An Introduction to TMJ Chiropractic Analysis and Adjustment

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Why TMD

• The TMJ’s are among the most frequently used joints in the body
• Open/close 2000+ times/day!

Why TMD?

• While we can rest most joints, it is nearly impossible to leave the jaw joint inactive, even when sleeping
• When it is not functioning properly, muscles begin to hold in a tense, unnatural position
• This leads to pain, trigger point formation, muscle spasm, and eventual spread throughout the soft tissues

• Many patients do not know where to turn for TMJ Disorders

• “The TMJ Association’s report to the National Institutes of Health (NIH) states that “TMJ patients see on average 6.9 specialists before receiving a definitive diagnosis” TMJ.org
• Burt Reynolds saw over 13 different doctors before getting help

• “His condition allegedly began when he was hit on the jaw. In the 1980’s, Reynolds didn’t work for three years. His weight dropped to 140 pounds. People thought he had AIDS which kept him from making movies. What he actually had was TMJ dysfunction.”

• Here is how Mr. Reynolds described his problem.

• “When your jaw, your bite, goes off, your equilibrium goes off, too. You’re in a kind of brain pain that comes up and whips your eyeballs out. Then the nausea starts. It is like being seasick all the time. You throw up, can’t lie down, and can’t take any light. If the phone rang, I’d fall on the floor with a pillow over my head because of the pain. I had tubes in my ears and I didn’t eat, just drank soup. I kept getting thinner and thinner. It was scary. I got real carved cheekbones. Friends suggested I see a psychiatrist.”

Who gets it?

• Effects 90% of the population in at least one stage of life

• NEJM
  • 40-75% of adults in the United States report at least one sign of TMJD
  • TMJD most commonly reported in 25-50 age group
  • Seen in both men and women, however women seek care 3-9x more

• Dynamed
  • Signs and symptoms of TMDs increase in frequency and severity from age 10 to 40 years, with a peak incidence in patients aged 20-40 years, and are more prevalent in women.

Risk Factors for TMD

• macrotrauma from impact injuries affecting the masticatory system and neck, including
  • falls resulting in trauma to the chin (may be associated with development of TMDs in children)
  • motor vehicle accidents
  • sports
  • physical abuse
  • forceful intubation
  • third molar extraction

• microtrauma from parafunctional habits that leads to cartilage breakdown, synovial fluid alterations, and other joint changes, such as
  • jaw clenching
  • hyperextension
  • playing a wind instrument
  • fingernail biting
  • other activities where the mouth is open outside of the usual rest position
  • bruxism (tooth grinding)
Risk Factors for TMD

- smoking in women < 30 years old
- psychological factors associated with clenching and bruxism may contribute to orofacial pain and temporomandibular dysfunction
- anatomical factors (skeletal and occlusal) may have a weak association with development of TMDs
- poor craniofacial posture may be associated with occlusion and dysfunction of the TMJ
  - Dynamed

Costs

- Enormous impact
  - Loss of an estimated $30 Billion/year in productivity
  - 550 million lost workdays due to TMD symptoms such as headache and facial pain
  - “TMDs exerted a substantial impact on the individual and economy through lost productivity and on the health care system due to disorganized care pathways increasing the number of consultations required to achieve either diagnosis or care for the condition.”
  - National Academies of Sciences, Engineering, and Medicine

What should be done about it?

- National Institute for Dental and Craniofacial Research (NIDCR)
- “Less Is Often Best in Treating TMJ Disorders” campaign

NIDCR Recommendations

- 1. Try simple self-care practices
- 2. Avoid treatments that cause permanent changes to the bite or jaw
- 3. Avoid, whenever possible, surgical treatment for TMJ
NEJM & NIH Recommendations

NEJM
• 2008
• Estimated 85-90% TMJD can be treated with “non-invasive, nonsurgical, and reversible interventions”

NIH
• Pamphlet on TMJD
• “experts strongly recommend using the most conservative, reversible treatments possible”

Issues Raised During Patient Experiences

• Lack of coordinated care and abandonment
  • Shuffled between MD’s and DDS’s
• Overtreatment/harmful treatment
  • Multiple TMD surgeries or orthodontic correction
• Impact on quality of life
  • Pain with dining, kissing, emotional consequences etc.

The Good News

• 50%-90% of patients treated conservatively reported to have pain relief
• < 5% of adults with temporomandibular symptoms develop chronic or debilitating symptoms

• Expense
  • Mostly out of pocket and upwards of $10,000+
• Identifying qualified health care professionals
  • Frustration of not knowing where to turn
• Comorbidities
  • Many also suffer from fibromyalgia, fatigue, depression, anxiety, arthritis, etc.
Causes of TMJ Problems

- Injury
  - Direct trauma to the jaw or face
    - Heavyweight Boxers can average about 1200-1700 psi
    - Untrained around 150 psi
  - Direct trauma from airbag deployment
    - 200 mile per hour inflation
    - Can withstand 2000 pounds of force
    - Without proper positioning and belting

Bad Habits

- Posture
  - Slouching
  - Forward head posture
  - Text neck

- Thumb sucking as a child
- Pencil biting
- Gum chewing
Holding the phone

• Stomach sleeping
• Resting on chin

Clenching the jaw

“When the mandible closes, hard, on nothing, as when grinding the teeth, it exerts too strong a pressure- the joint becomes “loaded”. Over a period of time the disc tends to be squeezed forward between the bones, rather like a watermelon seed squeezed between the fingers”

“The TMJ Book”, Andrew S. Kaplan, DMD

• Social/Emotional
  • Stressful life events
  • Depression
  • Anger
  • Fear
Dental

- Malocclusion
- Dental surgery
- Poorly fitting or worn-out dentures
- Opening jaw for prolonged period
- Big yawn

Genetics

- Muller et al (1992a, 1997) found a relationship between TMJ disc displacement and these anatomic features:
  - A deep mandibular fossa
  - A small condyle
  - Loss of posterior teeth

Subluxation!

- Adjust the spine first!
- Gonstead estimated 50% of TMJ issues were cervical subluxation
  - “Chiropractic care of a patient with temporomandibular disorder and atlas subluxation”
  - High-velocity, low-amplitude adjustments (ie, Gonstead technique) were applied to findings of atlas subluxation. The patient’s symptoms improved and eventually resolved after 9 visits.
• In a patient population with TMD, 70% found to have cervical spine dysfunction

• Chiropractic treatments enabled the body to respond positively to the dental changes

• This case report described how collaboration between a dentist and a doctor of chiropractic may help to provide quick resolution for patients with TMD, racemosis, and myalgia. With 25% of the population having some form of TMD and taking into account the neurological and biomechanical connection to the cervical spine, dentists and chiropractors have the potential to help patients improve symptoms through comanagement.

Terminology

• TMD = Temporomandibular Joint Dysfunction
• TMA = Apparatus
  - Teeth and support structures
  - Skeletal components (temporal and mandible)
  - TMJ joints
  - Muscles of mastication
  - Associated cervical musculature
• TMD = TM Dysfunction *MOST COMMON
• OFP = Orofacial Pain
• TMJD = TMJ Disorders
• TMS = TM Syndrome
• Costen’s syndrome

Anatomy Review

Mandible Review
Temporomandibular Joint (TMJ)

- Hinge type (ginglymus) of synovial joint (arthrodial)
- Articulation between head of mandibular condyle & mandibular fossa of temporal bone
- Innervated by auriculotemporal n which arises from the mandibular division of the trigeminal n. It also receives branches from the masseteric n. and the posterior deep temporal n.

TMJ Ligaments

1) Joint Capsule- surrounds joint- tightly attached to mandible, loosely to temporal bone
2) temporomandibular (lateral) ligament
3) sphenomandibular ligament
4) stylomandibular ligament

Muscles of Mastication

- Temporals
- Masseter
- Lateral Pterygoid
- Medial Pterygoid
- All originate on the fixed cranium and insert on the moveable mandible
**Temporalis**

Origin—temporal fossa

Insertion—coronoid process & ramus of mandible

Action—closes (elevates) jaw; posterior portion retracts jaw

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**Masseter**

Origin—zygomatic arch

Insertion—coronoid process & ramus of mandible

Action—closes jaw

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**Medial Pterygoid**

Origin—pterygoid plate of sphenoid, also palatine & maxillary bones

Insertion—medial surface of ramus of mandible

Action—closes jaw

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**Lateral Pterygoid**

Origin—great wing of sphenoid bone & lateral pterygoid plate

Insertion: condyle, articular disc, & capsule of TMJ

Action—opens, (depresses), protrudes, moves mandible from side to side

* Moves disc anterior with opening
Disc of TMJ
Articular surfaces covered by fibrocartilage
Articular disc positioned in between condyle & temporal bone; attached to capsule & tendon of the lateral pterygoid m
Disc divides joint cavity into upper & lower compartments
Disc has no innervation/blood supply

The Disc or Meniscus
• Biconcave shape
  • Similar to a side sleeping pillow
  • Needs to move within the concave mandibular fossa and over the convex articular eminence

The Retrodiscal Tissue
• Retrodiscal tissue (RT or RDT) also called the Posterior Band
• Highly vascular and highly innervated which makes it a main contributor to the pain of TMD particularly with inflammation or compression of the TMJ
• RT may function to limit anterior disc translation and may act as a “nutrient pump”

Retrodiscal Tissue Natural Adaptation
• With Anterior Disc Displacement the condyle compresses the RDT which can be very painful due to the nature of it being highly vascular and innervated
• However, a process called Natural Adaptation can occur
• The RDT develops disc-like scar tissue serving the purpose of the disc
Examination

- Subjective
  - Location and onset of symptoms
  - Mechanism of injury (if appropriate)
  - Severity of symptomology
  - Level of irritability
  - Provoking or palliative factors
  - Joint crepitus, clicking or locking

- Significant history (previous fractures or trauma, dental history, bruxism, etc.)
- Timing of symptoms
- Red and yellow flag identification
- Referral area questions (neck pain, dizziness, headaches, migraines or other neurological symptoms)

History

• 12 major signs and symptoms
  1. Pain at TMJ
  2. Crepitus at TMJ
  3. Bruxism
  4. Inability to open mouth
  5. Inability to close mouth
  6. Tracking problems
  7. Muscle weakness
  8. Headaches
  9. Chronic recurring cervical subluxations
  10. Tinnitus
  11. Vision problems
  12. Neck pain

**Must have 3 or more signs to have a TMD diagnosis

• Dr. Kevin Hearon, CCEP program

Other signs and symptoms

• Pain in the teeth
• Tired or sore jaw upon waking
• Difficulty swallowing
• Muscle soreness/spasm head or neck
• Difficulty hearing
• Earaches w/o infection
• Sinus pain
• Pressure behind eyes
• Tearing for no reason
• Muscle spasm neck, back, shoulders, arms, legs
• Numbness arms or fingers
• Dizziness
• Backache
• Cold hands/feet
• Arthritis

Examination

• Objective
  • Observation
    • Facial symmetry
    • Swelling or deformation
    • Occlusion
    • Muscle bulk
    • Jaw position at rest
    • Swallow
    • Audible joint noise
    • Cervical spine exam

Examination

• Palpation
  • Palpate the joint bilaterally
  • Static palpation for pain and swelling and palpable differences bilaterally

  • Motion palpate the joint as patient opens and closes slowly
    • Note any deviations, clicking, crepitus, pain, blockage
Examination

• Range of Motion
  • 5 motions and ranges (2)
  • Open – 40-60 mm normal
  • Close
  • Left Translation – 7-12 mm normal
  • Right Translation – 7-12 mm normal
  • Anterior Translation – 6-12 mm normal
• Open, Close, L+R Translation, and Anterior Translation against resistance

• Maximal Mouth Opening
  • 3 fingers

“These findings strongly suggest that the ability to position 3 fingers in the mouth during dental examination is a convenient index for assessing normal MMO.”


Special Test

• Tongue Blade test
  • Rule out mandibular fracture with trauma
    • Have patient bite down on a tongue depressor on one side of the mouth
    • Twist the depressor attempting to break it
    • Repeat other side
    • If patient experiences pain or has to let go of the depressor may be positive for mandibular fracture

Outcome measures

• Oral Behaviors Checklist (OBC)
  • This checklist assists in objectively recording whether any accessory behaviors induced by circumstances such as stress and anxiety are contributing to the condition.

Steigerwald Maher TMD Disability Index (SMTDI)

The Kinnie-Funt (K-F) Chief Complaint Visual Index for Head, Neck, and Facial Pain and TMJ Dysfunction.

Example:
- C. Mouth, Face, Cheek, and Chin Problems:
  - Discomfort
  - Limited opening
  - Inability to open smoothly, evenly
  - Jaw deviates to side when opening
  - Inability to "find bite"
- D. Teeth and Gum Problems:
  - Grinding, clenching at night
  -松ness and or soreness of back of teeth
  - Tooth pain
- E. Jaw and Jaw Joint (TMJ) Problems
  - Clicking, popping jaw joints
  - Grinding sounds
  - Jaw locking: opened or closed
  - Pain in cheek muscles
  - Uncontrollable jaw, tongue movements

Auscultate

• Listen for crepitus, clicking or popping sounds
• Stethoscope just anterior to the EAM
• Patient may tell you of the sound
**TMJ Motion**

- Condylar Process articulates with Mandibular Fossa through a Biconcave Disc

- Disc movement
  - Glides Anterior and Inferior upon opening
  - Glides Posterior and Superior upon closing

**Mouth Closed/Open**

Hinge/rotational movement - between condyle & disc (ginglymus joint type motion)

Gliding/translation movement - between mandibular fossa & disc when jaw is relaxed (arthrodial joint type motion)

Upon opening:
- first hinge in lower compartment (~20mm)
- then slide in upper compartment (~20-30mm)

Lateral movement – gliding of upper compartment
Temporomandibular Joint Dysfunction (TMD, TMJ, TMJD, TMJ Disorder)

Clicking – occurs in most common form of TMJD; disc displacement with reduction

In most common form, disc is located anterior to joint articulation

First click upon opening mandible – reduction of disc displacement (disc is now in between condyle & temporal fossa – where it should be normally)

Second click upon closing mandible – displacement of disc (disc is no longer between condyle & temporal fossa – in abnormal position again)

Temporomandibular Joint Dysfunction (TMD, TMJ, TMJD, TMJ Disorder)

Locking – when displaced disc impedes/prevents normal motion

Closed lock – cannot open fully; disc is anterior to condyle & prevents opening

Open lock – unable to close mouth; condyle gets stuck in open position because disc lagged behind, thus preventing closing (disc is posterior to condyle)
2 main subluxations of TMJ

- **Superior Lateral Condyle**
  - Anterior disc displacement

- **Anterior Inferior Condyle**
  - Posterior disc displacement

**Superior Lateral Condyle/Anterior Disc**

- Most Common
- 80%
- Trouble OPENING mouth
- Disc moves Anterior, Inferior, and Medially
- Condyle moves Superior and Lateral in the fossa
- **JAW WILL DEViate TO SIDE OF INVOLVEMENT**
- Tenderness and prominent condyle
Anterior Inferior Condyle/Posterior Disc

- Less common
- Trouble closing
- Involved side may feel “hollow” and tender
Superior Lateral Condyle
• Condyle is situated Superior and Lateral in the fossa because the disc is anterior and inferior and medial
• Examination
  • Trouble opening mouth
  • Prominence of condyle
  • Tenderness of either side in the mandibular fossa
  • Crepitus with movement
• Patient Placement
  • Seated or Supine
• Doctors stance
  • Behind chair or head of table
• Thrust
  • Lateral flex the patient towards the contact side, have them open the jaw, tissue pull down to the contact and then a short, quick HVLA thrust down the ramus. Almost a “tissue pull” adjustment

• Right Superior Lateral Condyle Seated
  o PP Seated with a chair back
  o DS Behind the chair slightly favoring Right side
  o SCP Condyle of the mandible on Right side
  o CP Right Thenar or Base of the First Metacarpal
  o SSP Left TMJ and Upper Cervical Spine similar to a Gonstead Cervical Chair Stabilization
  o LOC S-I, R-L, P-A Down the ramus of the mandible between the left nipple and left axilla

• Left Superior Lateral Condyle Seated
  o PP Seated with a chair back
  o DS Behind the chair slightly favoring Left side
  o SCP Condyle of the mandible on Left side
  o CP Left Thenar or Base of the First Metacarpal
  o SSP Right TMJ and Upper Cervical Spine similar to a Gonstead Cervical Chair Stabilization
  o LOC S-I, L-R, P-A Down the ramus of the mandible between the Right nipple and Right axilla
• Right Superior Lateral Condyle Supine
  o PP Supine
  o DS Head of table
  o SCP Condyle of the mandible on Right side
  o CP Right Fleshy Pisiform, Thenar, or Base of the First Metacarpal
  o SSP Left TMJ and Upper Cervical Spine similar to a Gonstead Cervical Chair Stabilization
  o LOC S-I, R-L, P-A Down the ramus of the mandible between the left nipple and left axilla

• Left Superior Lateral Condyle Supine
  o PP Supine
  o DS Head of table
  o SCP Condyle of the mandible on Left side
  o CP Left Fleshy Pisiform, Thenar, or Base of the First Metacarpal
  o SSP Right TMJ and Upper Cervical Spine similar to a Gonstead Cervical Chair Stabilization
  o LOC S-I, L-R, P-A Down the ramus of the mandible between the right nipple and right axilla

Anterior Inferior Condyle

• Condyle is seated Anterior and Inferior because the disc is Posterior and Superior in the Mandibular fossa
• Examination
  • Inability to close mouth or approximate teeth
  • Involved mandibular fossa is tender
  • Involved mandibular fossa may feel “hollow”
• Patient Placement
  • Seated or Supine
• Doctors stance
  • Behind chair or head of table

• Anterior Inferior Condyle Supine
  o PP Supine
  o DS either side of table facing patient
  o SCP Chin and Ramus
  o CP thumb web of inferior hand
  o SSP Forehead
  o LOC A-P, I-S Contact mandible have patient open jaw, apply firm A-P pressure and have them close slowly, as the jaw releases, apply I-S pressure also until mouth is closed
- Anterior Inferior Condyle Seated
  - PP Seated
  - DS Directly behind patient
  - SCP Chin and Ramus
  - CP Index and middle fingers over anterior chin and thenars and thumbs supporting the rami
  - SSP Patient’s head on your chest or belly (use of available condyle block)
  - LOC A-P, I-S Contact mandible have patient open jaw, apply firm A-P pressure and have them close slowly, as the jaw releases, apply I-S pressure also until mouth is closed, no thrust

Muscles of Mastication
- Nmonic “MTPP”
- Masseter
- Temporalis
- Lat Pterygoid
- Med Pterygoid

Trigger Point Patterns

Temporalis

- To stretch place your thumb on the zygomatic arch and fingertips spread out on the temples and press upward as you open the mouth
- Increase the stretch by keeping the tip of your tongue on the roof of your mouth
- Also for Med Pterygoid

Masseter

- To stretch, blow air into the back of your cheek one at a time
Medial Pterygoid

- To stretch relax the jaw completely and let it hang open slightly, then move the tongue side to side also for Lateral Pterygoid

Lateral Pterygoid

Stretch by holding mouth open just slightly and jutting jaw forward

Superior Belly of Lateral Pterygoid

- Due to its superior belly attachments at the disc (40% fibers) it makes perfect sense these muscles are "the number one myofascial source of pain and TMJ dysfunction"
  - Clair Davies, NCTMB, "Trigger Point Therapy Workbook"
  - Active especially during closing against resistance such as clenching or chewing

Trigger Point Patterns

Trapezius

Levator Scapulae
Trigger Point Patterns

Splenius Cervicus

Clinical Decisions

• Recommendations vary
• Conservative treatment of 6 visits
• If no significant improvement (50%) refer out to Dentist
• 2-4 weeks of conservative therapy (Dynamed)

Billing and Coding

• Adjustment falls under:
  • CPT
    • 98943 Extremity adjustment
  • Diagnosis
    • M99.00 segmental and somatic dysfunction of the head (including temporomandibular joint, excluding atlanto-occipital)
    • M26.60 through M26.65
      • 60 unspecified
      • 62 adhesions and ankylosis
      • 62 arthralgia
      • 63 articular disc disorder
      • 64 arthritis
      • 65 arthropathy
    * Plus a 2, 3, or 3 for Rt/Lt/Bilat

Billing and Coding

• When submitting claims for CPT code 98943, make sure to have at least:
  • the patient's history/subjective complaints
  • your examination findings
  • at least one extremity diagnosis
Contraindications to Adjustment

- Conditions that weaken the mandible
  - Extreme bony resorption
  - Cystic lesions
  - Infections
  - Tumors
  - Osteoporosis
- Conditions that weaken the dentition
  - Periodontal disease
  - Caries
  - Temporary restorations
- Extreme anxiety or muscle splinting

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