Overview
TMJ and EDS

TMJ in Hypermobility and EDS Patients,
The Cervical Myofascial Pain Syndrome (CMPS)

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You already know this but…

- The basis for EDS varies from patient to patient
- The treatment prescribed for another patient, while appearing similar to your condition, should not be utilized without a doctor's consent
- Stay within parameters of management
This lecture will cover:

- Anatomy
- Arthrokinematics and relationships of head, jaw and neck
- Patient conditions
- Pain Referral Patterns
- Management and Treatment protocols
Parameters

- Note that syndromes to be explained are after testing to rule out complex or life threatening conditions.
- The Myofascial Pain Syndrome (MPS) is a description of pain tracking in 200 Ehlers-Danlos patients. Of the 200 patients, 195 were afflicted with this pain referral syndrome pattern.
- The MPS is in direct association and correlation to Temporomandibular Joint dysfunction and Cervico-Cranial Pain and Instability syndromes. All syndromes are usually always correlated.
TMJ, EDS, CCI
Dysautonomia and CMFP
Referral Pain Syndromes
And Management
TEMPOROMANDIBULAR JOINT (TMJ)

What is Normal

- Rotation - mouth opening to 33 mm - non-stress motion
- Translation of joint from 33 to 55 mm
- No Deviations (lateral deviations or defects) – none
- No Pain with motion
- No Joint sounds
- Displacement of condyles, 1-3 mm (note that for every 45 mm of opening the condyle will move 1 mm laterally)
- Biting force of 600 - 800 PSI
TMJ- Symptoms

Facial Asymmetry
  -Mouth opening aberrations and deviations (usually to the affected side)
    -Lack of Lateral deflection of mandibular condyles

-Inability to chew
-Jaw locking “open or closed”
-Headaches in the temple or cheek areas
-Tenderness in the cheeks, floor of the orbits and/or sinuses. Deflection occurs.
Abnormal Mandibular Motion

- Less than 33 mm of rotation in either or both joints
  - Lack of Translation (opening 40-55 mm)
- Deviations – motion of the mandible to the affected side or none when both joints are affected
- Pain with or without motion around or in the TMJ and associated structures
- Joint sounds can be “crepitus” (cracking) or “popping” with jaw motion
- Displacement of condyles can occur with or without motion bi- or unilaterally.
Anatomy of Temporomandibular joint

Pain Generators

- Anterior superior synovium - fig 2
- Anterior inferior synovium – fig 1
- Lateral collateral ligament – fig 3
- Temporomandibular joint ligament – fig 4
- Posterior inferior Synovium – fig 5
- Posterior superior synovium – fig 6
- Posterior Laminate tissue – fig 7
- Retro discal tissue – fig 8

- Additional structures
  - Medial collateral ligament
  - Tanaka’s Ligament
  - Condyle of mandible
  - Temporal bone
  - Mastoid process
  - Articular eminence of zygomatic process
Arthrokinematics of Temporomandibular Joints (TMJ)

- Unstable (complex) joint
- (Ginglymoarthrodial joint)- 2 balls with an interposed meniscus that are subject to degenerative joint disease
- Meniscus - Usually requires a disc
- 3 dimensional pattern of movement (coronal, sagittal and transverse)
- Synovial joints Upper and lower and associated pathologies
- Centric relation (not a dental term) is synovial joint terminology for the congruencies of the joint surfaces for proportional growth and development.
- Pre and post vertebral musculature determine jaw position
- Craniomandibular rest position is a function of the mandibular rest position.
Muscular Anatomy

- Muscles of mastication (Headaches)
  - Temporalis (Anterior mid and posterior)
  - Masseter (superficial, mid and deep)
  - Internal pterygoid
  - External Pterygoid
    - Superior head to meniscus
    - Inferior head to condyle

- Muscle of the inferior border of the mandible and anterior neck and sub occipital triangles
  - Anterior bell of digastric muscle
  - Omohyoid muscle
  - Superior pharyngeal constrictor muscles
  - Middle pharyngeal constrictor muscles
Posterior Cervical Musculature

- Internal oblique muscles
- Rectus capitus minor muscles
- Trapezius muscles
- Semispinalis capitus muscles
- Levator scapulae muscles
Neurology of TMJ System

- Trigeminal Nerve
  - V-1 Supraorbital Sensory
  - V-2 Infraorbital Sensory
  - V-3 Mandibular Sensory and motor
    - Motor to all muscles of mastication
    - Anterior bell of digastric muscles
    - Lateral Rectus muscle of Eye
  - C-2 Area branches
  - L-2 Area branches
- Convergence Mechanisms
- Nociceptive Mechanisms
Cervicocranial Instability (CCI): Relationships (FHP)

- When the occiput is horizontal (left and right), the TM joints will be horizontal in all three planes and will be on the same plane as the inferior apex of the eminence of the temporal bone.
- Limitations of cervical motion caused by:
  - Extension-degeneration from straightening (forward head posture)
  - Rotation limitations indicate a problem with anterior flexion test and rotation
  - Side bend limitations - indicates rotation of C-2 impingement.
  - We are born in flexion and we need lordosis to lift the head (with slight extension). Kyphosis in the thoracic spine and lordosis in the lumbar spine is normal.
C-2 is the Keystone of cervical Stability!

- Imaging:
  - Anterior - Posterior Open mouthed coronal imaging demonstrates C-2 vertebral rotation with displacement
  - If the vertebrae rotates to the right, the dens to the anterior arch of C-1 space will increase on the right and v.v.
  - The occlusal plane will be elevated on the opposite side of the rotation and v.v..
  - The dens dictates the midline and the resultant horizontal occlusal planes as well as the orbital crests.
Mandibular Deflection as a Result of Displacement of C-2
Diagnostics/Cervical Spine

Atlas (C-1) limitations

- Rotation. If head rotation is limited to 50% (mid clavicle) with the head in full flexion.
  - If lateral tubercle of C-1 is prominent below the ear:
    - If the transverse process of C-1 is anterior to the styloid process area and has extended the cervical and mandibular areas forward.
      - this places the C-1 laterally

Axis (C-2) Testing

- Alar ligament test – Side bending of head with neck straight at the C-2 process, the dorsal process of C-2 should rotate to the opposite side. i.e., if the head side bends to the right, the dorsal process should rotate to the left with the finger around the neck at the facet joint. (Alar ligament to the occipital condyles from C-2)

  Important! If the spinous process of C-2 does not move, do not touch the patient! THE ALAR LIGAMENT IS STRECHED OR TORN!
Diagnostics, continued

- **Hyoid Bone Positioning**
  - If the hyoid bone is above the hyoid plane, the result is an “anterior open bite” from “clenching”.
  - Hyoid bone retrusion can cause airway constriction.

- Elevator muscle activity: increase
  - Shorted upper lip will be produced
  - Loss of “cupids bow” in upper lip
  - Common with “retro inclined profile”
  - Increased tension in superior and middle pharyngeal constrictors
    - Release of these 2 constrictors can restore 50% of muscle position and airway volume
  - Oral appliance with increased vertical dimension will increase the activity of the superior and middle pharyngeal constrictors. Increased vertical dimension will rotate the cranium posterior and superiorly.
Diagnostics, continued

- **Forward head posture (FHP)** is indicative of posterior head rotation and/or extension. They cannot look “up”. The result is an anterior cranial subluxation.

- **Cervical angulation:** is measured on a line from C-2 to C-7. All vertebral bodies should be anterior to this line.
  - Normal angulation is 101 degrees
  - Straight cervical spine is 90 degrees
  - Kyphotic or inverted spine is 80-84 degrees with likely “neck pain”.
“Torticollis” Cervical spine straightening and loss of the physiological curvature leads to degeneration of the spine. SCM spasms are typical. (C-6/7)

**Upper cervical ligament Evaluation:**

- Ligaments dictate Proprioception and Nociception
  - Cruciate Ligament: “Yes” ligament.
  - Alar ligament: “Perhaps” ligament.
  - Transverse ligament: “No” ligament.
Cervical Myofacial Pain Syndrome (CMFP)

Components
Pharyngeal Constrictors
Superior Pharyngeal Constrictor

- The **mentalis muscle** is the anterior origin located in the front of the chin and when activated moves the lower lip to move inferiorly.
- This muscle integrates with the **orbicularis oris** muscle that rings the lips (your pucker muscle)
  - The **orbicularis oris** muscle integrates with the **buccinator** muscle in the anterior portion of the cheeks.
- The **buccinator muscle** integrates with the **superior pharyngeal constrictor muscle** that and integrates with the anterior surfaces and the fascia of the cervical vertebrae at C-1/2/3 levels.
Buccinator to Superior Pharyngeal Constrictor
Middle Pharyngeal Constrictor Begins in the Infra-Mandibular Area
Middle Pharyngeal Constrictor- cont.

- The anterior belly of the digastric muscle:
  - Attaches to the inferior medial lingual surface of the mandible (CHIN) and insert on the hyoid bone.
  - The omohyoid muscle extends from the hyoid bone to the basion of the skull anterior to the foremen magnum
  - The middle pharyngeal constrictor muscle extends from the hyoid bone and integrates with the fascia of the cervical spine and stabilizes at the C-4 level.

- The most common cervical deformation and displacements are at the C-1/2 levels
Dysautonomia

Proximate Structures - Possible Malfunction of Input to the Autonomic Nervous System, Pots, ETC. due to possible Cervicocranial Positioning.
Posterior pharyngeal space structures
Proximate Structures

- Vagus Nerve
- Accessory Nerve
- Hypoglossal Nerve
- Sympathetic Trunk
- Alar Fascia
- Glossopharyngeal Nerve
- Internal Carotid Artery
- Facial Nerve
CMPS – Cervical Myofascial Pain Syndrome (TMJ-Cervico-cranial Pain Referral Path)

1) The first identifying symptom of the CMPS is the Levator scapulae muscle spasm. This muscle extends from the C-2 to C-7 vertebral dorsal processes to the medial inferior area of the scapulae. Rotation of vertebral displacement will cause spasm.
2) C-1 lateral tubercle prominence: Vertebral rotation (especially C-2) will often deflect the C-1 vertebrae to the direction of the dorsal eminence rotation (opposite the vertebral body rotation) of the C-2 vertebrae. C-1 will literally torsion laterally and become prominent below the stylohyoid process (behind the ramus under the ear).

A) -This prominence will produce medial pressure to the sternocleidomastoid muscle and hence tenderness along the lateral anterior portion of the neck.

B) -The longus coli muscle on the same side will become tender to touch due to the increased tension caused by the malposition of the vertebrae on their anterior aspects. (Anterior neck next to the trachea)

3) Rotation of C-2 also causes compression and irritation of the greater occipital nerve (up the back of the head) and the lesser occipital nerve (behind the ear). These nerve exit around the C-2 vertebrae and penetrate the trapezius muscle at the rear of the head.

- Greater Occipital nerve compression will cause occipital muscle spasms. This spasm will cause tension on the aponeurosis, which is a large piece of connective tissue that extends from the occipital muscle to the frontalis muscle above the eye. Hence pressure is noted above and behind the eye due to the compression of the V-1 branch of the Trigeminal nerve (CN V-1)
In summary: (The chicken or the egg?)

When the hypermobility occurs, the following can happen:
- The mandibular joint can malfunction that induces a mandibular position change, joint compression, malfunction and muscle spasms, contractions and “headaches”.
- The mandibular position change induces a cervical change that causes muscle spasms that extend from the infrascapular area, to the anterior and lateral neck (below the ear), behind the head and to the frontalis area over and behind the eye.
- This is all in addition to the temporomandibular joint symptoms.
- The mandibular occlusion will also be altered do the change in the mandible position (can’t find a “correct bite”) and the jaw joint “cracks” and “pops”.
In Conclusion: TMJ and Upper Cervical Stability

TMJ and upper cervical stability are almost always related in the EDS patient. Malposition of the vertebrae will produce jaw misalignment and malocclusion as well as limited function and joint noises.

Jaw misalignment will produce vertebral torsion and misalignment with limited function and skeletal referral pain.
THANK YOU