Chapter 3
Classification and Epidemiology of Orofacial Pain

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Introduction

There are several classification schemes that have been reported in the literature. The majority are based on either the structures involved or the symptoms. Some classifications are based on cluster analysis of pain conditions, and some are based on diagnostic criteria. A few of the popular known ones include:

- International association for the study of pain (IASP) [1]
- Research diagnostic criteria for temporomandibular diseases (RDC/TMD) [2]
- American academy of orofacial pain guidelines [3]
- ICD10—G 50.0 disorders of trigeminal nerve [4]

Classification systems have evolved over time from a simple one-dimensional location-based system to multidimensional/multiaxial systems [1, 2, 5]. Basic need to develop a classification would be to distinguish one entity from another, in other words make a "differential diagnosis," which would eventually help a clinician in decision making regarding identification of the disease process as well as prognosis and treatment planning. Classification systems for orofacial pain published to date have not been able to provide a clear allocation of the disease to the category because of the numerous overlapping pathophysiology as well as symptomatology.

In this chapter a simple and broad classification for orofacial pain conditions is proposed, and epidemiology for each of the classifications is described as reported in various literatures.

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Classification

A broad classification for clinically determined orofacial pain can be categorized as tooth related and non-tooth related; they could be further subclassified as shown in Table 3.1.

Facial pain can also be classified as peripheral or central; this of course will be a very primitive method; commonly, facial pain symptoms are caused by local factors, usually in the oral cavity or adjacent structures with teeth and temporomandibular joints being the major sources of peripheral facial pain. Central facial pain is always secondary to intracranial pathology, such as neoplasms, vascular compression, and other idiopathic phenomena.

Epidemiology of Orofacial Pain

Accurate incidence estimates for facial pain in the general population are scant; prevalence of up to 26 % has been reported [6]. Presented below is the epidemiology for different causes of orofacial pain.

Table 3.1 Classification based on clinical presentation of orofacial pain

1. Tooth related
   a. Pulpal
      i Dentinal hypersensitivity resulting from
         - Caries
         - Wasting disease
      ii Pulp disease (reversible and irreversible pulpitis) resulting from
         - Caries
         - Trauma
   b. Pathology in periapical region—acute abscess
   c. Gum/periodontal diseases
   d. Cracked tooth syndrome
2. Non-tooth related
   a. Musculoskeletal—temporomandibular diseases (TMD)
   b. Neuralgias and neuropathic
      i Trigeminal, glossopharyngeal, sphenopalatine
      ii Post injury
      iii Postherpetic neuralgia, burning mouth syndrome
   c. Idiopathic orofacial pain
   d. Mucosal—traumatic, immunologic, infective, erosive, ulcerative, and vesiculobullous lesions
   e. Psychosomatic
   f. Sinonasal
   g. Headaches—migraine, tension type, brain tumors, and aneurysms
   h. Salivary gland diseases—sialadenitis, sialolithiasis
   i. Cardiac toothache

Tooth-Related Orofacial Pain

Toothache (dental pain) is the most common amongst the causes of pain symptoms in the mouth, and this invariably affects quality of life. Epidemiological studies about dental pain are few, and hence it is difficult to infer its patterns [7, 8]. Dental pain is highly prevalent among children and is consistently associated with population levels of caries experience, the association being most apparent in lower socioeconomic groups with reduced access to care [9–11]. Tooth-related pain is strongly correlated with untreated dental disease (dental decay); in addition, fractured teeth and exposed dentin due to attrition, erosion, and abrasion may also cause pain. Impacted third molars also cause pain; 23 % of partially erupted impacted third molars develop pain symptoms compared to 10 % of unerupted [12]. It is also reported that tooth-related disease and pain in children are inversely associated with educational levels of parents [13, 14] as well as educational levels of individuals [15, 16]. Gender association of toothache is difficult to conclude, with the association being inconsistent [17].

Cracked or fractured tooth may be the reason for unexplained pain in a vital, amalgam-restored tooth. Cracked teeth are usually found in the molars with higher incidence in mandibular molars [18]. They are common in the fourth decade of life [18, 19] and in teeth with restorations involving the marginal ridges [20]. Among patients suffering from gum/periodontal diseases pain levels are minimum in those with gingivitis (6 %) and gradually increase as the disease progresses, manifesting periodontal pockets/loss of attachment (25 %) [21, 22].

Acute periapical abscess as well as acute exacerbation of chronic periapical abscess resulting as a sequel of pulp necrosis invariably induce pain; pain may or may not be accompanied by swelling [23, 24].

Non-tooth-Related Orofacial Pain

Temporomandibular Disorders and Orofacial Pain

Temporomandibular disorders (TMD) represent clusters of related disorders in the masticatory system. They are characterized by pain in the temporomandibular joint (TMJ) and/or pain in the preauricular area or muscles of mastication and may or may not be accompanied by TMJ sounds and/or deviations/restrictions in the mandibular range of movement. TMD are a major cause of non-dental pain in the orofacial region, and oral health-related quality of life is markedly impaired in these patients [25]. There is no strong association of gender for TMD [26]; however, it is found that a higher proportion of women seek treatment [27]. TMD are more common among patients with impaired general health [28, 29]. In otherwise healthy population it is a prevalent disease. It is very rare among children less than 5 years [30] and is evident in teenagers with a prevalence of up to 10.5 % [30–32]. Increasing age, general

health factors, and oral parafunctions are generally associated with TMD symptoms and signs. No clear relationship has been established between occlusal alterations and TMJ disease [32, 33]. Parafunctional habits and bruxism are considered risk factors of TMD [34] with odds ratio of up to 4.8 [32]. Stress is considered a major component for TMD [35]. Post-traumatic stress disorder patients are at increased risk for the development of TMD symptoms [36]. A substantial proportion of TMD patients have been found to be depressed and experience moderate to severe somatization [37]. Fifty-six percent of patients suffering from headaches, which include migraine, tension-type headache, and chronic daily headache, show at least one sign of TMD [38, 39]. A high prevalence of TMD has been noticed among obstructive sleep apnea patients [40]. Myofascial pain-associated TMD forms about 10.5 % of TMD [41]. Also, non-occlusion (posterior teeth, at least one side) and an open bite have been found to increase the risk of myofascial pain [42].

Neuralgias and Neuropathic Orofacial Pain

Prevalence of trigeminal neuralgia (TN) is low with an incidence range of about 4 to 5/100,000/year [43, 44] and increases with advancing age [44, 45]. It is more common among women (female:male = 3:2) [43]. TN pain is more predominant on the right side [45], but the difference is not statistically significant [44]. It has been hypothesized that smaller size of foramen rotundum and ovale on the right side are the causes of such presentation [46]. TN also manifests in up to 6 % of multiple sclerosis patients [47].

Glossopharyngeal neuralgia (GN) has an incidence of 0.7/100,000/year, and epidemiological studies have shown it to be less severe than previously thought [44, 48].

Sphenopalatine neuralgia is a rare craniofacial pain syndrome with higher prevalence in women [49, 50]. Chronic pain manifesting as varying degrees of paraesthesia, allodynia, or hyperalgesia is often a symptom following injury to lingual as well as inferior alveolar nerves [51]. Neuropathic orofacial pain as a result of deafferentation in trigeminal nerve fibers following endodontic and minor oral surgical procedures has also been reported in literature [52]. However, there are no true estimates available on its incidence and prevalence. Postherpetic neuralgia (PHN) is one of the long-term complications associated with herpes zoster infection and has a comparable incidence to idiopathic TN [44]. It has been estimated that up to 30 % of patients suffering from herpes zoster infection develop PHN, and it increases with increase in age [53]. As with TN, PHN is common among women [54]. Burning mouth syndrome is characterized by an oral burning sensation in the tongue or other oral mucous membrane in the absence of any clinical abnormal findings. It frequently affects middle-aged and aged women, with prevalence rates ranging from 0.6 to 12.22 % [55, 56].

Table 3.2 Prevalence of mucosal lesions

Mucosal lesion	Prevalence
Oral lichen planus	0.5–2.2 % of the population [62]
Pemphigus vulgaris	0.1–0.5 patients per 10^5 population per year [63]
Recurrent aphthous ulcers	5–60 % of population [64]
Radiation-induced mucositis	75 % of treated population [65]
Cancer chemotherapy-induced mucositis	40–70 % of treated population [65]
Mucositis in hemopoietic stem cell transplantation	75–99 % of treated population [65]

Idiopathic Orofacial Pain

Atypical facial pain, stomatodynia, atypical odontalgia, and some forms of masticatory muscle and temporomandibular joint disorders all seem to belong to the same group of idiopathic orofacial pain illnesses [57]. It is seen commonly in women and in the fourth decade of life. It is noticed in up to 6 % of patients undergoing endodontic treatment [58]. True prevalence or incidence rates of idiopathic orofacial pain have not been reported in literature.

Painful Oral Mucosal Lesions

Oral mucosal lesions are highly prevalent (Table 3.2), and painful oral ulcers are one of the main presenting symptoms of acute as well as chronic oral mucosal lesions (traumatic, infective, or immunologic) [59, 60]. Lesion prevalence differs significantly by age, sex, race/ethnicity, general health, denture wearing, and tobacco use [61].

Psychosomatic Diseases and Orofacial Pain

Stress, anxiety, psychological, as well as psychiatric disorders contribute substantially to causing orofacial pains and manifest as muscle tenderness, vague pains, and associated sleep disorders with no identifiable source of pain [66, 67]. Coexisting stress/anxiety disorders have been identified in 7 % of the population reporting with new onset of chronic orofacial pain [68].

Sinonasal Diseases and Orofacial Pain

Orofacial pain can originate from diseases of the sinonasal complex; it is most common from maxillary sinus diseases where pain is experienced even in the upper

molar teeth along with pain over antral and forehead region [69]. Prevalence rates of maxillary sinusitis in the general population of up to 5 % in Canadians [70] and 14 % in Americans [71] have been reported.

Salivary Gland Diseases and Orofacial Pain

Inflammation and pain are prominent features in nonneoplastic diseases of salivary glands. Chronic nonspecific type of sialadenitis is the most common (87 %) type of nonneoplastic disease of salivary gland [72].

Headache and Orofacial Pain

Headache is one of the most reported comorbidity states in patients with symptoms of orofacial pain [73]. An estimated 20 % of the general population suffers from headache; most common types are tension-type headache and migraine [74, 75]. Global prevalence for tension-type headache is found to be about 38 % and 10 % for migraine [76], and up to 9 % of patients with migraine present with facial pain [77]. Overall incidence rate for primary brain tumors in the United States is 13.8/100,000 [78], and facial pain can be a presenting feature for intracranial tumors [79, 80]. Aneurysms, intracranial as well as extracranial, can also present with pain in the orofacial region [81, 82].

Cardiac Toothache

Referred pain to the mandibular region due to cardiac ischemia/myocardial infarction is referred to as cardiac toothache and is characterized by pain provocation/aggravation by physical activity, pain relief at rest, and bilateralism [83] and might be the only presenting complaint [84]. Cardiac ischemia/myocardial infarction is a relatively prevalent disease in the general population, and incidence rate of up to 133/100,000/year has been reported in literature [85].

Conclusion

Orofacial pain is a prevalent symptom in the general population, and its impact in terms of diminishing quality of life is remarkable. Epidemiological data for subtypes of diseases producing pain in the orofacial region is not obtainable from present literature; hence, efforts to increase epidemiological studies should be made.

Essentially clinicians should be aware of the wide spectrum of diseases producing pain symptoms in the orofacial region so that they will be able to develop appropriate management strategies.

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