EDS Awareness in the TMJ Patient

TMJ and CCI with the EDS Patient “The 50/50” Myofascial Pain Syndrome

EDNF, Baltimore, MD
August 14, 15, 2015
Generation, Diagnosis and Treatment of Head Pain of Musculoskeletal Origin

Head pain generated by:
• Temporomandibular joint dysfunction
• Cervicocranial Instability
• Mandibular deviation
• Deflection of the Pharyngeal Constrictor Structures
Parameters & Observations

- 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 Instability syndromes. Both syndromes are virtually and always correlated.

- Evaluation of this syndrome was completed after testing was done to rule out complex or life threatening conditions.
The Temporomandibular Joint
TMJ Dysfunction
Symptoms: Deceptively Simple, with Complex Origins

1) Mouth opening, closing with deviation of mandibular condyles.
   - Menisci that maybe subluxated causing mandibular elevation.
   - Jaw locking “open” or “closed”.
   - Inability to “chew”.

2) “Headaches”/“Muscles spasms” (due to decreased vertical height) generated in the temporals muscle, cheeks areas, under the angle of the jaw.

3) Osseous distortion Pain can be generated in the cheeks, floor of the orbits and/or sinuses due to osseous distortion associated with “bruxism”.

---

John Mitakides, DDS, DAACP
THE TMJ TREATMENT CENTER
TMJ dysfunction cont.
(Any of the following motions may produce pain)

Pain With:

- Limited opening (closed lock):
  - Less than 33 mm of rotation in either or both joints
  - Translation - or lack of
- Deviations – motion of the mandible to the affected side or none when both joints are affected
- Over joint pain with or without motion around or
- Joint Sounds in the TMJ and associated structures or in “ear”.
  - can be “crepitus” (cracking) or “popping” with jaw motion
- Displacement of condyles can occur with or without motion bi- or unilaterally with or without motion.
Arthrokineatics of Temporomandibular Joints (TMJ)

- Ginglymoarthrodial joint - 2 balls with an interposed meniscus that are subject to degenerative joint disease (unstable complex joint)

- Pre and post vertebral musculature determine jaw position

- Craniomandibular rest position is a function of the mandibular rest position.
Arthrokinematics of Temporomandibular Joints (TMJ)
Pain Generating Structures in the Temporomandibular Joint

- 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
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 belly of digastric muscles
    - Lateral Rectus muscle of Eye
  - C-2 Area branches
  - L-2 Area branches
- Convergence Mechanisms
- Nociceptive Mechanisms
Headache, TMJ & Cervical Musculature Pain cont.

Headache type pain” may be generated by:
  Muscle Spasms
  Vascular Constriction
  Muscular Distortion
  Cranial Position
  Mandibular Position
  Inflammation or infection
  Neurologically
Muscles of mastication
(Headaches or pain sites)
- Temporalis (Anterior mid and posterior)
- Masseter (superficial, mid and deep)
- Internal pterygoid
- External Pterygoid
  - Superior head to meniscus
  - Inferior head to condyle

Muscles of the inferior border of the mandible and anterior neck and suboccipital triangles
- Anterior belly 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
TMJ, Mandibular and Oropharyngeal musculature

- How the mandibular musculature and upper pharyngeal constrictors interact
ANTERIOR JAW MUSCULATURE

- Mentalis muscle
- Orbicularis Oris Muscle
- Buccinator Muscle
- Superior Pharyngeal Constrictor
- Middle Pharyngeal Constrictor
Buccinator to Superior Pharyngeal Constrictor
Superior Pharyngeal Constrictor

- The mentalis muscle is located in the front of the chin and activated 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 integrate with the superior pharyngeal constrictor muscles that for the fascia and integrate with the anterior surfaces of the cervical vertebrae at C-1/2/3.

- Superior Pharyngeal constrictor is attached to the posterior fascia of the buccinator muscle
Nerve & Structure of the Superior Pharyngeal Wall
Proximate Structures

- Vagus Nerve
- Accessory Nerve
- Hypoglossal Nerve
- Sympathetic Trunk
- Alar Fascia
- Glossopharyngeal Nerve
- Internal Carotid Artery
- Facial Nerve
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 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.
Cervicocranial Instability and Impact on Craniofacial Pain
Cervicocranial Instability (CCI): Relationships (FHP)

- Normal Kyphotic Curve. When the occiput is horizontal, the TM joints will be horizontal in all three planes and will be on the same plane to the eminence of the temporal bone.
- 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

- 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.
Cervicocranial Relations cont.

- 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.
Result of Displacement of C-2
C-1 and -2 and Dens Articulation
Diagnostics/Cervical Spine

Atlas (C-1) limitations

- **Rotation**: If head rotation is limited to 50% (mid clavicle) with the head in full flexion.

- The lateral tubercle of C-1 is prominent:
  - If the transverse process of C-1 is anterior to the styloid process area and has extended the cervical and mandibular areas forward.
    - C-1 laterally and Produces “Pain”.

Axis (C-2) Testing

- **Side bending**: Bending of the 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)
RIGHT ROTATION OF ATLAS ON OCCIPUT.
Diagnostics, continued

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

- **Elevator muscle activity will cause shorted upper lip that will produce:**
  - 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

- **Increased vertical dimension:**
  - Appliance will increase the activity of the superior and middle pharyngeal constrictors. Increased vertical dimension will rotate the cranium posterior and superiorly.
Diagnostics, continued

- **Torticollis**: Cervical spine straightening and loss of the physiological curvature leads to degeneration of the spine. ("Torticollis")

- **Upper cervical ligament evaluation**
  - Ligaments Dictate
    - Proprioception
    - Nociception:
      - Cruciate Ligament: “Yes” ligament.
      - Alar ligament: “Perhaps” ligament.
      - Transverse ligament: “No” ligament.
Longitudinal portion of cruciform ligament
Apical dental ligament
Alar ligament
Transverse ligament of atlas (portion of cruciform ligament)
Accessory band of atlanto-axial capsule
Lateral atlantoaxial joint
Tectorial membrane
Posterior longitudinal ligament
Myofacial Pain syndrome

A referral a pain syndrome related to cervical stability proximate structures including Chiari that are influenced by mandibular and cervical distortions

Developed by J. E. Mitakides and research associates
Myofacial Pain Syndrome
(TMJ-Cervicocranial Pain Referral)

Sub and medial Infrascapular Pain:

- Mandibular positional change will cause superior and middle pharyngeal constrictor muscles tension that will affect tension of the cervical plane that will induce evulsion of the upper cervical vertebrae (C-2), (and V.V.).

- When the vertebrae avulse: the stabilizing musculature, especially the levator scapulae muscle opposite the side of rotation (to the dorsal prominence) will spasm.

- The levator scapulae muscle extends from the dorsal processes of C-2 to C-7 and inserts into the medial inferior aspect of the scapulae. The pain will feel like a knife under the shoulder blade when it is in spasm. The tenderness extends from the neck to the shoulder blade.
Image is from 3D4Medical's Essential Anatomy 4 application.
MPS, continued

C-1 lateral tubercle prominence: Vertebral rotation (especially C-2), the facets will 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)
MPS, continued

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

• 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).
MPS Summary

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.

- 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.”
Observations for pain demarcation and treatment

- If pain:
  - Starts in the infra scapular area and continues to the occipital base of the skull, over the head and behind the eyes and/or just behind the ramus on the same side:
    - Source is probably upper cervical (C-2) with the dorsal process rotated to the same side as the discomfort (MPS).
  - If the pain circles head like a “head band” around the face form anterior neck to top of head laterally:
    - Source is probably Migrainous
TREATMENT
Focus on Stabilization

- Eliminating/minimizing muscle spasms and pain
  - Deep heat
  - Cold laser
  - Friction muscle massage
  - Custom splints
  - Medication
  - Botox at trigger points
- Determine if Sleep Apnea is aggravating the problem
  - Sleep studies
  - Rx sleep appliance or c-pap
- Maintain stabilization
  - Custom splints and orthotics
  - Physical therapy
  - Lifestyle changes
- When specific indicators are present, send patient directly to neurosurgery consult
Patients & Self-Care

Patients are counseled against seeking upper cervical treatments such as chiropractic or other manipulation UNTIL ALL DIAGNOSTICS ARE COMPLETE and high-risk factors are eliminated.

Patients are given RED FLAGS to consider:

- “Worst headache of my Life!”
- Focal neurologic signs-not aura
- Headaches triggered by exercise or while engaging in sexual intercourse
- Headaches with a change in mental status, level of consciousness
- Neck stiffness or meningitis
- Onset of severe headache with pregnancy or post partum
- Onset of severe headaches in patients 50 years older or more.
- Papilledema (optic disc swelling that is caused by increased intracranial pressure) on funduscopic exam
- Thunderclap headaches” – sudden onset (maximum intensity occurs within seconds to minutes.)
- Systemic illness with headache (fever or rash)
- Worsening patterns
- New headache type in patient diagnosed with cancer, HIV or Lyme's disease
Pre-surgical Treatment Only

All treatments for instability and TMJ disorder are conducted by Dr. Mitakides ONLY in the appropriate pre-surgical patient.

Once surgery is performed for neck stabilization, all treatment is in the hands of the surgeon.
In Conclusion: TMJ and Upper Cervical Stability

There is a clear and direction correlation between malposition of the vertebrae and jaw misalignment and malocclusion, as well as limited function and joint noises. Such TMJ and upper cervical stability are almost always related in the EDS patient.

Additionally, jaw misalignment will produce vertebral torsion and misalignment with limited function and skeletal referral pain.
Course Disclaimer:

Dr. John Mitakides provides this information for instructional purposes. Dr. Mitakides shall not be liable for any and all injuries, damages or costs (including reasonable attorney’s fees) arising from the use of any or all of the materials or techniques that are provided to the participants of this course. Dr. Mitakides, The TMJ Treatment Center, and any employees therefore not liable for any direct or indirect, physical, consequential, special, exemplary or other damages arising from the use of the material that is presented or physically instructed by this course.
Migraine Headaches

The generation of migrainous head pain is still a “fluid” subject. However, the conclusions that my colleagues and I have reached are echoed by the Cleveland Clinic and Johns Hopkins Hospital.
Migraine headaches

The “Circle of Willis” is the primary arterial area affected at the base of the brain.

This area is affected by two separate inputs generating the same basic results. They are Vascular and Neurovascular:

- The neuro vascular inputs are affected by the Trigeminal Nerve that generates sympathetic and parasympathetic inputs to the arterial complex in the Circle. Hence the effectiveness of Imitrex and Topamax.

- Vascular inputs are also aberrated by the vertebral arteries at the skull base. The vertebral arteries joint to form the basilar artery which is the posterior communicating artery at the rear of the Circle of Willis. Hence the position of the vertebrae, head position and/or muscular tension affect this arterial flow. This is why neuromodulators will not affect the migraine.
Parameters for Migraines

5 headaches lasting 4-72 hours for > 3 months

2 of the following symptoms:
- Pulsating
- Unilateral
- Moderate to Severe
- Aggravated with exercise

One of the following:
- Photophobia and/or Phonophobia (light and sound)
- Nausea and/or vomiting
- Visual aura prior to onset of headache

Treatment may include rest, neuromodulators, cervical manipulation, Botox.
Circle of Willis
Physical Therapy

A review of techniques and instructions
Physical Therapy

- Physical Manipulation for treatment of the TMJ cervical complex
  
  - Distraction of the condyle-(inferior compartment of the TMJ)- When jaw will not rotate open or jaw is dislocated to replace the condyle into joint. Place thumb on occlusal surface of the lower mandibular teeth with the thumb under the chin. Rotate the molars down and chin up in a rotary motion.
  
  - Inferior joint mobilization of the TMJ. Use lateral condyle motion at the lingual of the lower molars and move the mandible laterally and forward.

(It is to be noted that the referring physician or dentist may place an oral orthotic in the patient’s mouth. This should be adjusted after all therapy sessions due to change in the mandibular positon after muscle adjustment.)
Physical Therapy, Continued

- Superior joint mobilization of the TMJ (when the condyle will not translate, open wider than 33 mm.)
  Lateral head shift- Stabilize the mandible and side and glide the fossae laterally.

- Mandibular rest position- tongue to the roof of the mouth

- Cervical muscle activation- see handout

- Superior pharyngeal constrictor stretch- see handout

- Middle pharyngeal constrictor stretch- see handout

- Cold Laser- max 1500 joules, Recommended 100-200 joules per sq., in area, (activates mitochondria to stimulate healing. 2.5 to 3 cm above tissue, lighter-skinned persons, further away)
Physical Therapy, Cont.

- Infrared therapy, 10 min Red-HOT, 3 min Blue-cold, 10 min Red-hot. Cycle

- Not that sleep appliances will increase airway spaces but may increase clenching and tightness of pharyngeal space.

- Malar-Sternal line exercise

- Lateral chin isometric exercise

- Opening stretch

- Scalene stretch

- Levator stretch

- Upper trap stretch
Physical Therapy Cont.

- Neck rotation
- Cervical extension
- Axial extension – chin tuck
- Neck flexion-self mobilization
- Jaw warm up
- Side bend isometric exercise
- Cervical brace in quadruped position
- Cervical “noodle” exercises
- Rotational seating appliance (RSA)
- Phase out sheet from appliances
Botox

- The use of Botox and similar neurotoxins has increased in recent years. Their use for therapeutic as well as cosmetic applications has increased dramatically.

- Uses:
  - Migraine protocols
  - TMJ therapy
  - Decrease clenching
  - Decrease AHI
  - Neuralgias (Trigeminal)
  - Cephalgias
  - Aphasias

Ehlers-Danlos

- A genetic hypermobility disease.
- Symptoms range from simple joint hypermobility to vascular symptomatology including but not limited to mitral valve prolapse, aortic distensions and ruptures, TIA’s, dysautonomia, POTS and a host of other symptoms.
- Included is a pamphlet handout with basic testing for the syndrome. Complex testing is done at Cincinnati Children's Hospital in Westchester, Ohio.
- All therapy for these patients are “closed loop”. and stabilized. Repetitions without weight load is recommended.
- Severe symptom onset is in early teens (esp. females)
Tinnitus

- Tinnitus is ringing in the ears

- Most ear ringing AKA tinnitus is temporary and may get better in a few days to a week. While you are waiting for your symptoms to subside:
  - Fan - run a fan in the background to produce white noise. This may help drown out the sound
  - Skip salty food! Salt increases inner ear pressure.
  - Try an antihistamine! Nasal allergies cause nasal swelling and fluid buildup, both can cause ear buzzing.
  - Pass on coffee and cocktails! Both can alter inner ear fluid dynamics.
- These remedies are for transient Tinnitus. Try them and see if they help.
THANK YOU