Oral and Maxillofacial Surgery

OROFACIAL PAIN

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- Orofacial pain refers to pain perceived in the face and/or oral cavity.
- It is one of the most common reasons for patients to seek dental or medical care.
- Pain in this region can arise from diverse sources: dental, temporomandibular joint (TMJ), muscles, nerves, vascular structures, or even referred pain from systemic diseases.

- According to International Association for the Study of Pain (IASP) definition :

"Pain is an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage."

- Pain is both sensory (stimulus-driven) and emotional (subjective). Individual perception varies greatly.

Physiology of Pain Transmission

- A. Pain Pathway
- Transduction – Conversion of noxious stimuli (thermal, mechanical,chemical) into electrical signals by nociceptors.
- Transmission – Propagation of these signals via primary afferent neurons (A-delta fibers – sharp, fast pain; C-fibers – dull, aching pain).
- Modulation – Synaptic processing in the dorsal horn of the spinal cord and trigeminal nucleus, with facilitation or inhibition.

- Perception – Integration and interpretation of pain in higher brain centers (thalamus, somatosensory cortex, limbic system).

- B. Key Neurotransmitters
- Substance P, glutamate, CGRP – **facilitate pain transmission**.
- Endorphins, enkephalins, serotonin, GABA – **inhibit pain**

C. Trigeminal System

- The trigeminal nerve is the primary pathway for orofacial pain .Nociceptive inputs from teeth, TMJ, and facial tissues converge at the trigeminal nucleus caudalis before ascending to the thalamus and cortex.

Type of Pain	Definition
Allodynia	Pain evoked with stimulus that normally does not provoke pain
Analgesia	Absence of pain in response to stimulation that would normally be painful
Causalgia	A syndrome of sustained burning pain, allodynia, and hyperpathia after a traumatic nerve lesion, often combined with vasomotor and sudomotor dysfunction and later trophic changes
Dysesthesia	An unpleasant abnormal sensation, whether spontaneous or evoked
Hyperesthesia	Increased sensitivity to stimulation
Hypoesthesia	Diminished sensitivity to stimulation
Hyperalgesia	Increased pain from a stimulus that normally provokes pain
Hypoalgesia	Diminished pain in response to a normally painful stimulus
Hyperpathia	A painful syndrome characterized by an abnormally painful reaction to a stimulus, especially a repetitive stimulus, as well as an increased threshold
Neuralgia	Pain in distribution of nerve or nerves
Neuropathic pain	Pain caused by a lesion or disease of the somatosensory nervous system
Neuropathy	A disturbance of function or pathologic change in a nerve: in one nerve, mononeuropathy; in several nerves, mononeuropathy multiplex; if diffuse and bilateral, polyneuropathy
Paresthesia	An abnormal sensation, whether spontaneous or evoked

From Merskey H, Bogduk N, editors: IASP Task Force on Taxonomy. In *Classification of chronic pain*, ed 2, Seattle, 1994, IASP Press, pp 209-214.

Classification of Orofacial Pain

A. Based on Origin

- Odontogenic pain – pulpitis, periapical periodontitis, cracked tooth.
- Musculoskeletal pain – temporomandibular disorders (TMDs), myofascial pain.
- Neuropathic pain – trigeminal neuralgia, postherpetic neuralgia, burning mouth syndrome.
- Neurovascular pain – migraine, cluster headache.
- Referred pain – cardiac pain, sinusitis, otitis.

B. Based on Duration

- Acute pain – short-lasting, protective.
- Chronic pain – persists beyond 3–6 months, often maladaptive, associated with central sensitization.

Musculoskeletal pain

1.Temporomandibular disorders (TMDs)

Clinical Classification of TMJ Disorders :

- **A. Muscular Disorders**

- -Myofascial pain dysfunction.
- -Muscle spasm / contracture.

- **B. Internal Derangements**

- Disc displacement with reduction
- Disc displacement without reduction.
- Disc perforation.

C. Inflammatory Disorders:

- -Capsulitis, synovitis
- -Retrodiscitis

- **D. Degenerative Disorders:**
- -Osteoarthritis
- -Osteoarthrosis
- -Ankylosis

- **E. Growth & Developmental Disorders:**
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- -Condylar hyperplasia / hypoplasia
- -Neoplasms of condyle

Diagnosis of TMDs

- **History** (habits, trauma, systemic disease eg. Psoriasis , Rheumatoid arthritis,Osteoporosis).
- **Clinical exam** (range of motion(normally 40 mm), tenderness, joint sounds).
- **Imaging**
- Panoramic radiograph (initial).
- CBCT (osseous changes).
- MRI (disc position & soft tissue pathology).

Treatment Modalities

- **A. Conservative**
- **B. Minimally Invasive**
- **C. Surgical**

2.Masticatory Muscle Disorders

- One component of the spectrum of temporomandibular disorders (TMDs) .
- Intrinsic pain in masticatory muscles, sometimes associated with localized trigger points (expressed as taut bands).

- **Etiology**
- –Trauma: Direct macrotrauma, indirect macrotrauma (whiplash)
- –Parafunction: Bruxism, stress
- **Symptoms**: Pain, muscle tenderness, limited range of mandibular motion

	Pain with function	Trismus	Comments
Myofascial pain	**Yes**	**Mild to moderate**	Unilateral dull, aching pain • •Localized, reproducible tenderness •Sensation of acute malocclusion (not verifiable clinically(•Otologic symptoms, complaints of frequent temporal headach
Muscle spasm	**Yes**	**Moderate**	•Acute onset of pain •Sensation of muscle tightness, cramping, stiffnes
Myositis	**Yes**	**moderate**	Localized, continuous pain in • muscle •Diffuse tenderness and swelling of the entire length of affected muscle
Muscle contracture	**Usually**	**Severe**	Unyielding firmness on passive • (stretch (hard end-feel •Little or no pain unless involved muscle is forced to lengthen •Remote history of trauma, infection, or long period of disuse and limited range of motion

Neuropathic Pain Disorders

- – Episodic: Severe, paroxysmal electric shock–like and/or lancinating pain of short duration
- – Continuous: Aching, burning, throbbing, stabbing pain

*Trigeminal Neuralgia

Pathophysiology:

– Most common hypothesis: Vascular compression of trigeminal nerve root entry zone → demyelination → spontaneous nerve firing

• Signs and symptoms: Excruciating, short-lasting, shock-like facial pain
– Unilateral, R > L
– V2 and V3 > V1
– No neurologic deficits
– Frequently pain free between attacks
– Local anesthesia of trigger point temporarily arrests pain

• Trigger points: Areas in distribution of the affected trigeminal branch (lip, nose, eye,
inside mouth) that initiate pain when touched

Types:

– Classic TN: 85% of cases

– Atypical TN: Longer attacks and constant background pain

– Symptomatic TN: Various forms of etiologic pathology including tumors, vascular malformations

• Differential diagnosis

– Multiple sclerosis

– Intracranial tumor: Posterior and middle fossa

Treatment

-Pharmacology

Anticovulsants:

1st line: Carbamazepine

2nd line: Phenytoin

Gabapentin 300 mg /day or pregapalin75 mg/day also can be used taking into account the side effects like sedation,drowsiness and mode disturbances.

– Surgery

Peripheral procedure

– Neurectomy

-Cryotherapy

-Alcohol injection

Central procedure

– Percutaneous rhizotomy

– Microvascular decompression

– Gamma Knife radiosurgery

Glossopharyngeal neuralgia (GN)

Pain in pharynx, tonsil, soft palate, posterior tongue base –

–Pain radiates toward mandibular angle

•Tympanic GN

–Pain in ear

–Pain may radiate to pharynx (can be confused with geniculate neuralgia).

•Pain triggered by swallowing, chewing, talking, coughing, yawning

•Can induce bradycardia and syncope

•Order magnetic resonance imagine (MRI) to rule out pathology (symptomatic GN).

–Tonsillar carcinoma in parapharyngeal space, cerebellopontine angle mass, vascular anomalies.

•Medical treatment similar to TN; intracranial cranial nerve IX and X upper rootlet sectioning, microvascular decompression.

***Post herpetic neuralgia**

- Reactivation of latent infection by varicella zoster virus dormant in peripheral ganglion.

16 to 22% of patients experience neuralgia—burning, throbbing, shooting, or sharp pain; may be accompanied by allodynia, hyperalgesia, anesthesia dolorosa

- Treatment: Tricyclic antidepressants, gabapentin, pregabalin, opioids, tramadol, topical lidocaine.

*Headache

-Primary headaches

- Migraine
- Tension-type headache
- Cluster headache
- Paroxysmal hemicranias

-Secondary headache

- Temporal arteritis
- Posttraumatic headache

Migraine headache



• Commonly starts at age 15–24, but most frequent at ages 35–45; females > males

• Four possible phases: Predromal, aura, pain, postdromal

• Pathophysiology: Neurovascular disorder

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Symptoms: Unilateral pulsing headache lasting 2–72 hours; associated with nausea, vomiting, and sensitivity to light

Treatment

Symptomatic

Specific: 5-hydroxytryptamine (5-HT) agonists (triptans), dihydroergotamine

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Nonspecific: Acetaminophen, acetylsalicylic acid (ASA), nonsteroidal anti-

inflammatory drugs (NSAIDs), caffeine

Prophylactic

Most effective: Tricyclic antidepressants, sodium valproate, topramate, timodol

ºModerately effective: Gabapentin, verapamil, naproxen

Tension type headach

Onset: Age 20–40

• 23% of female population; 18% of male population

• Pathophysiology

–Triggers: Stress, hunger, sleep deprivation, bad posture, eye strain

–Classic theory: Muscle contraction/tension

Symptoms: Bilateral pressing/tightening (nonpulsatile) quality

Treatment

–Episodic type: NSAIDs, acetaminophen, ASA; frequent use of these drugs can lead to rebound headache

–Chronic type: Amitriptyline, mirtazapine, relaxation tech-nique

Cluster headache

Symptoms: Severe unilateral orbital, supraorbital, temporal pain lasting 15–180 minutes accompanied by ipsilateral lacrimation, rhinorrhea, eyelid edema, miosis; 1 to 8 attacks per day

–Symptomatic/abortive: Oxygen (7 L per minute for 15 minutes), triptans, dihydroergotamine

–Prophylactic: Verapamil (1st line), short-term corticoster-oid, lithium, divalproex sodium, topiramate

–Intractable type: Invasive procedure (ie, sphenopalatine block, trigeminal rhizotomy, microvascular decompression of trigeminal nerve



Thank You