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Diagnosis and Management of Orofacial Pain

Pain is an unpleasant emotional feeling due to either physical or psychological trauma. It is a subjective symptom usually initiated by a noxious stimulus (that injure or threaten to destroy the tissue) and transmitted through a specialized neural network to the central nervous system, where it is interpreted as pain. The pain may be classified according to the duration and severity into: Acute and Chronic pain.

*Acute pain is of short duration, moderate to severe in severity and may be not relief by mild analgesics.

*Chronic pain is of long duration (4 to 6 months), mild to moderate in severity and is often associated with feelings of depression (attention to psychological influences).

It is appropriate to classify orofacial pains as primarily somatic, neuropathic, or psychological.

Classification of Orofacial Pain

I. Typical Orofacial Pain:
- A. Dental
- B. Periodontal
- C. Mucosal
- D. Bone
- E. Salivary gland
- F. Temporo-Mandibular Joint
- G. Maxillary sinus

II. Psychogenic Orofacial Pain:
- A. Facial arthromyalgia
- B. Atypical facial pain
- C. Atypical odontalgia
- D. Oral dysthesia
- E. Factitious ulceration

III. Vascular Orofacial Pain:
- A. Migraine
- B. Cluster headache
- C. Giant cell arteritis

IV. Neuralgia:
- A. Primary neuralgia:
  - i. Trigeminal neuralgia
  - ii. Glossopharyngeal neuralgia
- B. Secondary neuralgia:
  - i. Extra cranial lesions:
    - a. Two mental nerves neuralgia
    - b. Causalgia
    - c. Frey's auriculotemporal syndrome
    - d. Herpes zoster
    - e. Post herpetic neuralgia
    - f. Nasopharyngeal carcinoma
  - ii. Cranial base lesions:
    - a. Petrous Temporal osteitis
    - b. Cholesteatoma
  - iii. Intracranial lesions:
    - a. Posterior cranial fossa
    - b. Middle cranial fossa
    - c. Multiple sclerosis

V. Other Orofacial Pain (Referred pain):
- A. Ocular
- B. Cardiac
- C. ENT
- D. Elongated styloid process

Painful disorders of the maxillofacial region, whether neurologic or musculoskeletal, are common reasons for obtaining a dental opinion. Therefore, it is critical for dentists to become knowledgeable about facial neuropathologic conditions.

The different structures in the head and neck region (e.g., eyes, ears, salivary glands, muscle, joints, sinus membranes, intracranial blood vessels) make an accurate diagnosis challenging.

If there is no detectable sign of the disease, and the patient's history (symptoms) is the only evidence which the clinician can make the diagnosis, the history must be taken carefully. However, if there is associated sign, the patient must be sent for more laboratory investigations concerning the disease.

Pain is a subjective symptom and there are several methods used to document the symptoms severity described by the patient and use this to achieve classification of pain severity and disease control such as Visual Analogue Scale and Verbal Rating Scale.

In order to diagnose any pain and to distinguish between organic and psychogenic origin of pain it is essential to take the history which includes the following informations:

1. Character of the pain: sharp, dull, throbbing, burning or stabbing.
2. Severity of the pain: mild, moderate or severe.
3. Site at which it felt and any pain radiation.
4. Timing: frequency and duration of subsequent attacks.
5. Provoking factors: hot, cold, sweet, bruxism.
6. Relieving factors: analgesic, narcotic, application of heat.
7. Associated clinical features: swelling, ulcer, trismus.
8. If the patient suffers from pain elsewhere in the body: abdominal pain or cervical pain.
9. General medical history.
10. Patient's emotional history: anxiety, depression, antidepressant drug.
11. Family history: ill health, death of parents, brothers, etc.

Glossary of Pain Terms:

- *Allodynia:* Pain caused by a stimulus that does not normally provoke pain.
- *Analgesia:* Absence of pain in response to stimulation that would normally be painful.
- *Anesthesia:* Absence of all sensation.
- *Dysesthesia:* Unpleasant abnormal sensation, whether spontaneous or evoked (*Note:* Dysesthesia includes paresthesia, but not vice versa.)
- *Hyperalgesia:* Increased sensitivity to noxious stimulation.
- *Hyperesthesia:* Increased sensitivity to all stimulation.
- *Hypoalgesia:* Diminished sensitivity to noxious stimulation.

- ❖ *Hypoesthesia:* Diminished sensitivity to all stimulation.
- ❖ *Neuralgia:* Pain in the distribution of a nerve or nerves.
- ❖ *Neuropathy:* Disturbance of function or pathologic change in a nerve.
- ❖ *Paresthesia:* Abnormal sensation, whether spontaneous or evoked.

Other classification of Orofacial Pain

I. Typical Orofacial Pain:

Somatic pain arises from musculoskeletal or visceral structures interpreted through an intact pain transmission and modulation system. Common orofacial examples of musculoskeletal pains are temporomandibular joint (TMJ) disorders or periodontal pain.

Examples of visceral orofacial pains include salivary gland pain and pain caused by dental pulpitis.

1. Dental pain (odontalgia)

Pulpitis presented as transient dull or sharp pain provoked by thermal changes. The pain may be well localized but occasionally becomes diffuse or referred to the opposite tooth. Associated with carious or filled tooth. Acute pulpitis and periapical abscess are tender to percussion. All teeth must be carefully examined.

Treatment: Amalgam or composite filling, RCT, or extraction of unrestorable tooth.

2. Periodontal pain

Periodontitis presented as continuous dull pain initially relieved by clenching the teeth, but later on is aggravated by this action. Associated with gum recission, exposed root, pocket, or tooth mobility.

Treatment: Acute periodontal abscess treated by drainage of exudates and antibiotic, after that periodontal surgery (root planning and curettage) when the acute phase has been subsided.

3. Mucosal pain

Traumatic ulceration, aphthous stomatitis, viral ulceration, erosive lichen planus, etc, which may involve the oral mucosa, causing burning sensation which is provoked by spicy or hot food.

Investigation: biopsy if ulcer persists for more than two weeks.

Treatment: Each condition requires specific therapy.

4. Bone pain

Alveolar osteitis (dry socket), fracture, osteomyelitis and tumor causing bone pain which is vary from continuous dull ache to a severe throbbing.

Investigation: x-ray and biopsy. Treatment: Analgesic and antibiotic or surgery.

5. Salivary gland

Diseases of the salivary glands such as sialadenitis, obstructed duct, mump and tumors presented as well localized intermittent dull pain and associated with a swollen gland and xerostomia.

Investigation: Plain radiography or sialography. Treatment: Each condition requires specific therapy.

6. Temporo-Mandibular Joint (TMJ)

- Traumatic arthritis of TMJ:

This occurs following damage to the capsule and meniscus due to direct trauma on the mandible. It is presented as moderate to severe pain, well localized and aggravated by mandibular movements and tender joint on palpation.

Investigation: X-ray (TMJ, PA, OPG views or MRI).

Treatment: Conservative therapy, resting the joint and analgesics.

- Osteoarthritis of the TMJ:

It is a degenerative condition, the pain is well localized to the affected joint, provoked by jaw movements and there is tenderness and audible crepitus (clicking) in the joint.

Investigation: X-ray (TMJ, PA or OPG views) and Serum uric acid.

Treatment: Correction of the occlusion, Ibuprofen 400 mg t.i.d., arthrocentesis, Intracapsular injection of 1ml Dexamethasone or smoothing of the condylar head by open surgery.

7. Maxillary sinus

Sinusitis presents as dull or severe maxillary pain, either unilateral or bilateral which is become worse on head bending. The diagnosis may be obscured by sensitivity in the upper premolar and molar teeth which are tender to percussion giving the impression of pulpitis.

Investigation: X-ray; Occipitomental view reveals radioopaque sinus.

Treatment: Antibiotic, analgesic, nasal decongestant, or surgery.

II. Psychogenic Orofacial Pain:

Neuropathic pain arises from damage or alteration to the pain pathways, most commonly a peripheral nerve injury due to surgery or trauma.

Tension headache is psychogenic pain occurs as a result of stressful life, anxiety, neurosis or depression.

The clinical presentations of psychogenic orofacial pain include:

1. Facial arthromyalgia (TMJ Myofascial Pain Dysfunction Syndrome)

The condition may vary from clicking of the joint on chewing or talking to a severe continuous ache in one or both joints, and the pain may radiate to the temporal, occipital regions, or angle of the mandible. Tenderness in the TMJ and muscles (temporalis, masseter, medial & lateral pterygoid). The patient

may also has accompanied pain in other body sites as cervical pain and irritable colon, etc.

The pain in TMJ may present at morning together with trismus, it tends to improve during the day; in this case there is a history of nocturnal bruxism. Other patient tends to develop the TMJ pain during the course of the day which is due to stress. It is important to ask the patients whether they have suffered from anxiety, emotional disturbance or depression.

Treatment:

- Adjustment of the occlusion and all dental diseases must be treated.
- Reassuring that emotional tension expressed as bruxism which create muscle spasm.
- Muscle relaxant medications as Norgesic or Myogesic.
- 4. Benzodiazepine 2-5 mg (anxiolytic and mild muscle relaxant) at night.
- A bite-guard at night or during the day to discourage bruxism.
- Tricyclic antidepressant (Nortriptyline 10 mg at night for 2-3 weeks). If there is no remission prescribe; Motival (Flufenazine 0.5 mg and nortriptyline 10 mg at night). Psychiatric consultation for severely disturbed cases.
- Surgery is controversial, and the need for condylotomy in some cases.

2. Oral dysesthesia

This condition tends to be of abnormal sensation and more commonly occur in elderly with overt problem, menopause and loneliness. In some cases, there may be evidence of an organic psychosis due to cerebral ischemic changes. The most common clinical presentations are: burning tongue, dry mouth in the presence of saliva, feelings of sand in the saliva, denture intolerance and abnormalities of taste.

Treatment: Reassurance, and Trifluoperazine 2-4 mg twice a day.

3. Factitious ulceration

It is a self-inflicted ulceration, which is difficult to be recognized, particularly if the lesion resembles an aphthous ulcer, the mucosa may be abraded with rather finger nails or the application of erosive substance as Aspirin. The patient usually denies causing the lesion. The lesion is investigated by histopathological study reveals no evidence of any pathological lesion. Treatment: Trifluoperazines 2-4 mg a day.

4. Burning mouth syndrome

The patient fells a burning or aching sensation in all or part of the oral cavity. The tongue is the most frequently involved site. Dry mouth and altered taste are common symptoms.

The cause is unknown, but a defect in pain modulation may be the most promising theory. Most patients are postmenopausal women, although hormone replacement therapy does not consistently improve symptoms.

Approximately 50% of patients improve without treatment over a 2-year period. Treatment by antidepressant medications.

III. Vascular Orofacial Pain (Chronic headache):

1. Migraine

Migraine headaches are unilateral location, pulsating quality, moderate to severe pain. An aura may develop several minutes to 1 hour before headache onset in approximately 40% of patients. The aura is a neurologic disturbance, frequently expressed as flashing or shimmering lights or a partial loss of vision.

Complicated auras may produce transient hemiparesis, aphasia, or blindness. About 80% of those suffering from migraine headaches have nausea and photophobia (intolerance to light) during attacks. Migraines typically last 4 to 72 hours (if untreated).

Migraine intensified by sneezing, light, smell and noise, certain vasoactive foods or drugs. Women are at least twice as likely as men to have migraines. The mechanism for migraine headache, although not completely understood, appears to involve neurogenic inflammation of intracranial blood vessels resulting from neurotransmitter imbalance in certain brainstem centers.

Treatment:

- Nonsteroidal antiinflammatory drugs, opioid analgesics, and antiemetics.
- Vasoactive Ergotamine Tartrate (2 mg sublingually or 0.5 mg inhaler).
- Antidepressant; Motival (Flufenazine 0.5 mg with Nortriptyline 10 mg).
- Anticonvulsants
- Botulinum toxin

2. Tension-type headache

The majority of patients who report to the physician with a chief complaint of headache are diagnosed with tension-type headache.

More common present in women than in men. The headache is generally bilateral. Pain is frequently bi-temporal or frontal-temporal in distribution. Patients commonly describe their pain as though their head is “in a vice” or a “squeezing hatband” is around their head. These headaches can occur with or without “pericranial muscle tenderness” (i.e., tenderness to palpation of the masticatory and occipital muscles). To be defined as chronic tension-type headache, symptoms must be present longer than 15 days per month.

Treatment of a tension-type headache is commonly with tricyclic or other antidepressants. When tension-type headaches occur in those who also suffer from migraines, migraine treatments are usually beneficial.

For the dentist, it is important to distinguish tension-type headache from masticatory myofascial pain. This can be confusing because both conditions have similar symptoms. However, in tension-type headache, pain does not

proportionally increase with increasing pressure to the headache site or refer pain to other areas.

3. Cluster headache (Alarm clock headache)

Cluster headache is a clearly unilateral head pain typically centered around the eye and temporal regions. The pain is intense, severe or very severe unilateral orbital, supraorbital and/or temporal pain lasting 15–180 min if untreated, frequently described as a stabbing sensation (i.e., as if an ice pick was being driven into the eye). Some component of parasympathetic overactivity is present (commonly lacrimation, conjunctival injection, ptosis, or rhinorrhea). Attacks have a frequency from 1 every other day to 8 per day, commonly with precise regularity (e.g., awakening the patient at the same time night after night). The headaches can occur in clusters such that they may be present for some months and then remit for several months or even years. Alcohol ingestion and tobacco smoking consistently triggers headache. Men are much more likely to have cluster headaches compared with women.

Treatment: Preventive treatment is accomplished with verapamil, lithium salts, anticonvulsants, corticosteroids, and certain ergot compounds. Symptomatic treatment is with triptans, ergots, and analgesics. Oxygen inhalation at 7 to 10 L/min may be an effective abortive treatment.

4. Giant cell arteritis

Temporal arteritis (giant cell arteritis), is an inflammation of BV (vasculitis) of the cranial arterial tree that can affect any or all vessels of the aortic arch and its branches. The condition is most prevalent in those over 50 years of age. The inflammation results from a giant cell granulomatous reaction. Dull aching or throbbing temporal or head pain is a common complaint affecting 70% of patients and is the presenting symptom in one-third of patients. Jaw claudication (increasing weakness and pain in the jaw or tongue with ongoing mastication).

Arteritis of the superficial temporal artery present as a headache or local pain.

Arteritis of the maxillary artery present as pain in the masticatory muscles.

Arteritis of the lingual artery present as ulceration and necrosis of the tongue.

Investigation: Erythrocyte sedimentation rate
or cross-reactive protein testing. Biopsy of the artery.

Treatment is with high-dose corticosteroids, frequently for many months, and early treatment is necessary to avoid blindness caused by extension of the disease process to the ophthalmic artery.

IV.Neuralgia

Neuropathic pain arises from damage or alteration to the pain pathways, most commonly a peripheral nerve injury due to surgery or trauma. It refers to any neuropathic pain of trigeminal nerve origin, TN or tic douloureux.

Types of neuralgia

The etiology of neuralgia is unclear and has been attributed to viral infection of the nerve ganglion, demyelination of intracranial nerve roots due to nerve compression by small vascular loop, or by narrowing of the nerve foramina.

1. Paroxysmal Trigeminal Neuralgia

The pain is sharp, electric shock like or stabbing in the face or mouth, lasting within seconds to one minute, followed by a refractory period during which the pain cannot be reinitiated. provoked by talking, swallowing, shaving or touching specific areas where the branches of the nerve are distributed called the "trigger zone", usually affecting the middle aged and elderly (most frequently in patients older than 50 years) and often women are more affected than men. The most common sites involved are the mandibular mental area and the maxillary canine area (Common cutaneous trigger zones include the corner of the lips, cheek, ala of the nose, lateral brow, teeth, gingiva, or the tongue). The ophthalmic distribution of the trigeminal nerve is rarely affected. There is a period of remission but the condition tends to recur or persist throughout the patient's life. The pain can be also an early manifestation of multiple sclerosis.

Clinical Characteristics:

- Severe paroxysmal pain Common cutaneous
- trigger zones include the corner of the lips, cheek, ala of the nose, or lateral brow.
- Unilateral location (96%); right > left.
- Mild superficial stimulation provokes pain.
- V3 and V2 branches most commonly affected.
- Frequently pain free between attacks.
- No neurologic deficits.
- No dentoalveolar cause found.
- Local anesthesia of trigger zone temporarily arrests pain.

For the dentist, the critical issue is recognizing TN so that unneeded dental treatment or extractions are avoided.

Treatment:

The treatment of TN is medical or surgical.

- Anticonvulsant: Carbamazepine (Tegretol) 100-400 mg, every 6 hours. The alternative drug is Phenytoin 200-400 mg twice a day. Newer anticonvulsants (e.g., gabapentin and oxcarbazepine) and the antispastic baclofen are commonly used as well.

- When drug therapy is inadequate or immediate relief is essential, injection of 1 ml 60% or 90% alcohol into the mental or infraorbital foramina, taking care to avoid entering a blood vessel by aspirating before the injection. In all cases 2 ml of 2% lignocaine should be given before alcohol injection to avoid unnecessary pain.
- Peripheral neurectomy
- Cryotherapy Surgical
- Microvascular decompression of the offending vascular loop (*Janetta procedure*).
- Gamma Knife radiosurgery.
- Percutaneous needle thermal rhizotomy.

NOTE: Local block anesthesia of the trigger zone arrests the pain of TN for the duration of anesthesia and sometimes longer, which can lead the dentist to mistakenly ascribe a "dental" cause to the pain complaint. when the trigger zone is located in an intraoral, dental, or periodontal site, unnecessary dental treatment is common.

2. Glossopharyngeal neuralgia

The presenting symptom in glossopharyngeal neuralgia is typically sharp, electric shock like pain on swallowing with a trigger zone in the oropharynx or the base of the tongue. This pain is brought on by swallowing and radiate to the throat or tongue, but may be referred to the lower jaw.

Treatment: Tegretol 100-400 mg every 6 hours.

3. Two mental nerves neuralgia

The patient complains from pain in the lower mental areas due to pressure of lower denture flange on the mental nerve which has become superficial as a result of alveolar bone resorption. This condition treated by relieving the inner surface of the denture over the mental area or by mental nerve transposition. Other condition of mental neuralgia is due to entrapment of the mental nerve arising from narrowing of the mental foramen. This condition treated by decompression of the mental nerve by removal of a ring of bone around the margin of the foramen.

4. Causalgia

It is a well localized persistent burning pain at the site of peripheral nerve injury. It is typical of causalgia that exploration of the injured site and excision of scar tissue results in relief of pain, but the pain returns as healing is completed and new scar tissue forms.

Treatment: Antidepressant, Cryotherapy, or Avulsion of the peripheral nerve.

5. Frey's auriculotemporal syndrome

This condition arises following parotid gland or rarely TMJ surgery or trauma. The patient may complain of burning sensation in the temporal or facial region associated with flushing and profuse sweating on eating. The condition is attributed to parasympathetic secretomotor fiber of the auriculotemporal nerve reinnervation the cut ends of the sympathetic fibers.

Treatment: Conservative therapy with parasympathetic blocker using Poldine Methyl Sulphate 2-4 mg 3 times a day. Or use topical application of Anticholinergic (hyoscine) cream may produce relief lasting up to 48 hours and repeat the application.

6. Odontalgia resulting from deafferentation (Atypical odontalgia)

Pain resulting from deafferentation refers to pain that occurs when damage to the afferent pain transmission system has occurred. Usually, this condition is caused by trauma or surgery, including extraction and endodontic treatment.

History and clinical manifestations:

- Burning or aching pain is continuous or almost continuous.
- Sharp paroxysms may occur.
- Allodynia, hyperesthesia, or hypoesthesia may be present.
- No dentoalveolar cause is found.
- History of surgical or other trauma exists.
- History of symptoms greater than 4–6 months exists.
- Local anesthetic block is equivocal.

Further peripheral surgical procedures frequently intensify symptoms and lead to a broader area of perceived pain

7. Herpes zoster

Pain and burning sensation unilaterally precede the vesicular eruption by Varicella virus which may affect any peripheral nerve. If the virus involves the geniculate ganglion and nervous intermedius of facial nerve, the patient will have ipsilateral facial palsy, otalgia and erythematous vesicular rash of the auricle and oropharynx, this condition called Ramsay Hunt Syndrome.

Treatment: Acyclovir, which can be given as tablets systemically as well as applied topically to the lesion. Anticonvulsants or tricyclic antidepressant also used.

8. Post herpetic neuralgia

Post herpetic neuralgia occurs after reactivation of the virus, which can lay dormant in the ganglia of a peripheral nerve. This neuralgia may arise following untreated herpes zoster and presents as a persistent burning pain in an area of a diminished sensation. It is attributed to the destruction of the large myelinated sensory fibers by the Varicella virus.

Treatment: Ibuprofen 400 mg, 4-6 hourly and supplemented by Tricyclic antidepressant.

9. Neuroma

After peripheral nerve transection, the proximal portion of the nerve generally forms sprouts in an effort to regain communication with the severed distal component. When sprouting occurs without distal segment communication, a stump of neuronal tissue can form. This neuroma become sensitive to mechanical and chemical stimuli. The pain is commonly burning or shock like. Damage to the mandibular or lingual nerve after third molar surgery is a source for neuroma formation that a dentist might see.

10. Nasopharyngeal carcinoma

The mandibular and maxillary nerves are involved giving rise to a combination of facial pain, hypoesthesia and wasting of the masseter muscle. Treatment: Radiotherapy and Cytotoxic drug.

11. Multiple sclerosis

The condition may present as trigeminal neuralgia, but in most cases have accompanying neurological disturbances such as loss of taste, disturbance of facial sensation, neurological deficit of sensory, reflex or motor.

V. Other Orofacial Pain (Referred pain):

1. Ocular pain

Ophthalmic diseases such as acute glaucoma presents as ill-defined facial pain and treated by ophthalmologist.

2. Cardiac pain

Severe pain of ischemic heart disease may refer to the left mandibular teeth via their common autonomic sensory innervations. The pain is provoked by effort, diagnosed by ECG and treated by cardiologist.

3. Ear, nose and tonsil

A painful otitis externa due to furuncle, impacted wax or a fungal infection, the pain is elicited by rotating the pinna, and may referred to the mandible.
Peritonsillar abscess (quinsy) occasionally presents as pain in the maxilla and the patient misinterprets as toothache. Treatment: by ENT specialist.

4. Elongated styloid process (Eagle's syndrome)

The pain arising from an elongated styloid process (diagnosed by x-ray) and there is a tenderness on swallowing and palpation in the tonsillar fossa.

Differential Diagnoses of Common Headaches

	Temporal Arteritis	Migraine	Cluster	Tension
Onset	Acute or chronic	Acute	Acute	Chronic
Location	Localized	Unilateral (40%)	Unilateral	Global, unilateral
Associated symptoms	Weight loss, polymyalgia rheumatica, fever, decreased vision, jaw claudication	Nausea, vomiting, photophobia, phonophobia	Rhinorrhea, lacrimation of ipsilateral side	Multisomatic complaints
Pain character	Severe throbbing over area affected	Throbbing	Sharp stabbing	Aching
Prior history	(−)	(+)	(+)	(+)
Diagnostic test	Erythrocyte sedimentation rate (+)	None—history	None—history	None—history