



ISSN: 0975-833X

RESEARCH ARTICLE

NON ODONTOGENIC PAIN: THE PUZZLE

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ARTICLE INFO

Article History:

Received 29th August, 2015
Received in revised form
09th September, 2015
Accepted 20th October, 2015
Published online 30th November, 2015

Key words:

Nonodontogenic pain,
Differential diagnosis,
Treatment planning.

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Citation: Dr. Sarvesha Bhondwe, Dr. Rupali Balpande, Dr. Vishal Mahajan and Dr. Rohit Doot, 2015. "Non odontogenic pain: The puzzle", *International Journal of Current Research*, 7, (11), 22743-22747.

ABSTRACT

Orofacial pain can present with pain of odontogenic and nonodontogenic origin. It arises from facial area, temporomandibular joint, ear, pharynx and larynx. The dilemma the clinician faces is the correct diagnosis of these pains. Many times misdiagnosis of orofacial pain resulting in multiple endodontic procedures or even worse that still extraction recommended with no resolution of symptoms. Knowledge of the various nonodontogenic pains will ultimately prevent misdiagnosis and delivery of incorrect treatment. So this critical review emphasizes on multidisciplinary approach which highlight the importance of correct diagnosis and treatment planning.

INTRODUCTION

Orofacial pain includes odontogenic pains, painful diseases of TMJ disorders, oral mucosa and salivary glands, and neurological (e.g. neuralgia) and vascular pain (e.g. temporal arteritis, migraine) (Sessle *et al.*, 2000). Majority are acute and transient in nature. Although the pain of dental origin is the most common orofacial pain, non odontogenic pain can affect orofacial region and occasionally resemble dental pain. A median prevalence of 13% has been described based on epidemiological survey (Macfarlane *et al.*, 2001). Pain is the fifth vital sign to mark its importance as health status indicator (Lanser *et al.*, 2001). When daily life begins to be dictated by pain, psychological changes and restriction in lifestyle results in limiting the innate capabilities (Woolf *et al.*, 1998). So there is need of early detection of the underlying pain and treatment. For early establishment of diagnosis history of patient and physical examination is largely contributed (Tjakkes *et al.*, 2009). Orofacial pain refers to the differential diagnosis and management of pain and dysfunction affecting motor and sensory function of trigeminal system. Orofacial pain broadly classified in AXIS 1 (Physical condition) and AXIS 2 (Psychological condition) (Türp *et al.*, 2007).

The most widely used definition of pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage or describe in terms of such damage (Türp *et al.*, 2007). The classification and etiologies of orofacial pain itself present challenge because of many anatomic structure involved, diverse cause, unpredictable pain referral pattern and presenting symptoms and lack of concentration regarding differential diagnosis criteria (Esposito, 2001 and Gremillion, 2002). Chronic orofacial pain affects approximately 10% of adults and 50% elders. There is evidence that at the age of 19 years, masticatory muscle pain and tenderness emerges (Krogstad *et al.*, 1992). Women of reproductive age seek treatment for orofacial pain more frequently compared to men by 2:1 ratio. Also migraine, tension headache, fibromyalgia, autoimmune rheumatic disorders, orthopaedic problems and irritable bowel syndrome are more seen in women population. It is usually found that more elderly patient attend physician or dentists often with a complaint of pain and history of taking multiple medication than 2 or 3 decades younger people (Rene' M. Shinalet *al* 2007). Two most popular theories of orofacial pain, one is Convergence Projection Theory where Primary afferent nociceptors from both visceral and cutaneous neurons converge onto the same second order pain transmission neuron in the spinal cord. Multiple sources include Vth, VIIth IXth and XIth Cranial nerves and cervical plexus a C2 and C3 that is pain information from the face, teeth, TMJ ear, pharynx

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Table 1. Myofascial trigger point referral patterns

| Pain Source: | Site of Pain: | Associated Signs: |
|--|--|-------------------------|
| Anterior Temporalis | Maxillary Anterior Teeth Temple Frontal Retro-orbital | Dental hypersensitivity |
| Middle Temporalis | Maxillary bicuspids Temple | Dental hypersensitivity |
| Posterior Temporalis | Maxillary posterior teeth Temple | Dental hypersensitivity |
| Posterior Temporalis | Posterior Portion of Temple | Dental hypersensitivity |
| Superficial layer upper portion of Masseter muscle | Sinus Pain Posterior Maxillary Teeth | |
| Superficial layer lower portion of Masseter muscle | The Mandible, Retro Orbital, Frontalis | |
| Deep Layer of Masseter | Earache (Auricular), TMJ | |

Table 2. Differential diagnosis of non-odontogenic pain and their management

| Feature | Myofascial pain | Trigeminal neuralgia | Post herpetic neuralgia | Occipital neuralgia | Glossopharyngeal neuralgia | Acute and chronic maxillary sinusitis | Persistent idiopathic facial pain |
|---------------|--|---|--|---|---|--|---|
| Age | Middle and old age | Fifth decade | Any age ,potential sequel of infection with herpes zoster | Middle and old age | Middle and old age | Any age | Middle and old aged |
| Pain type | Usually dull, non-pulsable, and aching pain | Electric shock type, stabbing | Aching, burring or shock like | stabbing | Stabbing | Continuous dull ache or diffuse lingering pain, | Constant aching pain |
| Pain severity | Moderate to severe, in morning and during period of tension and anxiety | Severe | severe | Moderate to severe | Severe | Moderate to severe | Moderate to severe |
| Pain location | Localized spot in muscle, tendon, or fascia, sometimes unable to localized and believe pain is originating from the tooth. | Trigger zone Usually unilateral | Ear ache, sometimes tooth ache | Below superior nuchal line | Affect tonsil , base of tongue, ear nd intra auricular area | Unilateral /bilateral, pressure over cheek bone, pain in upper teeth and around eyes. | Poorly localized , may cross midline |
| Pain duration | Last for minutes to hours | Last for few seconds to minutes, episodic | Last for seconds to minute | inconsistent | Last for few seconds to minutes, episodic | variable | variable |
| Triggers | Trigger points where muscle have taut, palpable bands twitch when percussed. | trivial stimulation such as touching of face, mastication, shaving, chewing , talking | Palpation on healing vesicle aggravates pain | Palpation below superior nuchal line may reveal tender. | Yawning and swallowing. | Elicited by palpation of infraorbital region, exacerbated by stooping | Variable factors |
| Treatment | Education of patient and eliminate oral habit such as gum chewing , clenching of teeth. thermal therapy | Medical treatment, Surgical treatment (invasive) | Antiviral and corticosteroids after presentation of rash reduce incidence. | Treatment has included occipital nerve block, neurolysis, C2 dorsal root ganglionectomy | Anti convulsion drugs, carbamezipine. Vascular decompression. Intracranial or extra cranial neuroectomy | Decongestants, Steam inhalations, Antibiotics if indicated, Local Heat, Antihistamines if allergic component corticosteroids | Demand physical treatment Often do not accept psychological explanation |

Table 3. Differential diagnosis of non-odontogenic pain and their management

| Feature | Psychogenic toothache | Cardiac toothache | TMJ disorders | Orofacial neoplasm | Burning mouth syndrome | Migraine | Cluster headache |
|---------------|--|---|--|---|--|--|--|
| Age | Middle age to old age | Old age | Middle aged and old aged | Middle aged mostly male affected | Middle age to old age | Age between 10 to 50 yrs of old | Age between 20 to 40 yrs of old |
| Pain type | Sharp, stabbing, vague type of pain | Vague dental pain | Dull, stabbing | variable | Aching, burning | Pulsating | Boring |
| Pain severity | Intense pain, multiple teeth often involved | mild | Moderate ,limited mouth opening | | Dry mouth , abnormal toothache | Moderate to severe | Very severe |
| Pain location | Difficult to localize | Ischemic pain radiates in neck, throat, ear, tooth mandible, headache. | Good , diffuse | Severe and aching | Tongue most commonly, bilateral, especially tip, lip, palate, buccal mucosa. | Frontotemporal | Orbital |
| Pain duration | variable | Lasting for minutes to hours | Minutes to hours | Diffuse (usually unilateral affecting ear, jaw, temporal region) | variable | 4- 72 hours 1/ month | 15- 180 hours 1-8/day |
| Triggers | Sometimes sensitive to temperature | Precipitated by exertion activities and alleviated by rest | TMJ activities such as mastication, clenching of teeth , wide opening , palpation over preauricular area | Variable | Sometimes eating aggravates in other relieved. | stress, foods, vasodilators, sleep pattern changes, afferent stimulation, hormonal changes | alcohol, nitrates |
| Treatment | Lack of response to reasonable dental treatment Unusual or unexpected response to therapy. Patients should be referred to a psychiatrist or psychologist for further management. | If the pain is associated with cardiac or chest pain, it is most often relieved by sublingual nitroglycerin and im-mediate referral to a medical practitioner is imperative | Treatment of underlying cause. | Treatment of underlying cause related to neoplasm. | Reassurance, education, possibly drugs for neuropathic pain | Attempts to minimize reactions to the stress of everyday living by using relaxation techniques. Drug therapy used either prophylactically to prevent attacks include ergotamine and propranolol, verapamil, and TCAs | Breathing 100% oxygen in acute attack. Injection of sumatriptan or sublingual or inhaled ergotamine. Lithium is effective therapy and other drugs e.g. include ergotamine, prophylactic sumatriptan, prednisone, and calcium channel blockers. |

larynx, scalp and other associated structures is converging into a pool of nociceptive neurons located at the brainstem level in sub nucleus caudalis of spinal nucleus. Second one is Convergence Facilitation Theory which is similar to the convergence projection theory except that the nociceptive input from the deeper structures causes the resting activity of the second order pain transmission neuron in the spinal cord to be increase or be facilitated. Facilitation from the deeper nociceptive impulses causes the pain to be perceived in the area that creates the normal resting background activity (John *et al.*, 2002). In clinical practice, misclassified cases neuropathic pain would be expected to continue to be painful after endodontic treatment or become more worsen, whereas referred pain of nonodontogenic origin from distant tissues, such as musculoskeletal, pathological, and headache disorders, would likely not be adequately addressed with endodontic treatment. The amount of misclassification is not known because to our knowledge such research results have not been reported (Oshima *et al.*, 2009 and Allerbring *et al.*, 2004).

Clinical characteristics of non-odontogenic pain

The clinical presentation of non odontogenic pain is varied and may mimic other pain disorders which may not originate in the orofacial region such as odontogenic pain. Table 1 (Davidoff *et al.*, 1998 and Ramesh Balasubramaniam *et al.*, 2011) showed the myofacial trigger point referral patterns which are associated with misdiagnosed odontogenic pain. Table 2& 3 showed differential diagnosis of non-odontogenic pain and their management (John *et al.*, 2002; Oshima *et al.*, 2009; Allerbring *et al.*, 2004; Travell and Simons, 1999; Davidoff *et al.*, 1998; Ramesh Balasubramaniam, 2011; Okeson *et al.*, 1997; Polycarpou, 2005; Lipton *et al.*, 1993; Linn *et al.*, 2007; Myers, 2008; Osguthorpe *et al.*, 1999; Bahra *et al.*, 2004; Penarrocha *et al.*, 2001; Leone *et al.*, 2006; Merrill *et al.*, 1992; Law and Lilly, 1995; D'Silva *et al.*, 2006 and Hirshberg *et al.*, 1994).

DISCUSSION

The orofacial is the most frequent site for pain with 12.2% of cases reporting dental pain as the most common orofacial pain. Tooth sensitivity to temperature, percussion or occlusal pressure may be felt as a result of offending muscle (Polycarpou *et al.*, 2005 and Lipton *et al.*, 1993) Linn *et al* reported that 37% of patients diagnosed with muscular orofacial pain had previously undergone endodontic or exodontic treatment in an attempt to alleviate their pain (Linn *et al.*, 2007). A recent case report suggest an association between vagal stimulation and toothache in patient undergoing experimental treatment with a vagal nerve stimulator for the treatment of depression (Myers, 2008). Maxillary sinus infection may present pain in the maxillary teeth with sensitivity to percussion, mastication and/or temperature. This hypersensitivity is often felt in multiple teeth making it more indicative of a pain of sinus origin rather than odontogenic pain (Osguthorpe, 1999) Bahra and Goadsby reported that 45% of a group of cluster headache patient were seen by a dentist prior to receiving the correct diagnosis. They also found that a misdiagnosis provided by a dentist often led to unnecessary and inappropriate dental procedures (Bahra and Goadsby, 2004) Penarrhocha *et al* in a study of 54 cluster headache patients found that poor tooth extraction or endodontic has been performed in the pain affected quadrant in 31 (58%) of the subjects (Penarrocha *et al.*, 2001). In case of trigeminal neuralgia, on occasion a tooth can represent the trigger zone and if this occurs, it can pose a great diagnostic challenge for the clinician. Patient with trigeminal neuralgia frequently receive endodontic treatment for their dental pain (Leone *et al.*, 2006; Merrill *et al.*, 1992 and Law and Lilly, 1995). In one retrospective case series of metastatic disease of jaw, 60% of 114 cases reported, the metastatic lesion in the oral lesion to be the first indication of an undiscovered primary malignancy at a distant site (D'Silva *et al.*, 2006 and Hirshberg *et al.*, 2009).

Neuropathic complications have also been documented after mandibular implant surgery as a rate of 5% to 15% with the permanent neuropathies resulting in approximately 8% of the cases. Undiagnosed and mistreated cases of acute neuritis not only lead to unnecessary dental procedures but also aggravate and therefore, specific pain has greater chance of becoming chronic (Leckle, 2009).

Conclusion

There are multiple non odontogenic pain entities which mimic odontogenic pain. So whenever patient comes to clinic, history and physical examination plays an important role to rule out differential diagnosis. Dental practitioners should also have knowledge about complex anatomy of orofacial structure and complex mechanism of odontogenic pain. He should be able to diagnose the disease with different etiological factors. Unable to have knowledge about etiological factors of diseases will result in incorrect diagnosis and inappropriate treatment.

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