Phantom tooth pain: The atypical facial pain

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ABSTRACT

Chronic pain is more prevalent in the head and neck region than other parts of the body. Almost one-third of patients attending a facial pain clinic have history of undergoing some dental procedures often without success. Literature review reveals that atypical odontalgia, atypical facial pain or if teeth have been extracted phantom tooth pain are used to describe a common pain syndrome. At present, chronic pain disorders are diagnosed mainly on the basis of clinical signs and symptoms, since the mechanism underlying the pathophysiology is not well understood. Many diagnostic criteria for atypical facial pain has been proposed without much benefit however, it remains a diagnosis of exclusion after ruling out all other pathologies of the head and neck. Clinically, phantom tooth pain is similar in many essential characteristics to deafferentation pain syndrome. In the absence of controlled clinical trials specifically directed to phantom tooth pain, treatment should be guided by standards used for other neuropathic pain disorders.

Key words: Chronic, neuropathic, pain, phantom tooth

Introduction

Chronic pain is more prevalent in the head and neck region than other parts of the body.[3] Lipton et al. described that an estimated 22% of the general population experience orofacial pain given over a period of 6 months.[4] Almost one-third of patients attending a facial pain clinic have history of undergoing some dental procedures often without success. If no attributing factors such as infection, inflammation or other pathology detected, then the differential diagnoses should include phantom tooth pain. Phantom tooth pain has many common features of other phantom pain disorders.

The aim of this article is to review current knowledge about this disorder which has been validated extensively, yet reported rarely.[3]

Literature review reveals that different terms have been used to describe this syndrome, e.g., atypical odontalgia, atypical facial pain, or if teeth have been extracted phantom tooth pain. Atypical facial pain was first coined by Frazier and Russell to differentiate it from trigeminal neuralgia.[4] It was also included in the classification system of international headache society (2004), and presented in the category of facial pain not fulfilling other criteria.[5] One group applied ontological principle for classifying orofacial pain disorder, using the descriptive name, persistent dentoalveolar pain (PDAP) syndrome, and produced initial diagnostic criteria.[6] In an attempt to avoid further confusion, the Association for the Study of Pain (IASP) discontinued to list atypical facial pain in their classification of chronic pain. Recently, IASP also advocated for the similar broader term to define phantom tooth pain or atypical odontalgia, as mentioned...
in their bulletin of global year against orofacial pain (2013) that following a recent consensus exercise involving clinical experts and methodologists, the entity has been termed persistent PDAP disorder, and diagnostic criteria have been proposed. Although the criteria were expert-derived and not evidence-based, and as such were less than ideal.

**Diagnosis**

The majority of time this problem is misdiagnosed by a dentist, which can lead to unnecessary interventions with no resolution of the pain symptoms. Patient in the dental environment are more likely to be considered to have dental pain as opposed to patient referred to a physician. Myofascial, neurovascular, sinus, and cardiac structures can all be the source of referred dental pain, frustrating the diagnostic efforts of the general practitioner. At present, chronic pain disorders are diagnosed mainly on the basis of clinical signs and symptoms, since the mechanism underlying the pathophysiology is not well understood. Unlike acute pain, persistent pain has no biological advantage. Many diagnostic criteria for atypical facial pain has been proposed without much benefit however, it remains a diagnosis of exclusion after ruling out all other pathologies of the head and neck.

**Pathophysiology**

The pathophysiology of phantom tooth pain or atypical odontalgia is poorly understood. One study calculated odds ratios and found that extended duration of preoperative pain, presence of other chronic pain problems, female gender, and a history of painful treatment in the orofacial region are statistically significant risk factors for persistent pain following root canal therapy. Marbach hypothesized that atypical odontalgia was of similar etiology to phantom limb pain. Clinically, phantom tooth pain is similar in many essential characteristics to deafferentation pain syndrome. A limitation to this taxonomy is the lack of definitive information with respect to the pathophysiology of deafferentation pain in the trigeminal nerve. The cortical reorganization hypothesis proposes that after deafferentation injury, organization and activity of central and peripheral nerves can change. This can result in chronic pain symptoms which is basically neuropathic in nature. Epidemiologic information indicates that 3-6% of patient develop atypical odontalgia after endodontic therapy. After root canal therapy, persistent pain was reported in 3-13% of cases. Neuroma secondary to nerve injury is thought to result in such pain.

Other attributing mechanism involves sensitization of pain fibers, sprouting of adjacent afferent fibers, sympathetic-sensory afferent coupling, diminished or loss of inhibitory mechanism, and phenotypic switching of afferent neurons. Phenotypical changes in primary afferents and dorsal horn neurons have revealed that after nerve injury long term changes may occur in gene expression such as changes in ionic channel proteins, neurotransmitters, and neurotrophins. Although sympathetic axons sprouting into dorsal root ganglion where they form baskets around sensory neuron has not been shown in the trigeminal region yet. The episodic neuropathic pain presents as a period of remission of symptoms in contrast to continuous neuropathic pain, which is unremitting pain condition. The inconclusive data assessing psychological factors in relation to persistent dental pain prevents any conclusion regarding their role in the development of this chronic pain disorder.

**Treatment**

In the absence of controlled clinical trials specifically directed to phantom tooth pain, treatment should be guided by standards used for other neuropathic pain disorders. Furthermore, experts agree that earlier recognition and initiation of therapy is more beneficial than delayed diagnosis and treatment. Based on available evidence from other neuropathic pain conditions, tricyclic antidepressants (TCAs) or gabapentin would be the first drug indicated. Undesirable side effects require that TCAs be titrated to the lowest clinically effective dose and discontinued if pain abates. Topical capsaicin application to the painful tissue has also been investigated for atypical odontalgia. Nonsteroidal anti-inflammatory drugs are either ineffective or produce a temporary result. Several sets of observational data recommend against repeated interventional procedures. Repeated surgical injury, unless there is a specific indication may worsen the situation. Additional treatment options proposed include transcutaneous electrical nerve stimulation, sympathetic nerve blocks, psychotherapy, and behavioral approaches.

**Conclusion**

About one-third of patient attending facial pain clinic have history of undergoing some dental procedure. Phantom tooth pain or atypical odontalgia has many characteristics of neuropathic pain syndrome. Diagnosis is challenging and based on clinical signs and symptoms. Early initiation of treatment is beneficial.
should be based on other neuropathic pain disorders. Further surgical injury without specific indication may worsen the disease.

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Conflicts of interest
There are no conflicts of interest.

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