

Neurolysis of Buccal Nerve – Management of Post Traumatic Neuropathic Pain – A Case Report

Abhishek Bhattacharjee^{1*}, Rudresh KB², Prashanth R³, Abhishek Khatua¹ and Vinod Kumar¹

¹Post Graduate Student, Department of Oral and Maxillofacial Surgery, Vokkaligara Sangha Dental College and Hospital, Bengaluru, India

²Professor, Department of Oral and Maxillofacial Surgery, Vokkaligara Sangha Dental College and Hospital, Bengaluru, India

³Reader, Department of Oral and Maxillofacial Surgery, Vokkaligara Sangha Dental College and Hospital, Bengaluru, India

***Corresponding Author:** Abhishek Bhattacharjee, Post Graduate Student, Department of Oral and Maxillofacial Surgery, Vokkaligara Sangha Dental College and Hospital, Bengaluru, India.

Received: May 28, 2018; **Published:** July 10, 2018

Abstract

Pain is one of the common complain of the patient with peripheral nerve damage. Nerve injuries after surgical removal of mandibular third molar is a common complication and of great concern for the maxillofacial surgeon as it also a matter of litigation. It is also causes morbidity in patients psychosocial life. Most of the nerve injuries that occurs after surgical removal of mandibular third molar affects the inferior alveolar nerve and lingual nerve and very rarely occur in buccal nerve. Here we present a case of 30 year old female with a history of surgical removal of right mandibular second molar after which she was suffering with neuropathic pain for 4 months, the patient was diagnosed with long buccal nerve neuropathy and its proper management was done.

Keywords: Trigeminal Nerve; Long Buccal; Iatrogenic; Demyelination; Neurectomy; Microsurgical Repair

Introduction

Nerve injuries can occur idiopathically or iatrogenically. The pathology of the neuropathic pain is poorly understood but mechanism like compression, transection, contusion, stretch and crush may add to the cause [1]. The buccal nerve/buccinators nerve/long buccal nerve is commonly anaesthetized in oral and maxillofacial practice, either by infiltration or nerve block procedures, along with other terminal branches of the trigeminal nerve. The Buccal nerve is well known to be at risk of being injured during the extraction of lower molars [2]. As a sensory branch of the mandibular division of the trigeminal nerve that innervates the entire mucosa of the cheek, as well as the skin around the angle of the mouth. It is often described as having a common origin with the anterior deep temporal nerve and the nerve to lateral pterygoid. The Buccal Nerve is described as supplying 'sensation to the skin over the anterior part of the buccinator and the buccal mucosa, together with the posterior part of the buccal gingivae adjacent to the second and third molar teeth [3]. Traumatic neuropathic pain also called as unilateral or bilateral facial or oral pain following or caused by trauma to the trigeminal nerve (s), with other symptoms and or clinical signs of trigeminal nerve dysfunction [4]. It is difficult to diagnose a patient with traumatic neuropathy but a proper history and clinical examination can be helpful. There are various treatment modalities, non-surgical and surgical which has provided relieve to the patients with traumatic neuropathic pain [5].

Case Report

A 28 year old female visited the department of oral and maxillofacial surgery with a chief complain of burning kind of pain which is continuous in nature in the right lower back tooth region. The pain was radiating towards the ear and neck and was aggravated on eating

and drinking. Patient gave history of surgical removal of mandibular second molar four months back. After 10 days of the surgical procedure patient started experiencing this kind of continuous pain. On VAS the pain can be given a score of 9.

On examination 47 was missing and gingiva distal to 46 was normal in appearance but patient experience sharp pain when the gingiva was percussed in the area of missing 47. An orthopantomograph was taken to rule out any bony pathology, but the orthopantomograph did not show any abnormality (Figure 1). As the pain was not episodic and was continuous in nature, not associated with any trigger points and history of trauma was positive so a diagnosis of post traumatic neuropathic pain was made. After taking a written consent from the patient the treatment was started. To locate the nerve involved diagnostic block test were given first with placebos and later with local anesthetic, it was found that buccal nerve was involved, which is a branch of the mandibular division of trigeminal nerve. Non-surgical management was started with carbamazepine 200 mg three times daily, and was continued for one month, patient was evaluated every week but at the end of four weeks patients symptoms were not reduced so a surgical management was decided to be performed. It was decided to do exposure of the painful area under local anesthetic and perform neurolysis of the buccal nerve.

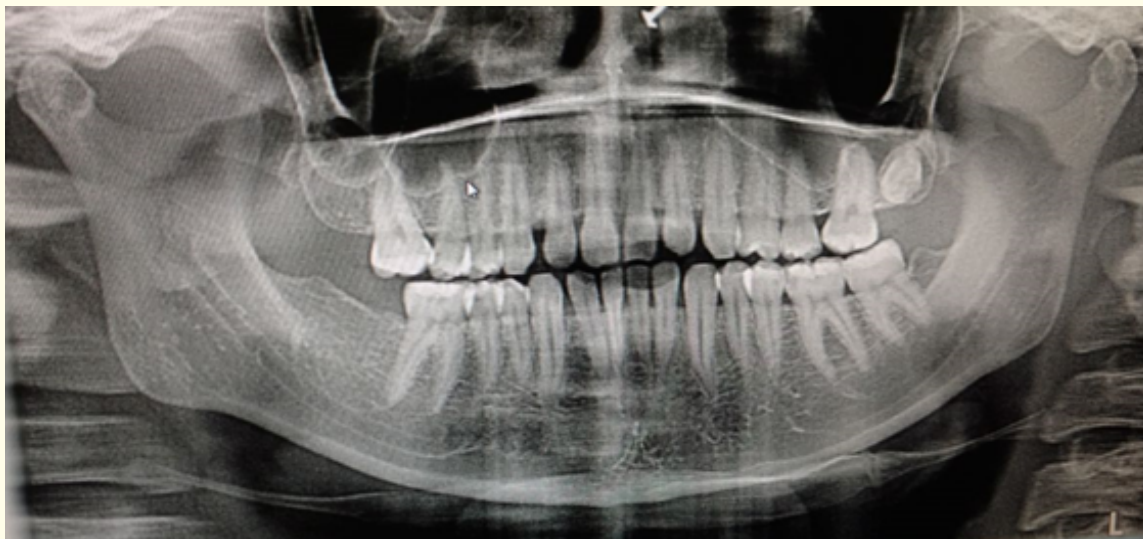


Figure 1: Orthopantomograph showing missing 47.

Under aseptic protocol, local anesthesia was administered and full thickness mucoperiosteal flap was reflected. Distal to the mucoperiosteal flap, on further dissection the buccal nerve was visualised and traced (Figure 2). The buccal nerve was present distal to the 1st molar and was crossing from the medial aspect of the ramus towards the buccinators muscle, just anterior to retromolar trigone. The nerve travelled a course from lingual to buccal direction (Figure 3).



Figure 2: The buccal nerve was visualised after careful dissection.

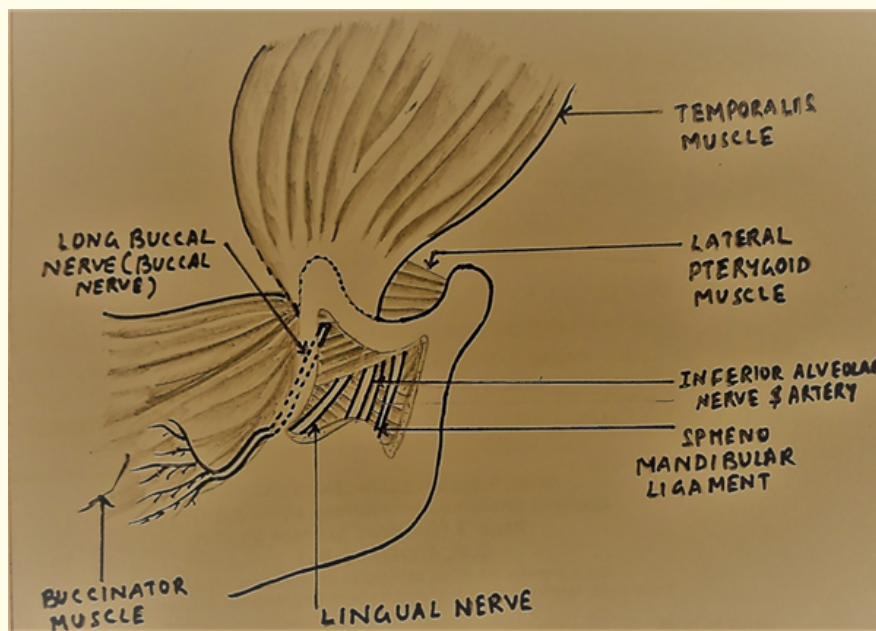


Figure 3: Diagrammatic representation of the course of buccal nerve.

The nerve was carefully dissected out from the mucosal and muscle attachment. The area of scar tissue was relieved and further dissection of the buccal nerve was done proximally and distally. The scar tissue was freed with the help of microsurgery sickle knife (Figure 4). The bony margins around the nerve was rounded. The wound was irrigated and closed with resorbable suture. Postoperative antibiotics and analgesics were prescribed. Patient was reviewed after a week and patient was symptom free. Patient was reviewed for three months without any remission of painful symptoms.

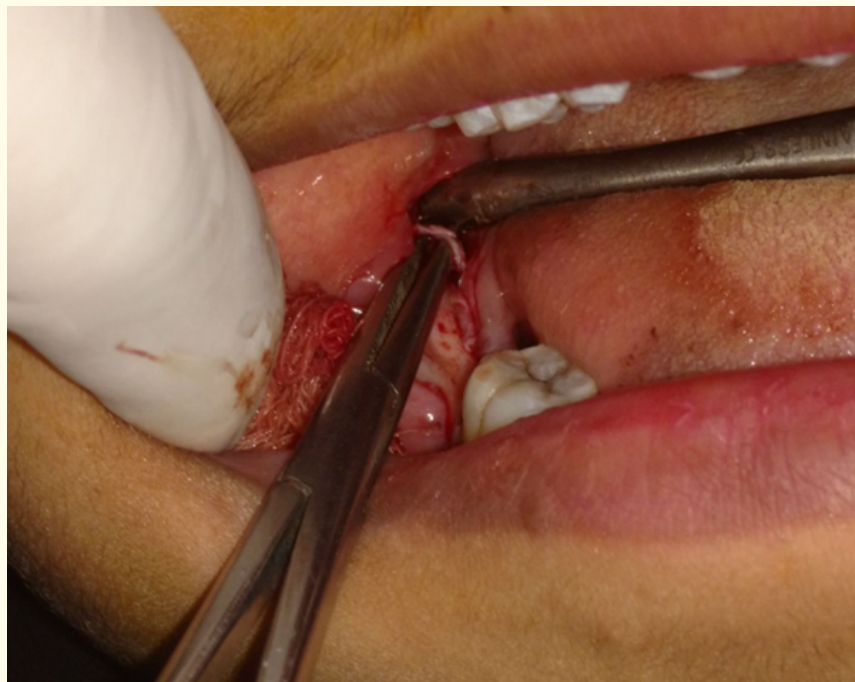


Figure 4: Buccal nerve was freed from all scar tissues (neurolysis).

Discussion

The head and neck regions are the most common sites of the human body to be involved in chronic pain conditions. Neuropathic pain is a chronic pain condition, and refers to all pain initiated or caused by a primary lesion or dysfunction or transitory perturbation in the peripheral or central nervous system (CNS) [1]. Trigeminal neuralgia, atypical odontalgia (phantom tooth pain), burning mouth syndrome, traumatic neuropathies, postherpetic neuralgias and complex regional pain syndrome are neuropathic pain conditions in the orofacial region that can be encountered in pain and dental clinics. episodic and continuous disorders based on symptoms. The episodic neuropathic pain presents as periods of total remission of symptoms whereas the continuous neuropathic pain is an ongoing unremitting pain condition. It has been estimated that 1 - 1.5% of the general population is affected [6]. Neuropathic pain can be due to a vascular compression, radiation, inflammation, trauma, infection, and exposure to neurotoxins to the peripheral nervous system can lead to pathologic damage [7]. Demyelination and axotomy (deafferentation with severance of the axon) are the ways to incur these damages [8,9]. A number of mechanisms have been proposed to explain neuropathic pain conditions, but they are not fully understood. The possible mechanisms which can be responsible for neuropathic pain are Ephaptic transmission, Ectopic impulses from damaged primary afferent nerve fibers, Central sprouting, Phenotypical changes in primary afferents and dorsal horn neurons, Changes in segmental inhibitory control, Central sensitization, Neuronal plasticity, which is the change in function, chemistry and structure of neurons obviously plays an important role in the development of neuropathic pain [6].

Buccal Nerve is well known to be at risk of being injured during the extraction of lower third molars as in our case. Merrill (1979) suggests that the branches of the buccal nerve are frequently cut during the incision for the removal of mandibular third molars but sensory changes in the buccal mucosa go unnoticed [3].

Initially, the buccal nerve presents an anterior trajectory, expanding between both bundles of the lateral pterygoid muscle. Then it keeps a descendent trajectory as it pierces the temporalis tendon, next to the medial face of the ramus of the mandible, to finally cross the retromolar trigone in direction to the cheeks. additional distribution of the Buccal Nerve are given to the buccal gingival tissues around the lower premolar and first molar region and the posterior part of the buccal surface of the gingivae [2,3,10].

It is very important to diagnose a case of post traumatic neuropathic pain. Diagnosis is often established by history and physical examination. First the diagnostic block should be tried although every time it may not give a proper diagnosis of the nerve involved [7]. Other supportive test like electrophysiologic, electromyographic and nerve conduction studies, imaging modalities like Magnetic resonance imaging and ultrasonography may also be useful. Assessment of quality of pain and pain generation should be done. Complete neurologic examination should be performed. Percussion of the skin over a nerve at the site of an injury may evoke tingling or pain in the distribution of the nerve (percussion tenderness), this physical examination is important for localisation of injury [1].

Diagnostic criteria for post traumatic neuropathic pain according to international head ache society

- A. Facial and or oral pain in the distribution (s) of one or both trigeminal nerve(s) and fulfilling criterion C
- B. History of Traumatic event to the trigeminal nerve (s), with clinically evident positive (hyperalgesia, allodynia) and/or negative (hypoesthesia, hypoalgesia) signs of trigeminal nerve dysfunction.
- C. Evidence of causation demonstrated by both of the following:
 - Pain is localized to the distribution (s) of the trigeminal nerve(s) affected by traumatic event
 - Pain has developed < 6 months after the traumatic event
- D. Not better accounted for by another International classification of headache - 3 diagnosis [11].

Management of post traumatic neuropathic pain can be broadly divided into medical management and surgical management. Once the diagnosis of pain originating from a peripheral nerve is made initial management of neuropathic pain in most of the time is non-surgical. Pharmacotherapy for pain includes a wide range of medication like antidepressant, anticonvulsant and analgesics. Rehabilitation including physical therapy, massage, psychosocial intervention such as counselling, biofeedback, relaxation therapy, splint therapy, desensitization techniques, steroid injection, Transcutaneous electrical nerve stimulations [1,8].

Surgical Management includes neurolysis/decompression, neurectomy and nerve repair and reconstruction. Neurolysis is of two types, external and internal [1]. External neurolysis (circumferential) dissection outside the epineurium is performed to free the nerve from points of compression, strangulation or tethering in order to mobilize the nerve. Neurolysis of a nerve from scar is applied to nerves that have experienced injury and altered signalling caused by focal changes in the environment [12]. Internal neurolysis or interfascicular dissection or nerve combing is performed when a nerve injury has occurred in the cross section of the nerve or presence of a intraneural tumor [13]. Neurectomy is considered in patient who complains of pain in the distribution of purely sensory nerves and also in whom neurolysis has not worked [14]. The main aim of the surgery is to change the painful dysesthesia into hypesthesia in the distribution of the nerve. In this technique the peripheral nerve branch is identified and the nerve is transected. Nerve microsurgical repair or reconstruction can be considered in patient with intractable pain from a nerve injury. The technique is used with longer gap between the two ends of nerve fiber, nerve grafts or biological or synthetic nerve conduits may be used [1,14].

Conclusion

Painful post traumatic neuropathy of any branch of the trigeminal nerve following surgical or non-surgical removal of tooth or any other oral and maxillofacial procedure can affect the social life of the patient. A proper history, clinical finding and using good diagnostic modalities can help in proper treatment and render a patient with disease free life.

Funding Sources

Nil.

Conflict of Interest

Nil.

Bibliography

1. Lipinski LJ and Spinner RJ. "Neurolysis, neurectomy, and nerve repair/reconstruction for chronic pain". *Neurosurgery Clinics* 25.4 (2014): 777-787.
2. Takezawa K, *et al.* "The course and distribution of the buccal nerve: clinical relevance in dentistry". *Australian Dental Journal* 63.1 (2018): 66-71.
3. Alves N. "Study of descendent course of buccal nerve in adults individuals". *International Journal of Morphology* 27.2 (2009): 295-298.
4. Zakrzewska JM. "Multi-dimensionality of chronic pain of the oral cavity and face". *The Journal of Headache and Pain* 14.1 (2013): 37.
5. Hillerup S. "Iatrogenic injury to oral branches of the trigeminal nerve: records of 449 cases". *Clinical Oral Investigations* 11.2 (2007): 133-142.
6. Tinastepe N and Oral K. "Neuropathic pain after dental treatment". *Agri* 25.1 (2013): 1-6.
7. Spencer CJ and Gremillion HA. "Neuropathic orofacial pain: proposed mechanisms, diagnosis, and treatment considerations". *Dental Clinics of North America* 51.1 (2007): 209-224.
8. Marbach JJ and Raphael KG. "Phantom tooth pain: a new look at an old dilemma". *Pain Medicine* 1.1 (2000): 68-77.
9. Maeda S, *et al.* "A trigeminal neuralgia-like paroxysmal pain condition presumably due to buccal nerve compression in the temporalis muscle". *Cranio* 19.1 (2001): 56-60.
10. Sloman EG. "Anatomy and anesthesia of the buccinator (long buccal) nerve". *The Journal of the American Dental Association* 26.3 (1939): 428-434.
11. Vázquez-Delgado E., *et al.* "Prevalence of neuropathic pain and sensory alterations after dental implant placement in a university-based oral surgery department: A retrospective cohort study". *Gerodontology* 35.2 (2018): 117-122.
12. Joshi A and Rood JP. "External neurolysis of the lingual nerve". *International Journal of Oral and Maxillofacial Surgery* 31.1 (2002): 40-43.
13. Ko AL, *et al.* "Long-term efficacy and safety of internal neurolysis for trigeminal neuralgia without neurovascular compression". *Journal of Neurosurgery* 122.5 (2015): 1048-1057.
14. Syed S, *et al.* "Endoscopic Endonasal V2 Neurectomy at Foramen Rotundum for Intractable Facial Pain". *Journal of Neurological Surgery Part B: Skull Base* 77.S1 (2016): A050.

Volume 17 Issue 8 August 2018

© All rights reserved by Abhishek Bhattacharjee, *et al.*