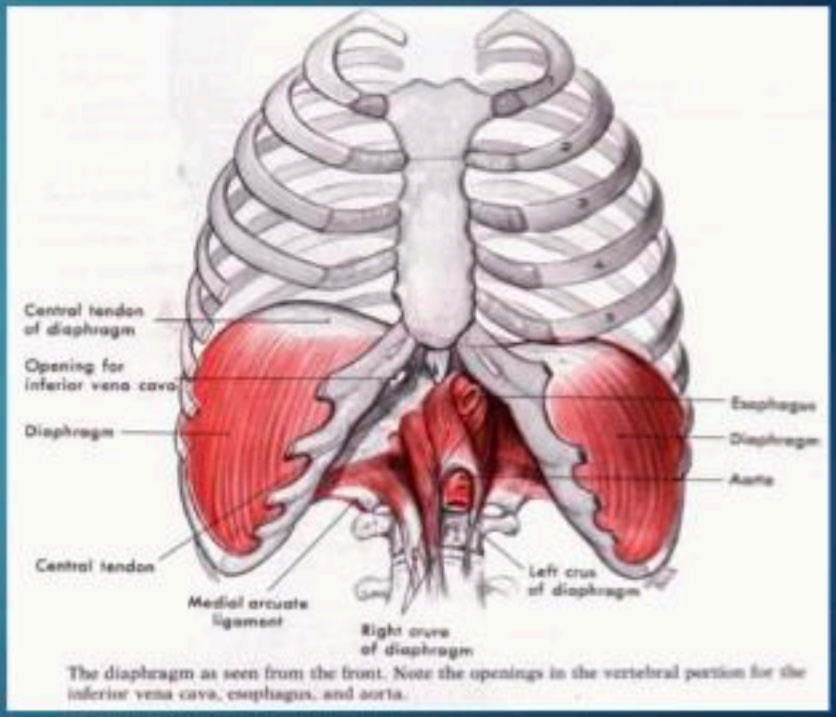
Do you think this can lead to malocclusion?





Respiration- an imbalanced system

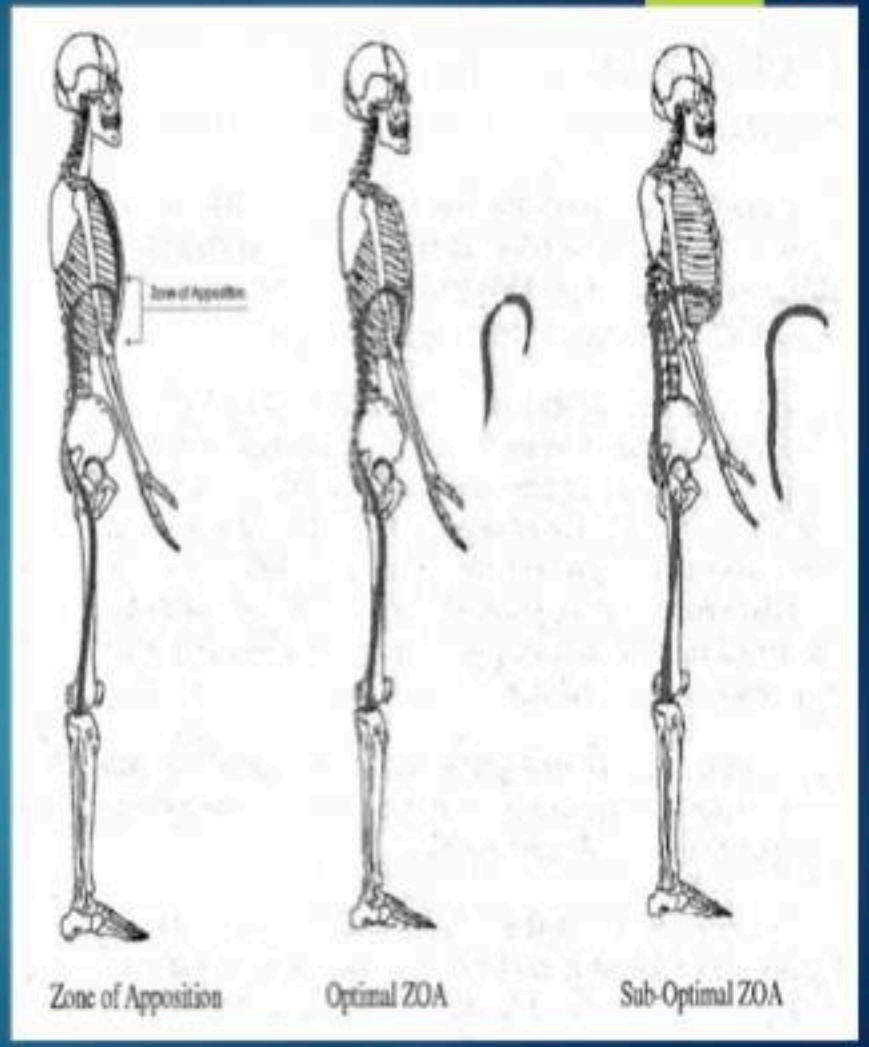
- Diaphragm/thorax continued
  - The heart helps keep the L chest wall open assisting the R diaphragm in filling the L lung
  - There are only 2 lobes of lung on the L because it is easier to fill
  - There are 3 lobes of lung on the R increasing alveoli to address the more challenged expansion of the R chest wall



The diaphragm as seen from the front. Note the openings in the vertebral portion for the inferior vena cava, esophagus, and aorta.

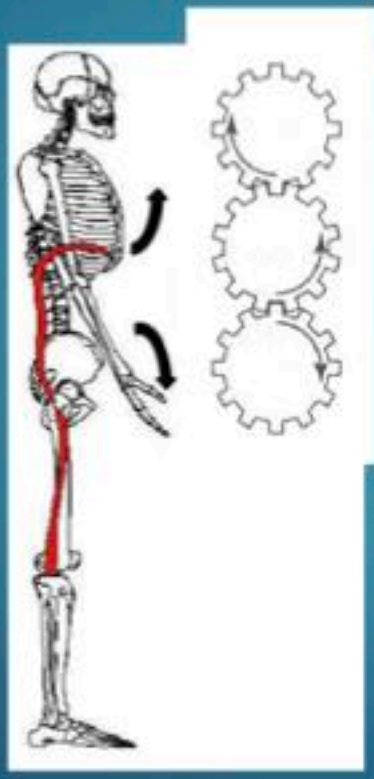
Respiration

- Zone of Apposition (ZOA)
  - Cylindrical area of the diaphragm that apposes the inner aspect of the lower mediastinal (chest) wall
  - During inspiration the diaphragm flattens and the ZOA is decreased
  - During expiration the diaphragm domes and the ZOA is increased
  - The ZOA is most influenced by the orientation of the ribs

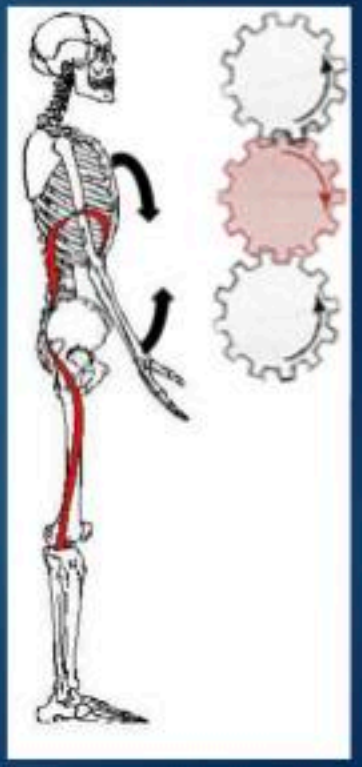


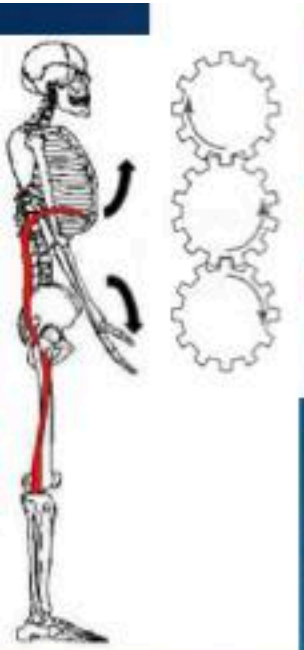
Respiration- related to FHP

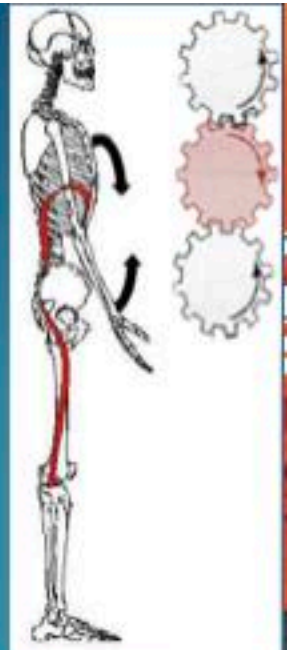
- Suboptimal ZOA
  - Individuals with anteriorly elevated and externally rotation ribs will have a decreased ZOA on one or both sides
  - This creates the need for accessory muscles of respiration since diaphragm is descended
- FHP



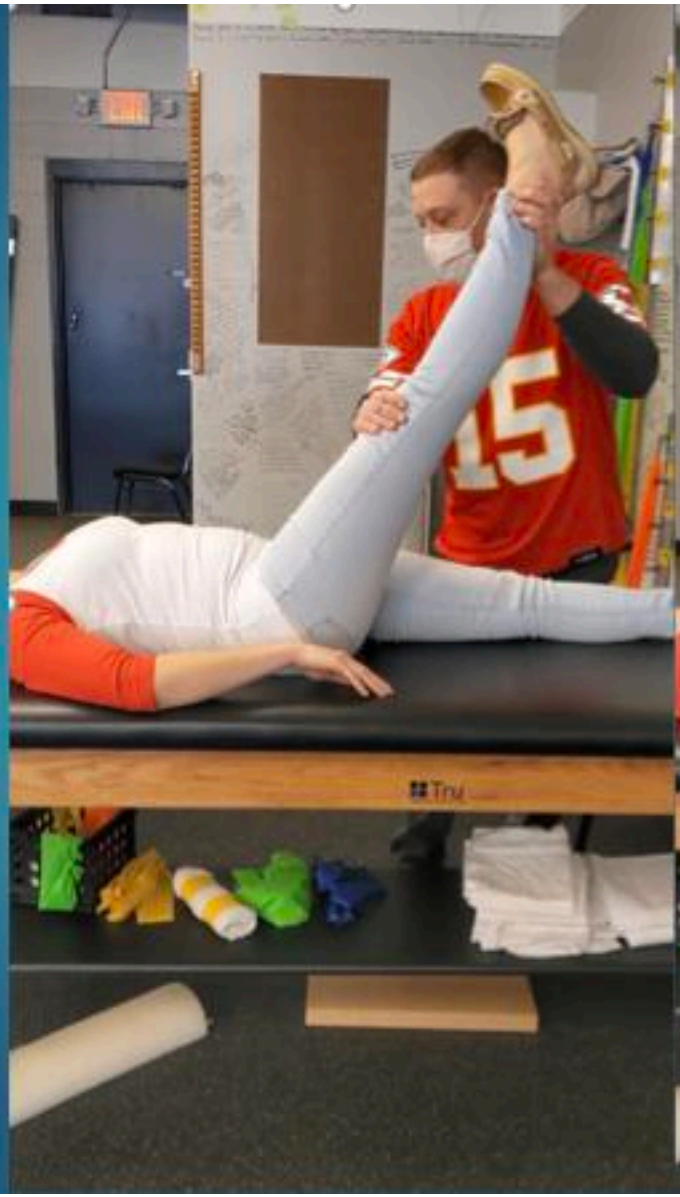
- Optimal ZOA
  - Ribs are held down in internal rotation by good resting abdominal and oblique tone
  - This allows for good diaphragmatic opposition for respiration
- Neutral head position





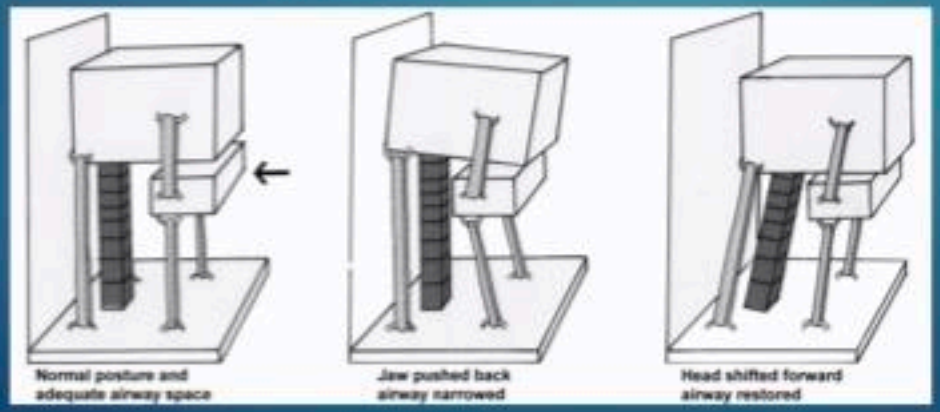


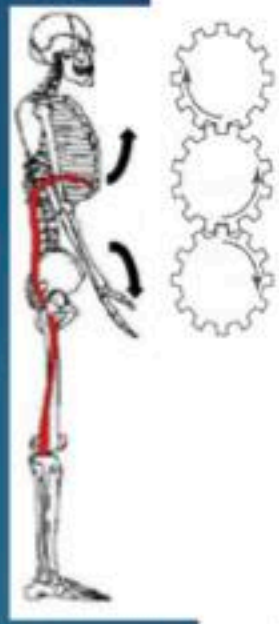
- A more forward pelvis puts tension on the hamstrings (Left pic)
- A neutral pelvis allows for 80-90 degrees of straight leg raise (right pic)
- **This demonstrates that the mouthguard is reducing her anterior neck and anterior pelvic muscle tone.**

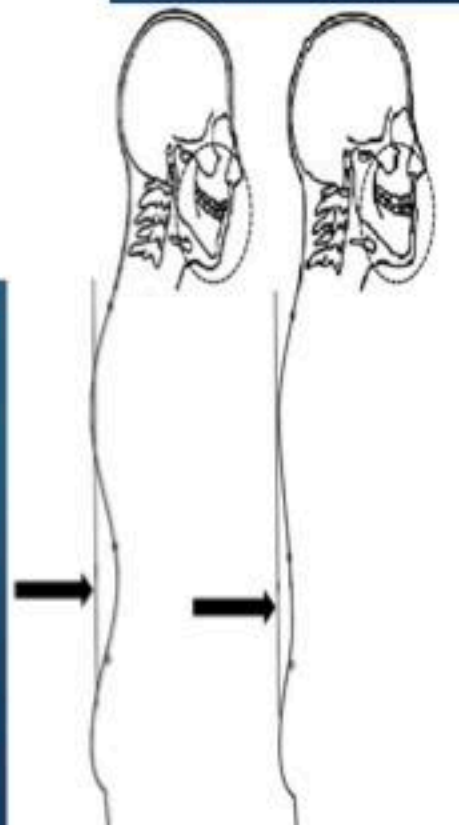


Breathing and TMD

- Most efficient muscular pattern of inspiration is through the use of the diaphragm, with assistance of the intercostals and opposition from the abdominals.
- If this is compromised an individual is apt to mouth breathing which may lead to malpositioning of the jaw and other oral structures.
- Nasal obstruction is directly related to FHP

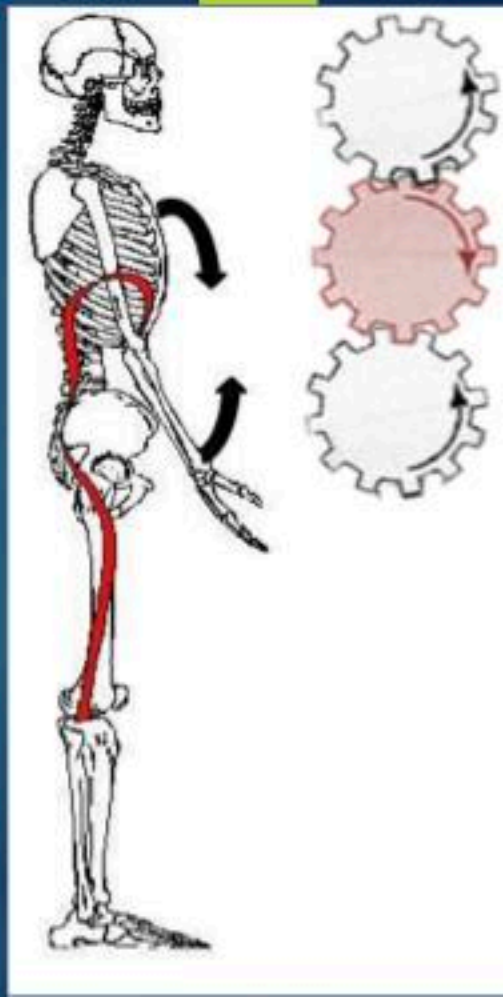






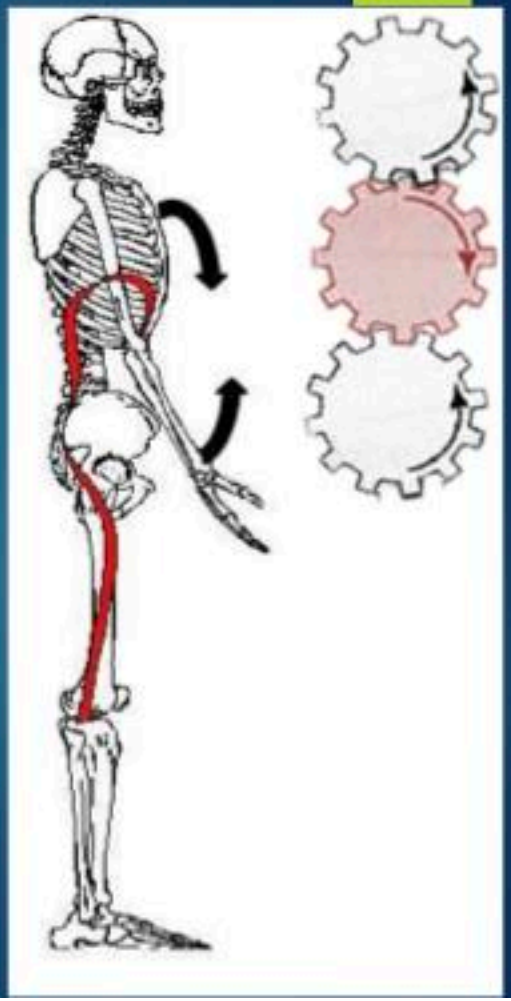
Autonomics- related to breathing and posture

- Sympathetics- Fight or Flight
  - Thoracolumbar spine
  - Compression/activation through extension of the spine "military posture"
  - Pain/distress increases the activity of this system
  - When in distress individuals will tense their neck and back
- Parasympathetics- Rest and Digest
  - Craniosacral spine
  - Need thoracolumbar flexion with good breathing into the posterior mediastinum to inhibit the sympathetic nervous system
  - The restoration of normal thoracic kyphosis allows for reduced anterior neck accessory use during breathing and thus FHP



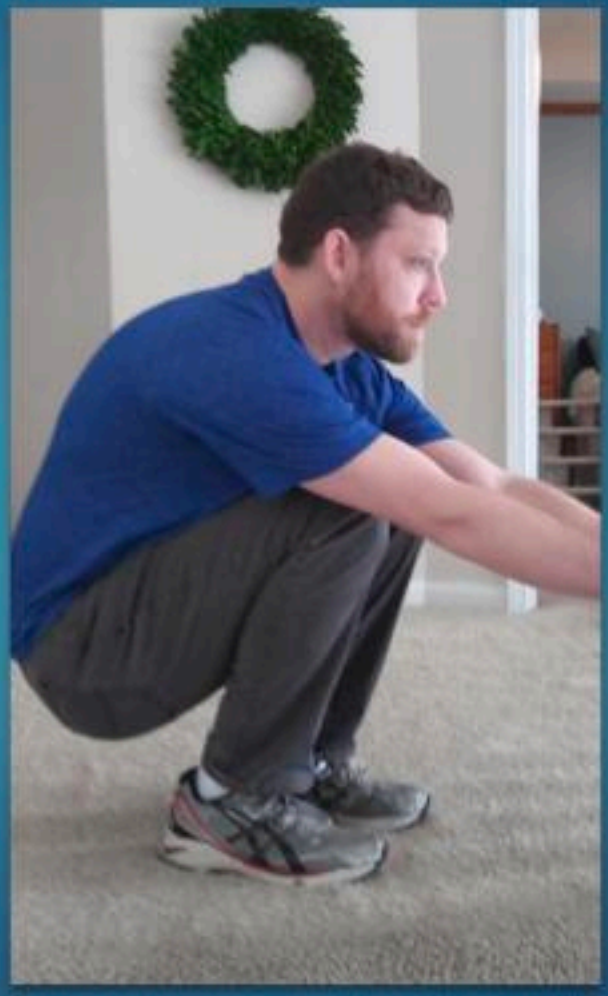
Autonomics

- Reducing Sympathetic activity
  - Treatment consists of thoracolumbar flexion activities to decompress the symphathetic ganglia
  - Diaphragmatic breathing with posterior mediastinum expansion examples:
    - Squatting with a rounded spine
    - blowing up balloons in flexion
    - Wall Press
    - All Four Rounding

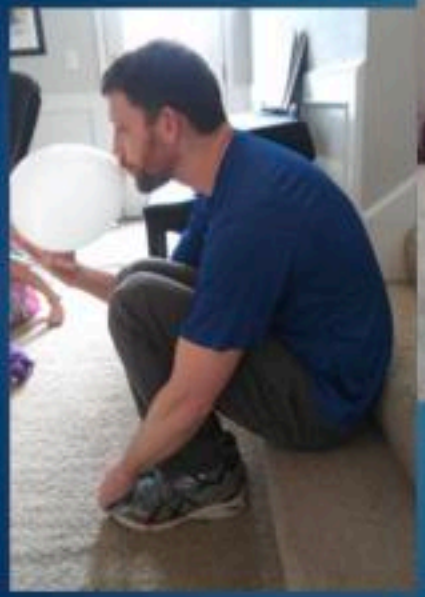


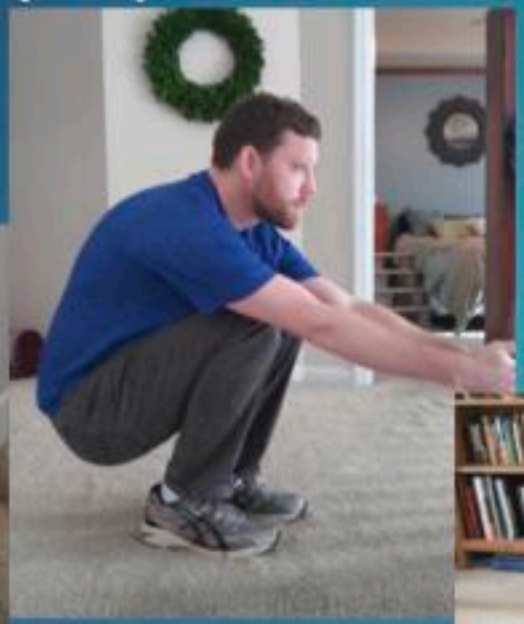
Easy Assessments to determine heel sense with flexion of the spine

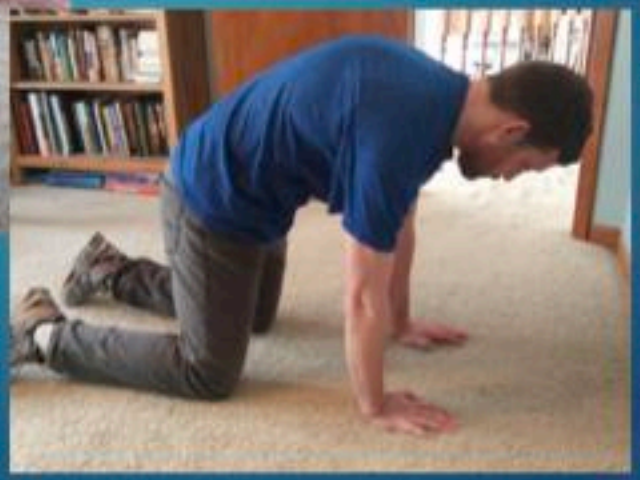
- Toe Touch and Full Deep Squat
- Sense bilateral heels, posterior occlusion, inhalation to back



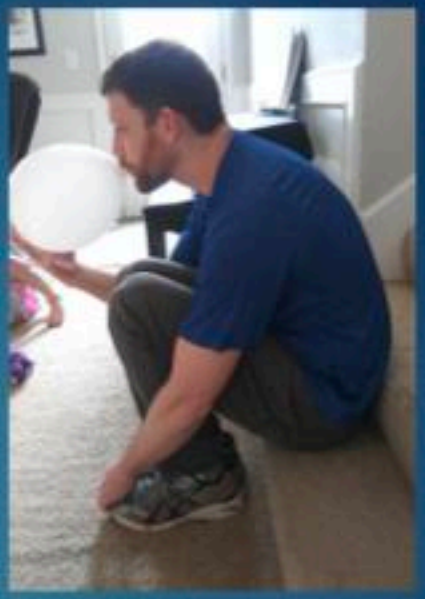
Exercise Examples for Thoracolumbar Flexion/Sympathetic Inhibition:







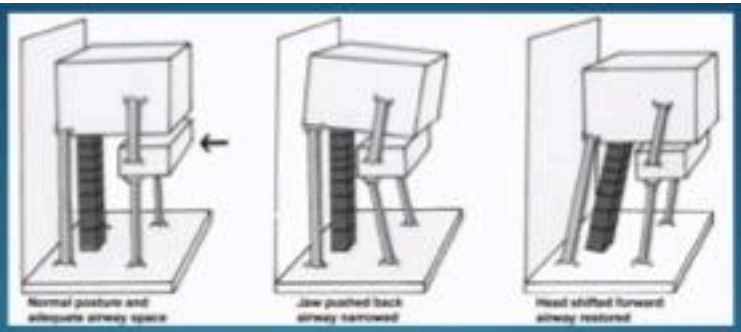
Exercises- Practice

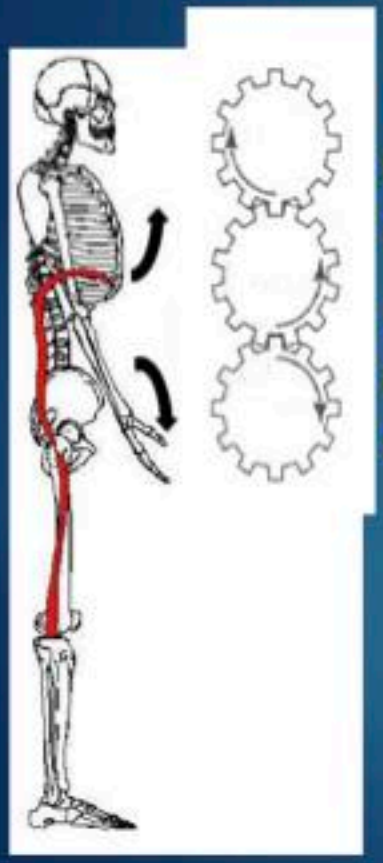


- Wall Press- hands on table
- Seated balloon
- Pre and post test = Toe Touch

- We must exhale all air (out mouth) to fully engage abdominals that oppose diaphragm
- We are striving to maintain flexion of the thoracolumbar spine during inhalation while sensing air expand to our posterior chest wall (PRESS)
- These exercises improve orientation of the cranium and neck by reducing anterior neck tension that is associated with accessory breathing- Reduces FHP

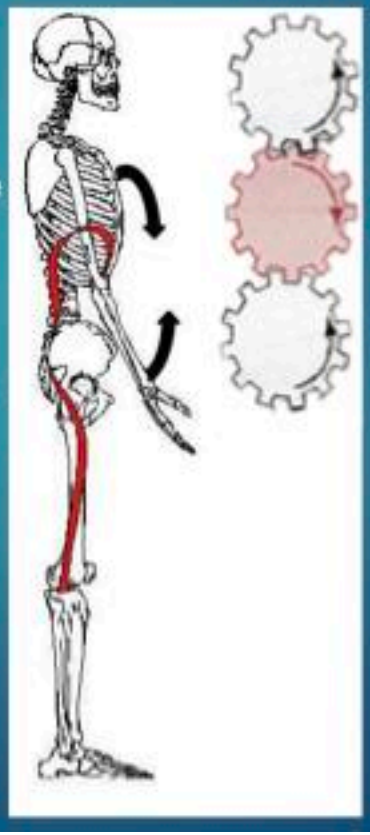
Airway





FHP (Protracted)

- Elevated ribs anteriorly
- Flattened mid cervical spine
- Mandible retracts
- Hyoid muscle hyperactivity
- Teeth positioned to contact anteriorly (see middle pic)

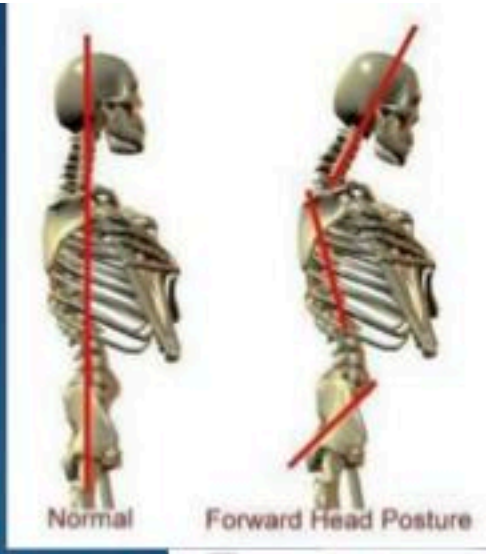


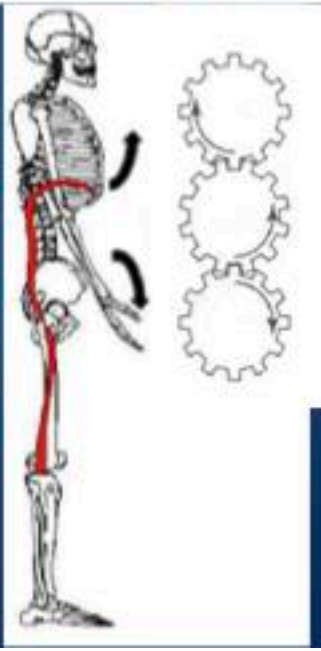
Neutral Head (Retracted)

- Proper abdominal opposition
- Neutral 30 degrees lordosis
- Mandible protrudes
- Anterior neck tone reduces
- Teeth positioned to contact evenly (see first pic)
- Maintains sense of posterior occlusion

The Knee and the Neck Relationship

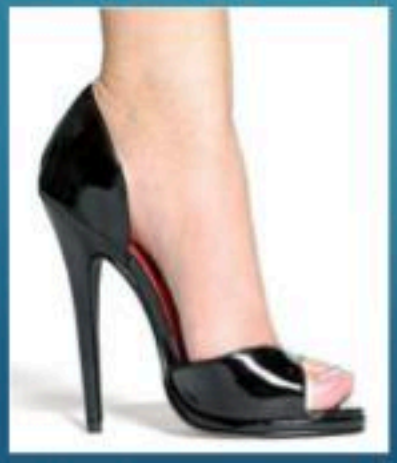
- Hyperextension of the knees leads to FHP
  - Pulls the pelvis forward and weight to toes
  - Causes extension of the back
  - Activates anterior neck due to submaximal positioning of the diaphragm for respiration
- Knees need to move forward for heads to move back
  - Unlocking the knees allow for the pelvis to rotate back and sense heels
  - This reduces the need for thoracolumbar extension thus reducing spinal tone
  - The diaphragm is in a better position due to proper amount of thoracic flexion and reduces the need for the anterior neck to pull air in during normal inhalation





Shoe Considerations with TMD patients

- Heel, arch and big toe awareness is very important
  - Heel = molars, arch = canines, toes = incisors
- If a person is unable to sense these parts of their feet while walking, they are unable to swing and shift from side to side
- Remember, translation from side to side that is sensed at the feet should and will be sensed by the person's occlusion



Shoes

- See PRI shoe list
- Goal for shoes is to allow for neutrality at the pelvis, trunk and neck
- Good test
  - Stand with the right foot behind the left and shift weight over the right foot; right arm is forward, left arm back (mimic gait position)
  - Sense the R heel, arch and big toe in the shoe
  - Attempt to lift the left foot and balance continuing to sense these three areas of the foot
  - Repeat on the left side

When to use an ancillary health professional as an adjunct to dental intervention

Physical Therapist
Massage Therapist
Chiropractor
Cranio/sacral practitioner
Atlas Orthoganist
Movement Therapist

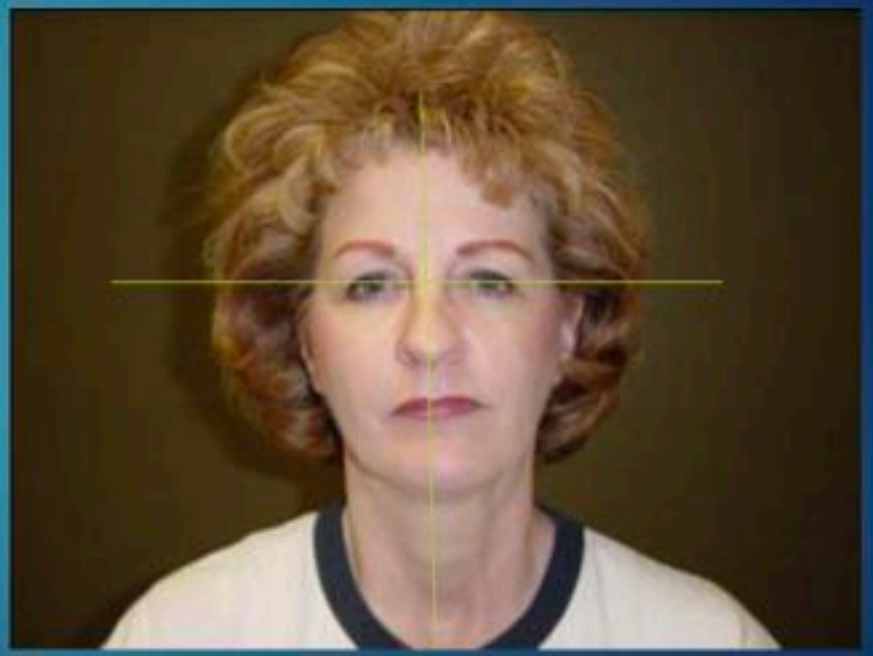
Daytime clenchers

Neck or back trauma or pain that predates the TMD

Obvious posture abnormalities

Muscular tenderness that does not respond to appliance therapy

Facial asymmetries



Headaches that do not respond to appliance therapy

How to find a practitioner

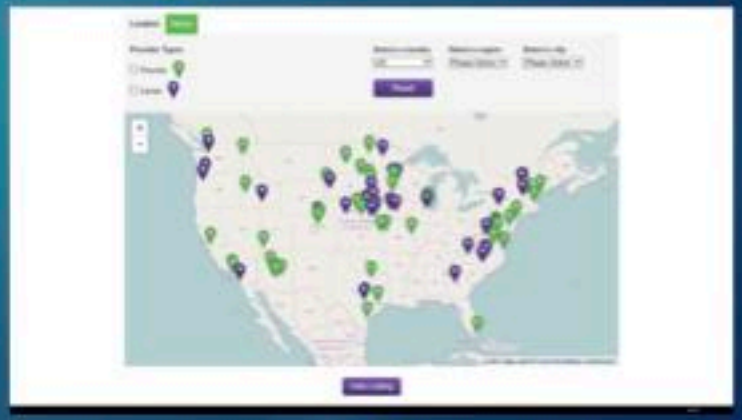
Ask your patient

consider adding to your intake info

www.apta.org

For the Public / Find a PT

www.posturalrestoration.com



What to ask…

- What is your specialty area?
- What special training have you had?
- How do you treat patients with TMD / facial pain?
- How do you accomplish cranial alignment and appropriate sphenoid positioning?

How to coordinate treatments


It's QUESTION TIME!!


THANK YOU