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Case Series

Dentistry Section

# Diagnostic Dilemma in Differentiating Odontogenic Pain and Non Odontogenic Pain: A Case Series

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## ABSTRACT

Pain is one of the most common reasons why patients seek medical attention. When experiencing discomfort in the orofacial region, a dentist is usually the first medical professional consulted. While odontogenic factors are the most common causes of acute pain in the maxillofacial region, it can also be non odontogenic, making it challenging to differentiate between the two. However, with a thorough examination, taking a complete history, and ordering necessary diagnostic tests, a dentist can make an accurate diagnosis and evaluate the entire stomatognathic system and other relevant anatomical regions. Misdiagnosis can lead to unnecessary dental procedures and cause trauma to the patients. Case 1 (50-year-old female) and case 3 (63-year-old female) were finally diagnosed as Trigeminal Neuralgia (TN), which were initially misdiagnosed as odontogenic pain and were treated with unnecessary irreversible dental treatments like Randomised Controlled Clinical Trials (RCT). Case 2 ( 28-year-old female) was eventually diagnosed as a case of myofascial pain with loss of muscle tone, for which the patient required palliative physical therapy. Instead, the splint, which was worn day and night by the patient, and soft diet resulted in muscle atrophy. The present case series emphasises the importance of accurate diagnosis to prevent irreversible dental treatment and protect patients from harm.

**Keywords:** Face Pain, Myofascial pain, Orofacial pain, Temporomandibular disorder, Trigeminal neuralgia

## INTRODUCTION

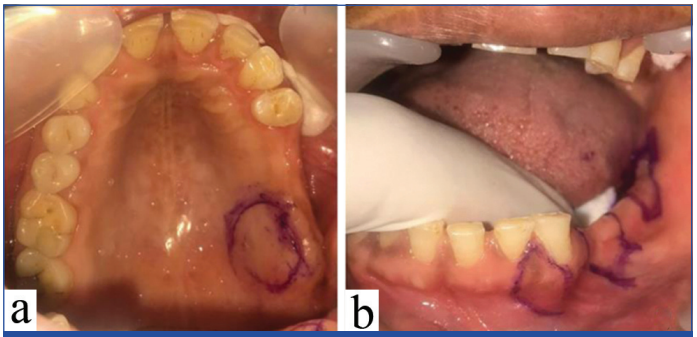
Orofacial pain affects around 25% of the general population [1]. In some cases, patients may visit a dental clinic with dental pain, but no pathology is involved, posing a diagnostic challenge for the dentist. Orofacial pain is defined by the International Association for the Study of Pain as “pain perceived in the face and/or oral cavity. It is caused by diseases or disorders of regional structures, by dysfunction of the nervous system, or through referral from distant sources” [2].

It is crucial to conduct a thorough oral examination to arrive at an accurate diagnosis. The entire stomatognathic system and relevant anatomical regions should be assessed, including intraoral structures, cranial nerve screening, musculoskeletal examination, Temporomandibular Joint (TMJ) assessment, and evaluation of cervical structures. Misdiagnosis can lead to incorrect dental interventions, which can result in severe consequences for the patient. Therefore, a comprehensive history, appropriate diagnostic tests, and a thorough examination are necessary to ensure the proper diagnosis and treatment of non odontogenic Orofacial Pain (OFP).

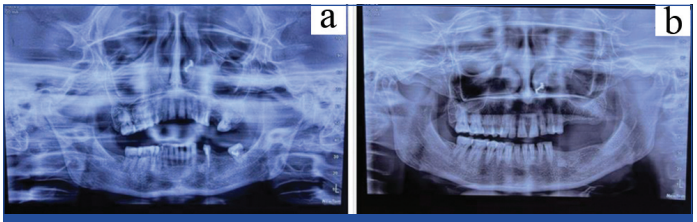
### Case 1

A 50-year-old woman reported to the Department of Dentistry with a chief complaint of pain in the upper and lower left back jaws for the past three years. The patient described sudden, continuous, intense throbbing pain located in the palatal mucosa of the maxillary tuberosity [Table/Fig-1a], radiating to the head, neck, ear, and the buccal mucosa of the left mandibular canine, premolars (tooth 33, 34, 35), and retromolar pad area [Table/Fig-1b].

The patient’s past dental history revealed extractions of teeth 26, 34, 36, 37, root canal treatments in teeth 25, 35, and partially treated teeth 27 and 38 [Table/Fig-2a]. Subsequently, these root canal-treated and partially treated teeth were also extracted [Table/Fig-2b]. Previous unsuccessful attempts to treat the patient’s pain included scaling and root planing. The patient had also been treated for cervical spondylosis by a neurologist. There were no other remarkable medical or psychosocial histories.




**[Table/Fig-1]:** Areas of pain in (a) Maxilla (palatal mucosa of maxillary tuberosity); (b) Mandible (buccal mucosa of left mandibular canine, and premolars [(teeth #33, #34, #35), retromolar pad area].




**[Table/Fig-2]:** Orthopantomogram (OPG) showing the history of unnecessary treatment like (a) Root Canal Treatment (RCT) of 25, 35; extractions of 26, 34, 36, 37; and (b) Additional extractions of 25, 27, 35, and 38.

During the examination, no aggravating or relieving factors were reported. Associated features included difficulty in swallowing and sleeping due to pain. TMJ palpation revealed no significant findings, and cranial nerve screening did not detect any abnormalities. Additionally, no anomalies of hard or soft tissues were found. Provocation of trigger areas made it easier to reproduce the patient’s symptoms. An administration of Lidocaine 2% with 1:200,000 epinephrine for local infiltration in the left maxillary palatal area and left inferior alveolar nerve block was performed. Five minutes after the injection, the pre-injection Visual Analogue Scale (VAS) score, which was usually recorded at 9 on a 10-point scale, was at 0.

The patient’s pain appeared to be non odontogenic in nature, as teeth were missing and there were no hard or soft tissue anomalies,

suggesting neuropathic pain. The differential diagnosis included myofascial pain, cervical disorders, neurovascular pain, and psychogenic pain. Intense throbbing pain upon provocation of trigger areas, specifically the posterior superior alveolar branch of the maxillary and mandibular division of the trigeminal nerve, led to the confirmatory diagnosis of TN.

Current medications include Gabapentin (Gabantin NT 400/10 OD), Oxcarbazepine (Oxetol 300 mg BD), and nutritional supplements. Dental management includes the rehabilitation of the edentulous 2nd and 3rd quadrants with a Removable Partial Denture (RPD) and topical application of Gabapentin and lidocaine gel over the painful areas in the mouth. Pain has significantly reduced from a VAS score of 9 to 4 in about four weeks.

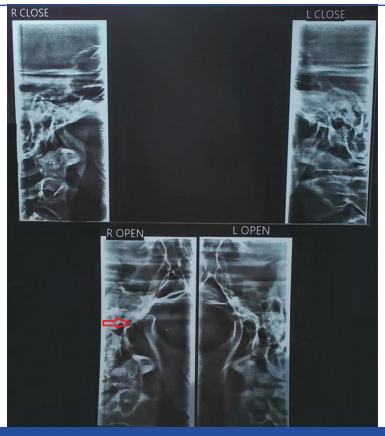
## Case 2

A 28-year-old female patient reported to the Department of Dentistry with a chief complaint of a clicking sound, locked jaw, and pain upon waking up in the morning on the right-side of her face for the past six years. The frequency of locked jaw episodes was twice in six years, with no associated pain. Mild stiffness occurred upon waking up in the morning and was relieved with massage.

The patient's past medical history revealed hypermobility of joints with 4-5 incidents of patella dislocation and ankle dislocation on the left leg, and once on the right leg and ankle. The patient was provided with a night guard for 3-4 months and was advised to follow a soft diet to address the TMJ clicking sounds and stiffness in masticatory muscles. The patient's psychosocial history revealed a stressful environment at home, but there was no history of any parafunctional habits like bruxism.

During the evaluation of the patient's mandibular range of motion by gently stretching the mandible sagittally to their tolerance, the temporomandibular examination revealed mild discomfort (non familiar pain), while TMJ palpation yielded negative results. Cervical range of motion was within normal limits. No cranial nerve abnormalities were detected, and there were no abnormalities in hard or soft tissues. The temporal characteristics were unremarkable.

The TMJ X-ray showed rounding of the articular eminence on the right-side upon opening [Table/Fig-3]. The differential diagnosis of the patient's condition included fibromyalgia, polymyalgia rheumatica, and chronic fatigue syndrome. Previous treatments such as night guard wear for 3-4 months, soft diet, and TMJ exercises provided no benefits.




**[Table/Fig-3]:** TMJ view X-ray showing rounding of articular eminence of right-side on opening.

The findings were suggestive of myofascial pain with loss of muscle tone due to long-term underuse of masticatory muscles. The trigger point associated was in the area in front of the tragus of the ear on the right-side of the face.

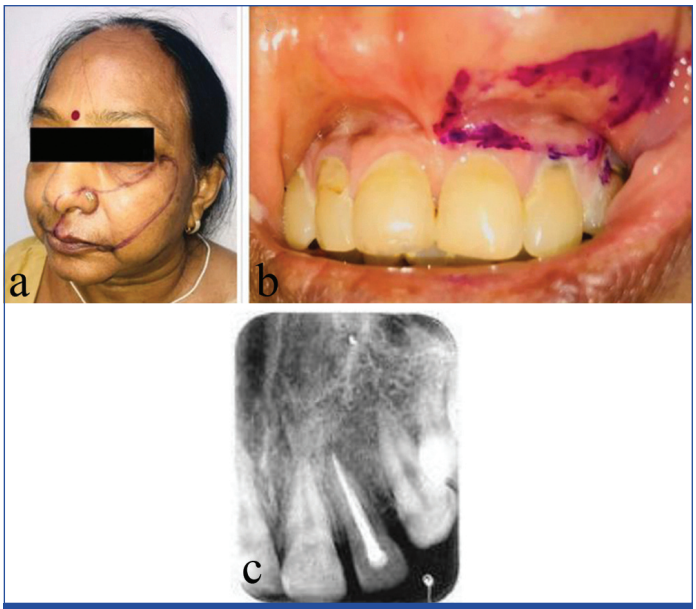
The management plan included Acetaminophen 500 mg (Calpol 500 mg, Glaxo SmithKline Pharmaceuticals Ltd) TDS for 10 days, physical rehabilitation therapy, and Transcutaneous Electric Nerve Stimulation (TENS) with a gradual increase in eating from soft to hard foods to regain muscle strength.

At the six-month follow-up, the patient was completely asymptomatic and was able to chew a normal diet without any pain.

## Case 3

A 63-year-old woman reported to the Department of Dentistry with pain in the left lip area, extending to the side of the nose and upto the left corner of the eye. The pain began six years ago, leading her to visit her dentist for root canal treatment in the upper left anterior teeth 21 and 22. The pain was described as severe, throbbing, like an electric current, and constant. The intensity of the pain ranged from 7 to 8 on a 10-point VAS scale. The pain was predominantly felt in the left nasolabial fold, extending to the outer canthus of the left eye [Table/Fig-4a], and the mucobuccal fold area around teeth 21 and 22 [Table/Fig-4b]. Aggravating factors included talking, chewing, brushing, eating cold foods, and washing the face with cold water. No relieving factors were reported. The patient also experienced swelling around the nose and cheek.

The patient's past medical and psychosocial history was unremarkable. Previous treatments for the pain included long-standing analgesics, which did not provide relief. Root canal treatment was repeated twice on the same teeth without any peri-apical lesions [Table/Fig-4c].




**[Table/Fig-4]:** Areas of pain: (a) Extraoral (Left nasolabial fold, extending to the outer canthus of the left eye); (b) Intraoral (Mucobuccal fold area around teeth no. 21 and 22); (c) Intraoral Periapical Radiograph (IOPA) showing the absence of any periapical lesion.

The musculoskeletal examination yielded unremarkable results. Cervical screening and TMJ examination results were within the normal range. No abnormalities were detected during the intraoral examination. The patient's familiar pain was triggered by tactile stimulations of the buccal and labial mucosa of the left upper incisors (teeth 21 and 22). The intensity of pain was rated as 9 on a scale of 1 to 10. After several minutes of stimulating the trigger zones, the area could no longer be stimulated to cause pain.

This pain response, consistent with the trigger zone, is a key feature of TN with autonomic features. The pain was completely relieved by local infiltration of the trigger zone area with 1 mL of 2% Lidocaine mixed with 1:100,000 epinephrine.

After six years of enduring pain, the patient was finally diagnosed with TN (involving the V1 and V2 divisions) and was prescribed Oxcarbazepine (300 mg twice daily) and Indomethacin SR 75 mg one tablet as needed to completely relieve her pain. After three months, the patient continued with Oxcarbazepine 300 mg (Oxetol 300 by Sun Pharma, India), as the autonomic conditions

were relieved. Gabagesic gel (Gabapentin + Lidocaine) (Gabagesic® by Linux Laboratories, India) was provided for topical application intraorally on the buccal mucosa. The pain reduced to a 2 on the VAS scale. Six months later, the patient continued to use Gabagesic gel and Oxcarbazepine.

## DISCUSSION

Odontogenic pain is the most common type of pain that dental professionals encounter. However, patients may also experience tooth pain due to non odontogenic causes. The clinical presentation of non odontogenic pain is varied. The pain may be very mild and intermittent or severe, sharp, and continuous. To ensure an accurate diagnosis and treatment plan, it is essential for dentists to differentiate between the site and source of the pain. Heterotopic pain presents a diagnostic challenge as it originates from a different site than the source of pain. The neurologic mechanisms involved in heterotopic pain are not yet fully understood. However, it is believed to be associated with central sensitisation resulting from nociceptive input from deep structures like muscles, joints, and ligaments. This allows for a precise and effective approach to managing the patient's symptoms.

Myofascial pain, trigeminal neuropathic pain, and neurovascular pain are the most commonly reported non odontogenic types of toothache [3-5]. Many articles have shown that pain due to systemic disorders in other anatomical regions like sinuses, nose, throat, and heart may present symptoms similar to toothache. Atypical odontalgia may gradually spread to more extensive parts of the face or jaws. The levels of pain can range from minor to severe. The discomfort typically has no clear origin and often occurs after or is related to a previous dental procedure, such as a root canal or tooth extraction. This situation can be frustrating and confusing for both the patient and the dentist, leading to ongoing dental treatments that do not effectively alleviate the pain [6].

Patients suffering from Classical Trigeminal Neuralgia (CTN) typically experience sudden, intense, painful episodes resembling electric shocks that occur unilaterally along the path of the trigeminal nerve's second or third branch. While these attacks can occur spontaneously, many are triggered by actions such as talking, chewing, touching a trigger zone, or exposure to cold or wind.

Up to 50% of patients experience paroxysms along with a less intense, persistent, dull, throbbing, or burning pain. Distinguishing between dental pain and other conditions can be difficult since activities like chewing, brushing, and even consuming sweet or salty foods can act as triggers [7,8]. Therefore, a comprehensive dental examination is justified for every patient with a provisional diagnosis of CTN [9]. Due to the severity of the pain, patients often attribute it to a specific tooth and request extraction. However, the pain typically returns shortly after the extraction [10,11]. Initially, carbamazepine or oxcarbazepine is used to treat CTN. Other supplements like lamotrigine, baclofen, gabapentin, valproate, and phenytoin may be recommended if these sodium channel blockers are not effective [12,13]. In cases where pharmacological treatment is inadequate or has significant side effects, various surgical techniques (microvascular decompression, radiosurgical techniques, and percutaneous destructive neurosurgical techniques) are available [14-17].

Case 1 and Case 3 were classical cases of TN, but due to a lack of proper diagnosis, the patients underwent numerous dental procedures, including root canal treatments on healthy teeth and unnecessary extractions, without finding relief from pain as the cause was non odontogenic.

Myofascial pain is one of the many conditions classified under non odontogenic pain. Myofascial trigger points have traditionally been recognised for their sensory, motor, and autonomic symptoms in the literature [18,19]. A myofascial trigger point is defined as "a hyperirritable spot in skeletal muscle that is associated with a hypersensitive palpable nodule in a taut band of muscle" [20,21]. The diagnostic criteria for temporomandibular disorders describe myofascial pain with referral as "pain at a site beyond the boundary of the muscle being palpated" [22,23]. Patients with chronic pain have been found to have a prevalence as high as 90%, while the general population has a prevalence of 20%-30% [17]. One of the most common symptoms seen is pain that is referred to a specific site [18,19]. It is crucial for the clinician to conduct a thorough examination and elicit pain to identify the source by reproducing the patients' familiar pain, as patients often struggle to pinpoint the source. Recognising repetitive referral patterns in individual muscles is critical to identifying the source of pain. Trigger points in any of the masticatory muscles can initiate odontalgia [20]. Besides the cheeks and jaws, other orofacial anatomical structures may also experience pain related to myofascial trigger points. This type of pain is usually misinterpreted by patients as toothache. Myofascial trigger points in the cervical muscles can also lead to headaches and facial pain [24-26]. Replicating familiar pain and locating the trigger points aid in diagnosing the pain.

Case 2 was diagnosed as a case of myofascial pain. Furthermore, due to improper diagnosis and the patient wearing a night guard day and night, muscle atrophy was observed. Consequently, by not using the masticatory muscles and sticking to a soft diet, the masticatory muscles lost their tone and strength. After a few months, when the patient attempted to chew normal foods, it resulted in muscle spasms.

Potential diagnostic pitfalls are unavoidable due to the intricacy of the anatomy, orofacial regions, neurobiological significance, and the variable presentation of toothache. These problems are worsened by the isolated training of medical professionals who give conflicting advice and administer unnecessary dental treatments to patients in desperate search of a correct diagnosis and efficient relief from their OFP pain. An interdisciplinary approach is crucial for such patient groups. A suitable diagnosis can be made by employing a comprehensive strategy with a good patient history and targeted investigations when necessary. For many of the OFP conditions described, there are well-defined treatment guidelines; however, these are not tailored towards individuals, and the variable response may be attributed to the multifactorial nature of pain. To prevent unnecessary dental treatments on a patient, joint education regarding OFP is necessary.

## CONCLUSION(S)

Pain from non odontogenic origins can make diagnosis difficult. Cases 1 and 3 were finally diagnosed as classical cases of TN, which were initially misdiagnosed as dental pain and were treated with unnecessary irreversible dental treatments like RCT. Case 2 was finally diagnosed as a case of myofacial pain with loss of muscle tone due to long-term disuse of masticatory muscles, for which the patient required palliative physical therapy. Instead, the splint and soft diet caused masticatory muscle weakness and loss of function due to misdiagnosis. A thorough dental, periodontal, and intra-oral examination, along with a detailed history and supporting radiographs, should always be taken to rule out any local pathology in the orofacial region. It is imperative to listen to the patient and ask detailed questions about the onset of pain, course, frequency, intensity, character, nature of pain, aggravating and relieving factors, and related symptoms. Collaboration with other specialties should be respected.

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