

Orofacial Pain; An Unpleasant Sensory and Emotional Experience

Dr. Anju k s
Post Graduate

Department of Periodontology & Implantology
A J Institute of dental sciences, Mangalore, India

Dr. Nandini Manjunath
Head of Department

Department of Periodontology & Implantology
A J Institute of dental sciences, Mangalore, India

Dr Abraham Davis
Post Graduate

Department of Periodontology & Implantology
A J Institute of dental sciences, Mangalore, India

Abstract:- The vast majority of dental consultations are for issues involving pulpal, periodontal, and mucosal structures that cause intraoral pain. The structural complexity of the orofacial region will make diagnosis difficult. Before implementing an effective treatment plan for orofacial pain, a correct diagnosis is required.

I. INTRODUCTION

Pain is defined by the IASP (International Association for the Study of Pain) as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage."^{1,2} Patients seek medical attention for various reasons, including discomfort. Orofacial pain, usually excruciatingly painful for patients because it frequently interferes with basic daily functions including chewing, swallowing, talking, and laughing.^{3,4}

Orofacial pain is pain that originates below the orbitomeatal line, above the neck, and anterior to the ears..² In comparison to many other parts of the body⁵ orofacial region has a complex anatomy.. The region is also innervated by the trigeminal, facial, glossopharyngeal, and vagus cranial nerves, as well as the first, second, and third cervical spinal nerves. Pain can be referral pain from other parts of the body as well as from within the orofacial region due to this significant regional neural complex. As a result, categorising orofacial pain conditions is difficult.⁶

Many cases of orofacial pain and the risk factors that contribute to it have multifactorial and complex mechanisms that are not fully understood. The development of more effective therapy techniques and medications to prevent, control, or eliminate them, as well as the realisation of their causes and risk factors, are all essential targets for continuing study.⁷

II. ANATAMICAL CONSIDERATIONS

➤ Considerations In Anatomy

The dominant nerve that relays sensory impulses from the orofacial area to the central nervous system is the trigeminal nerve (CN V). The upper cervical nerves (C2 and C3), as well as the facial (CN VII), glossopharyngeal (CN IX), and vagus (CN X) nerves, relay sensory information from the face and surrounding area. Fibers from the spinal trigeminal tract synapse in the adjacent trigeminal nucleus in the brainstem, which runs parallel to the tract. The nucleus caudalis, which extends from the chief sensory nucleus of CN V to the spinal cord, is continuous with and resembles the dorsal horn of the cervical spinal cord. The nucleus caudalis is the primary site in the brainstem for nociceptive information, according to morphologic, clinical, and electrophysiologic observations. Axons from the CN V spinal nucleus cross to the opposite side and ascend to the thalamic ventral posteromedial nucleus, as well as the reticular formation and the medial and intralaminar thalamic nuclei.⁸

III. THE PRIMARY CAUSES OF OROFACIAL PAIN

1. Dental Causes

Pain intensity varies greatly, If the pain is dentally related it typically starts with a sharp stabbing pain that gradually dulls and throbs. Fluid movement which is present in the dentinal tubules could cause sharp pain of short duration⁹. Gingival recession, abrasion, dentinal erosion, or dentinal cracks or fractures are considered to be the common causes of exposed dentin. The pulp and periapical tissues are usually involved in deep throbbing pain. A comprehensive clinical and radiographic examination can help with the diagnosis of acute dental pain.

2. Mucosal Causes

Mucosal erosions or ulcerations can be caused by a variety of regional and general disorders. This may result in localised oral pain^{6,10,11}. Erosions are reddish epithelial breaches that are sometimes covered by a yellowish exudate. When an ulcer is the primary source of pain, most patients are aware of its presence and may complain of toothache. Aphthous ulcers, herpes associated ulcerations, erythema

multiforme (a Type IV hypersensitivity), and blistering conditions such as pemphigus and pemphigoid are the most painful lesions.

3. Pain From Temporomandibular Disorder (TMD)

TMD(temporomandibular disorder) Masticatory muscle pain, temporomandibular joint (TMJ) pain, and chronic neuropathic pain can all manifest as headaches.^{6,12}:

- Masticatory muscle disorders (muscle pain)
- Arthralgia (temporomandibular joint pain)
- Headache associated with TMD (headache)

4. Masticatory Muscle Disorders (Muscle Pain)

The majority of nonodontogenic orofacial pain is masticatory muscle pain. The muscles of the jaw's elevator, notably the temporalis, masseter, and pterygoid muscles, must move simultaneously in both directions when chewing. Muscle pain can develop as a result of muscle inflammation, overuse, or dysfunction⁶.

5. Temporomandibular Joint Pain

The temporomandibular joint is a bilateral hinged joint that connects the mandible to the temporal bone (TMJ). Arthralgia is nothing but the pain within the joint capsule due to inflammation. This disorder is characterised by a joint that feels tender when the lateral pole of the condyle is palpated or by pain in the joint with a wide aperture.

6. Paranasal Sinus - Related Orofacial Pain

Rhinosinusitis, or inflammation of the nasal cavity and paranasal sinuses, is a frequent source of orofacial pain. The maxillary sinus is the largest of all paranasal sinus, Through ostium maxillary sinus is connected to middle meatus of the nasal cavity. Orofacial pain is frequently caused by diseases of the maxillary sinus¹³. From excruciating localised discomfort and congestion to a persistent midface headache with or without systemic problems, this can occur.

7. Trigeminal Nerve Pain

The largest cranial nerve is the trigeminal nerve (CN V)¹³. It transmits sensory data to the scalp, face, mouth, and ocular tissues. The mandibular, maxillary, and ophthalmic portions of the nerve branch out from the brainstem's trigeminal nerve root or ganglion. Several orofacial pain syndromes can involve the cranial nerve.. A trigeminal nerve abnormality can cause trigeminal neuralgia (TN), a severe pain condition. It feels like an electric shock and can last anywhere from a few seconds to several minutes.

8. Glossopharyngeal Nerve-Related Orofacial Pain

The glossopharyngeal nerve (CN IX) carry both sensory and motor impulses. Parasympathetic fibres supply the parotid gland, while motor fibres supply the stylopharyngeus muscle. Glossopharyngeal neuralgia is an uncommon and devastating disorder characterised by intense pain in the throat, tonsils, tongue, and middle ear caused by an anomaly in the glossopharyngeal nerve.

9. Occipital Nerve Pain

The back of the scalp is innervated by two spinal nerve pairs known as the occipital nerves, which begin between the second and third vertebrae. A painful ailment known as occipital neuralgia that is severe and incapacitating is characterised by paroxysms, can be caused by nerve trauma, nerve entrapment under the trapezius or capitis muscles, or upper cervical spine (C1–C2) spondylosis.⁶

10. Salivary Gland Pain

Salivary glands are found in three major pairs: one in each mandible and one in front of each ear. Additionally, the submucosa of the oral mucosa contains hundreds of tiny salivary glands that are distributed throughout the oral cavity. Via ducts, Saliva is released from each of the major glands into the oral cavity. The submandibular and sublingual glands are situated anteriorly behind the tongue, while the parotid duct is situated close to the upper molar teeth.⁶

A duct blockage, which is usually caused by a salivary stone or calculus, can cause salivary gland pain. Viruses, including the mumps virus, can cause pain and swelling in both sides of the salivary glands (usually the parotids).

11. Neurovascular Causes of Orofacial Pain

The most common type of vasculitis in adults (nearly everyone over the age of 50) is giant cell arteritis, which causes headaches, scalp tenderness, facial pain, joint pain, throat or tongue pain, and vision problems, including permanent loss of vision in one or both eyes. Fever, cough, jaw claudication, arm pain during exercise, weight loss, depression, tiredness, night sweats, and anorexia are all systemic manifestations of the condition..⁶

12. Neuropathic Pain

Neuropathic pain is characterised by the expression of pain-producing neuropeptides like substance P and other neurokinins. Because these neuropeptides are enzymatically resistant, they cause chronic neuropathic pain. Neuropathic pain necessitates the use of anti-neuropathic medications which act on the central cholinergic system. Neuropathic orofacial pain typically begins with a stressful life event that happened just before the pain manifested.

❖ Classification

To name and classify the specific disease entity, correct definition and classification is important for the clinician because It will support accurate treatment planning and prognosis communication with the patient.. various classification systems have been proposed for orofacial pain. The following is a simple and widely used classification:¹⁵

A. Neuralgias

- Primary Trigeminal Neuralgia (Tic Douloureux)
- Secondary Trigeminal Neuralgia (CNS Lesion or facial trauma)
- Herpes Zoster
- Post Herpetic Neuralgia
- Geniculate Neuralgia (Cranial Nerve VII)
- Glossopharyngeal Neuralgia (Cranial Nerve IX)
- Superior Laryngeal Neuralgia (Cranial Nerve X)
- Occipital Neuralgia

- B. Pain of musculoskeletal origin
 - Cervical Osteoarthritis
 - Temporomandibular joint disorders
 - TMJ Rheumatoid arthritis
 - TMJ Osteoarthritis
 - Myofascial Pain Dysfunction
 - Fibromyalgia
 - Cervical Sprain or Hyperextension
 - Stylohyoid (Eagle's) Syndrome
- C. Primary vascular disorders
 - Migraine with aura
 - Migraine without aura
 - Cluster Headache
 - Tension-type Headache
 - Hypertensive Vascular changes (Aneurysm, Emboli)
 - Mixed Headache
 - Cranial arteritis
 - Thrombophlebitis
- D. Psychogenic pains
 - Delusional/hallucinatory
 - Hysterical/Hypochondriac
- E. Generalised pain syndromes
 - Post-traumatic pains
 - Sympathetically maintained pain (Causalgia)
 - Phantom Pain
 - Central Pain
- F. Lesions of the ear, nose, and oral cavity
 - Maxillary Sinusitis
 - Otitis media
 - Odontalgia
 - Dentin defects

- Pulpitis
- Periapical pathology/Abscess
- Cracked tooth/restoration
- Atypical odontalgia
- Periodontal pathology
- Occlusal trauma
- Dental impaction
- Cysts and tumors
- Osteitis
- Mucocutaneous diseases
- Salivary gland diseases
- Atypical facial pain
- Glossodynia

IV. DIAGNOSIS OF OROFACIAL PAIN

Diagnosing a pain complaint consists essentially of three major steps¹⁶

- Correctly identifying the structure from where the pain is emanating.
- Determining the appropriate pain category requires a thorough understanding of pain's genesis and mechanisms. Recognizing clinical characteristics displayed in the patient's physical, psychological, or behavioural condition is required.
- Choosing a pain disorder that accurately explains for the patient's pain problem's occurrence and behaviour. This necessitates expertise with the clinical symptoms associated with orofacial pain syndromes.

1. Chief complaint(s) and history of present illness • Date and event of onset • Location • Quality • Intensity • Duration • Frequency • Remissions or change over time • Modifying factors (alleviating, precipitating, or aggravating) • Previous treatment results 2. Medical history • Current or prior relevant physical disorders or disease (particularly systemic arthritis) or other musculoskeletal or rheumatologic conditions) Sleep disorders and sleep-related breathing disorders • Previous treatments, surgeries, and/or hospitalizations • Face and head injuries • Medications (prescription and Non-prescription) • Allergies to medications • Alcohol and other addictive substances	3. Dental history • Relevant physical problems or diseases that are present or have previously existed • previous therapies, as well as the patient's perspective on the process • A history of head and neck injuries (including iatrogenic trauma). • Parafunctional history, both awake and asleep 4. Psychosocial history • Social, behavioural, and psychologic issues • Occupational, recreational, and family status • Litigation, disability, or secondary gain issues
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Table 1:- Comprehensive history format for orofacial pain patients¹⁶

❖ Assessment of Pain

Pain intensity is frequently assessed using rating scale methods. The following are the most commonly used methods:

- Scale of Numerical Ratings (figure 1)
- Analogue Visual Scale (figure 2)
- McGill Pain Inventory
- Scale of Behavioural Rating

Scale of Numerical Ratings: Due to its ease of use The numerical pain rating scale (NRS) has become the most widely used pain screening instrument. Patients rate the intensity of their current pain on a scale of 0 ("no pain") to 10. ("worst possible pain").¹⁷



Figure 1:- Numerical pain rating scale

Visual Analogue Scales (VAS) ;It's a 10 cm line with anchor points at both ends. The VAS is more widely used because it has been shown to be more sensitive to change.

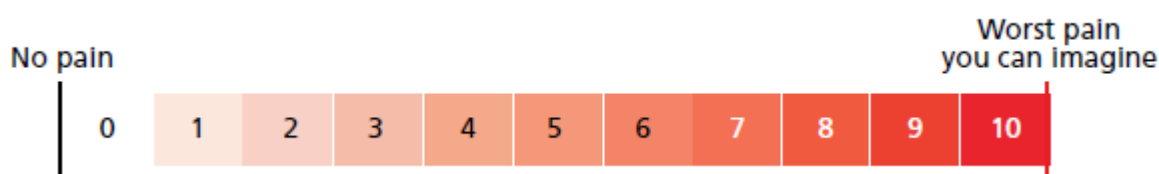


Figure 2:- Visual Analogue Scale

McGill Pain Questionnaire; Using a self-reported questionnaire called the McGill Pain Index, patients can describe their pain in more detail. There are 78 pain adjectives classified into 20 groups, which are further classified into sets of words that describe sensory aspects of pain quality.

Behavioural rating scale; Based on clinical observation, patients who are unable to self-report their discomfort are given a score between 0 and 10.

A. General examination 1. Vital signs a. Blood pressure b. Pulse rate c. Respiration rate d. Temperature 2. Cranial nerve evaluation 3. Eye evaluation 4. Ear evaluation 5. Cervical evaluation 6. Balance and coordination B. Muscle examination 1. Palpation a. Pain and tenderness b. Trigger points and pain referral	C. Masticatory evaluation 1. Range of mandibular movement a. Measurements b. Pain 2. Temporomandibular joint evaluation a. Pain b. Dysfunction 3. Oral structures a. Mucogingival tissues b. Teeth c. Periodontia d. Occlusion D. Other diagnostic tests 1. Imaging 2. Laboratory tests 3. Psychologic assessment 4. Psychologic provocation tests
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Table 2:- Summary of a comprehensive clinical examination for oral and facial pain

THERAPEUTIC MODALITIES FOR THE MANAGEMENT OF ORAL AND FACIAL PAIN DISORDERS

A. PHARMACOLOGIC THERAPY

1. Analgesic medications
 - Single non-narcotic analgesic medications
 - Combination non-narcotic analgesic medications
 - Narcotic analgesic medications
 - Adjuvant analgesic medications
2. Anti-inflammatory medications
3. Muscle relaxants
4. Anxiolytic medications
5. Antidepressants
6. Anticonvulsive medications
7. Vasoactive medications
 - Preventive medications
 - Abortive medications
8. Norepinephrine blockers
9. Antimicrobial medications
10. Antiviral medications
11. Antihistamine medications
12. Neurolytic medications
13. Uricosuric medications
14. Dietary considerations
15. Anaesthetic medications
 - Topical anaesthetics
 - Injectable local anaesthetics

B. PHYSICAL THERAPY

1. Modalities
 - Counter stimulation
 - Thermal therapy
 - Coolant therapy
 - Ultrasound
 - Phonophoresis
 - Iontophoresis
 - Electro galvanic stimulation
 - Transcutaneous electrical nerve stimulation
 - Cold laser
2. Manual techniques
 - Massage
 - Spray and stretch techniques
 - Joint mobilization
 - Muscle conditioning

C. ACUPUNCTURE

D. PSYCHOLOGIC THERAPY

1. Counselling
2. Behavioural modification training
 - Emotional stress reduction training
 - Relaxation training
 - Physical self-regulation

E. OCCLUSAL APPLIANCE THERAPY

TMD has long been treated with oral appliances (OAs), which are processed acrylic devices with a variety of patterns. In order to lessen the strain on the masticatory muscles, distribute parafunctional loads equally across the jaw, and protect the occlusal surfaces of the teeth from nocturnal bruxing, flat plane splints are utilised. Instruct the patient to wear the splints only at night if parafunctional activity is

reduced during the day utilising education and bite relation awareness, which helps the patient to recognise when they are clenching their teeth.. The splint should cover all maxillary or mandibular teeth and have little to no anterior contacts, bilateral posterior contacts, or both. After one week, the patient's satisfaction with the stabilisation device should be evaluated. In order to account for changes in the splint's shape and functionality brought on by chronic bruxing, adjustments should be made every three to six months.^{16,2}

CONDITION	TYPE OF SPLINT ADVISED
Bruxism and headaches but no TMD	Full coverage splint (stabilization splint)
Muscle Disorder	Bite plane therapy (Ant. Midpoint contact splint)
Combination of muscle and disk disorders	Stabilization splints
Acute trauma	Anterior repositioning splints

Table 3:- Types of splint advised in various conditions

❖ CLASSIFICATION OF OCCLUSAL APPLIANCES ¹⁹

- According to Okeson
 - Stabilization appliance
 - Anterior repositioning appliances (ARA)/ Mandibular orthopaedic repositioning appliance (MORA)
 - Other types: a) Anterior/Posterior bite plane b) Pivoting appliance c) Soft/ resilient appliance (silicone)
- Dawson classified splints as follows:
 - Permissive splints/ muscle deprogrammer.
 - Non-permissive splints/ Directive splints
 - Pseudo permissive splints (e.g. Soft splints, Hydrostatic splint)

VI. CONCLUSION

Understanding the aetiology and management of orofacial pain is a difficult task for busy dental professionals. A holistic approach to history taking is essential for the correct diagnosis and treatment. It is imperative to emphasise the value of randomised controlled clinical trials for evaluating the effectiveness of both established and cutting-edge treatments for orofacial discomfort. In the near future, New and exciting discoveries from the bench to the bedside should help to alleviate the burden of chronic orofacial pain conditions.

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