

# Trigeminal Neuralgia Involving All Three Branches Of Trigeminal Nerve Treated By Peripheral Neurectomy: An Interesting Case Report

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## Abstract

Trigeminal neuralgia is a well known facial pain syndrome characterized by excruciating, paroxysmal, shock like pain attacks located in the somatosensory distribution of the trigeminal nerve. It occurs in both genders (with a slight female predominance), and the diagnosis is most common over age 50. Treatment options are varied for this condition ranging from medical therapy to invasive surgical procedures. No treatment modality to date is totally recurrence free. Peripheral neurectomy is one of the oldest surgical modalities which is least invasive and with few complications. We present an interesting case of a 53 year old male patient with trigeminal neuralgia simultaneously involving all the three branches ipsilaterally. Following neurectomy of all the three involved branches, the patient was free of recurrence in a five year follow – up period.

## INTRODUCTION

Trigeminal neuralgia or tic douloureux is a debilitating syndrome consisting mainly of unilateral short bursts of lancinating pain in one or more branches of the trigeminal nerve<sup>1</sup>. The first detailed account of trigeminal neuralgia was given by John Fothergill in 1773 when he presented a paper in the Medical Society of London<sup>2</sup>. According to the ICHD - II criteria (International Classification of Headache Disorders II), classic trigeminal neuralgia is the most common idiopathic form of disorder and is defined as “a unilateral disorder characterized by brief electric shock-like pains, abrupt in onset and termination, limited to the distribution of one or more divisions of trigeminal nerve. Pain is commonly evoked by trivial stimuli including washing, shaving, smoking, taking and/or brushing the teeth (trigger factors) and frequently occurs spontaneously”<sup>3</sup>. In individual patients, the pain attacks are stereotyped, recurring with the same intensity and in the same distribution. The second and third trigeminal divisions are more often involved<sup>4</sup>. Right side of the face is more involved than the left<sup>5</sup>. The etiology of trigeminal neuralgia is widespread from no specific reason – known as “idiopathic form” to space – occupying lesions within the posterior cranial fossa. The current opinion is in favour of a “neurovascular conflict”: An artery, most often a loop of the superior or antero-inferior cerebellar artery, has an offending

contact with the trigeminal nerve root, which results in localized demyelination and ectopic triggering of neuronal discharges<sup>6</sup>.

The diagnosis is made on the basis of typical history and the exclusion of secondary cases<sup>7</sup>. Treatment of trigeminal neuralgia is both through medical therapy and surgical intervention, with each one having its own merits and demerits. Among the surgical procedures, neurectomy is the oldest modality of intervention<sup>8</sup>. In the centers where the facilities are not available or the patient is not fit for major neurosurgical procedures like microvascular decompression or radiofrequency thermocoagulation, neurectomy has its role in the treatment of trigeminal neuralgia. This paper highlights a typical case of idiopathic trigeminal neuralgia simultaneously involving all the three divisions of the trigeminal nerve. Peripheral neurectomy was performed under local anesthesia for all the three branches i.e., supra-orbital, infra-orbital and mental. The patient was followed regularly for a 5 year period and was free of any recurrence.

## CASE REPORT

A 53 year old male patient was referred to our center by a general dental practitioner with acute bouts of severe pain on the right side evoked by perioral triggers. He was under medical therapy (Tab. Carbamazepine 200 mg, twice daily) for the past 8 months. Diagnosis was confirmed at our center

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by asking the patient to stop carbamazepine for a period of 3 days and by giving diagnostic test blocks of local anesthesia. Comprehensive head and neck examination with special attention to the trigeminal sensory system and cranial nerves was also performed. There was no sensory deficit involved. Odontogenic or nonodontogenic source for the pain was ruled out through a detailed intraoral examination of the dentition, oral cavity, oropharynx, salivary glands, and associated oral structures. Considering the patient's age and his reluctance to undergo invasive neurosurgical procedures under general anesthesia, treatment plan was advocated for peripheral neurectomy under local anesthesia.

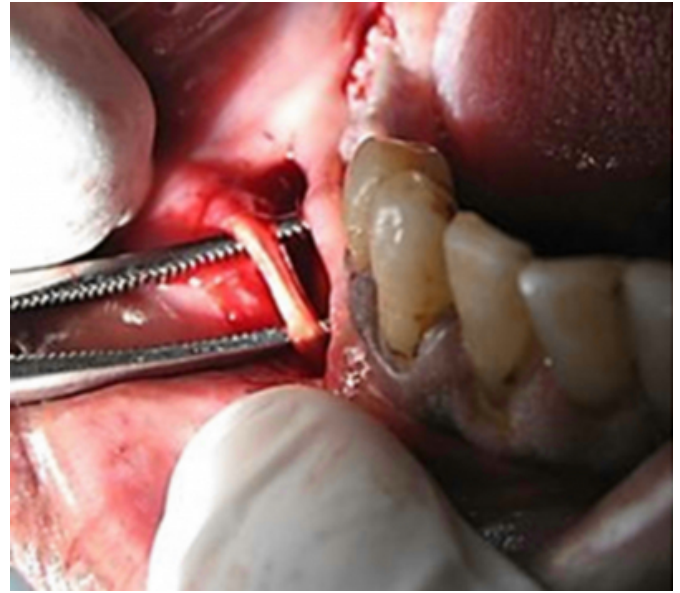
The mental nerve was accessed through a vestibular incision and the identified nerve trunk was avulsed out from the inferior alveolar canal (figure I,). 100% alcohol was injected into the inferior alveolar canal through the mental foramen to burn the remaining nerve segment in the canal.

Infra-orbital neurectomy was performed through a vestibular incision. Muco-periosteal flap was reflected upto the infra-orbital foramen and all the three branches of infra-orbital nerve i.e., a) inferior palpebral, b) lateral nasal and c) supra-labial branches were dissected out from the infra-orbital canal (figure II). Figure III clearly shows all the three branches of infra-orbital nerve. The supra-orbital nerve was accessed through a supra-orbital incision and the nerve trunk was avulsed out (figure IV). Figure V shows the avulsed nerve trunks of mental and supra-orbital nerves.

Closure was performed through simple interrupted sutures with 3-0 vicryl. There was minimal edema post-operatively. The patient was prescribed antibiotics (Cap. Amoxicillin 8 hourly for 3 days) and analgesics (Tab. Diclofenac Sodium 100mg – thrice daily – 3 days) and was discharged on the same day. Follow up was scheduled after 3 days and then every month for the next one year and every 3 months for the next 4 years. The patient was free of neuralgic pain symptoms all along the follow-up period.

**Figure 1**

Figure 1: Dissection of Mental nerve



**Figure 2**

Figure 2: Dissection of Infra-orbital nerve



**Figure 3**

Figure 3: Infra-orbital nerve trunk



**Figure 4**

Figure 4: Dissection of Supra-orbital nerve



**Figure 5**

Figure 5: Nerve trunks of mental & supra-orbital nerves



## DISCUSSION

Trigeminal neuralgia is a well recognized disorder characterized by lancinating attacks of severe facial pain. The diagnosis of trigeminal neuralgia is based primarily on a history of characteristic pain attacks that are consistent with specific, widely accepted research and clinical criteria for the diagnosis<sup>3</sup>. The cause of this disorder is widely unknown with various factors and pathogenesis put forward in the literature. Although, the pathogenesis of trigeminal neuralgia has not been fully elucidated, various invasive procedures have been described over the years. Few of the invasive surgical modalities include Percutaneous stereotactic radiofrequency thermal lesioning of the trigeminal ganglion and/or root, Posterior fossa exploration and microvascular decompression (MVD) of the trigeminal root and Gamma Knife radiation to the trigeminal root entry (GKR).

Tatli M et al<sup>9</sup>., conducted an analysis to report the long-term outcomes of surgical options of trigeminal neuralgia since the development of electronic databases. Twenty – eight studies mostly including microvascular decompression and radiofrequency thermorhizotomy were included in their analysis and all the studies had a minimum 5 years or more mean duration of follow-up. According to them, recurrence of pain affects atleast 19% of patients undergoing any surgical treatment for trigeminal neuralgia.

Neurectomy is the oldest of all procedures<sup>8</sup>. This is one of the simplest surgical method for treatment of trigeminal neuralgia<sup>10</sup>. Few of the advantages of peripheral neurectomy include ease of performing the surgery, well tolerated by elderly or debilitated patients. The patient can be sent home either the day of surgery or the following day. Murali R et al<sup>11</sup>.,reported a series of 40 patients who underwent surgical intervention for trigeminal neuralgia. Peripheral neurectomy was performed in 12 patients as a primary procedure and as a secondary procedure following radiofrequency thermocoagulation in 28 patients<sup>11</sup>. According to them, 79% had excellent pain relief lasting 5 years or more.

Shah SA<sup>8</sup> et al., evaluated the role of peripheral neurectomies in the treatment of trigeminal neuralgia in modern practice by analyzing 50 patients. They reported that 70% of the patients had excellent pain relief for a period of 2-5 years and concluded that peripheral neurectomy may be done in the elderly and microvascular decompression should be preferred for younger patients unless there is a specific reason for neurectomy. Grantham EG<sup>12</sup> et al., in their study

involving 55 patients who underwent neurectomy reported a pain relief of 0-5 years.

In this case report, the patient had simultaneous involvement of all the three branches which is rare. Jannetta in 1996 reported in his extensive study involving 1204 patients that only 12.3% are affected by trigeminal neuralgia with all the three branches being simultaneously involved<sup>13</sup>. The patient in this case report was advised and treated by peripheral neurectomy as he had become refractory to medical treatment and was not indicated (due to his old age, poor socio-economic status) and neither willing to undergo more invasive surgical procedures like microvascular decompression under general anesthesia. The pain relief over a follow-up period of 5 years was excellent without recurrence in any of the branches avulsed out. Thus peripheral neurectomy, though an old surgical technique gives adequate pain relief and can be advocated in patients who are not indicated for more invasive procedures.

## **CONCLUSION**

Treatment for trigeminal neuralgia is widespread and should be selected based on individual merits.

There is no ideal surgical treatment which is minimally invasive and acceptable to the patient, lacks complications and has no side effects or recurrences.

Peripheral neurectomy is an ideal treatment of choice in old age patients, refractory to medical therapy and patients not indicated for invasive procedures under general anesthesia.

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