

Diagnostic Classification and Treatment
Implications by Physical Therapists for Patients with
Headaches and/or Temporomandibular Disorders

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Disclosure

No relevant financial relationship exists

2/20/2016

Session Learning Objectives

- Provide a valid approach for PTs in classifying and treating patients presenting with TMD or other craniofacial disorders including headaches.
- Detail best practices for physical therapy examination and plans of care for patients with TMD and/or other craniofacial disorders, based on best evidence and interprofessional standards.

2/20/2016

Session Learning Objectives

- Describe indications and precautions, based on the examination and screening, for integrating an interprofessional approach for diagnoses or treatment classifications suspected to be outside the scope of typical PT practice, including screening for primary headache, cranial nerve disorders, and behavioral health issues.
- Provide an overview of the functional anatomy and pathomechanics as they pertain to the primary disorder classifications associated with TMD and craniofacial pain.

2/20/2016

Session Learning Objectives

- Discuss the clinical indications for recommending additional imaging studies of the TMJ region to assist with differential diagnosis and plan of care.
- Describe the roles of the members of the interprofessional team in managing the care of the patient with chronic TM and craniofacial disorders including headaches.
- Describe the pathomechanics, and best practices for classification and interventions for cervicogenic headaches.

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Outline

- PT and the interprofessional team
 - How to find an OFP specialist
- Current classification scheme
- Anatomy of the Craniovertebral region
- Differential diagnosis
- PT intervention algorithm

2/20/2016

TMD Classifications

APTA Combined Sections Meeting, Anaheim CA, 2016

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Introduction¹

- TMJ ≠ TMD
- ADA accepted TMD dx in 1983
- ≈ 35% of US population has TMD
 - 5-10% seek medical assistance
- 20-40 y/o females most common
 - Genetics, hormonal, and occupational

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Team Approach

- Management of TMD may involve multiple players²
 - PT
 - Dentist
 - Psychologist/Psychiatrist/BPM
 - Others?

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Team Players: PT

- Most common TMD complaints seen in PT
 - Muscle and joint involvement– both cervical and TMJ
 - ↑Pain and/or ↓ROM
 - Psychosocial and behavioral factors contributing to dysfunction
 - Parafunction, stress, posture
- PT = experts in neuromuscular dysfunction³⁻¹⁰
 - This can be extrapolated to TMJ region

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Team Players: Dentistry

- Recruit OFP dentist if still present after 1 month:^{1, 11}
 - Parafunctional activity
 - Joint inflammation and/or trigger points
 - Muscle pain

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How Do I Find an Expert?

- Not all dentists are experts in the management of TMD
 - ≈ 14% of general dentists and 22% of oral surgeons treat TMD
 - TMD comprises <5% of their practices
 - Patients with TMD see average of 5.3 clinicians and pain 4.2 years before seeing a specialist

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How Do I Find an Expert?

- Credentials: Dental Diplomate
 - Orofacial pain specialists
 - 5 years of OFP experience
 - 400 hours of CEUs
 - Board exam
- www.aaop.org

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How Do I Find an Expert?

- Credentials: PT-CCTT
- Experience: 5 years at PT
 - 2000 hours in OFP, HA, neck pain in 5-10 years
 - 100 CEUs
- 2 letters of reference
 - Dentist/oral surgeon and PT
- Board exam
- www.ptcctt.org

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Team Players: BPM

- TMD is associated with psychosocial issues¹²
- Patients with chronic TMD are physiologically over-reactive → leads to substantial psychosocial stressors vs. those without TMD¹³

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Classification

- DC/TMD originally developed by Dworkin and LeResche in 1992
 - Based on symptoms – termed RDC/TMD
- Modified in 2010 by inter-professional consortium¹⁴
 - Based on ICF model – termed DC/TMD

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DC/TMD

- Axis I – Physical Exam
 - Group I – Masticatory muscle disorders (M62.89)
 - Group II – Disc displacement (M26.63)
 - Group III – Joint dysfunction (M26.62)
 - If using algorithm, excellent inter-examiner reliability for any muscle disorder, any joint pain, or any disc disorder¹⁴⁻¹⁷

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DC/TMD

- Axis II – Psycho-social
 - Shift toward Axis II dominance as time passes¹
 - Ask Anne about Okeson's chart that relates time with more psychosocial issues

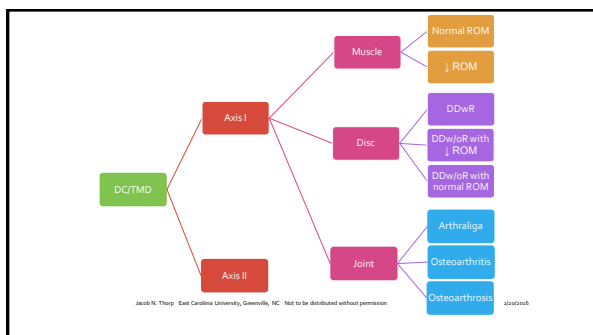
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Kraus, 2014

Groups	Total patients	Right	Left	Bilaterally
Group I	425			
Myofascial pain	321			
Ia. Myofascial pain without limited opening				
188, masseter; 3, temporalis; 130, masseter & temporalis				
Masseter	318	30	57	231
Temporalis	133	11	14	108
Ib. Myofascial pain with limited opening (≤30 mm)	106			
72, masseter; 0, temporalis; 34, masseter & temporalis				
Masseter	106	28	23	55
Temporalis	34	7	6	21
Group II				
Disc displacements	199			
IIa. Disc displacement with reduction	88	31	37	20
IIb. Disc displacement without reduction with limited opening (≤30 mm)	70	30	34	6
IIc. Disc displacement without reduction without limited opening (>30 mm)	41	14	19	8
Group III				
IIIa. TMJ arthralgia	249	77	81	82
IIIb. Osteoarthritis	24	11	7	6
IIIc. Osteoarthrosis	25	10	11	4

TMDs, temporomandibular disorders; TMJ, temporomandibular joint.

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- Harrison AL, Thorp JN, Ritzline PD. A Proposed Diagnostic Classification of Patients with Temporomandibular Disorders: Implications for Physical Therapists. *JOSPT*. 44(3):182-197, 2014.
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- de Toledo EG, Jr., Silva DP, de Toledo JA, Salgado IO. The interrelationship between dentistry and physiotherapy in the treatment of temporomandibular disorders. *J Contemp Dent Pract*. 2012;13:579-585.

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Anatomy of the Temporomandibular Joint

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APTA Combined Sections Meeting, Anaheim, 2016

Temporomandibular Joint Anatomy



 **WALSH**
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TMJ Anatomy – Overview¹

- Diarthrodial synovial joints
- Fibrous cartilage covers articular surfaces
- Fibrocartilaginous articular disc
- Construction
 - Beneficial for rapid & smooth mandibular movement
 - Vulnerable to failure
 - Too little loading
 - Too much loading

Tanaka E, Koolstra JH. Biomechanics of the temporomandibular joint. J Dent Res, 2008 Nov;87(11):989-91.

Bones of the Skull²

Cranial Bones	Quantity	Facial Bones	Quantity
Ethmoid Bone	1	Inferior Nasal Conchae	2
Frontal Bone	1	Lacrimal Bones	2
Occipital Bone	1	Mandible	1
Parietal Bone	2	Maxillae	2
Sphenoid Bone	1	Nasal Bones	2
Temporal Bone	2	Palatine Bones	2
		Vomer	1
		Zygomatic Bones	2

Cook C, Fleming R. Orofacial Pain Disorders. In: Hegedus E, Cook C. *Orthopedic Assessment*. Upper Saddle River, NJ: Prentice Hall; 2011.

Osteology: Maxilla, Mandible, Temporal bone, Dentition³

Agur AM, Dalley AF. *Grant's Atlas of Anatomy*. 13th ed. Lippincott Williams & Wilkins Publishers. 2013.

TMJ Anatomy – Bony³

Agur AM, Dalley AF. *Grant's Atlas of Anatomy*. 13th ed. Lippincott Williams & Wilkins Publishers. 2013.

Joint Surfaces³

- Concave mandibular fossa of the temporal bone
- Convex articular eminence of the temporal bone
- Convex condyle of the mandible
- Fibrocartilage

Agur AM, Dalley AF. *Grant's Atlas of Anatomy*. 13th ed. Lippincott Williams & Wilkins Publishers, 2013.

TMJ Anatomy – Disc/Meniscus⁴

Morales H, Cornelius. Imaging approach to temporomandibular joint disorders. *Clin Neuroradio*, 2015 Feb;(2):1-18.

TMJ Anatomy – Ligaments/Capsule^{3,5}

Agur AM, Dalley AF. *Grant's Atlas of Anatomy*. 13th ed. Lippincott Williams & Wilkins Publishers, 2013.

Le Toux G, Duval JM, Darnault P. The human temporo-mandibular joint: current anatomic and physiologic status. *Surg Radiol Anat*, 1989;(11):283-288.

TMJ Anatomy – Capsule³

Agur AM, Dalley AF. *Grant's Atlas of Anatomy*. 13th ed. Lippincott Williams & Wilkins Publishers. 2013.

TMJ Anatomy – Muscles³

Agur AM, Dalley AF. *Grant's Atlas of Anatomy*. 13th ed. Lippincott Williams & Wilkins Publishers. 2013.

TMJ Anatomy – Muscles³

Agur AM, Dalley AF. *Grant's Atlas of Anatomy*. 13th ed. Lippincott Williams & Wilkins Publishers. 2013.

TMJ Anatomy – Muscles³

Agur AM, Dalley AF. Grant's Atlas of Anatomy, 13th ed. Lippincott Williams & Wilkins Publishers. 2013.

TMJ Associated Structures

- Bony
 - Head
 - Cervical spine
 - Hyoid bone
- Teeth
- Muscles
- Vascular structures
- Neurological structures

TMJ Associated Bony Structures

- Head
- Cervical spine
- Hyoid bone

TMJ Associated Bony Structures³

Agur AM, Dailey AF. Grant's Atlas of Anatomy, 13th ed. Lippincott Williams & Wilkins Publishers. 2013.

TMJ Associated Structures

TM Joint Associated Muscles³

Agur AM, Dailey AF. Grant's Atlas of Anatomy, 13th ed. Lippincott Williams & Wilkins Publishers. 2013.

TM Joint Associated Muscles³

Agur AM, Dalley AF. *Grant's Atlas of Anatomy*. 13th ed. Lippincott Williams & Wilkins Publishers. 2013.

TM Joint Associated Muscles³

Agur AM, Dalley AF. *Grant's Atlas of Anatomy*. 13th ed. Lippincott Williams & Wilkins Publishers. 2013.

TM Joint Associated Muscles³

Agur AM, Dalley AF. *Grant's Atlas of Anatomy*. 13th ed. Lippincott Williams & Wilkins Publishers. 2013.

TM Joint Associated Muscles³

Suboccipital muscles

Agur AM, Dalley AF. Grant's Atlas of Anatomy, 13th ed. Lippincott Williams & Wilkins Publishers, 2013.

TM Joint Associated Muscles³

Agur AM, Dalley AF. Grant's Atlas of Anatomy, 13th ed. Lippincott Williams & Wilkins Publishers, 2013.

TMJ Associated Neurovascular

Differential Diagnosis

- Primary headache
- Secondary headache
- Cranial & peripheral neuralgias
- Central nervous system disorders

TM Structures as Source⁶

- Key questions
 - Have you had pain or stiffness in the face, jaw, temple, front of ear, in the ear in the last month?
 - Are the symptoms altered by any of the following:
 - Functional activities – chewing, talking, singing, yawning, kissing, moving the jaw
 - Parafunctional activities – clenching, grinding, bruxing
 - Have you ever had your jaw lock or catch?

The International Headache Society, ICHD-3 beta. The international classification of headache disorders, 3rd edition (beta version). Cephalalgia. 2013;33(9):629-808 10.1177/0333102413485658.

Differential Diagnosis

- Screen for Red Flags – SNOOP
 - Systemic – fever, chills, night sweats
 - Neurologic – abnormal neurologic findings
 - Onset sudden – H/A peaks within 1 minute
 - Onset after age 50
 - Pattern change
 - Increase in frequency
 - Associated with Valsalva
 - Aggravated by postures that change cranial or eye pressure
 - Any of above = immediate medical attention

Martin V.T. The diagnostic evaluation of secondary headache disorders. Headache. 2011;51(2):346-52.

Primary Headache

- IHS – neurological or vascular in origin
- Migraine
- Tension type
- Trigeminal autonomic cephalgia
 - Cluster
- Other primary headache disorders

Migraine⁶

- Common disabling primary H/A
- Disrupts life, daily function
- 3rd most prevalent disorder worldwide
- 7th specific cause of disability worldwide
- Women > men
- Major subtypes
 - Migraine without aura
 - Migraine with aura

The International Headache Society, ICHD-3 beta. The international classification of headache disorders, 3rd edition (beta version). Cephalalgia. 2013;33(9):629-808 10.1177/0333102413485658.

Migraine Diagnosis⁶

- HA: Unilateral, may shift
- Lasts 4-72 hours
- At least 2
 - Unilateral
 - Moderate to severe intensity
 - Increased with physical activity (avoidance of.....)
 - Pulsating quality
- At least 1
 - Nausea, vomiting
 - Photophobia, photophobia

The International Headache Society, ICHD-3 beta. The international classification of headache disorders, 3rd edition (beta version). Cephalalgia. 2013;33(9):629-808 10.1177/0333102413485658.

Primary Headache⁶

- **Migraine**
 - Neurological, with possible vascular component
 - **Cortical Spreading Depression**
 - Self propagating progression of depolarization of both neuronal and glial cells
 - Previous theory: vasodilation (aura) followed by vasoconstriction (HA)

The International Headache Society, ICHD-3 beta. The international classification of headache disorders, 3rd edition (beta version). Cephalalgia. 2013;33(9):629-808 10.1177/0333102413485658.

Cortical Spreading Depression⁸

- Depolarization begins in occipital lobe
- Band is depolarization, causing depression of cortical activity and increased CBF
- Blue is reduced CBF
- Visual aura in occipital
- Sensory changes in extremities as CSD reaches post central gyrus (SS cortex)
- 6: usually stops at central gyrus
- 7: full scale attack
- 8: brain perfusion returns to normal

Journal of Cerebral Blood Flow & Metabolism (2011) 31, 17–35; doi:10.1038/jcbfm.2010.191; published online 3 November 2010

Neuronal changes⁶

- Cortical spreading depression definitely part of migraine with aura
- Still debated in terms of migraine without aura
 - Neurobiology is still the culprit
 - Brain stem blood flow reduced in migraine without aura

The International Headache Society, ICHD-3 beta. The international classification of headache disorders, 3rd edition (beta version). Cephalalgia. 2013;33(9):629-808 10.1177/0333102413485658.

Triggers⁶

- Food/Drink
- Musculoskeletal
 - Cervical "tension"
- Stress
- Menstrual cycle
- Medication
 - Overuse
 - Withdrawal

The International Headache Society, ICHD-3 beta. The international classification of headache disorders, 3rd edition (beta version). Cephalalgia. 2013;33(9):629-808 10.1177/0333102413485658.

TENSION TYPE Headache

Tension Type Headache⁶

- Very common
- Typically bilateral
- May greatly decrease quality of life if chronic
- Exact mechanisms unknown
 - Infrequent – peripheral pain mechanisms
 - Frequent – central pain mechanisms

The International Headache Society, ICHD-3 beta. The international classification of headache disorders, 3rd edition (beta version). Cephalalgia. 2013;33(9):629-808 10.1177/0333102413485658.

Tension Type Headache Characteristics⁶

- At least 10 episodes of H/A < 1 day/month
- Lasts from 30 minutes to 7 days
- At least 2 of the following
 - Bilateral location
 - Pressing or tightening (not pulsating) quality
 - Mild or moderate intensity
 - Routine physical activity does NOT aggravate
- Also:
 - No nausea or vomiting
 - No more than one of photophobia or phonophobia

The International Headache Society, ICHD-3 beta. The international classification of headache disorders, 3rd edition (beta version). Cephalalgia. 2013;33(9):629-808 10.1177/0333102413485658.

Trigeminal Autonomic Cephalgia (TAC)⁶

- Cluster headache
- Prominent cranial parasympathetic autonomic features
- Paroxysmal hemicrania
- Men 3x more than women
- Activation in posterior hypothalamic gray matter

The International Headache Society, ICHD-3 beta. The international classification of headache disorders, 3rd edition (beta version). Cephalalgia. 2013;33(9):629-808 10.1177/0333102413485658.

TAC Clinical Features⁶

- Severe lateralized/ipsilateral pain
- Unilateral orbital, supraorbital, or temporal H/A - at least 5 episodes
- Pain can be debilitating, excruciating
- Lasts 15-180 minutes
- Episodes - one every other day, up to 8 a day, during active "cluster" phase - active phase lasting weeks or months

The International Headache Society, ICHD-3 beta. The international classification of headache disorders, 3rd edition (beta version). Cephalalgia. 2013;33(9):629-808 10.1177/0333102413485658.

TAC Diagnosis⁶

- **At least 1 of the following ipsilateral to H/A**
 - Conjunctival lacrimation
 - Rhinorrhea (nasal congestion)
 - Eyelid edema
 - Facial swelling
 - Facial flushing
 - Ear fullness
 - Meiosis/ptosis

The International Headache Society, ICHD-3 beta. The international classification of headache disorders, 3rd edition (beta version). Cephalalgia. 2013;33(9):629-808 10.1177/0333102413485658.

IHS Criteria for Trigeminal Neuralgia⁶

- **Paroxysmal attacks of facial or frontal pain**
 - Lasts few seconds to 2 minutes
- **Pain – at least 4 of the following**
 - Distribution along 1 or more divisions of trigeminal nerve
 - Sudden, intense sharp, superficial, stabbing, or burning
 - Severe intensity
 - Precipitation from trigger areas
 - Eating, talking, washing the face, cleaning teeth
- **No neurological deficit**
- **Attacks stereotyped in individual**
- **Exclusion of other causes of facial pain**

The International Headache Society, ICHD-3 beta. The international classification of headache disorders, 3rd edition (beta version). Cephalalgia. 2013;33(9):629-808 10.1177/0333102413485658.

Secondary Headache

- Cardiovascular origin – angina, MI, HTN
- Eyes
- Ears
- Sinuses
- Dental structures
- Medication complications
- Neurologic types of pain
- Cervical spine disorders

Secondary Headache⁶

- Red Flags
 - Sudden onset of severe headache
 - Weakness
 - Slurred speech
 - Angina
 - Myocardial infarction
 - Hypertension

The International Headache Society, ICHD-3 beta. The international classification of headache disorders, 3rd edition (beta version). Cephalalgia. 2013;33(9):629-808 10.1177/0333102413485658.

Cranial & Peripheral Neuralgias

- Herpes zoster, post herpetic neuralgia
- Optic neuritis
- Trigeminal neuralgia
- Space occupying tumor
- Red Flags
 - SNOOP H/A criteria

The International Headache Society, ICHD-3 beta. The international classification of headache disorders, 3rd edition (beta version). Cephalalgia. 2013;33(9):629-808 10.1177/0333102413485658.


Central Nervous System Disorders⁶

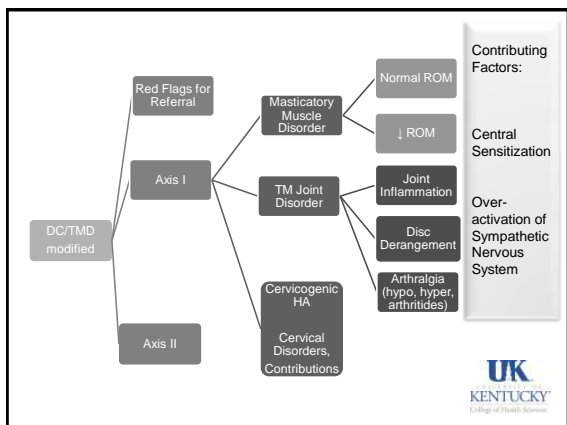
- Red Flags
 - Weakness
 - Loss of balance
 - Confusion

The International Headache Society, ICHD-3 beta. The international classification of headache disorders, 3rd edition (beta version). Cephalalgia. 2013;33(9):629-808 10.1177/0333102413485658.

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3. Agur AM, Dailey AF. *Grant's Atlas of Anatomy*. 13th ed. Lippincott Williams & Wilkins Publishers. 2013.
4. Morales H, Cornelius. Imaging approach to temporomandibular joint disorders. *Clin Neuroradio*, 2015 Feb;(2):1-18.
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Central Sensitization

- “....abnormal and intense enhancement of pain by mechanisms of the central nervous system...”¹
 - Allodynia: pain response to non-painful stimulus
 - Hyperalgesia: excessive sensitivity to painful stimulus
 - Expansion of receptive field: Pain in much larger area of body
 - Prolonged pain after removal of stimulus

Central Sensitization Exercise

- Relaxation Exercises
 - Reduction of parafunction
- Postural Exercises
- Breathing Exercises
- Aerobic Exercise
- Strengthening Exercise
 - Upper quarter
- Graded physical activity

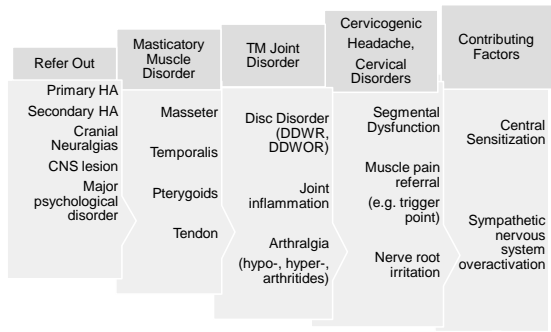
Peripheral Nociceptive Inputs ⁴

Table 1. Diagnostic subsets of TMD among 511 patients

Group	Diagnosis	Total patients	Right	Left	Bilateral
Group 1	Muscle pain	427			
	TMJ dysfunction without limited opening	220			
	TMJ dysfunction with limited opening < 2mm				
	TMJ dysfunction with limited opening > 2mm				
Group 2	TMJ dysfunction with limited opening < 2mm	199			
	TMJ dysfunction with limited opening > 2mm	188			
	TMJ dysfunction without restriction with limited opening < 2mm	76			
	TMJ dysfunction without restriction with limited opening > 2mm	69			
Group 3	TMJ dysfunction without restriction without limited opening < 2mm	204			
	TMJ dysfunction without restriction without limited opening > 2mm	21			
	TMJ dysfunction without restriction without limited opening < 2mm	21			
	TMJ dysfunction without restriction without limited opening > 2mm	4			

Kraus, 2014

Physical Therapy Scope



TMJ: Mechanisms of Injury

Macrotrauma

Microtrauma

TMJ Pathology:
Masticatory Muscle Disorder

- 427/511 referrals of people with TMD ⁴ (Kraus)
- Often coexists with joint dysfunction

Masticatory Muscle Disorder

- Overuse
- Strain
- Muscle Guarding
 - Muscle adapting to pain
- Trigger points
- Tendinitis

Masticatory Muscle Disorder

- Associated with cervical spine disorder
- Muscle nociceptors readily sensitize CNS
 - Acute to chronic
- Altered motor control patterns

Masticatory Muscle Disorder Examination, Key elements

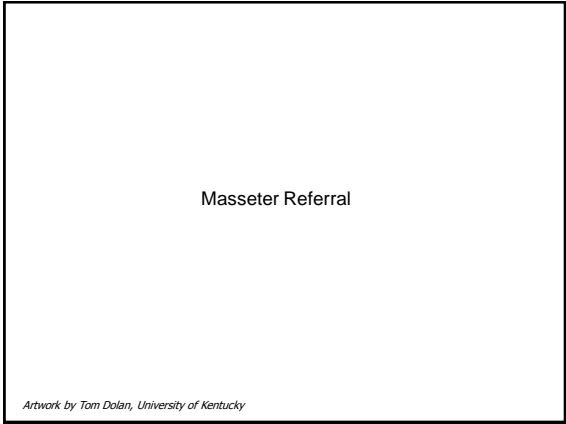
- History
 - Pain with jaw function
 - Parafunction
 - AM pain
- Function/Mobility
 - Pain at end range motion
 - Limited opening (possible)
 - Resisted protrusion (LP)
- PALPATION
 - Muscle and tendons
 - Temporalis
 - Masseter
- Cervical spine

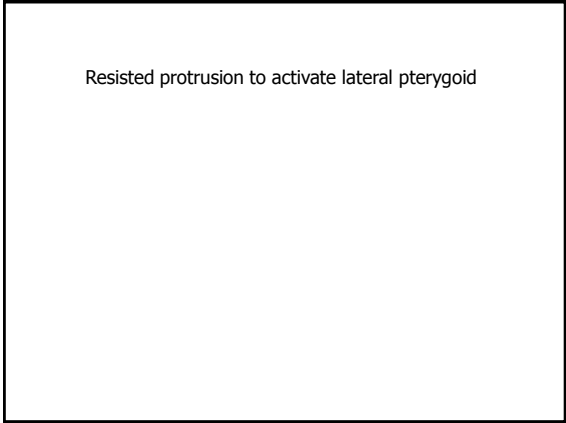
Temporalis Referral

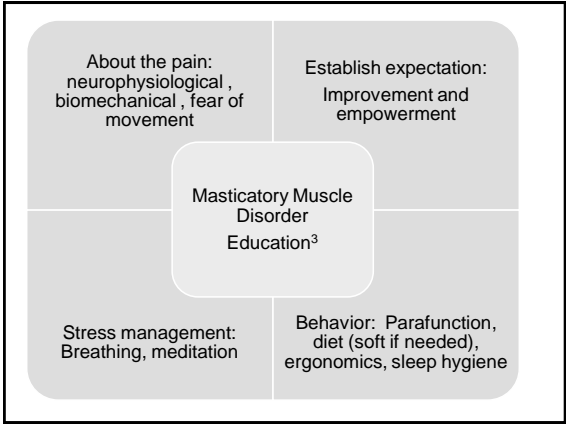
Medial Pterygoid


Lateral Pterygoid

Artwork by Tom Dolan, University of Kentucky







 **MMD: Education**

- Physical self regulation vs splint therapy ⁵
 - PSR: “postural relaxation, breathing, proprioceptive awareness”
 - No diff: MMO and pain reduction
 - 26 week follow up: PSR superior
- Education + intraoral manual therapy+ exercise ⁶
 - Superior to manual therapy alone
 - Superior to no treatment
- Used as control group in several studies ⁷ demonstrating effectiveness of education alone

**MMD: Manual Therapy
Joint, Soft Tissue Mobilization**

- MT improved mouth opening and reduced pain ⁸
 - Botox had slightly better results in ROM at 3 mths, MT slightly better in pain outcomes.
- MT with ex reduced pain and improved motion ⁹
- Research is limited and mixed

**MMD:
Upper Cervical Segmental Mobilization**

- Reduction in pain (intensity and sensitivity via PPT) in masseter and temporalis (RCT) ¹⁰
- Research suggests the relationship is reciprocal
 - Treating TMD helps reduce pain and increase ROM in upper cervical ¹¹

Masticatory Muscle Disorder:

Plan of Care: Exercise

- Rocabado "6x6" ¹²
 - AROM, tongue to roof
 - Rhythmic stab to mandible
 - Cervical axial extension, upper flex
 - Add slight upper cervical distraction with flexion
 - "Shoulders back and down"
- Kraus ¹³
 - Rest position of tongue
 - Nasal diaphragmatic breathing
 - "Teeth apart"
 - Wiggling mandible
 - AROM, guide mandible
 - Touch and bite (AROM lateral excursion and protrusion)
 - Isometrics

Exercise

- Overview of 8 studies examining effect of various JAW exercise programs on people with MMD ⁸
 - Results were mixed
 - Exercise vs education: non significant effect on maximal mouth opening (MMO)
 - Exercise vs splint: significant improvement in MMO

Exercise: Rationale

- Mobility, joint nutrition
 - AROM
 - Touch and bite (Kraus)
 - Self stretch
- Muscle relaxation
 - Tongue position
 - Teeth apart and breathe (nasal)
 - Wiggling mandible (Kraus)
- Stabilization
 - Isometrics (mandible)
- Proprioceptive
 - AROM guiding mandible
 - Touch and bite
- Postural retraining
- Cervical exercises as indicated
- Aerobic Exercise (?)

Postural Exercise

- Addressing cervical and thoracic
 - Stretch, strengthen, healthy ergonomics
- Pooled 2 studies ⁸
 - Improved maximum painfree opening
 - Reduced pain

Aerobic exercise

- Evidence of positive effect in people with central sensitization
- Reduces pain intensity, duration, and frequency in people with migraine (Naze and Harrison, 2015, unpublished)
- Reduces pain intensity in people with fibromyalgia

Masticatory Muscle Disorder: Dry Needling

- Lateral pterygoid
 - RCT: Reduced pain, increased opening ¹⁴
 - Similar effectiveness (one injection only, and no other interventions) to lidocaine injections in people with masticatory mm trigger points, over 30 days (initially lidocaine reduced VAS more) ¹⁵
- Upper quarter trigger points
 - DN more effective than sham or placebo ¹⁶
 - DN as effective as lidocaine injections ¹⁷

Masticatory Muscle Disorders: Physical Agents

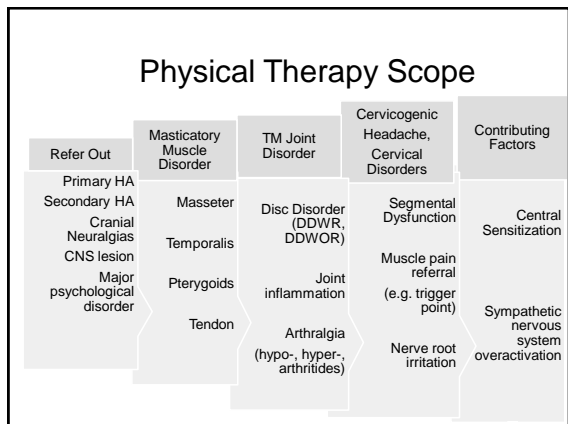
- Low level laser similar to splint therapy in pressure pain threshold (ppt) of masticatory muscle (n=30) ¹⁸
 - Patients mixed with joint and/or muscle disorders
- TNS and iontophoresis: mixed evidence ¹⁹
 - *No studies on temporalis tendonitis*
- Ultrasound: RCT: reduced pain and ppt in cervical myofascial pain (phono no better) ²⁰
- Always consider rationale in using physical agents as adjunct

MMD: Interprofessional Referral

- Dentistry
 - Splint
 - Medications
 - Injections
- Behavioral Health
 - Access in interprofessional orofacial pain clinic
 - Red flags: Axis II mental health diagnoses
- Red flags: other medical practitioners as needed
 - Primary headache
 - Neuropathic pain (e.g. trigeminal neuralgia)
 - HA due to secondary causes outside PT scope
 - Orofacial pain dental expert if splint or medications should be considered, or dental problems apparent

Masticatory Muscle Disorders Summary

- Education (pain, habits, breathing, sleep, diet)
- Treat the cervical spine if needed
- Manual therapy
 - Joint mobilization
 - Soft tissue mobilization
- Dry needling
- Iontophoresis (e.g. temporalis tendonitis)
- Therapeutic exercise:
 - Postural exercises
 - Mandibular exercises with rationale
 - Neuromuscular, proprioception, ROM, relaxation
- Interprofessional referral if indicated



Disc Disorders: Disc Displacement with Reduction (DDWR)

Okeson²¹, 2014

Exam: "Clicking"

- Used to discern anterior disc displacement
- Sn=.82-.86, Sp=.19-.24²²
- High Sn; SNNOUT
 - Likely not to have DDWR if no click

Disc Displacement Without Reduction
DDWOR:
Results in an arthrokinematic block

Temporomandibular Disorders

- Address pain
- Address dysfunction

DDWR, DDWOR
What hurts?

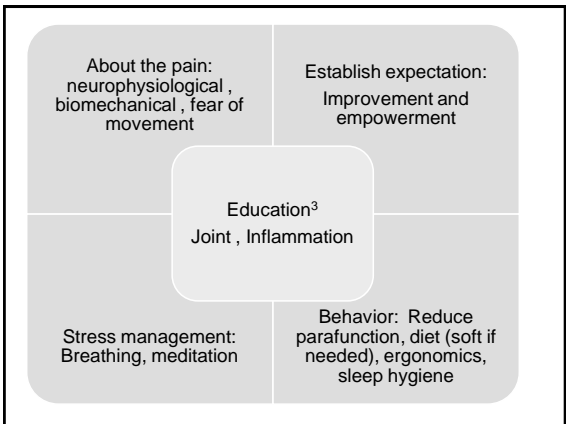
Retrodiscitis, synovitis,
capsulitis?

**Inflammation
Joint Structures**

- DDWR
- Pain associated with clicking (?)
- ROM likely to be normal
- DDWOR
- No clicking (possible crepitus; previous history of clicking)
- ROM limitations possible
 - Opening with deflection
 - Reduced contralateral lateral excursion

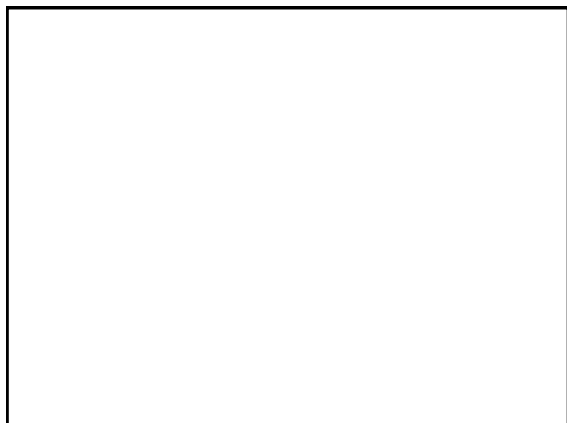
**Inflammation
Joint Structures**

- Preauricular Palpation: Pain (Sn=.92; Sp=.21) ²³
- Special tests: Joint compression



**Inflammation
Joint Structures**

- Address masticatory muscle disorder
- Joint mobilization
 - Low grade if painful
 - Higher grade once pain subsides, if indicated
- Exercise
 - Relaxation ex
 - AROM in painfree range
 - Kraus "wiggle"
 - Proprioceptive exercises: guiding mandible
 - Isometric: joint stability
- Address cervical as needed



**Physical agents to address
inflammation/joint pain**

- Iontophoresis
 - Improved pain and ROM in children with JRA ²⁴
 - Improved ROM, but not pain ²⁵
- Laser
 - 2 reviews, 2011 ^{26,27}
- More research is still needed

DDWOR: Mobility

- Exercise plus manual therapy
 - Reduced pain and increased ROM ⁸ (compared to splint therapy, medications, self care)

- Conservative care (e.g. joint mobilization and exercise) should be the first line with TM joint dysfunction compared to arthrocentesis or arthroscopy ²⁸

DDWOR: Interprofessional Referral

- Dentistry, Medicine
 - Meds: anti-inflammatories, injections
- Dentistry (specialists in OFP): splint to reposition mandible anteriorly (note: this is not conservative as it alters bite)
- Oral surgery
 - Arthrocentesis
 - Arthroscopy

TMJ Arthralgia: Hypomobility

Capsular fibrosis (prolonged immobilization)

- pain
- Function: Capsular pattern
 - limited opening with ipsilateral deflection
 - reduced contralateral lateral excursion
 - limited protrusion with ipsilateral deflection
- special tests (joint compression) for joint inflammation
- differentiate from masticatory muscle disorders

TMJ Arthralgia: Hypermobility

- Examination:
 - Mechanisms: Trauma, open lock, steep short eminence
 - Special tests for joint inflammation
 - Masticatory muscle disorder
- Interventions
 - Treat masticatory muscle disorder
 - Treat joint inflammation if present
 - Education: reducing mouth opening during function

Hypomobility

- Modalities: anti-inflammatory, or thermal
- Joint mobilizations
- Therapeutic exercise
- Address masticatory muscle disorders

Hypermobility

- Modalities: anti-inflammatory
- Education to avoid end range
- Address masticatory muscle

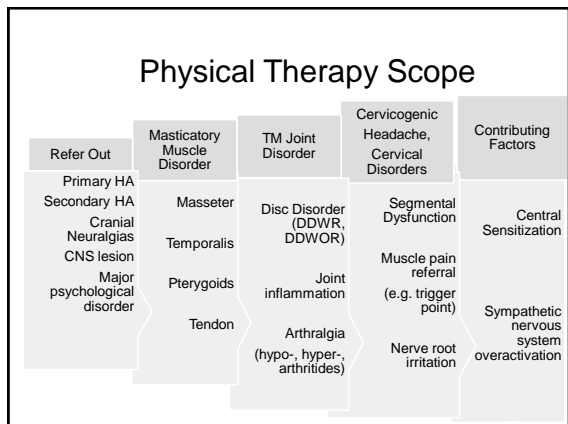
TMJ Arthralgia

Arthritides:

OA

RA

Ankylosis



TM Joint Disorders: Summary

- As needed: Self management strategies for central sensitization (education, exercise)
- Address masticatory muscle disorders as needed
 - Education: pain, expectation, breathing, sleep, behavioral change
 - Soft tissue mobilization, dry needling
- Joint inflammation/Pain
 - Iontophoresis/phonophoresis
 - Soft diet if needed

TM Joint Disorders: Summary

- Joint mobility
 - Joint mobilization (with movement, if not painful)
 - Exercise: mobility, relaxation, proprioception, stabilization
- Address cervical spine disorders if indicated
- Interprofessional referral if indicated

Cervical Region and Orofacial Pain

- Association between cervical spine, stomatognathic system, and craniofacial pain ^{29, 30}
- Patients with chronic neck pain had greater masseter EMG activity bilaterally at higher force levels (*patients not diagnosed with MMD*) ³¹
- Patients with TMD have increased fatigability of cervical extensors ²⁹
- Biomechanical, neurophysiological, and functional associations between trigeminal and cervical systems ³²

Orofacial Pain Cervicogenic Headache and/or other Cervical Contribution

- Muscle/trigger point referral
- Segmental referral
- Convergence at CNS level
- Potentiation: cervical and masticatory muscles

Artwork by Tom Dolan, University of Kentucky

Trigger Points

- Electrical stimulation, moist heat, spray and stretch
 - Research supports immediate effectiveness in decreasing sensitivity of tp's ^{33,34}
 - Manual therapy ^{34, 35}
- Dry needling ^{35, 17}

Segmental referral patterns ³⁶

Segmental referral patterns ^{37, 38}

Cervicogenic Headache: Interventions

- Mobilization, manipulation and exercise reduced HA and neck pain ^{39, 40, 41}
Mobilization/manipulation improved pain and dizziness in cervicogenic dizziness ⁴²
- Upper cervical mobilization: Reduction in pain in masseter and temporalis (RCT) ¹⁰
- Treating TMD helps reduce pain and increase ROM in upper cervical ¹¹

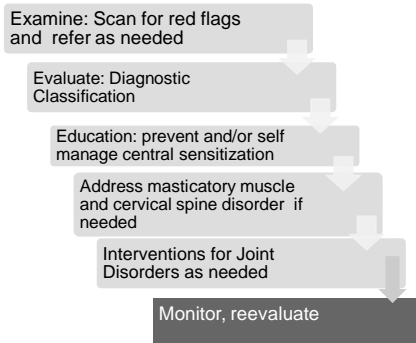
The literature provides a strong rationale for investigating cervical disorders in patients with orofacial pain.

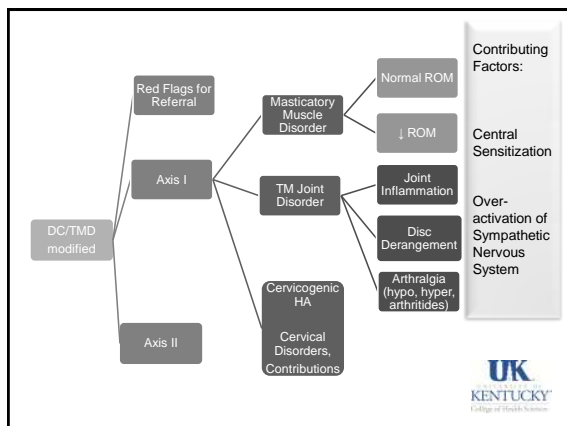
Avoid traction such as this

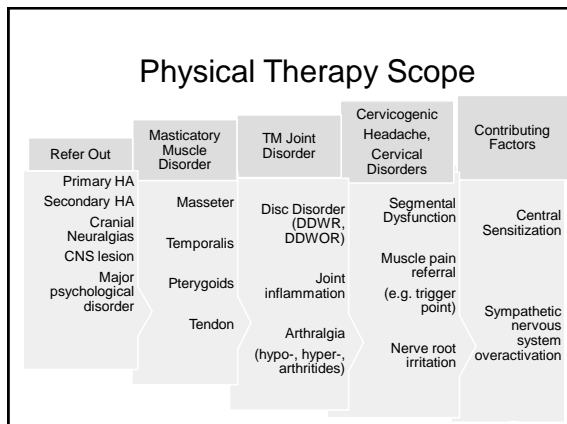
Summary

- Scan for red flags
 - Primary and secondary HA
 - CNS Disorders
- Examine
- Interprofessional referral as needed
- Make diagnostic classification
 - Include both central sensitization and peripheral nociception as appropriate
- Provide interventions
- Reevaluate
 - Refer out if needed

SUMMARY








Closing Thoughts

The physical therapist is well equipped to be a primary provider for people with orofacial pain.

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