



Hanging by a Thread: Facial & Orofacial Pain

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Disclosures

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- Clinical Investigator – ATI Study for SPG stimulator for chronic cluster headache



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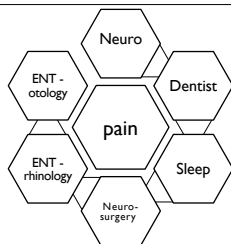
Learning Objectives

- Differentiate between neuralgia, myofascial pain and headache syndromes in terms of their presentation
- Determine appropriate treatment pathways for patients
- Utilize medications, procedures, physical therapy and psychological treatments for the management of pain



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The challenge of facial pain



Painweek

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Is this a Nerve Issue?

Approach:

1. Is it CLASSIC?
 - Classic → thought to be due to vascular compression
2. Is it NOT CLASSIC (sensory findings?)
 - Secondary → space occupying lesion, MS
3. Is there nerve injury?
 - Neuropathic Pain

Treatment:

- Medications
- Imaging
- Procedures/Surgeries

Painweek

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Typical Patient

- 60 year old F who has severe pain in the V3 distribution that started 3 months ago.
- It is episodic, brief, lancinating
- Triggered by air conditioning and eating, brushing teeth
- She has been to 3 dentists, they all say her teeth are fine

Painweek

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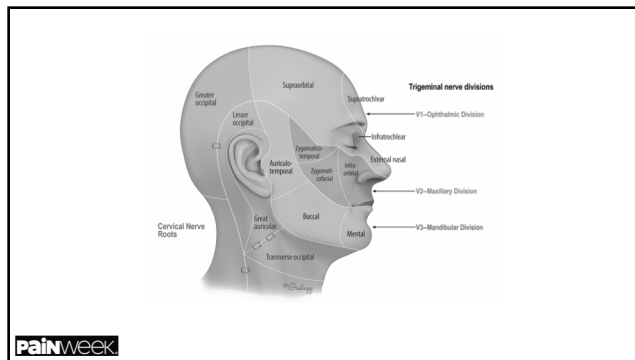
The Trigeminal Nerve

Classic Trigeminal Neuralgia:

- A recurrent disorder shock-like pain in one or more divisions of the trigeminal nerve, triggered by an innocuous stimuli
- Persistent background pain in the affected divisions may or may not be present
- Sharp, severe, unilateral
- Territory V2> V3> V1
- Seconds to min
- Triggers: cold air, chewing, face washing, tooth brushing, talking



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Classic Trigeminal Neuralgia

- The distribution of pain most often involves the V2 and/or V3 subdivisions of the trigeminal nerve, right side more common than left
- isolated involvement of the V1 subdivision occurs in <5 percent of patients with TN
- Things to think about:
 - Any temporal association with herpes zoster rash or trauma?
 - Any autonomic symptoms?
 - Originating distinctly from the teeth?



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A few more points

- Stimulus dependence - triggers including light touch, chewing, talking, face washing, tooth brushing or even wind or cold air.
- Extreme pain can evoke contraction of the muscles of the face on the affected side (tic douloureux).
- Autonomic symptoms such as conjunctival tearing and redness, rhinorrhea may arise
- It is common to be asymptomatic between attacks and there are frustratingly few predictors as to when a patient may go into or emerge from an attack.
- Patients often have a memorable onset of pain
- About 50% of patients experience a lower intensity background pain in the same distribution. This background pain can be continuous or nearly continuous



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Pathophysiology CTN

- ICOP criteria for CTN lists demonstration of **neurovascular compression**, not contact, with morphological changes seen on MRI or during surgery
- Most common vasculature: superior cerebellar artery, anterior and inferior cerebellar artery, and pontine branches of the basilar artery
- There is evidence of anatomical changes, typically nerve root atrophy, displacement, distortion, dislocation, distension, indentation, flattening, demonstrated on MRI or during surgery



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Pathophysiology: central and peripheral nerve dysfunction

- Root Entry Zone - Myelin sheath transitions from Schwann cells to Oligodendroglial cells
- Vascular compression of the trigeminal nerve root at the REZ leads to chronic focal demyelination and afferent hyperexcitability
→ leads to hyperexcitability in the trigeminal brainstem complex
→ which subsequently responds to both nonnoxious and noxious stimuli in the same manner leading to the symptoms seen in TN



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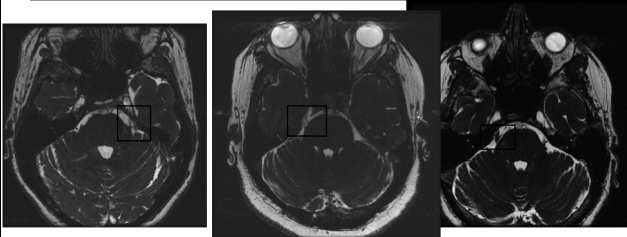
Imaging -

- MRI – 3T preferable
- Neurovascular Contact in Root Entry Zone



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MRI



Images courtesy of Robert Dodd, MD, PhD, Stanford Neurosurgery

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Testing

- Exam –
PERFORM SENSORY TESTING in the trigeminal distribution and look for hypoesthesia, allodynia.

Most patients with CTN will **not** show sensory abnormalities within the trigeminal territory or motor weakness of the muscles of mastication. If sensory deficits are present, then a secondary cause should be explored through prompt neuroimaging studies and other diagnostic tests



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Treatment

First Line (Therapeutic Agents: Sodium Channel Blockers)
Carbamazepine (gold standard)
Oxcarbazepine
Second Line (Therapeutic Agents: Add on or Monotherapy)
Lamotrigine
Baclofen
Gabapentin
Pregabalin
Botulinum Toxin A Injection
Third Line (Interventions/ Surgery)
Microvascular Decompression



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Secondary TN

- TN attributed:
 - multiple sclerosis
 - space-occupying lesion
 - skull-base bone deformity
 - connective tissue disease
 - arteriovenous malformation
 - dural arteriovenous fistula
 - genetic causes of neuropathy or nerve hyperexcitability



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Trigeminal Neuropathic Pain

- Definition: continuous facial pain in the distribution
- The pain is continuous or near-continuous: burning, squeezing, aching, or like pins and needles.
- There may be pain paroxysms but this is not predominant
- mechanical allodynia, and cold hyperalgesia indicative of neuropathic pain



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Trigeminal Neuropathic Pain

- Trigeminal Neuropathic Pain Attributed to Herpes Zoster Infection
- Trigeminal Post-Herpetic Neuralgia
- Post Traumatic Neuropathic Pain (previously anesthesia dolorosa or painful post-traumatic trigeminal neuropathy)



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Glossopharyngeal Neuralgia

Classic:
 Quality: Unilateral, brief, stabbing pain
 Location: in ear, base of the tongue, tonsillar fossa, back of the throat, and/or beneath the angle of the jaw
 Trigger: by chewing, swallowing, talking, yawning, drinking cold liquids or coughing
 Time Course: abrupt in onset and termination and may remit and relapse
 Cause : In the majority of patients, the cause of pain is an artery compressing the glossopharyngeal nerve near the brainstem

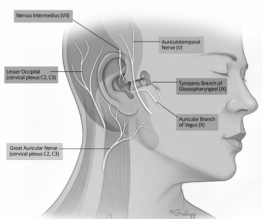
Secondary:
 neck trauma, MS, tonsillar or regional tumors, cerebellopontine angle tumors and Arnold-Chiari malformation

Glossopharyngeal Neuropathic Pain – continuous, burning, squeezing, pins and needles, with superimposed paroxysms. Positive exam: weak or absent gag reflex, hearing loss, decreased or absent sensation to touch in the posterior ipsilateral tongue, tonsillar fossa, middle ear



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Ear



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Nervus Intermedius Neuralgia

- Termed "geniculate neuralgia" Hunt in 1907
- seventh cranial nerve and sensory afferents located in the geniculate ganglion.
- Quality: unilateral, lancinating, and paroxysmal, lasting seconds or minutes
- Location: auditory canal and retroauricular regions, but can also spread to the temporal regions
- Triggers: sensory or mechanical stimuli at the posterior wall of the auditory canal
- Additional: disorders of lacrimation, salivation, and taste, as the nervus intermedius is involved in the greater superior petrosal nerve and chorda tympani nerve

- Cause: Compression may be by the AICA or the PICA



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Trigeminal Neuralgia Differential Diagnosis:

- | | |
|---|---|
| <ul style="list-style-type: none"> ▪ Peripheral etiologies: ▪ Trigeminal Neuropathic Pain ▪ Glossopharyngeal neuralgia/
Glossopharyngeal Neuropathic Pain ▪ Nervus intermedius neuralgia/Painful
Nervus intermedius neuropathy ▪ Painful Optic Neuritis ▪ Persistent idiopathic facial pain ▪ Burning Mouth Syndrome ▪ Dental Etiologies ▪ Temporal mandibular joint arthralgia ▪ Temporal mandibular joint
dysfunction/myofascial pain | <ul style="list-style-type: none"> ▪ Central Etiologies: ▪ Short-lasting unilateral neuralgiform
headache attacks with autonomic
symptoms (SUNA), short-lasting unilateral
neuralgiform headache attacks with
conjunctival injection and tearing (SUNCT) ▪ Paroxysmal Hemicrania ▪ Cluster Headache ▪ Primary stabbing headache ▪ Tolosa Hunt Syndrome ▪ Central Pain attributed to Multiple
Sclerosis ▪ Central Post-stroke Syndrome |
|---|---|



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International Classification of Orofacial Pain

<p>1. Orofacial pain associated with disorders of dentoalveolar and associated structures</p> <p>1.1 Dental pain</p> <p>1.1.1 Pulpal pain</p> <p>1.1.2 Periodontal pain</p> <p>1.1.3 Gingival pain</p> <p>1.2 Non-dental pain</p> <p>1.2.1 Oral mucosal pain</p> <p>1.2.2 Salivary gland pain</p> <p>1.2.3 Jaw bone pain</p>	<p>2. Orofacial pain associated with regional muscles</p> <p>2.1. Primary myofascial pain</p> <p>2.2. Secondary myofascial pain</p> <p>3. Orofacial pain associated with disorders of the Temporomandibular Joint (TMJ)</p> <p>3.1. Primary TMJ arthralgia</p> <p>3.2. Secondary TMJ arthralgia</p> <p>4. Orofacial pain associated with lesion/disorders</p>
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International Classification of Orofacial Pain

5. Orofacial pain resembling presentations of primary headaches
5.1. Orofacial migraine
5.2. Tension-type orofacial pain
5.3. Trigeminal autonomic orofacial

6. Idiopathic orofacial pain
6.1. Burning mouth syndrome (BMS)
6.2. Persistent idiopathic facial pain (PIFP)
6.3. Persistent idiopathic dentoalveolar pain



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Temporomandibular Disorders (TMD)

- A heterogenous group of disorders: includes myalgic disorders, arthralgic disorders and non-painful disorders
- Diagnostic Guidelines set out in The Diagnostic Criteria for Temporomandibular Disorders (DC/TMD)
- Affect approximately 5% to 12% of the population
- TMD is the second most common musculoskeletal condition (after chronic low back pain) resulting in pain and disability
- Myofascial conditions account for the at least 50% of TMDs, being more common than intra-articular causes

Schiffman et al. J Oral Facial Pain Headache. 2014 ; 28(1): 6-27.



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Primary Myofascial Pain

- A. Single or repeated days of myofascial pain occurring within the past 3 months and fulfilling criteria B-D
- B. Lasting from at least 2 hours daily to days, or unremitting
- C. Positive for both of the following:
 1. Pain in the jaw, temple, in the ear or in front of ear
 2. Pain modified with jaw movement, function or parafunction
- D. Positive for both of the following
 1. Confirmation of pain location(s) in the temporalis or masseter muscle(s)
 2. Report of familiar pain in the temporalis or masseter muscle(s) with at least one of the following provocation tests: Palpation of the temporalis or masseter muscle(s) OR maximum unassisted or assisted opening movement(s)

International Classification of Orofacial Pain - https://www.ihp-headache.org/library_file/2168_the-international-orofacial-pain-classification-committee-icpp-1-beta-03eview.pdf



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Secondary Myofascial Pain

Myofascial pain attributed to persistent inflammation (due to e.g. infection, crystal deposition or autoimmune disorders), structural changes (such as osteoarthritis or spondylosis), injury, or diseases of the nervous system. Diagnostic criteria:

- A. Any myofascial pain according to 2.1.1-4 and fulfilling criterion C
- B. The parent disorder meets its respective diagnostic criteria
- C. Evidence of causation demonstrated by at least two of the following:
 1. Myofascial pain has developed, or substantially worsened, in temporal relation to the onset of the presumed causative disorder
 2. Myofascial pain has significantly worsened in parallel with progression of the presumed causative disorder
 3. Myofascial pain has significantly improved or resolved in parallel with improvement in or resolution of the presumed causative disorder



International Classification of Orofacial Pain - https://www.ihc-headache.org/binary_data/3468_theinternational-orofacialpainclassification-committee-2013.pdf

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Acute primary TMJ arthralgia

A. Single or repeated days of myofascial pain occurring within the past 3 months and fulfilling criteria B-D

B. Lasting from at least 2 hours daily to days, or unremitting

C. All of the following characteristics:

1. Pain in front of the ear, or in the ear
2. Pain modified with jaw movement, function or parafunction.
3. Examiner confirmation of pain location in the area of the TMJ(s).
4. Report of familiar pain in the TMJ with at least one of the following provocation tests:
 - a. Palpation of the lateral pole or around the lateral pole
 - b. Maximum unassisted or assisted opening, right or left lateral movements, or protrusive movements



International Classification of Orofacial Pain - https://www.ihc-headache.org/binary_data/3468_theinternational-orofacialpainclassification-committee-2013.pdf

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Diagnosis

Ddx: dental caries or abscesses, oral lesions, trauma, dislocation, maxillary sinusitis, salivary gland disorders, TN, PH, GPN, giant cell arteritis, pain associated with orofacial malignancy, and a primary headache syndrome

Diagnosis:

- history / physical examination.
- Patient's exact pain should be replicated on examination
- Palpation of reported painful regions, assisted/ unassisted jaw opening for myofascial pain, and assisted/ unassisted jaw opening or right or left lateral movements, or protrusive movements for joint disorders can refabricate familiar pain
- If patient has a headache, a temporal relation should be determined to distinguish between a secondary and primary headache



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Diagnosis

- Additional physical examination:
- abnormal mandibular movement
 - decreased jaw range of motion
 - neck and shoulder tenderness
 - pain with dynamic loading
 - signs of bruxism



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Imaging?

- Only done if
 - concerning signs and symptoms
 - conservative management has failed
- Panoramic radiography to identify dental pathology
- MRI for soft tissue lesions and TMJ articular disc pathologies
- CT (multidetector CT scan or conebeam CT scan) to assess bony pathology

Apfelberg, D.B., et al., *Temporomandibular joint disease*. Postgraduate Medicine, 2016. 65(5): p. 167-172.



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Treatment

- Physical Therapy -primary modality although studies are of low quality
Active and passive modalities such as posture training, therapeutic exercise, manual therapy, ultrasound, iontophoresis, electrotherapy, low-level laser therapy have been used.
Goal: improve muscle strength, coordination, relaxation, range of motion.
Active relaxation exercises of the muscles of mastication may be more effective compared to strengthening exercises
- Acupuncture –positive but low quality studies. This treatment modality should be considered by patients.
- Orthopedic Appliance Therapy – no good data
Cochrane Review (2004) compared stabilization splints to other active treatments and no statistically significant difference in reducing symptoms was noted. There was positive albeit weak evidence that it may be useful in reducing pain severity compared to no treatment



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Treatment - Patient Education and Self-care

- 40% of TMD patients have spontaneous resolution of symptoms with no serious long-term effects
- Self-management routine:
 - Education about habits
 - Reassurance on the natural course of TMD
 - Self-exercises and massage to improve jaw range of motion,
 - Thermal or cold therapy,
 - Dietary advice to limit hard-textured food, and parafunctional behavior modification.
- Behavioral modification for overuse
- CBT, biofeedback, psychological interventions to address underlying psychiatric comorbidities



Aggarwal, V.R., et al., *Psychosocial* Cochrane Database Syst Rev. 2011(11): p. CD008456.
 Dworkin SF, Huggins KH, Wilson L, Mandl L, Turner J, Massoth D, LeResche L, Tuelove E.
J Orofac Pain. 2002 Winter;16(1):48-63.

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TMD treatment - Management has been based mostly on expert opinion

1. NSAIDs (10 to 14 days for initial treatment) Among the NSAIDs, naproxen has been proven to reduce TMD.
2. Adding a short course of muscle relaxant can be prescribed with NSAIDs.
3. CAs, gabapentin, ? SSRIs
4. Topical: capsaicin has been explored clinically in patients who have TMD

5. Myofascial trigger point injections with local anesthetic agents may be a simple intervention to consider as an adjunct therapy. It is usually done as a series of 3 to 5 treatments.

6. Botulinum toxin injections for TMD, a number of randomized controlled trials with a crossover design showed no significant effect with a noted trend to significance in pain reduction or jaw range of motion. In addition, a systematic review yielded similar findings inconclusive findings.



Mujalpeno, H.R., et al., *Cochrane Database Syst Rev.* 2010(10): p. CD008715; Machado, E., et al., *Int J Oral Maxillofac Surg* 2018, 47(11): p. 1420-1432; Chen, Y.W., et al., *Int J Oral Maxillofac Surg.* 2015, 44(8): p. 1018-28.

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