

The Curve of Spee

Hyoid Connection

from TMJ Disease

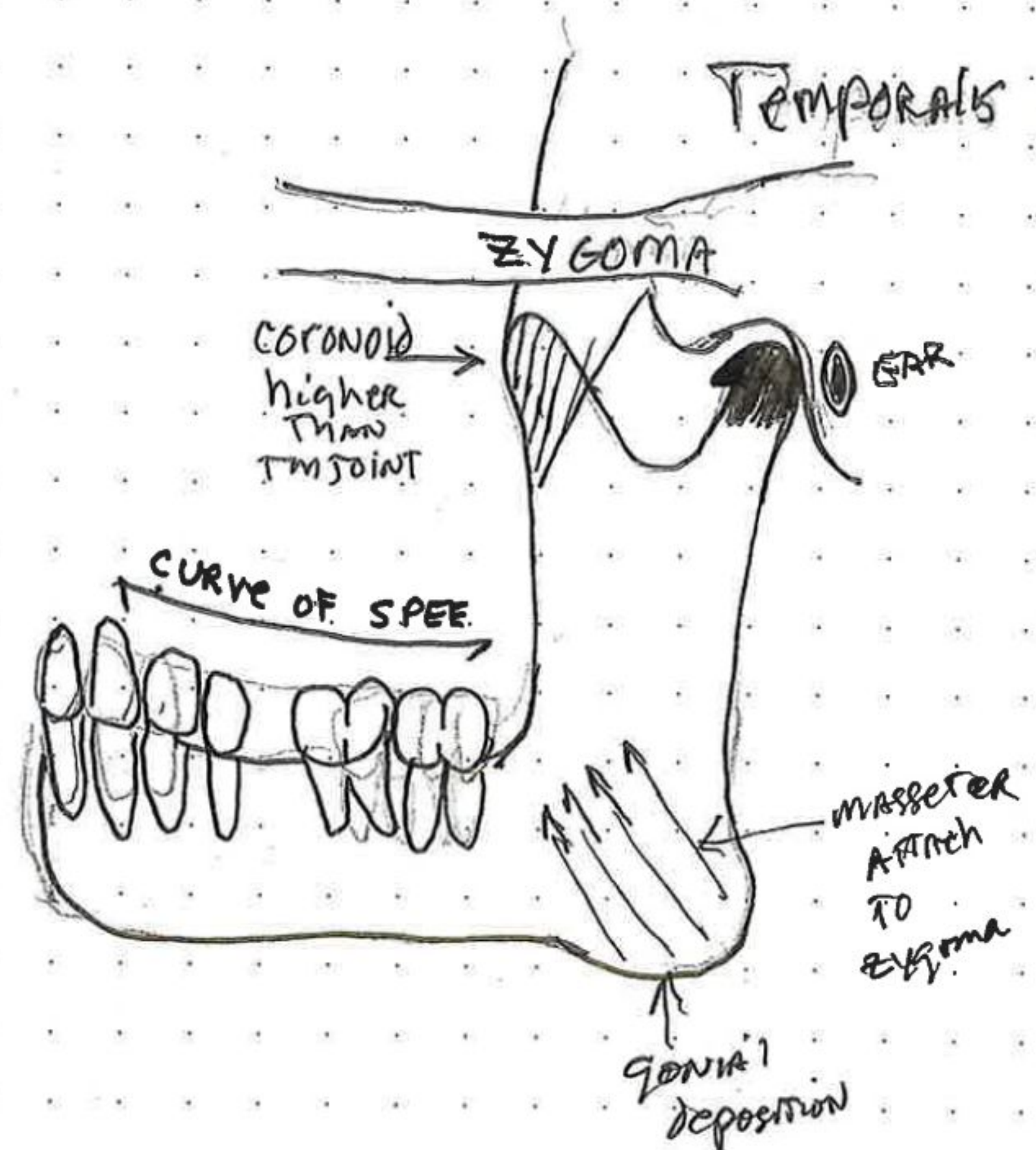
- Anterior teeth higher than posterior teeth - **taught** in dental school. Consequences of this - why - Curve of spee is pathology
- Anterior teeth NOT super erupted.
- Intrusion of posterior teeth due to clenching-
- Shortened muscle attachments - dysfunctional -
- Masseter "bails out" - no recruitment on EMGs
- Addition of cotton rolls on posterior teeth

Curve of Spee: Why?



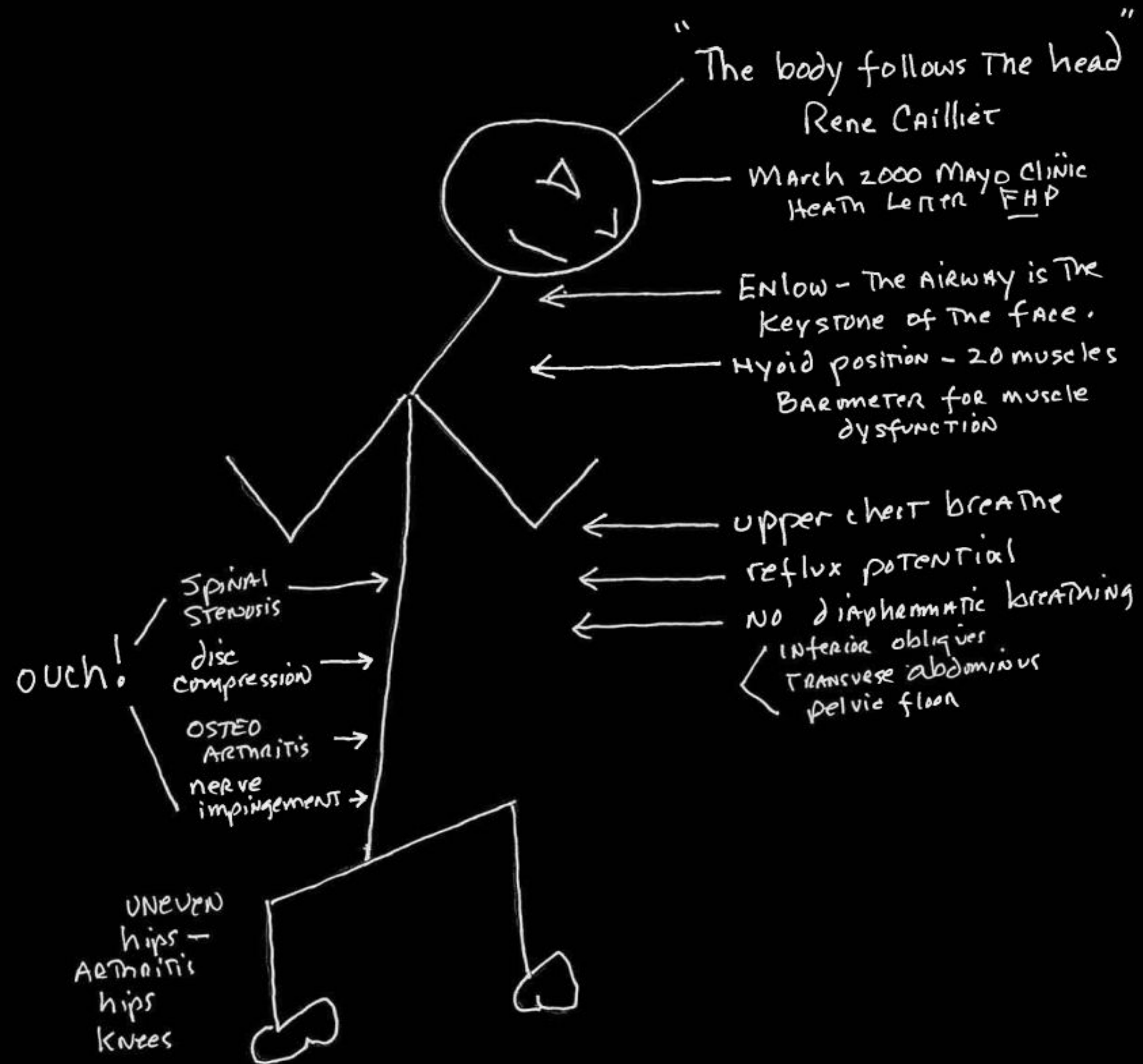


Anatomy of Curve of Spee Jaw Relation



The affect of forward head posture:

With Curve of Spee



Muscle Connection

- Primary closure muscles TMJ/temporalis NOT in harmony. Cannot recruit for bite force/swallow/breathing 5000x/day [form follows (dys)function]
- Vertical Dimension compromise creates dysfunctional muscle and changes bone.
- Mandible-gonial deposition bilateral (masseter attachment)
- Coronoid hyperplasia attenuation- temporalis imbalance coronoid higher than the
- TMJoint capsule.
- Posterior superior condylar position in fossae

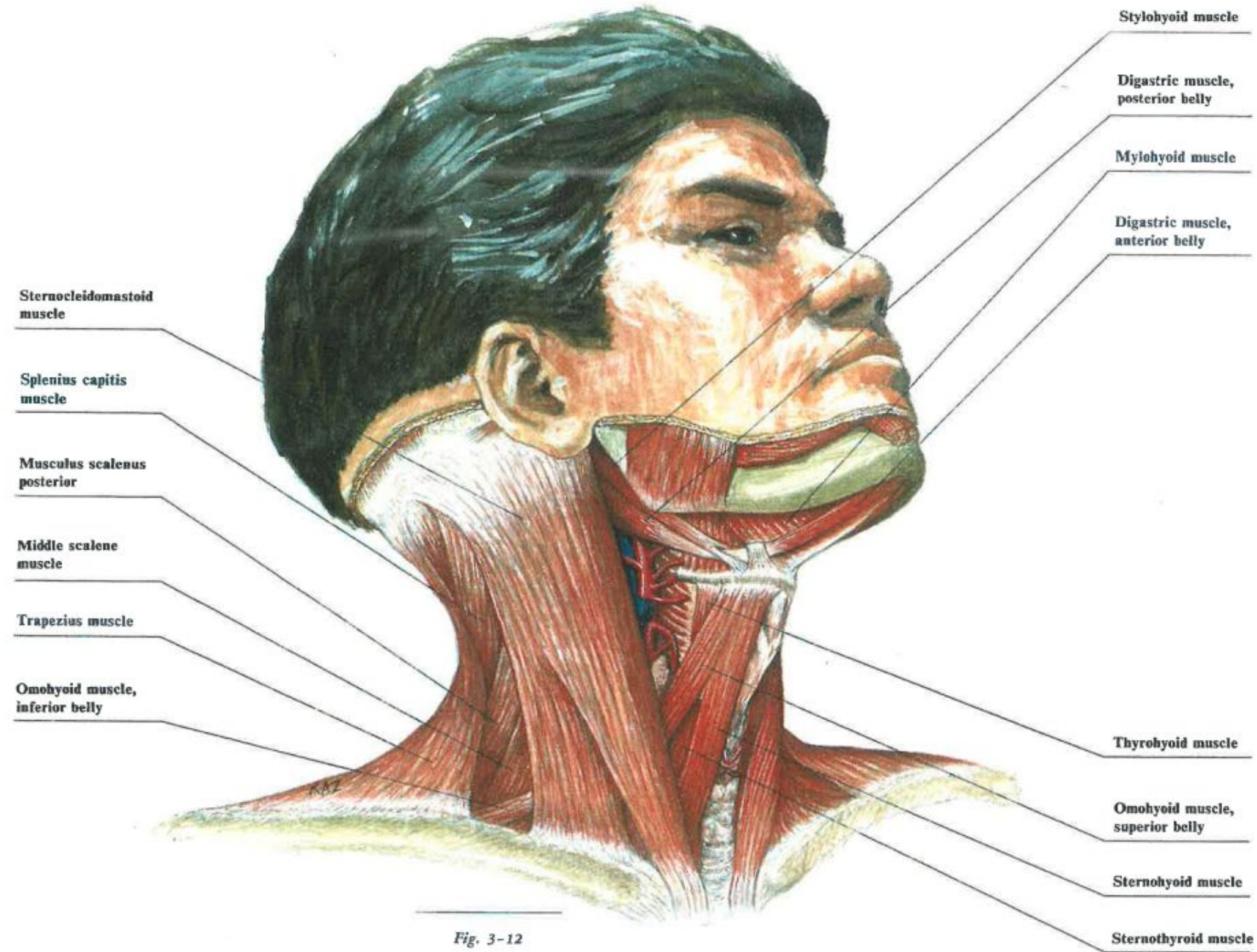


Fig. 3-12

The Hyoid

Ronald C Avvenshine DDS, PHD

Nathan J. Pettit DMD MSD

- RELAX
- RELAXATION
- RESTING
- RELAXED
- RELAXATION
- GOAL

"Change in hyoid bone position in patients treated for and resolved of myofascial pain."

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Pg. 83-84 "Perhaps as muscles in the throat RELAX, head posture corrects itself because it no longer must compensate for reduced airway."

Pg. 84 "This change in hyoid position suggests a RELAXATION of supra hyoid musculature, tongue position, and coincident change in oropharyngeal and airway dimensions. Position of the tongue has been suggested as more important in airway size than the size of the soft palate . "

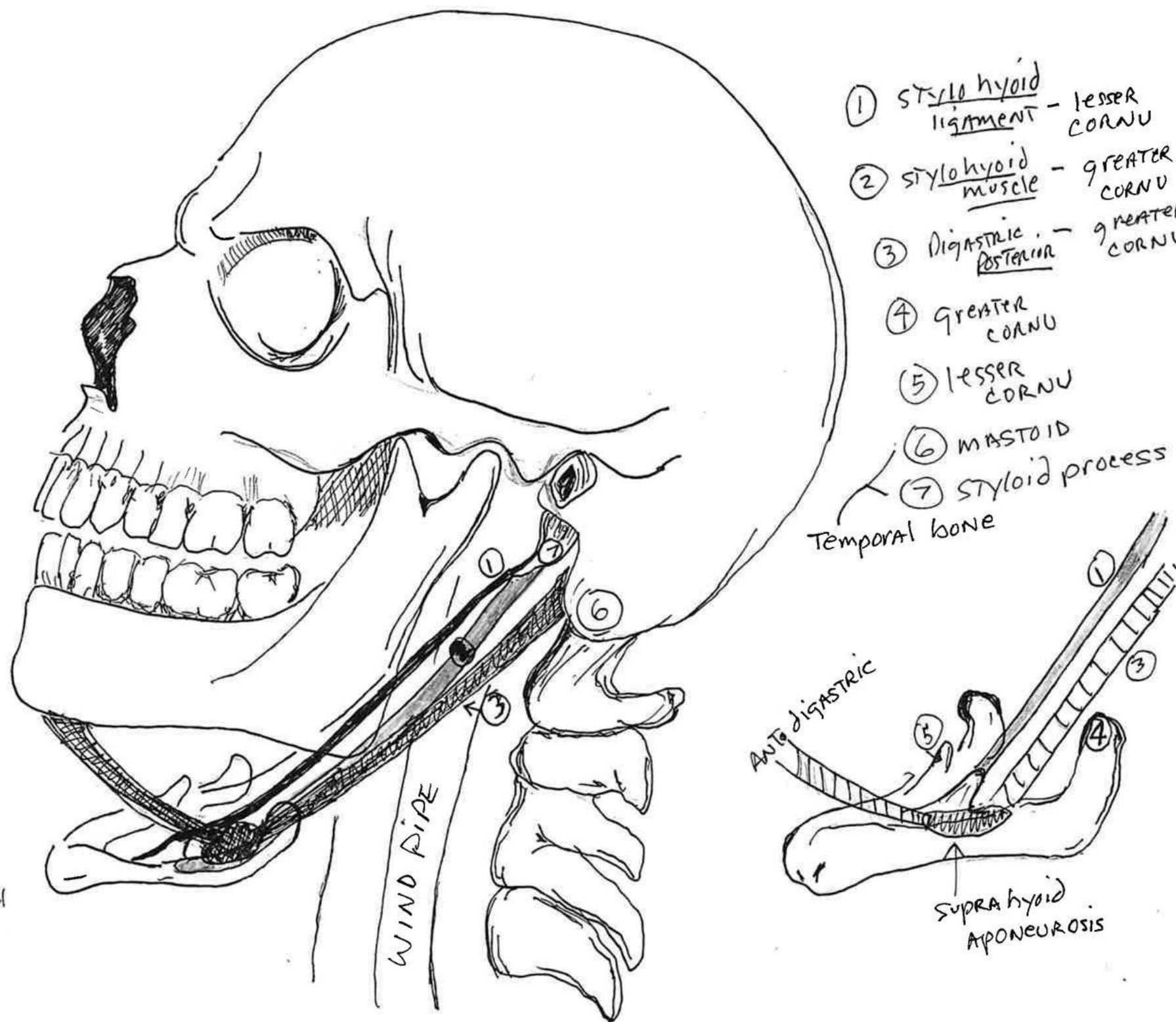
Pg. 84-85 "One of the authors interests for future investigation is the effect this change in RESTING hyoid position may have on airway dimension. The hyoid bone and its posture have been related to the stabilization and maintenance of the airway. The airway is dependent upon soft tissue volumes and the bony confinements that determine its dimension. The hyoid serves as a prop to maintain a patent airway, providing an attachment for the muscles of the anterior neck. Hyoid bone position has also been related to OSA"

*Pg 85 "Upward positioning of the hyoid bone has been related to a significant reduction in posterior lingual airspace. The possibility of a RELAXED suprahyoid complex in the resolved myofascial pain patient and affiliated opening of the airway space is evident."

*Pg 86 "These finding suggest **that** resolution of myofascial pain may correlate with decreased forward head posture AND RELAXATION of suprahyoid musculature.

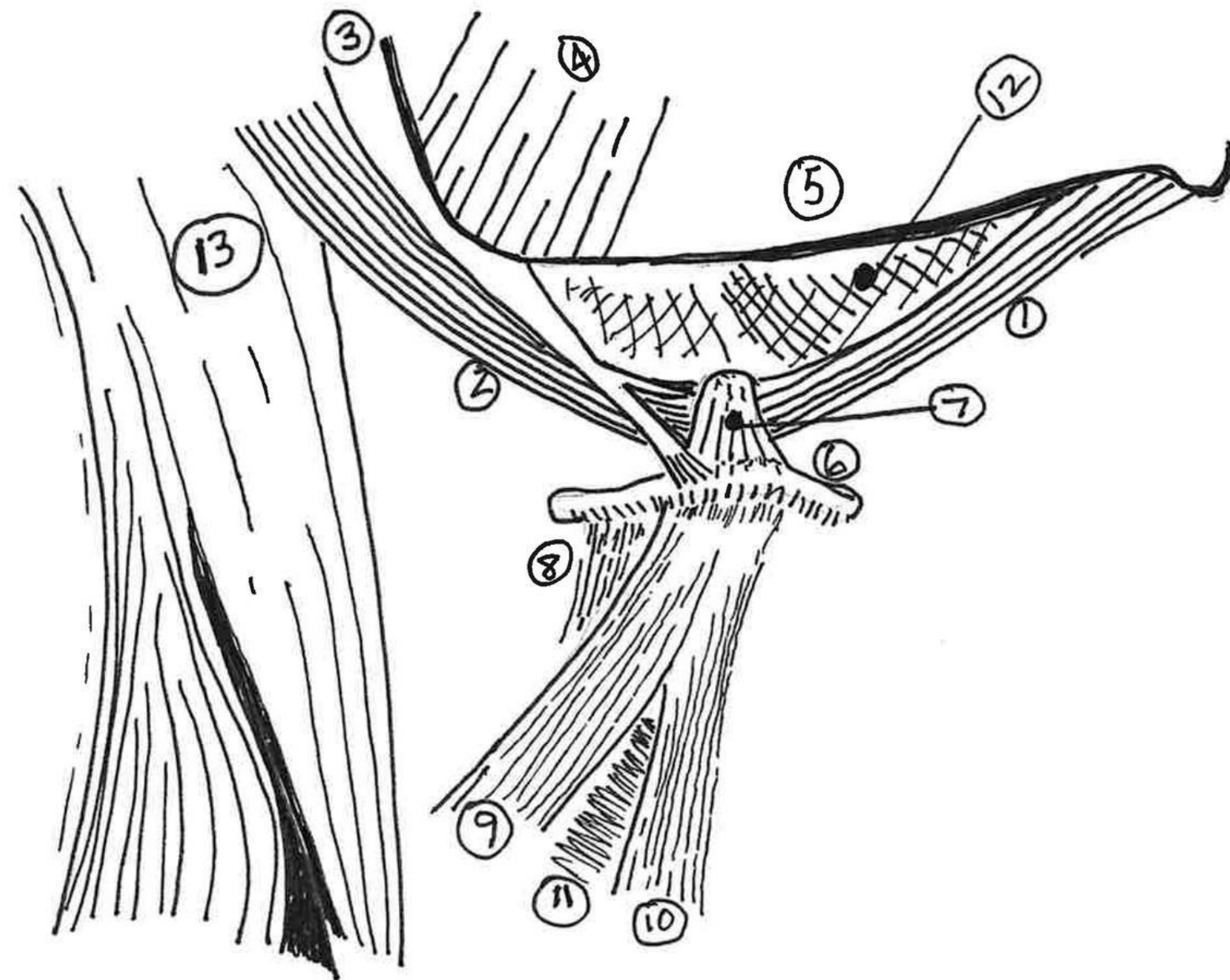
GOAL: When treating TMJ/ Sleep Apnea/Breathing/Swallow establish a neuromuscular functional environment for the supra/intra hyoid musculature

• The Hyoid Bone



- 20 muscles insert into the hyoid bone.
- The hyoid bone is responsible for airway and posture due to the outer flanges and central positioning of the bone in the throat.

• The Hyoid Bone



- ① Anterior belly digastric
- ② posterior belly digastric
- ③ Stylohyoid muscle
- ④ MASSETER
- ⑤ MANDIBLE
- ⑥ Hyoid bone
- ⑦ supra hyoid. APONEUROSIS
- ⑧ Thyroid
- ⑨ omohyoid superior belly
- ⑩ STERNOHYOID
- ⑪ STERNOTHYROID
- ⑫ mylohyoid
- ⑬ STERNOCLEIDOMASTOID

- There are only 2 muscles from the skull that insert into the hyoid bone.
 - Posterior digastric
 - Stylohyoid muscle
- They form an aponeurosis on the greater cornu of the hyoid (spot weld).
- The head become a lever associated with bad or good posture and (dys)functional bite.

Muscles Affecting Hyoid Position

Hyoid Bones

“It is at the level of the fourth cervical vertebrae and its greater cornu extends back on a level with the angle of the mandible”

- Pg 57 Grays Anatomy

Brings Greater Cornu up and back

Posterior Digastric

Stylohyoid

Anterior Digastric

Hyoid

Supra Hyoid Aponeurosis

Brings hyoid forward but downward as well

- Stylohyoid muscle perforated by the posterior digastric on the greater cornu of the hyoid.
- “The two bellies end in an **INTERACTIVE TENSION** which **PERFORATES** the stylohyoideous muscle and is held in connection with the side of the body

**Optimization of
bite and posture
optimizes airway
and diaphragmatic
breathing**

• The Hyoid - Liz



Case Studies

Curve of Spee Cervical Air Way Relationship



minibracket



155 orthotic



Teeth

Curve of Spee

After:
Neuromuscular Appliance

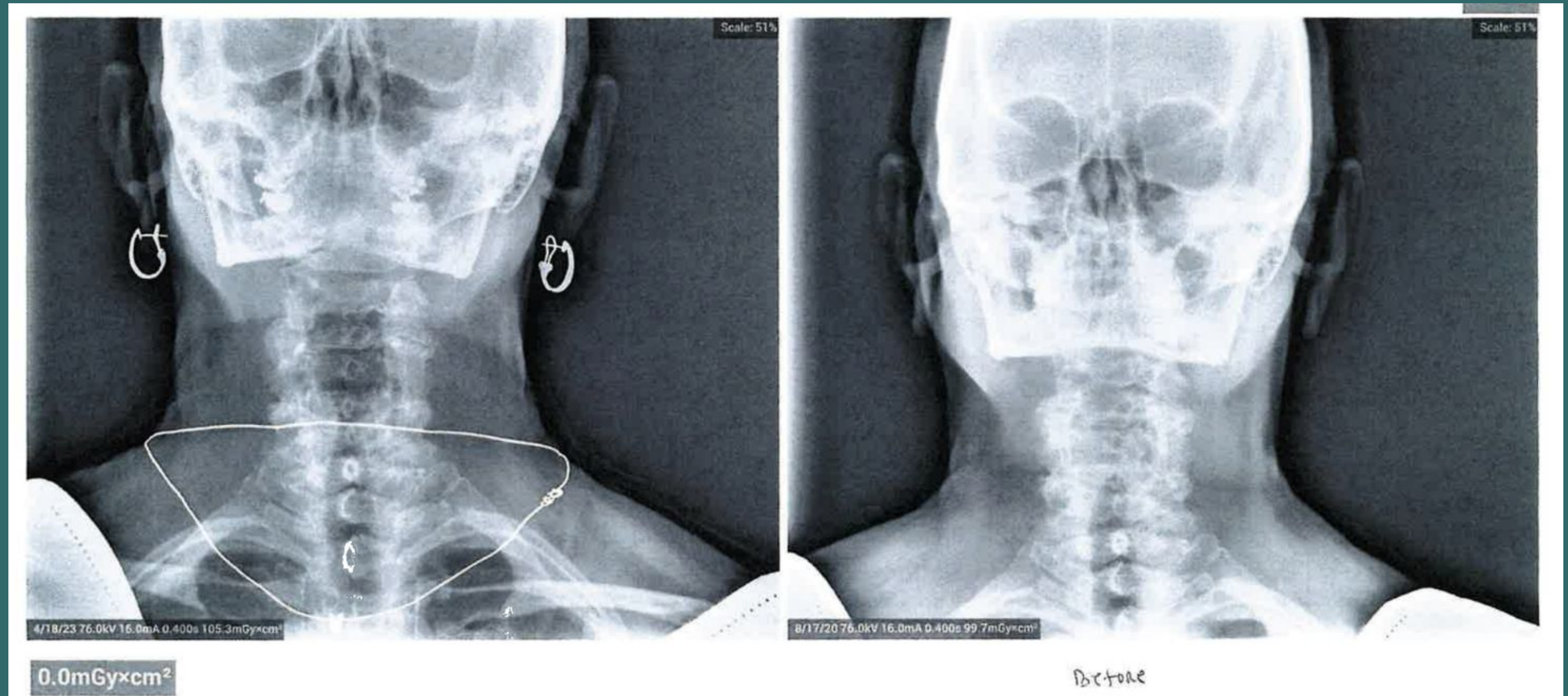
Before:
On Natural Teeth



• NM Therapy

After

Before



• Trigeminal Nerve Case Study



9/16/2021

5/18/2021

9/6/2018

5 Year Old Patient Case Study



Pre & Post Case Study Cervical Component

Orthotic 2

Orthotic 1

Before



OPTIMIZATION OF BITE AND POSTURE OPTIMIZES AIRWAY

*R. Cailliet

GOAL: When treating TMJ/Sleep Apnea/Breathing/Swallow establish a neuromuscular functional environment for the supra/intra hyoid musculature allowing the hyoid to establish a lordotic curve to the cervical spine by its optimization of its position in the neck/throat.

Crucial- Environment of the throat- directly affected by masticatory environment responsible for:

1. Airway integrity
2. Postural integrity
3. Hyoid position

Cannot achieve this UNLESS you can measure muscle (dys)function. So, you can correct it (NMO/Posture)

ALSO: Proper consistent postural therapy augments the constant functional message of the neuromuscular orthotic 5000x/day to reduce forward head position and discal/vertebral/rotation compression while creating an avenue for diaphragmatic breathing (NOT upper chest as with forward head posture)

*R. Cailliet, former director at University of Southern California department of physical medicine and rehabilitation, said that Forward head posture may result in a loss of 30% of vital lung capacity. These breath related effects are primarily due to loss of cervical lordosis which blocks the action of the hyoid muscles- especially the inferior hyoid responsible for helping lift the 1st rib during inhalation. He also states- most attempts to correct posture are diverted toward the spine, shoulders and pelvis, all are important, but the HEAD position takes precedence over all others. **THE BODY FOLLOWS THE HEAD** therefore, the entire body is ALIGNED by first restoring proper functional alignment to the head.

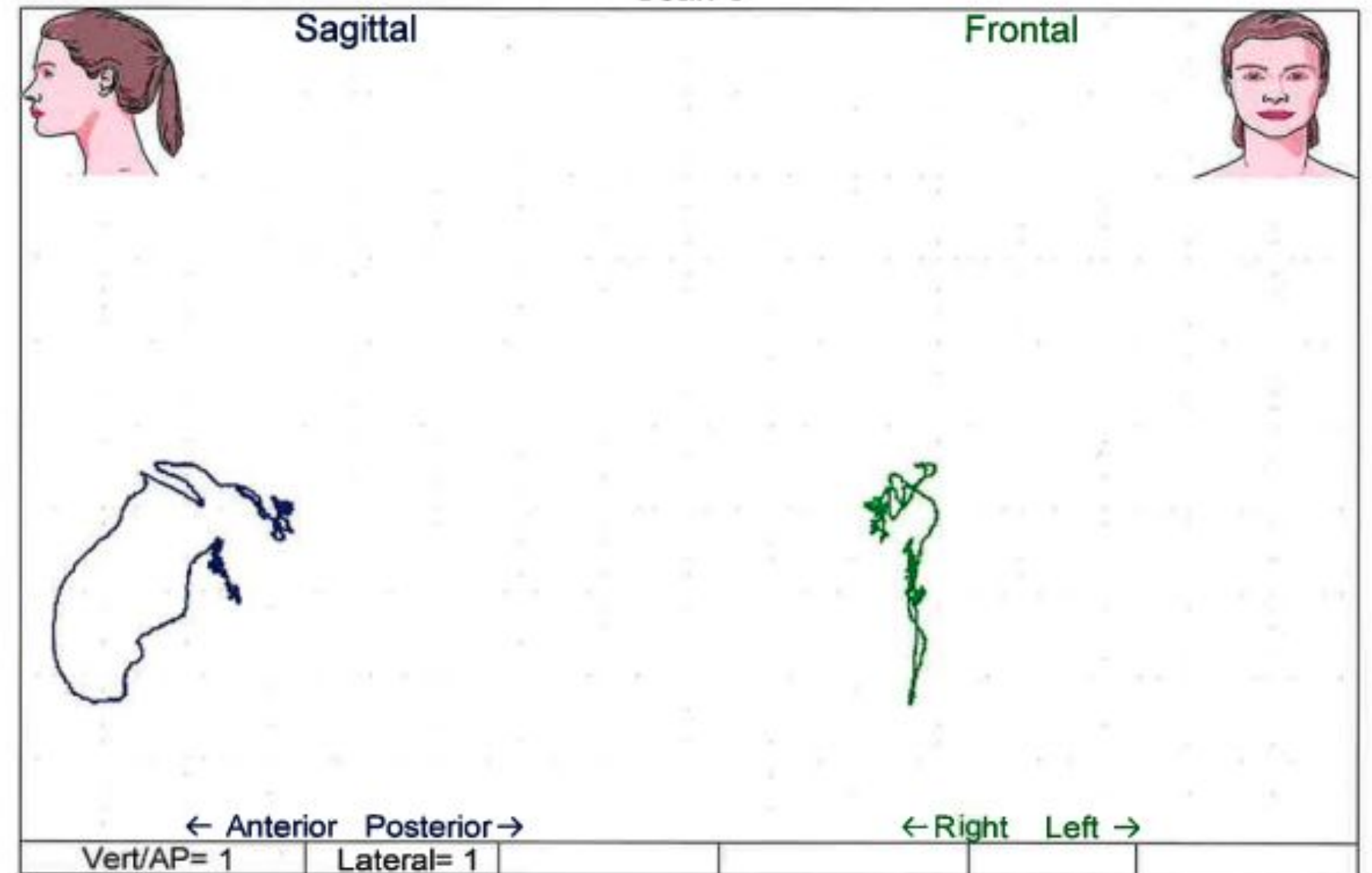
Treating TMJ, orthodontic, orthopedic problems and sleep apnea all manifest from dysfunctional musculature that is based on the mandibular/condylar position in the TMJoint when occlusion takes place. (Genetic/Habitual)

Creating a “healthy” hyoid position is dependent on recognizing, measuring, treating and eliminating the curve of spee found in our patients.

The Water Test: Swallow Scan

3000 times a day with
Accessory muscles

Patient's Name: Vic
Visit: 1
Date: 8/1/2022
Name: V1 S6 M1 T1
Phone: Work Phone: Chart Number: 6868-0
Scan 6

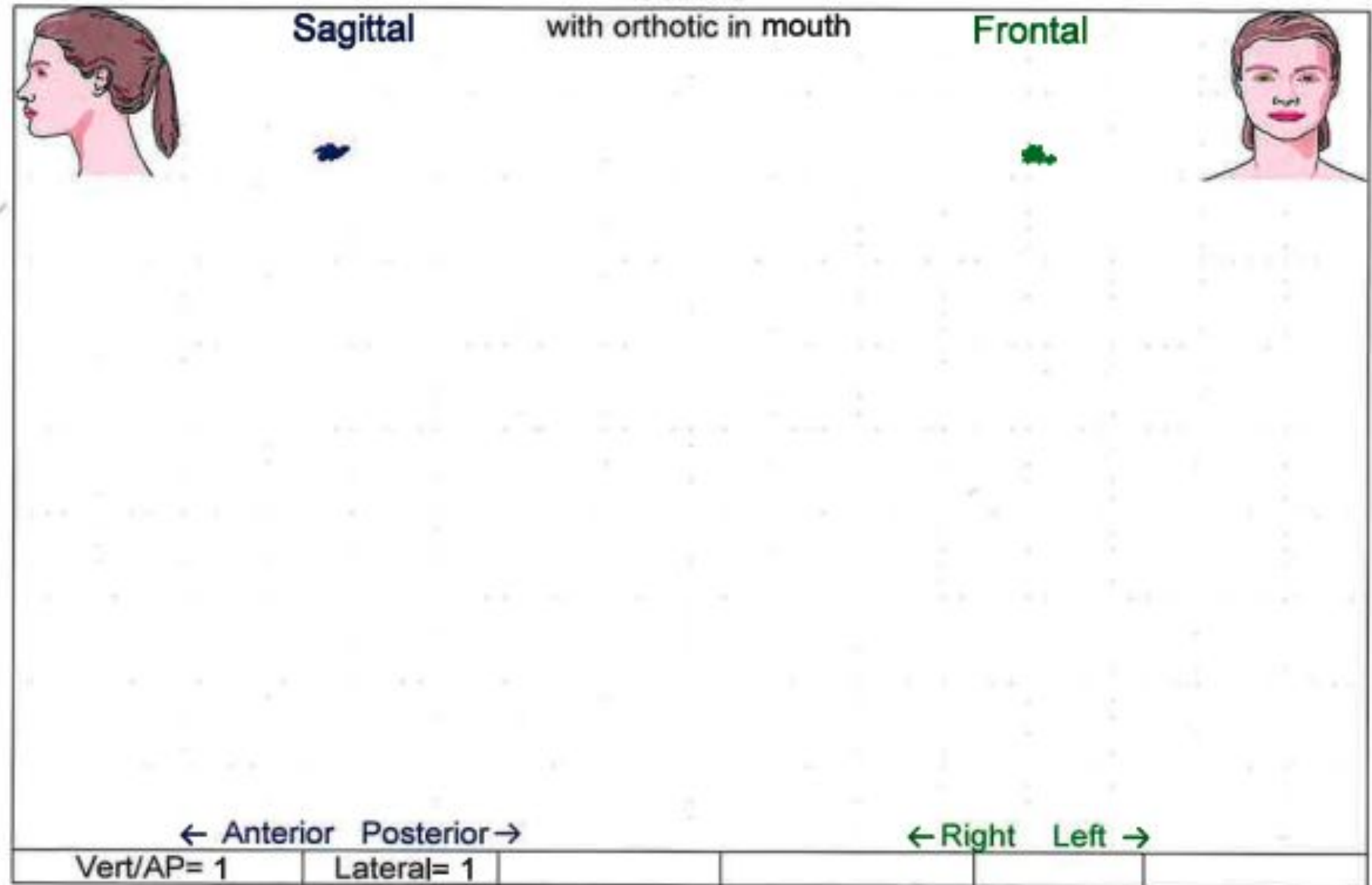


Patient Swallowed with Teeth Together

Normal Swallow on Teeth / Orthotic

Patient's Name: _____ Visit: 3 Date: 12/21/2022
Filename: V3 S6 M1 T1
Home Phone: _____ Work Phone: _____ Chart Number: 6868-0

Scan 6



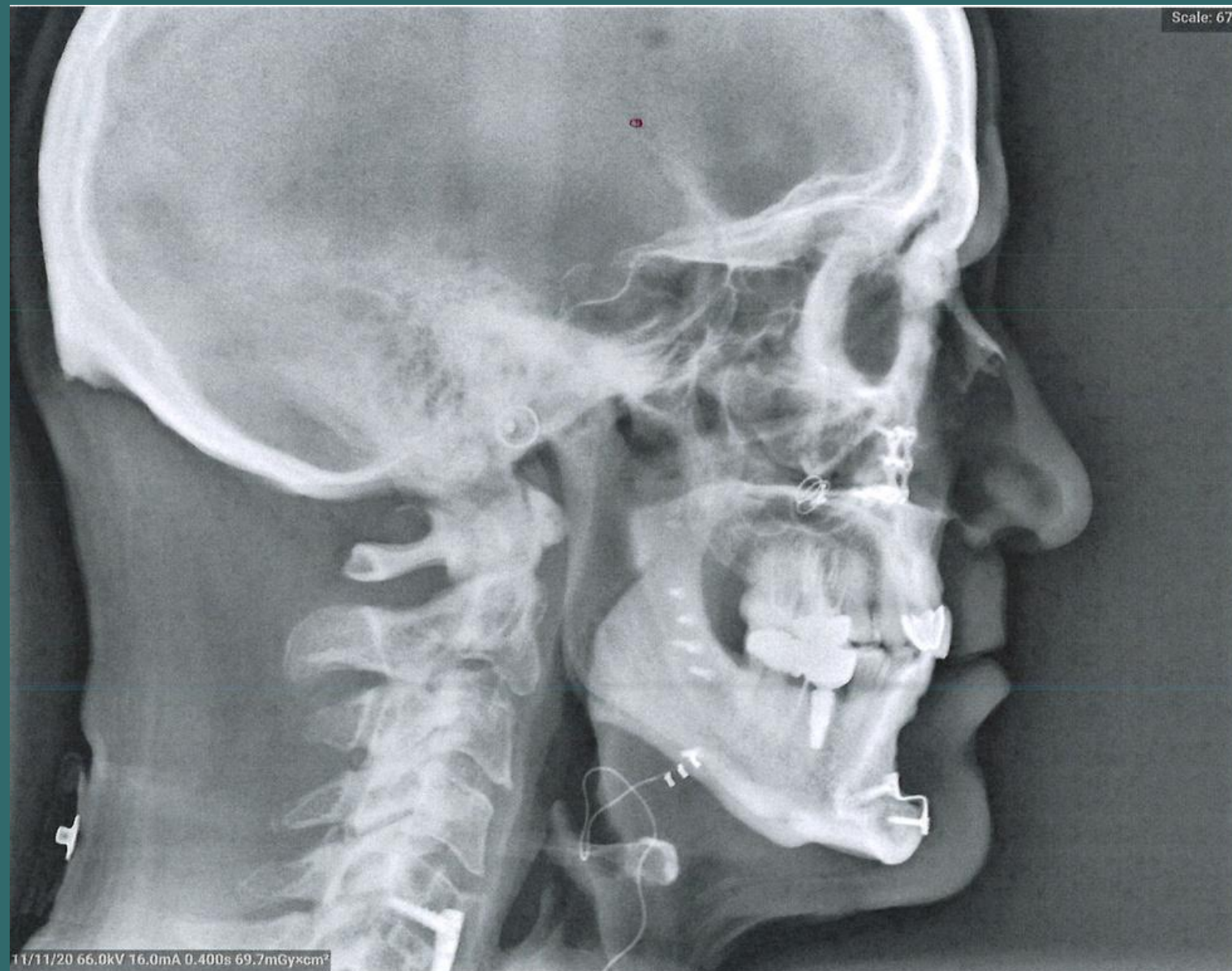
Patient Swallowed with Teeth Together

Scalloped Tongue

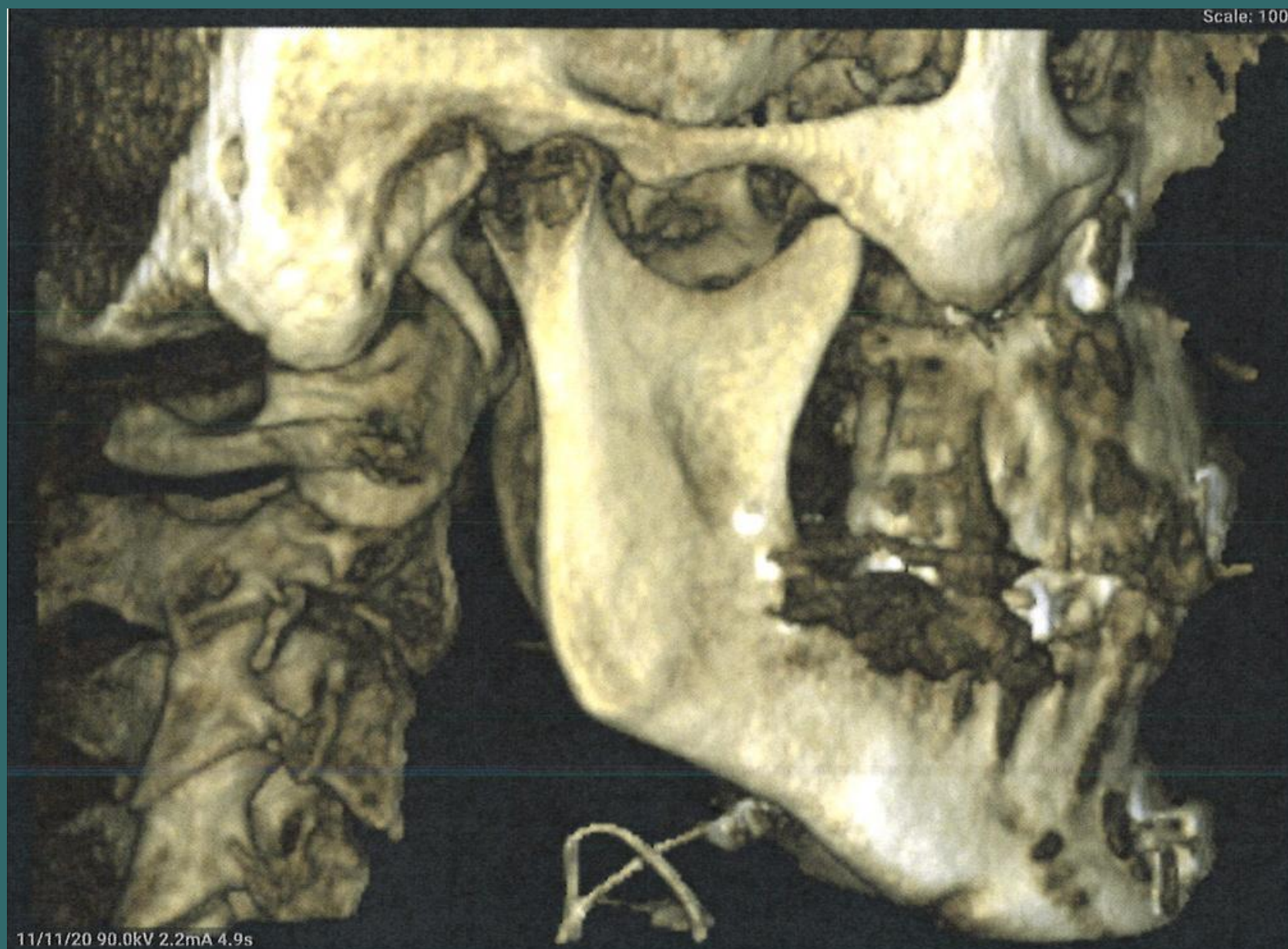
- Scalloped tongue - swallow dysphagia.
- No recruitment (muscle on swallow) tongue finds alternative and presses against teeth for anchorage.
- Forward head posture created by age 5.
- Upper chest breathing/mouth breathing
- This environment portrays a dysfunctional muscle/jaw environment that will influence the hyoid position in the throat affecting posture, breathing (airway) and swallow.



• Chronic Pain - Why?



• Chronic Pain - Why?

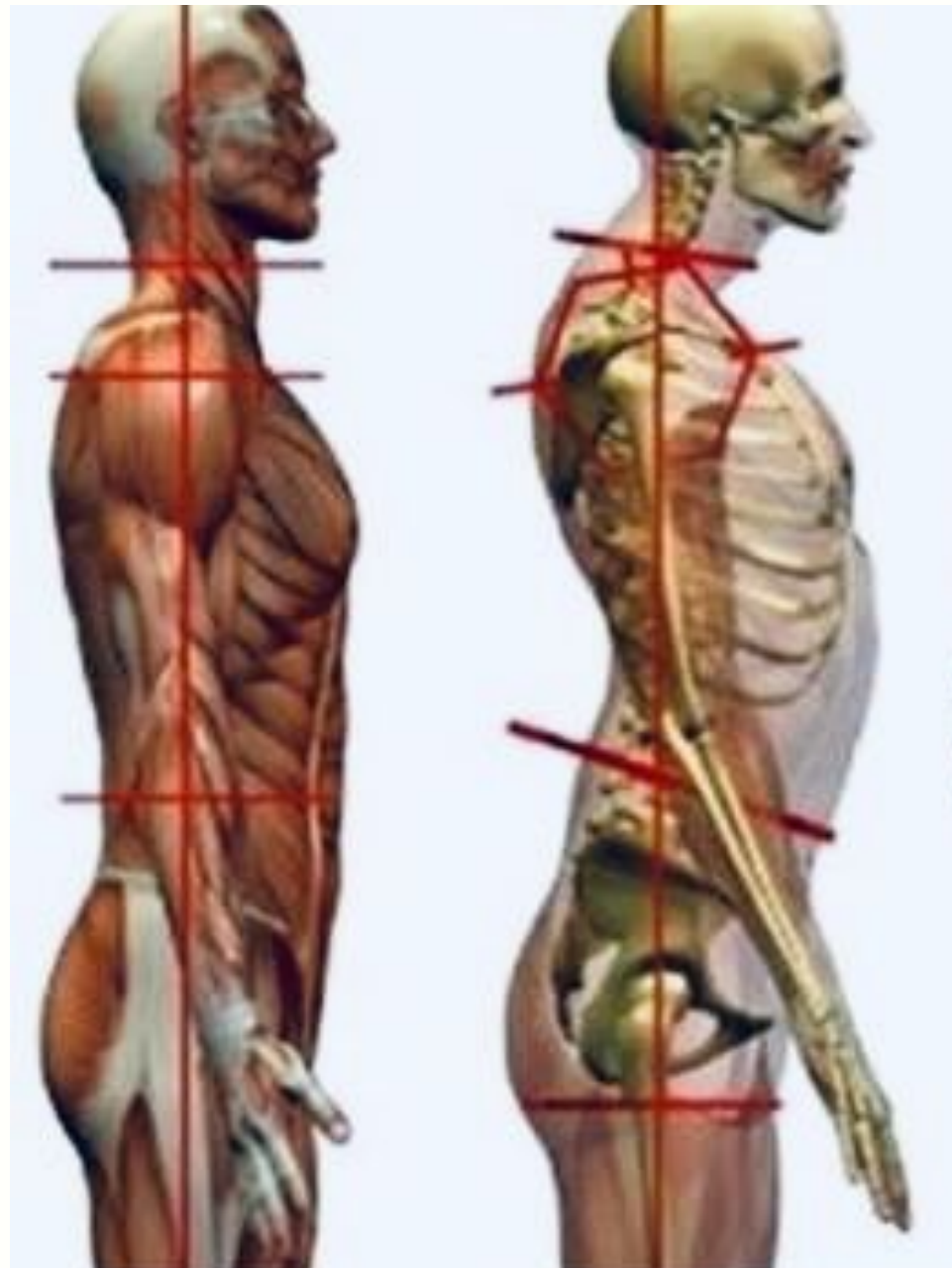


⋮ Panorex Use Can Reveal:



- High coronoids (attenuated) – temporalis imbalance
- Gonial deposition – masseter clench
- Not Diagnostic for condyles/position in fossae

TMJ Disease will create:



- Forward Head Posture (even in children)
 - Swallow dysfunction-breathing-GERD
 - Facial pain
 - Temporalis pain – temporal headaches
 - Pain behind eyes, condylar pain
- No Diaphragmatic breathing
- Intrudes posterior teeth
- 3-Dimensional Intra-oral imbalance
- Condyles move posteriorly, superiorly

Did You Know?



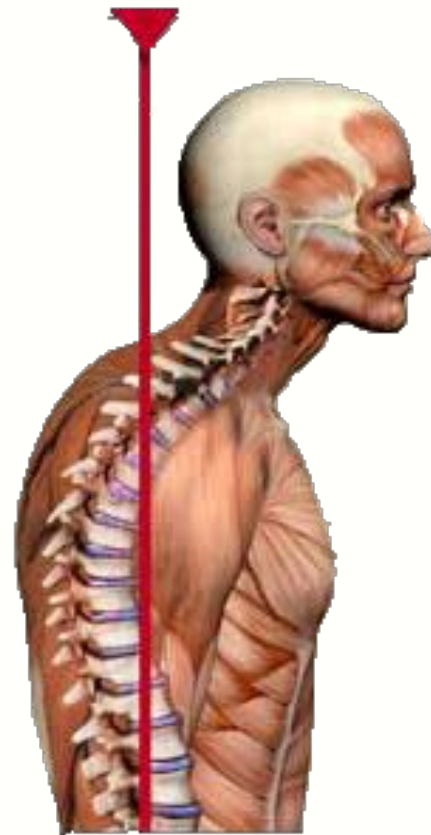
12 lb. head



32 lb. head



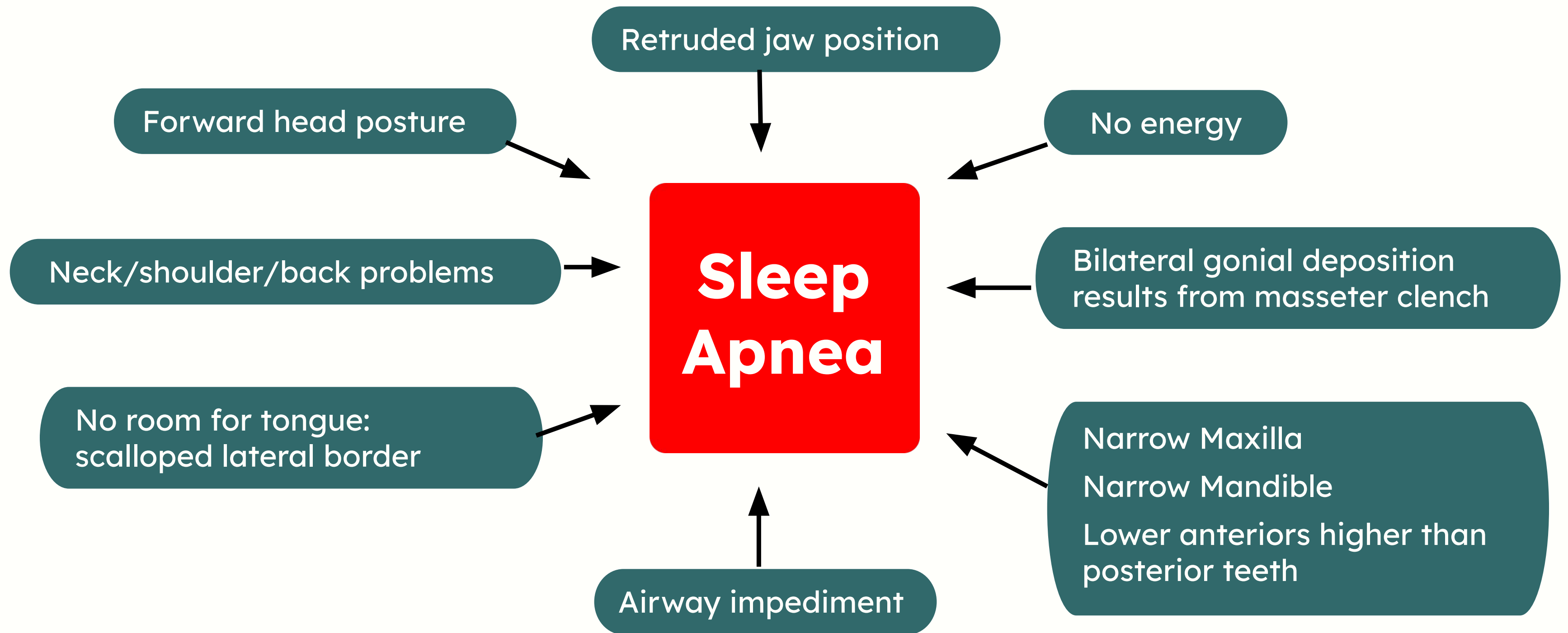
42 lb. head



For every inch of Forward Head Posture, it can increase the weight of the head on the spine by an additional 10 lbs.

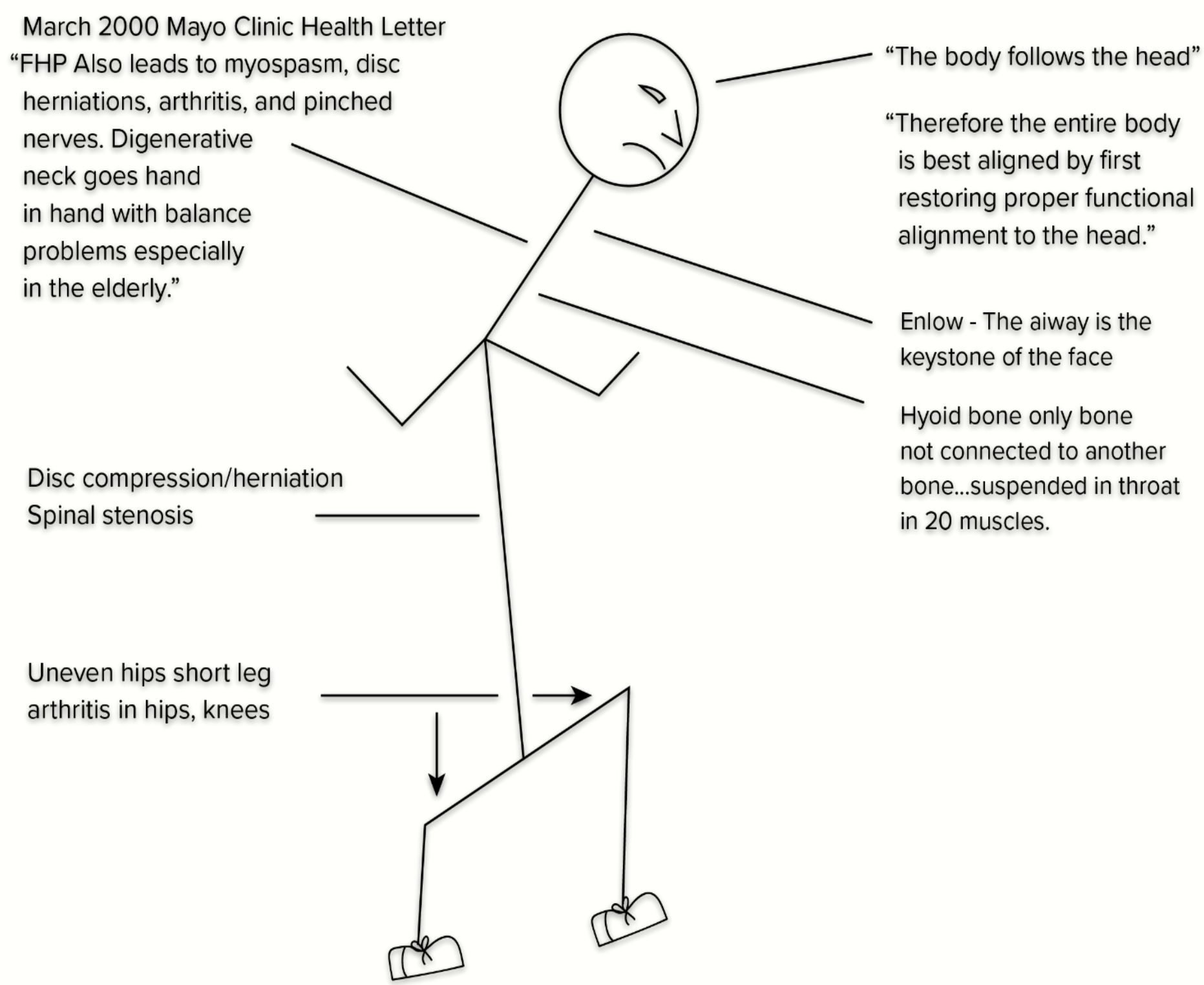
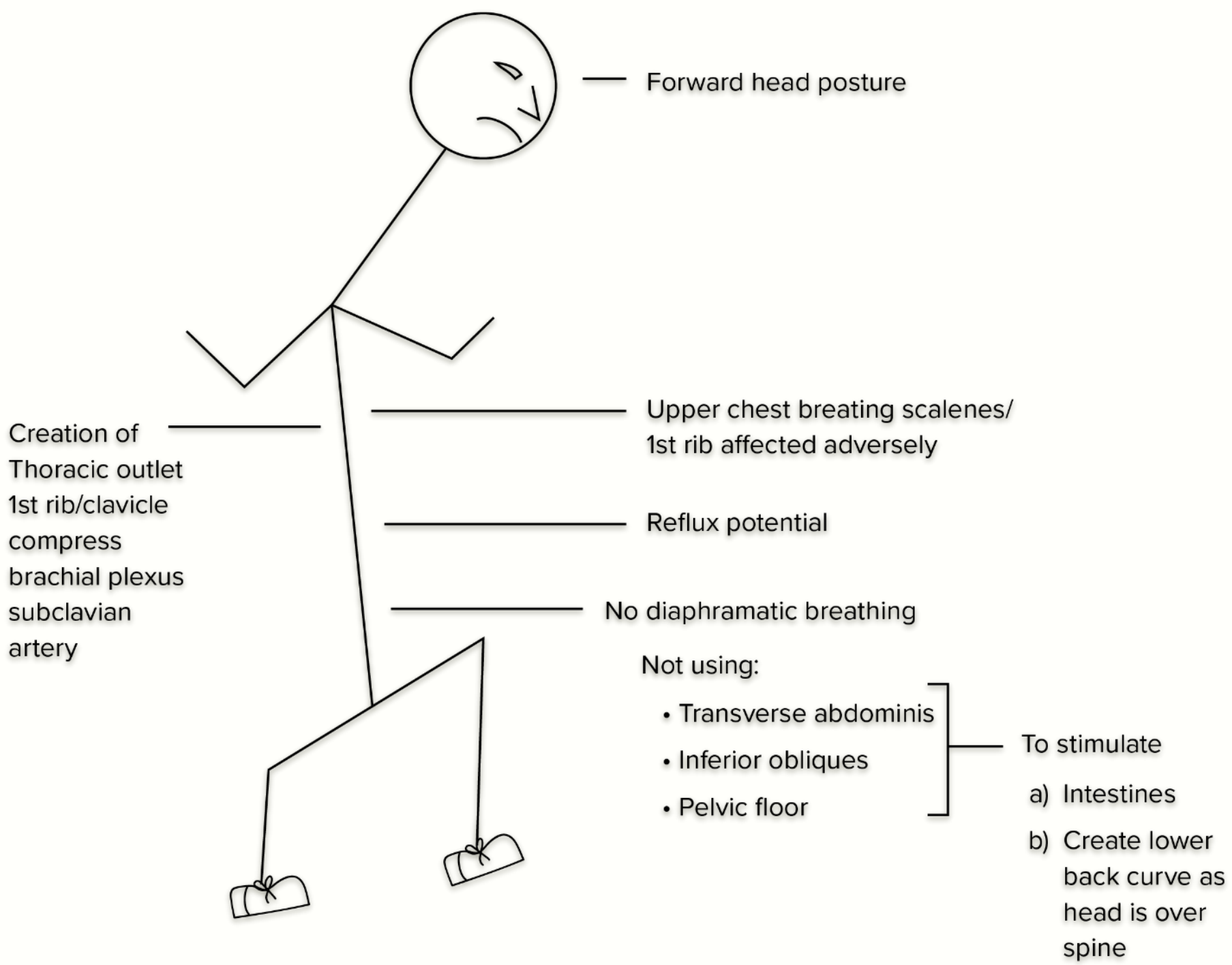
- Forward Head Position can create over 40 lbs. of pressure on the musculoskeletal system
- Longer head remains forward, more the spine is compressed AND muscles are shortened
- “Forward Head Posture (FHP) leads to long term muscle strain, disk herniation, arthritis, and pinched nerve.” – Mayo Clinical Health Letter, March 2000

TMJ Disease and Sleep Apnea:



FHP, Sleep Apnea, & Posture Concerns ➤

Cailliet



● Potential Class III TMJ Sleep Apnea Patient

Age 9, Postural Sleep Concerns, Resolved of Symptomology

BEFORE



AFTER 4 MONTHS



● "Mom, my throat is open, I can breathe."



This quote is from a 9 year old girl who had problems with swallowing, breathing and operations for fluid in her ears. Close inspection revealed a deep bite or over closure. This deep bite brings the lower jaw backwards toward the ear and brings the tongue and neck muscles backwards toward the throat impeding airway.

Through neuromuscular computer and tomography x-ray, a proper bite was established that eliminated the deep bite and brought the jaw forward; thus relieving the TM Joints, bringing the tongue and muscles attached to the jaw forward. This will create an open airway day and night.

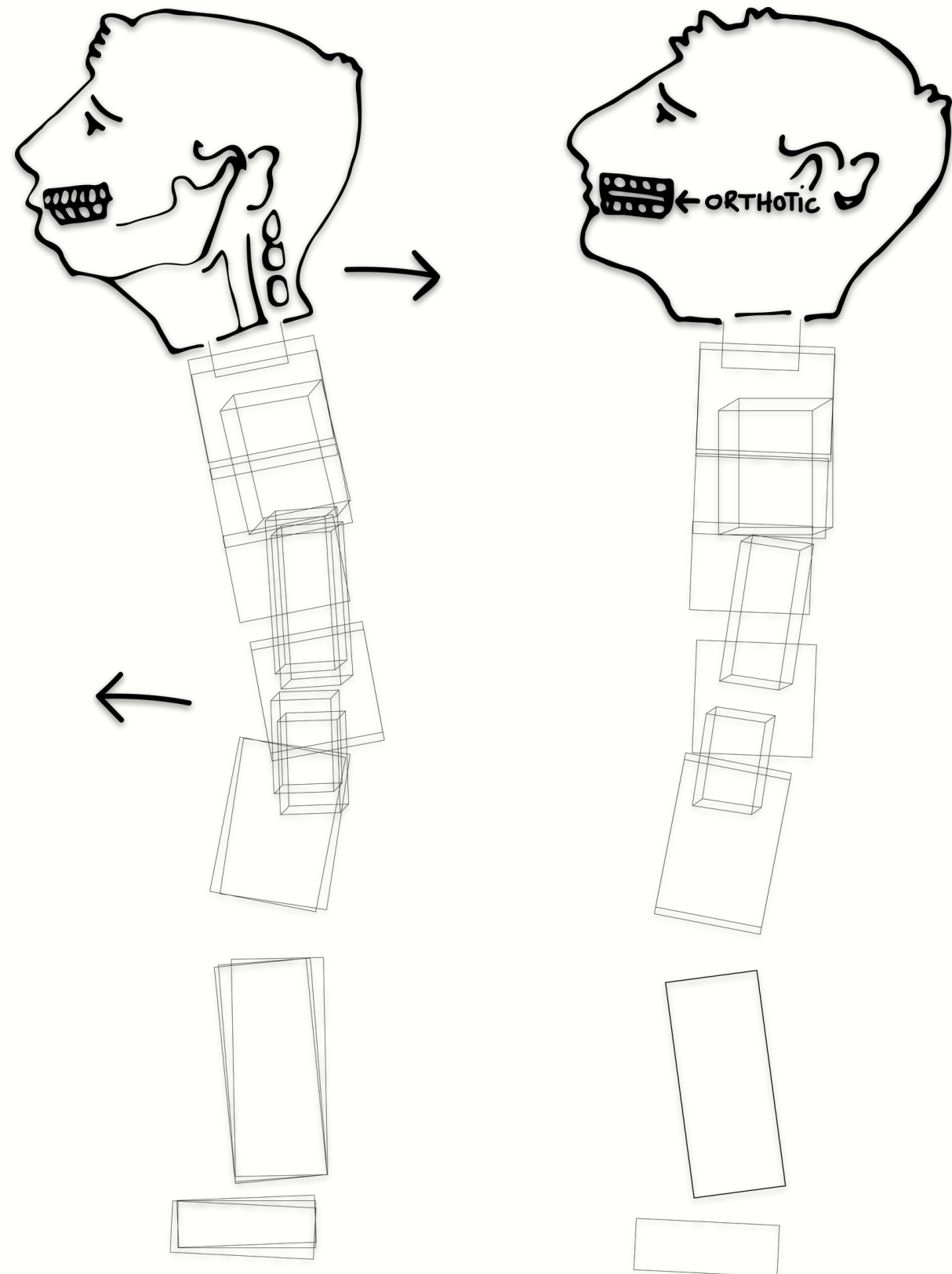


⋮ Did You Know?



All cured patients of TMJ disease have a posterior open bite after Phase I.

Phase II of TMJ Treatment



Create permanent functional jaw position

- Permanent NMO appliance
- Special orthodontic therapy
 - Never long teeth
 - Create tooth eruption by building bone (osteoblasts)
 - Maintain proper intra/extra capsular position
 - Neuromuscular Orthotic Appliance

Before & After TMJ Disease Treatment



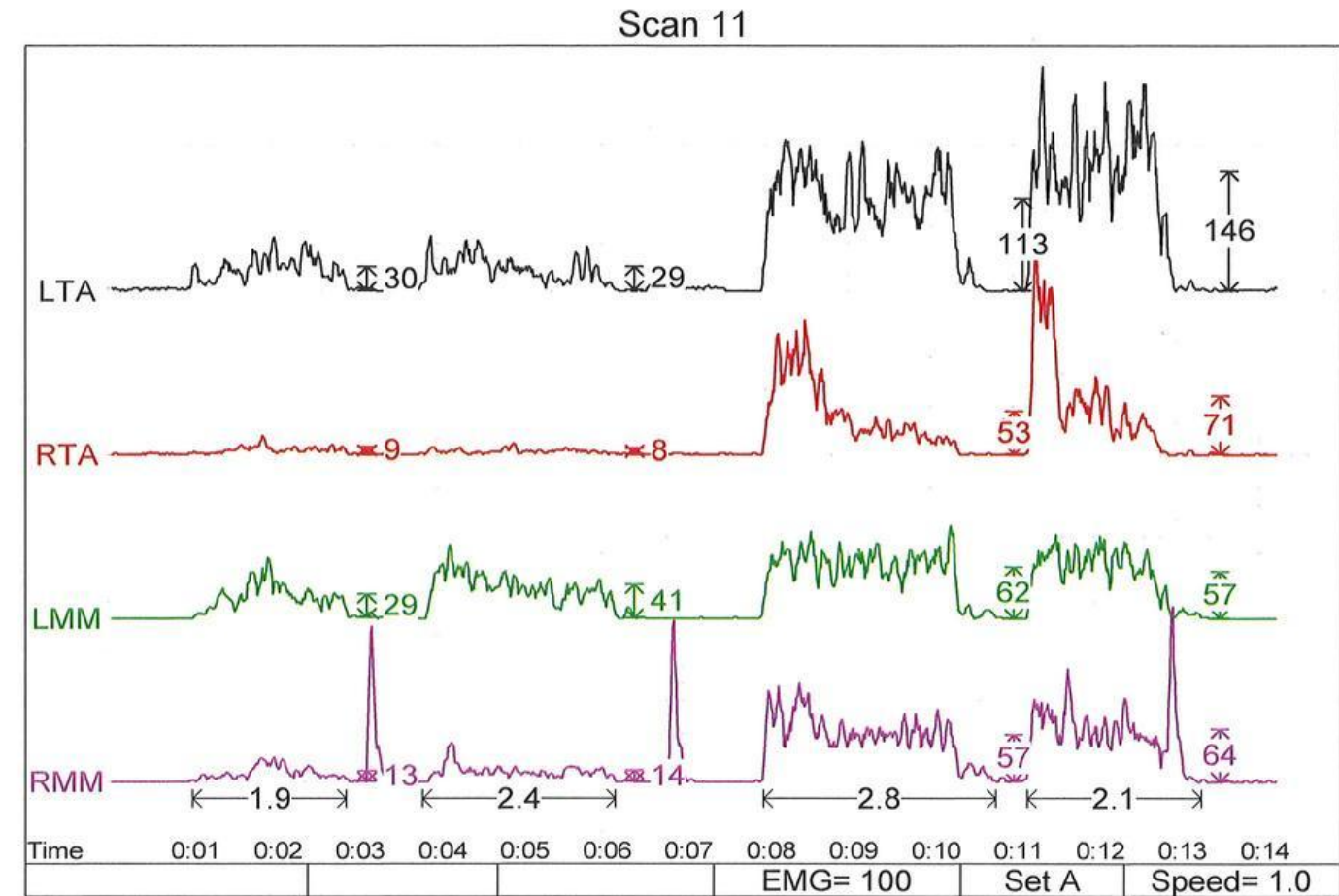
40-YEAR-OLD



Before & After TMJ Disease Treatment



Bite Recruitment EMG



Clench 1 over 1.9 Seconds

LTA (Left Temporalis Anterior)	Peak= 66 uV,	Average= 30.1 uV
RTA (Right Temporalis Anterior)	Peak= 24 uV,	Average= 9.4 uV
LMM (Left Masseter)	Peak= 73 uV,	Average= 29.5 uV
RMM (Right Masseter)	Peak= 30 uV,	Average= 13.0 uV

Firing Order - LTA LMM RMM RTA

Clench 2 over 2.4 Seconds

LTA (Left Temporalis Anterior)	Peak= 67 uV,	Average= 29.4 uV
RTA (Right Temporalis Anterior)	Peak= 15 uV,	Average= 7.7 uV
LMM (Left Masseter)	Peak= 91 uV,	Average= 41.2 uV
RMM (Right Masseter)	Peak= 50 uV,	Average= 14.2 uV

Firing Order - LTA LMM RMM RTA

Clench 3 over 2.8 Seconds

LTA (Left Temporalis Anterior)	Peak= 189 uV,	Average= 112.6 uV
RTA (Right Temporalis Anterior)	Peak= 164 uV,	Average= 53.3 uV
LMM (Left Masseter)	Peak= 109 uV,	Average= 62.4 uV
RMM (Right Masseter)	Peak= 122 uV,	Average= 57.1 uV

Firing Order - LTA LMM RMM RTA

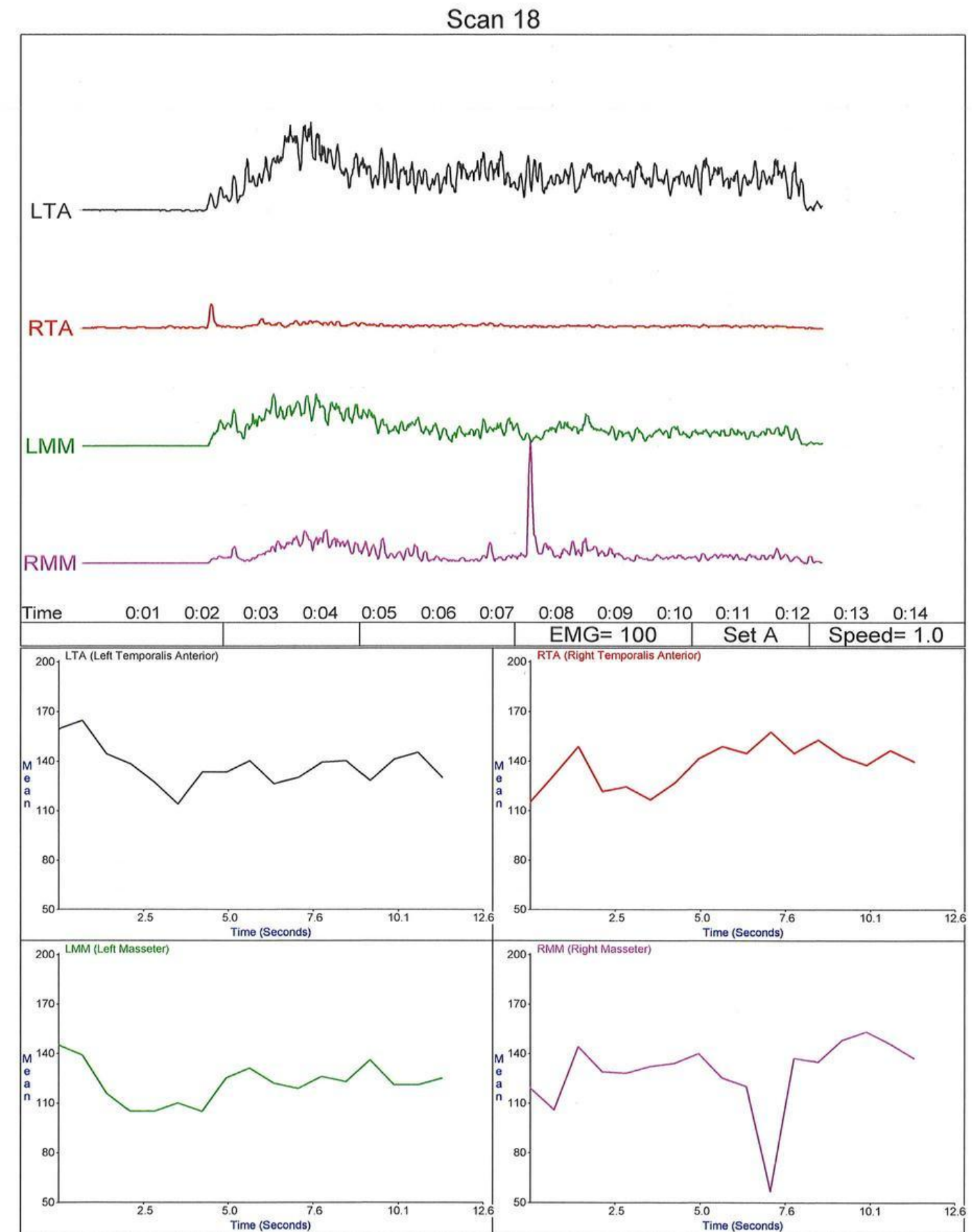
Clench 4 over 2.1 Seconds

LTA (Left Temporalis Anterior)	Peak= 272 uV,	Average= 146.3 uV
RTA (Right Temporalis Anterior)	Peak= 251 uV,	Average= 71.5 uV
LMM (Left Masseter)	Peak= 105 uV,	Average= 57.3 uV
RMM (Right Masseter)	Peak= 212 uV,	Average= 64.4 uV

Firing Order - RMM LTA LMM RTA

Bite Recruitment EMG

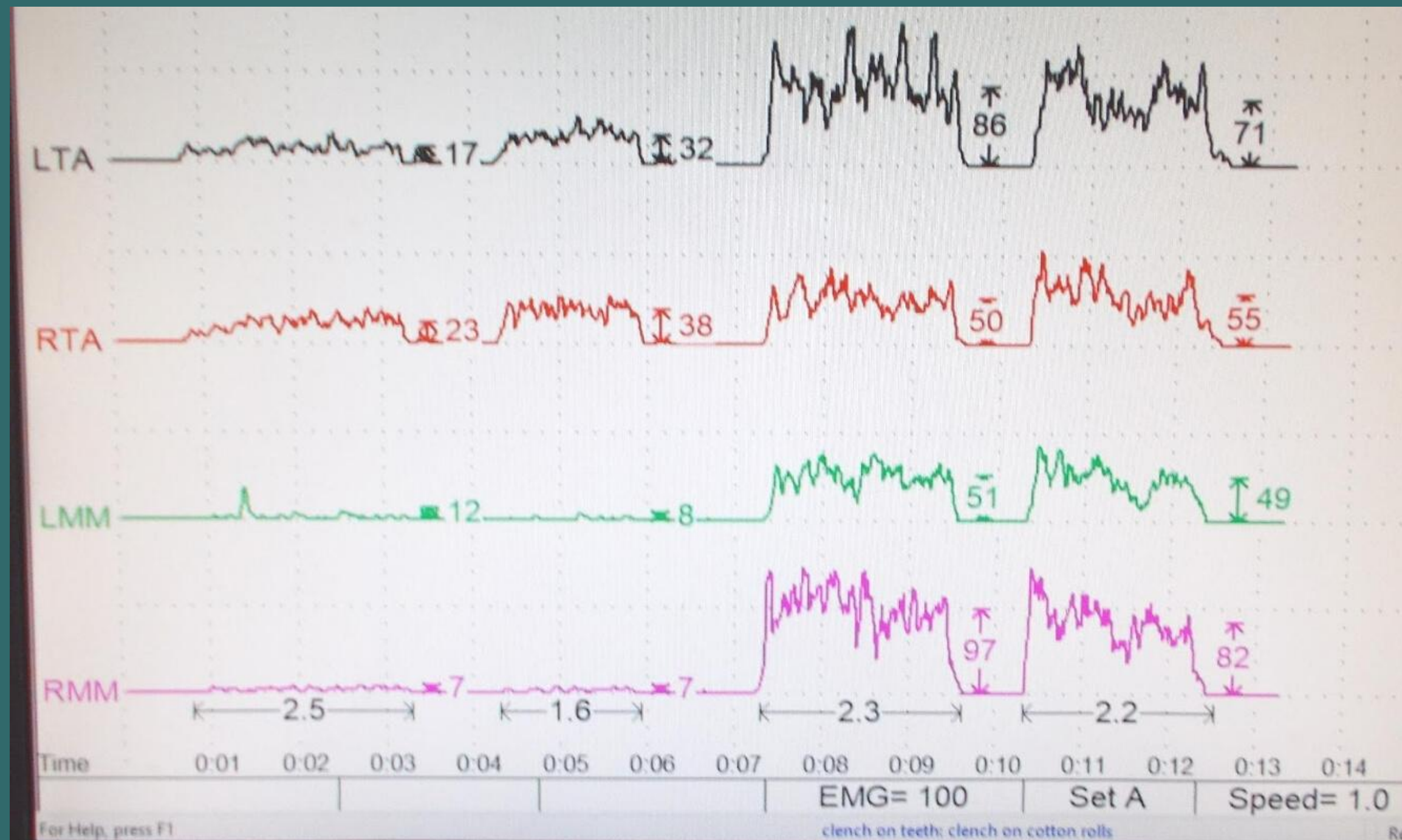
10 SECOND INTERVAL



• K7 Myotronic Scans

CLENCH ON TEETH

CLENCH ON COTTON ROLLS



TMJ Disease



No Diaphragmatic breathing

Forward head posture - body follow head
Posterior teeth intruded (clench)
No recruitment for masseters
Temporalis/masseter imbalance

Results of TMJ Disease:

- Intrudes posterior teeth
- 3-Dimensional Intra-oral imbalance
- Condyles move posteriorly, superiorly
- Muscles shorten, head comes forward

Panorex can reveal

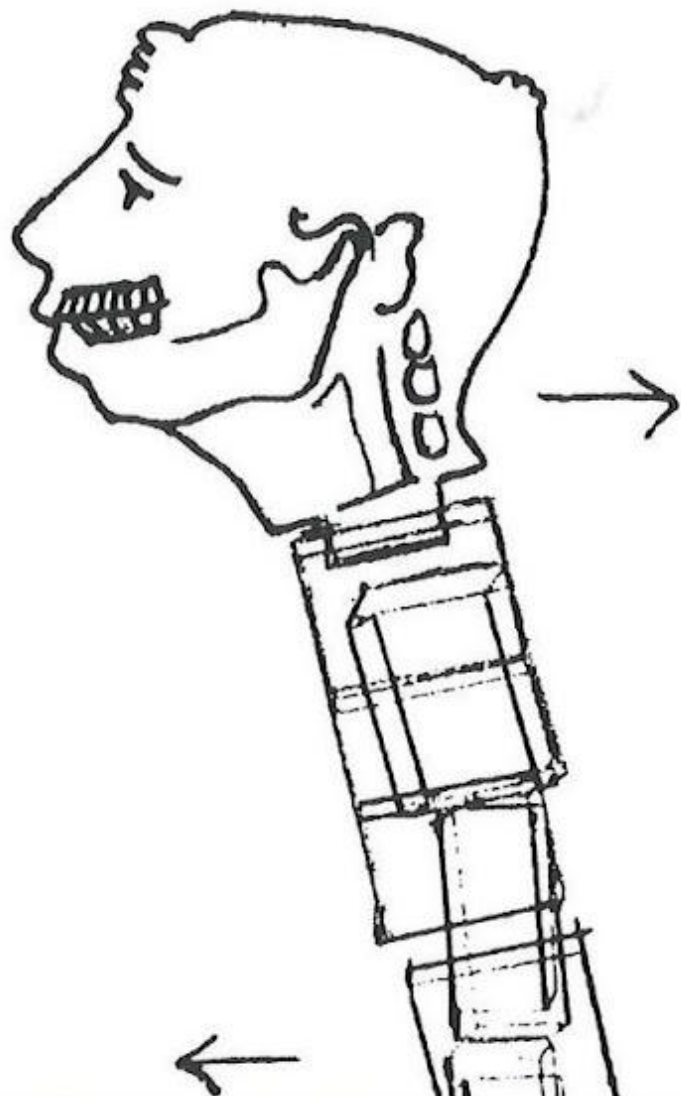
Form follows dysfunction



- High coronoids (attenuated) - temporalis imbalance
- Gonial deposition - masseter clench
- Not diagnostic for condyles/position in fossae

⋮ Treatment is Able To Provide

A neuromuscular bite position with EMG measure to make a neuromuscular orthotic for optimum 3-dimensional muscle recruitment intra-orally.

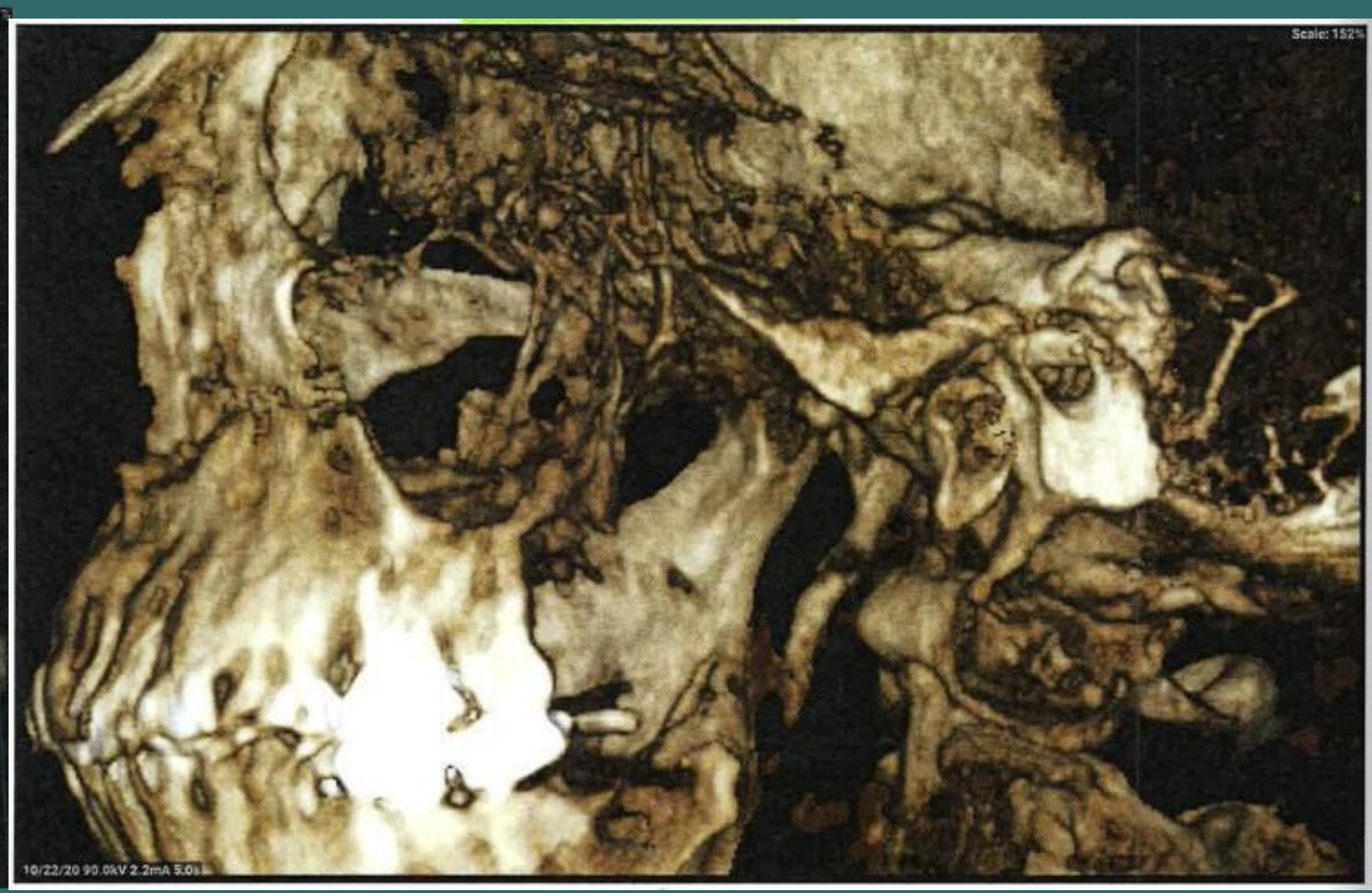


**INTEGRATE POSTURE
WITH BITE**

**SLEEP APNEA
FINDINGS WITH TMJ**

Bite change can be seen on orthotic as posture/bite change occur through function.

• Burning Tongue Case



• Burning Tongue Case

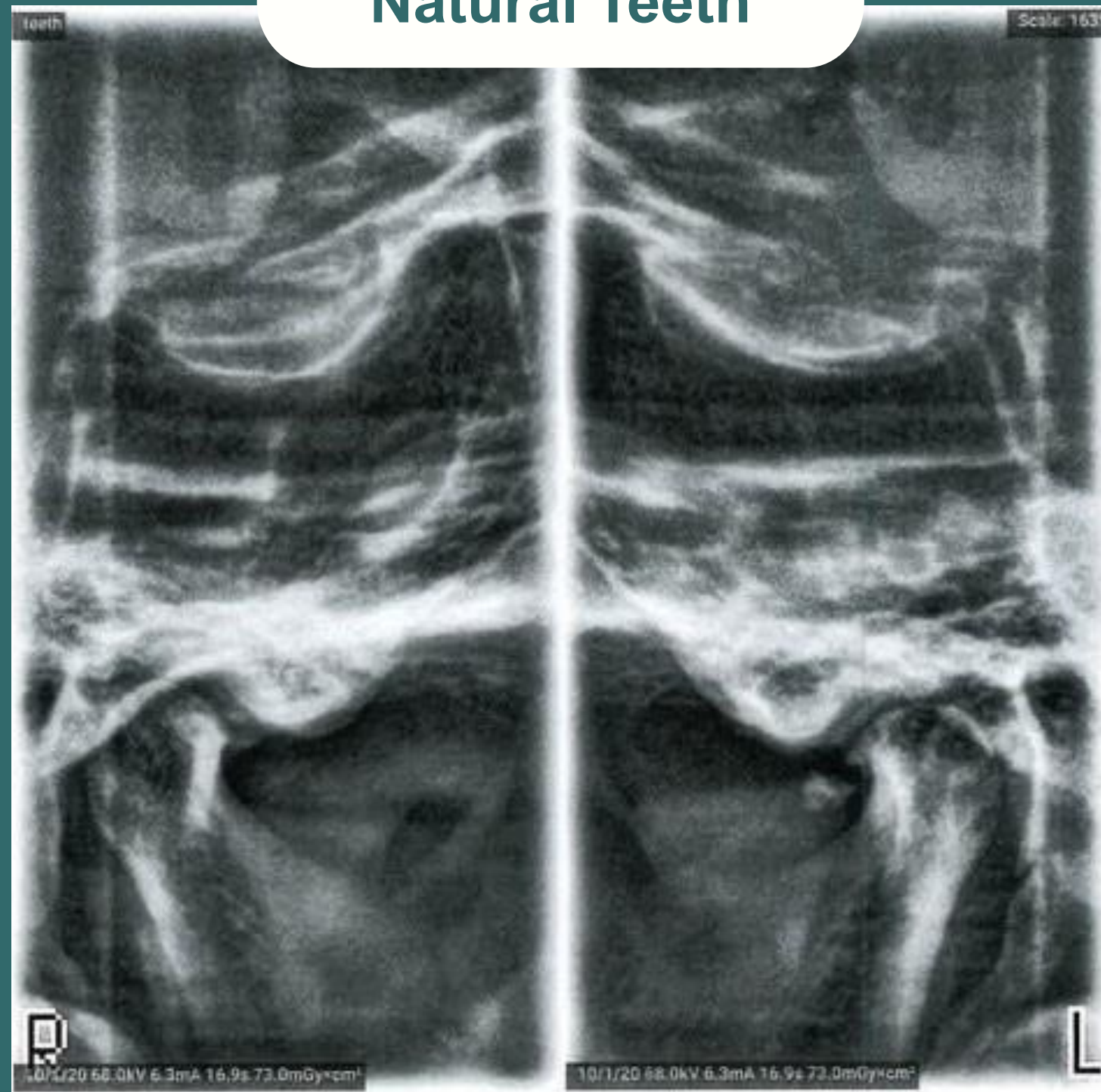


• Burning Tongue Case



• Burning Tongue Case

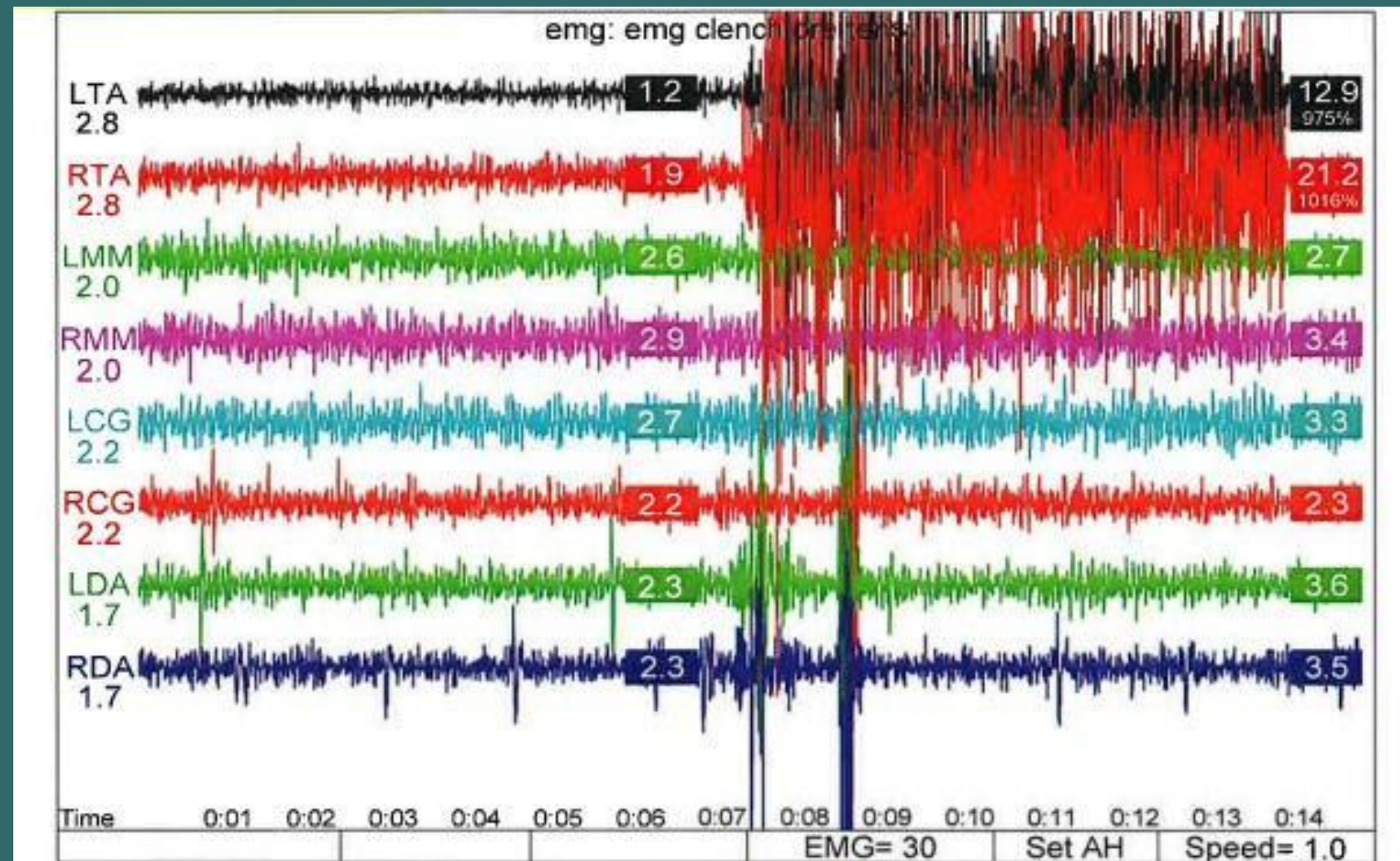
Natural Teeth



With Orthotic Bite



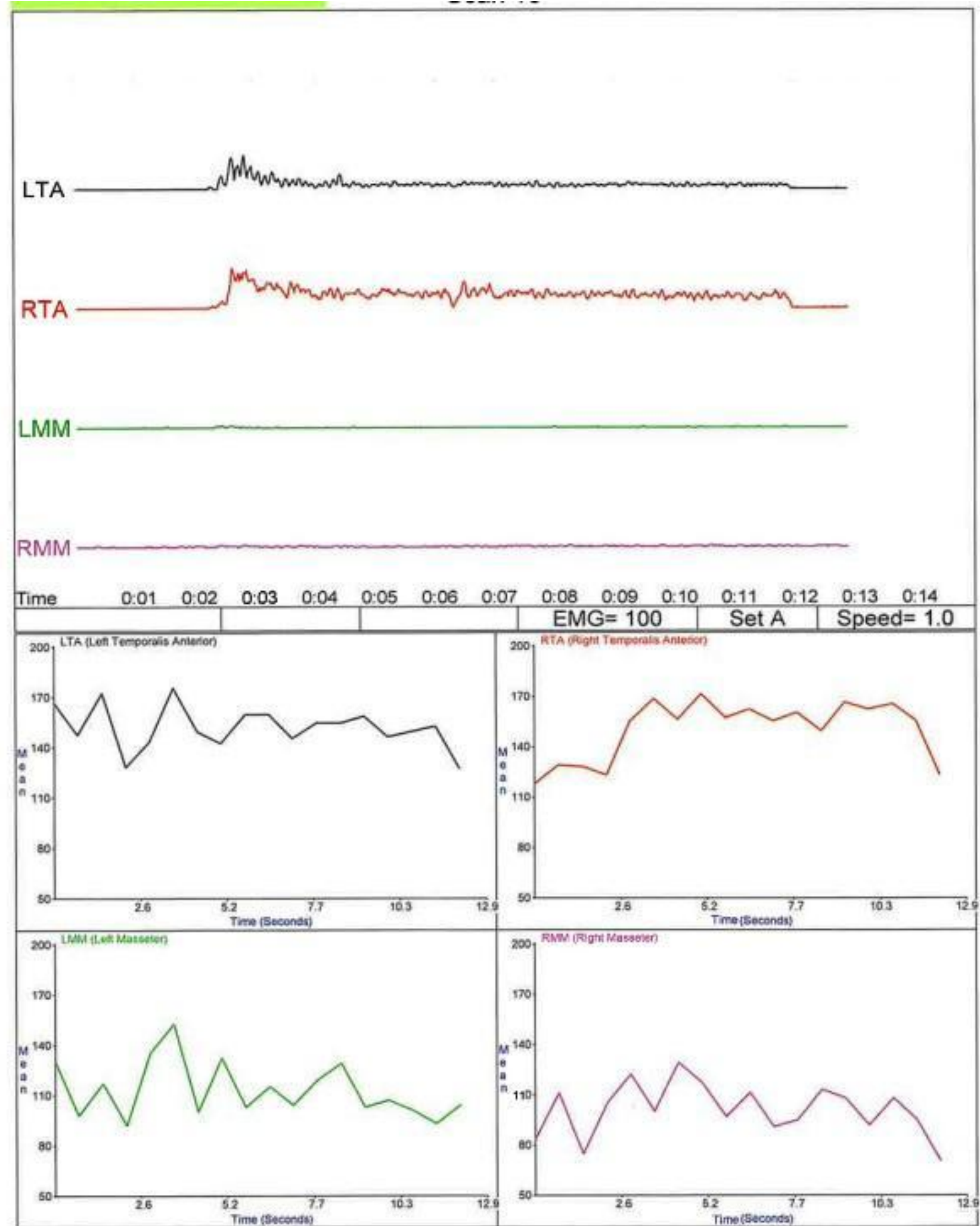
Burning Tongue Case



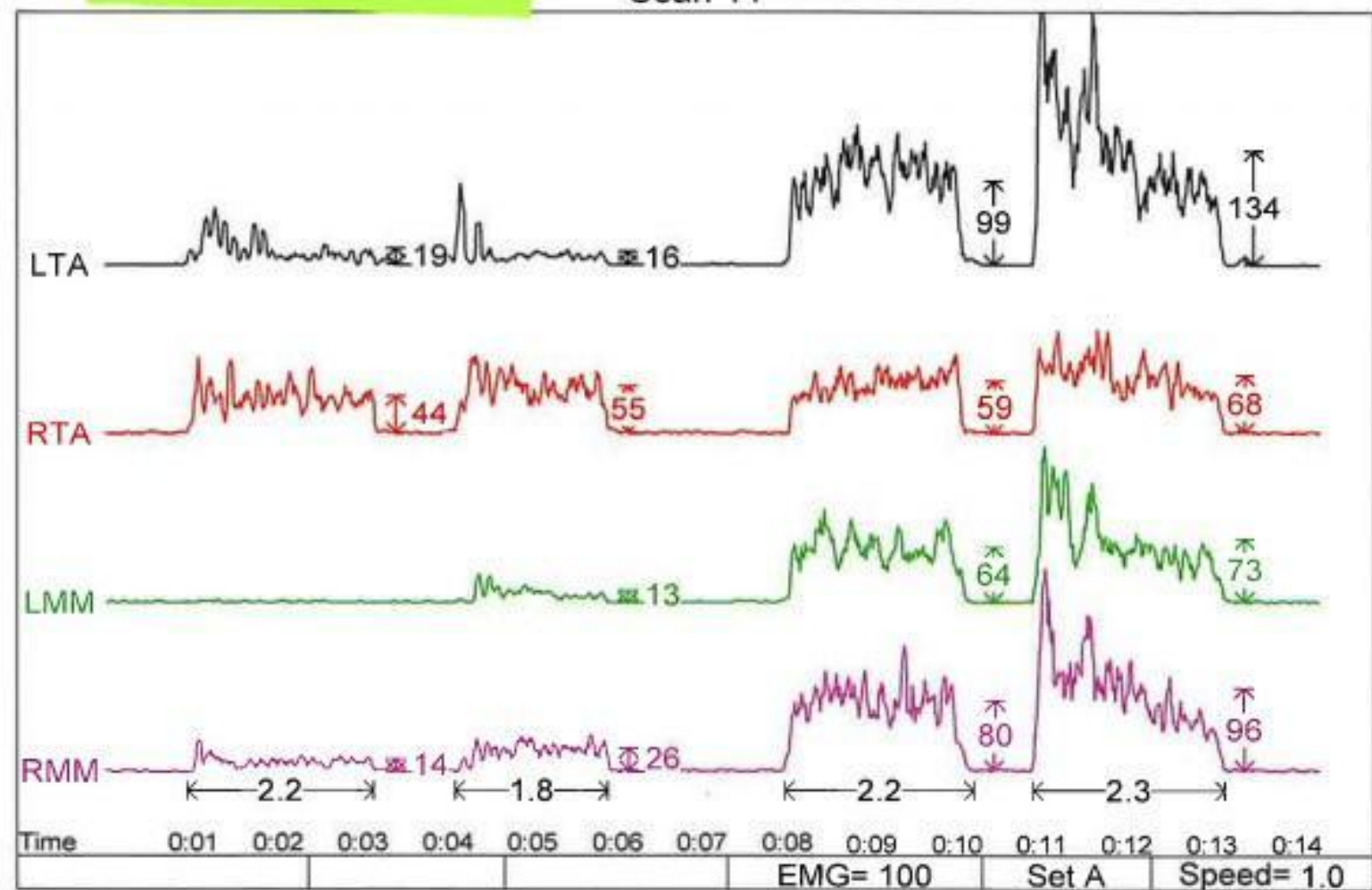
SAMPLE - 14.84 seconds

LTA (Left Temporalis Anterior)	Avg= 1.2 uV	CO Avg= 12.9 uV
RTA (Right Temporalis Anterior)	Avg= 1.9 uV	CO Avg= 21.2 uV
LMM (Left Masseter)	Avg= 2.6 uV	CO Avg= 2.7 uV
RMM (Right Masseter)	Avg= 2.9 uV	CO Avg= 3.4 uV
LCG (Left Cervical Group)	Avg= 2.7 uV	CO Avg= 3.3 uV
RCG (Right Cervical Group)	Avg= 2.2 uV	CO Avg= 2.3 uV
LDA (Left Digastric)	Avg= 2.3 uV	CO Avg= 3.6 uV
RDA (Right Digastric)	Avg= 2.3 uV	CO Avg= 3.5 uV

Burning Tongue Case



Burning Tongue Case



Clench 1 over 2.2 Seconds

LTA (Left Temporalis Anterior)	Peak= 69 uV,	Average= 19.4 uV
RTA (Right Temporalis Anterior)	Peak= 89 uV,	Average= 43.7 uV
LMM (Left Masseter)	Peak= 0 uV,	Average= 0.0 uV
RMM (Right Masseter)	Peak= 37 uV,	Average= 13.5 uV

Firing Order - LTA RTA RMM

Clench 2 over 1.8 Seconds

LTA (Left Temporalis Anterior)	Peak= 94 uV,	Average= 15.7 uV
RTA (Right Temporalis Anterior)	Peak= 90 uV,	Average= 55.2 uV
LMM (Left Masseter)	Peak= 38 uV,	Average= 13.4 uV
RMM (Right Masseter)	Peak= 44 uV,	Average= 26.0 uV

Firing Order - LTA RTA RMM LMM

Clench 3 over 2.2 Seconds

LTA (Left Temporalis Anterior)	Peak= 170 uV,	Average= 98.9 uV
RTA (Right Temporalis Anterior)	Peak= 98 uV,	Average= 59.3 uV
LMM (Left Masseter)	Peak= 114 uV,	Average= 63.7 uV
RMM (Right Masseter)	Peak= 149 uV,	Average= 80.1 uV

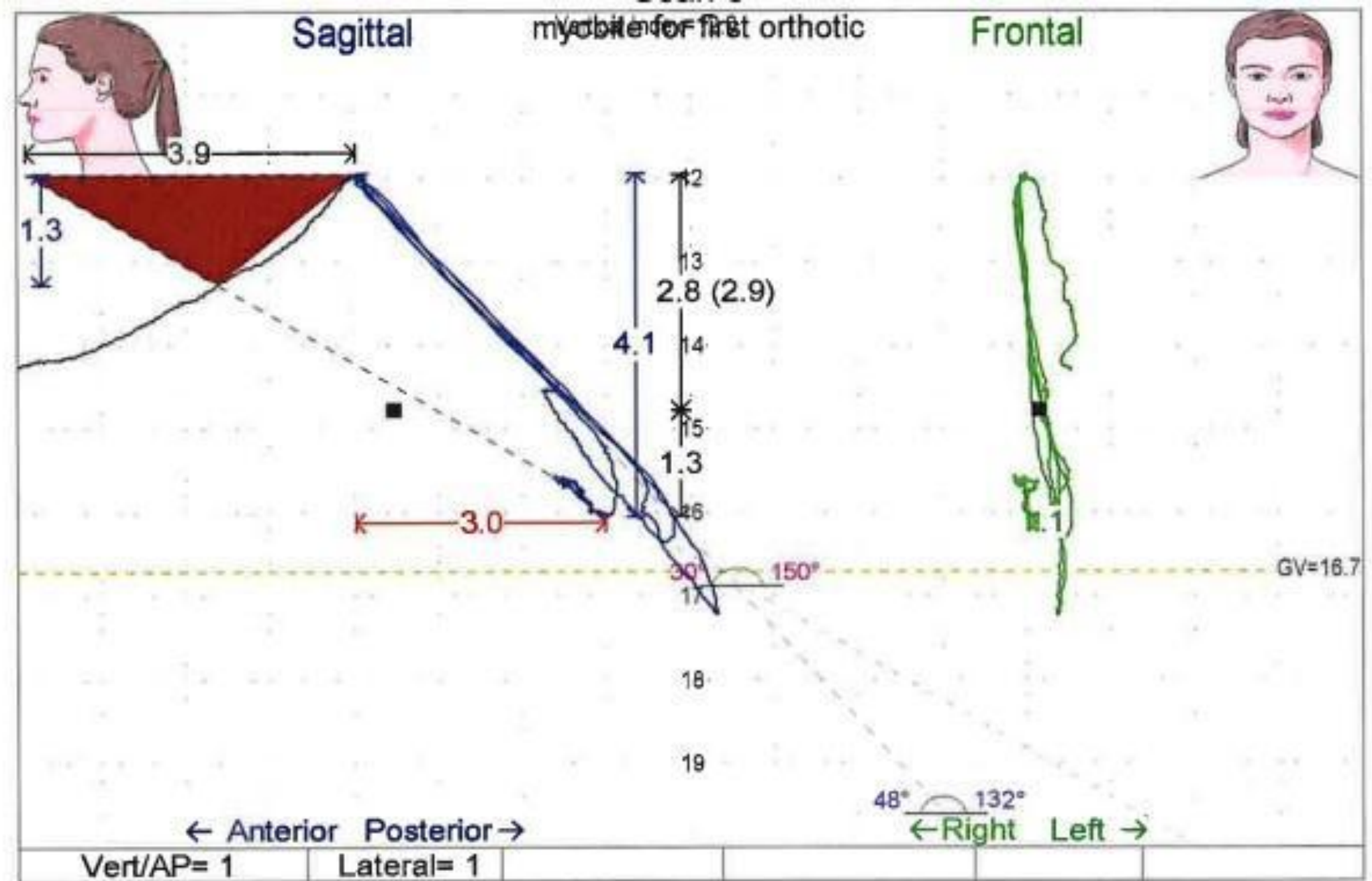
Firing Order - RMM LMM LTA RTA

Clench 4 over 2.3 Seconds

LTA (Left Temporalis Anterior)	Peak= 339 uV,	Average= 134.5 uV
RTA (Right Temporalis Anterior)	Peak= 118 uV,	Average= 67.6 uV
LMM (Left Masseter)	Peak= 189 uV,	Average= 72.9 uV
RMM (Right Masseter)	Peak= 254 uV,	Average= 96.0 uV

Firing Order - RMM LTA LMM RTA

Burning Tongue Case



Physiologic Rest is:

4.1 mm Inferior to C.O. (Vertical Freeway Space)

3.0 mm Posterior to C.O.

0.1 mm Left of C.O.

The Myo-trajectory Intersects the Protrusive Border

1.3 mm Inferior to C.O.

1.6 mm Anterior to C.O.

From Myo-Trajectory to Habitual CO on Horizontal Plane = 3.9 mm

From Initial Tooth Contact to Horizontal Plane of Habitual C.O. as Measured Along the Myo-Trajectory is = 2.6 mm

2.60 Square mm would have to be Ground on the Sagittal Plane to Accommodate Closure to C.O.