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Case Report

Minimal invasive, maximum relief: The ginwala approach to trigeminal neuralgia- A case report

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Abstract

Trigeminal neuralgia (TN) is a chronic and debilitating neurological disorder characterized by recurring episodes of intense facial pain. I present a case report of a patient with trigeminal neuralgia underwent the Ginwala Approach, a novel minimally invasive surgical technique. The patient experienced significant pain relief and improvement in quality of life. This case report highlights the potential benefits of the Ginwala Approach for trigeminal neuralgia patients who have failed conventional treatments. The approach's minimally invasive nature and targeted intervention may offer a promising alternative for managing this complex condition.

Keywords: Trigeminal neuralgia, Neurectomy, Denervation, Pain, Hypoesthesia.

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1. Introduction

Trigeminal neuralgia (TN) is a rare and complex neurological disorder that significantly impacts an individual's quality of life. Trigeminal Neuralgia (TN) is characterized by sudden, severe, and recurrent stabbing pain in one or more branches of the trigeminal nerve.[1] It is estimated to affect approximately 4-5 people per 100,000 per year, with a prevalence of around 0.1-0.3% in the general population. TN typically affects people over the age of 50, with a higher incidence in females. Despite its rarity, trigeminal neuralgia can have a profound impact on an individual's daily life, causing debilitating pain, anxiety, and depression. The intense, electric shock-like pain can be triggered by everyday activities such as shaving, brushing teeth, or touching specific areas.[2] The exact cause of primary or idiopathic Trigemina Neuralgia remains unclear, but it is widely accepted that the condition results from vascular compression and demyelination of the trigeminal nerve.[3] Trigeminal neuralgia often requires a multidisciplinary approach for management, and awareness among healthcare professionals and the general public is crucial to ensure timely and effective treatment. Historically, peripheral neurectomies have been attempted to alleviate Trigeminal Neuralgia symptoms, with varying degrees of success. Although this technique is still employed by some maxillofacial surgeons, its effectiveness compared to other treatments remains understudied.[4]

This article presents a successful case of peripheral inferior alveolar neurectomy performed on an elderly woman with Trigeminal Neuralgia, who had previously undergone medical therapy with inadequate results.

2. Case Report

A 58-year-old woman was referred to the maxillofacial unit, complaining of severe pain on the left side of her face for the past one month. The pain radiated to her jaw and forehead on the same side. She had been diagnosed with trigeminal neuralgia (TN) of the third branch two years prior and was initially treated with Tegretal, later switched to a combination therapy of Carbamazepine and Baclofen. Despite increased

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dosages and combination therapy, she found no relief from the pain. Previously, she had undergone a total tooth extraction of lower left side of the jaw two years ago, advised by a local dentist, in an attempt to alleviate the pain. However, the pain intensified over the past one month, becoming periodic and lancinating, worsening with actions like eating, speaking, and chewing. The pain remained unilateral and was accompanied by brief facial spasms. Even mild stimuli, such as a gentle breeze, triggered pain. Upon presentation, the patient appeared elderly and moderately built, with a mask-like face and an expression of agony. She reported difficulty opening her mouth and swallowing due to the severe pain. An extra oral examination revealed no trigger zones. To identify potential triggers, the patient was asked to make various facial expressions. The examination also assessed the first and second branches of the trigeminal nerve, but no abnormal responses were detected. A series of tests were conducted to evaluate the patient's sensitivity, including:- Gentle hair movement and skin displacement, Air puffs, temperature changes (heat, cooling, and warming).[5] These assessments helped evaluate the patient's trigeminal nerve function and sensitivity. The patient did not show positive response to the above mentioned tests. An examination of the temporomandibular joint (TMJ) was performed due to the patient's reported difficulty opening her mouth, but no irregularities were found. Additionally, a musculoskeletal evaluation revealed no underlying conditions. Upon intraoral examination, it was observed that the patient had no teeth in the lower left region of jaw. The remaining teeth presented with generalized recession with presence of mild stains and calculus.

Imaging studies, including an orthopantomograph of the jaw, showed no abnormalities. A brain MRI was also performed to rule out structural or compressive lesions affecting the trigeminal nerve, but the results were unremarkable. The patient then underwent a peripheral nerve block test with 2% lignocaine. The test provided temporary relief from pain associated with the mandibular nerve, and the neuralgia was not triggered.

The patient's case was reviewed with a neurosurgeon, and further investigation was recommended. After conducting a thorough examination and various neurological tests, the neurosurgeons confirmed that the patient had trigeminal neuralgia (TN) affecting the mandibular nerve. They ruled out other cranial nerve dysfunctions and pathologies. The patient was presented with various treatment options, including their outcomes and associated costs. They opted for peripheral neurectomy, a less expensive, simple, and effective treatment for neuralgia.[6,7]

After obtaining informed consent, the patient underwent presurgical preparations and was scheduled for peripheral neurectomy under general anaesthesia. The surgical approach used was Dr. M.S.N. Ginwalla's technique, that suggests an incision intraorally on the anterior border of the ascending ramus. The incision extends from below the coronoid process to the angle of the mandible, where it divides into two forks, straddling the ridge like an inverted Y.

The incision provides better exposure to the surgical site. The temporalis and medial pterygoid muscles are split and divided at their insertion, and the inferior alveolar nerve is located. The nerve is then followed and freed, and a heavy linen thread is looped around it. Two loops are thrown around the nerve, and the proximal loop is carried up as high as possible and knotted. The distal knot is applied lower, and the nerve is divided between the two knots. The proximal knot is cut short, and the end of the nerve retracts upwards. The ends of the distal knot are kept long and secured with a haemostat. A small incision is made in the buccal sulcus, and the nerve is exposed in the mental foramen region. The nerve is teased out of the foramen, grasped by two haemostats, and divided between them. The distal end of the nerve is wound around and avulsed, removing the peripheral branches of the nerve. The divided nerve end is then grasped by a haemostat, and the entire nerve is avulsed out of the mandibular canal. The mental foramen is obliterated with bone wax, and the wound is closed with absorbable 3-0 vicryl sutures after toileting with saline and achieving haemostasis.

Following the surgery, the patient was instructed to avoid consuming extremely hot foods. The postoperative recovery was smooth, and the wound heals satisfactorily. The patient was discharged on 3rd day after the surgery, experiencing complete relief from neuralgic pain. However, the patient reported experiencing paraesthesia (numbness or tingling sensations) on the left side of lower face. The patient has been under regular follow-up for the past 6 months, allowing for ongoing monitoring and management of this symptom.

Figure 1: Preoperative photograph of the patient

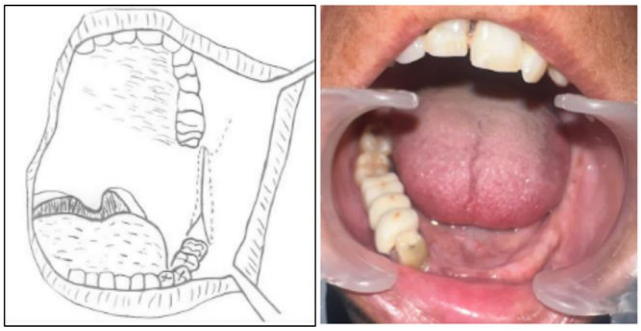

Figure 2: Diagram shows Ginwalla's incision as given in his original article and in the patient

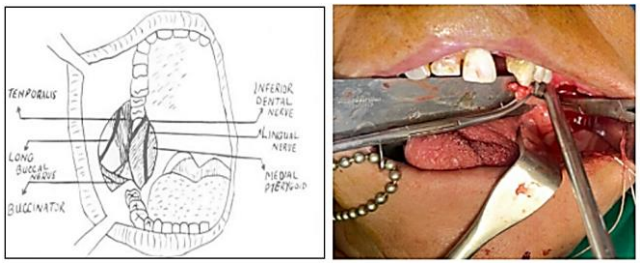

Figure 3: Inferior alveolar nerve identification as shown in Ginwalla's original article and IAN held by artery forcep in patient

Figure 4: Figure showing site where linen thread is tied on IAN

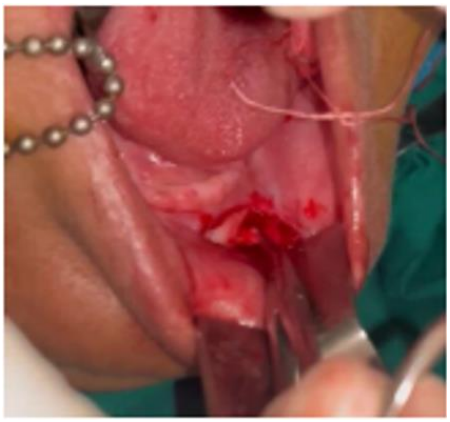

Figure 5: Mental nerve winding done using haemostat

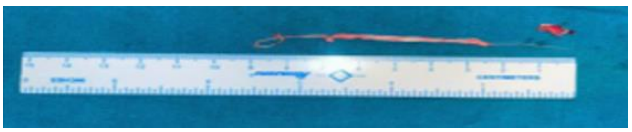

Figure 6: Specimen of 4cm transected inferior alveolar nerv

Figure 7: Post-operative OPG after 6 months

3. Discussion

Trigeminal Neuralgia (TN) is a debilitating condition characterized by intense facial pain, which has presented a longstanding challenge to clinicians. Despite the trigeminal nerve's mixed composition, the sensory component is predominantly affected. The clinical presentation of trigeminal neuralgia is distinct and can manifest in various forms. Patients often seek medical attention due to the severe pain, which may necessitate consultation with multiple healthcare professionals and trials of various therapeutic interventions.[7]

Trigeminal Neuralgia (TN) may manifest with symptoms that mimic musculoskeletal pain, temporomandibular dysfunction, or lockjaw. Additionally, trigeminal neuralgia may be associated with intraoral trigger points, which can further complicate the diagnosis.[2,5,9] A notable study revealed that 6 out of 48 patients with idiopathic Trigeminal Neuralgia (TN) became edentulous as a consequence of dental procedures undertaken for treatment.

Statistical analysis demonstrated a significant correlation (P = 0.004) between the number of patients undergoing dental treatments and the duration of idiopathic trigeminal neuralgia.[9]

The patient in this case suffered from misdiagnosis, leading to unnecessary tooth extractions. As a result, the patient was left edentulous for 2 years, experiencing no relief from pain and a decline in overall health.

Currently, there is no specific test to diagnose Trigeminal Neuralgia. A comprehensive clinical examination, including an assessment of cranial nerve function, is crucial. Any unusual sensory loss or cranial nerve dysfunction that cannot be attributed to a pre-existing nerve injury should be further evaluated using brain imaging techniques.[4] Imaging studies, including CT scans of the craniofacial region and MRI, are essential for all patients to rule out rare conditions such as tumours or abnormal blood vessels that may be compressing the nerve roots.[2,10]

Patients who experience persistent symptoms despite medical therapy may require referral to a neurosurgeon for further evaluation and potential surgical intervention.[2]

A thorough diagnostic evaluation was conducted, and all possible causes of the patient's symptoms were carefully ruled out. The findings confirmed that the patient was suffering from Trigeminal Neuralgia, specifically affecting the mandibular division.

The underlying pathophysiology of Trigeminal Neuralgia (TN) remains unclear, posing a challenge for clinicians. Effective management requires prompt diagnosis and treatment initiation to alleviate severe symptoms. The absence of a clear organic substrate complicates treatment. As a result, various therapeutic approaches have been proposed, leading to confusion in trigeminal neuralgia management. An ideal treatment would preserve facial sensation, minimize invasiveness, and ensure long-term efficacy. Unfortunately, such a treatment has yet to be developed.[7]

Currently, no medicinal therapy can provide a definitive cure for Trigeminal Neuralgia. While carbamazepine is the preferred treatment option, offering symptomatic relief, it is not universally effective. Furthermore, carbamazepine is associated with numerous side effects, often necessitating its discontinuation. Prolonged use of this medication can also lead to serious complications, including bone marrow depression, with reported cases of fatal outcomes.[7] Other antiepileptic medications used to treat Trigeminal Neuralgia are generally less effective than carbamazepine. These alternatives are typically considered as adjunctive therapies or reserved for patients who cannot tolerate carbamazepine due to adverse effects or allergic reactions. When the initial treatment fails, it is often attributed to an inadequate therapeutic response or the inability to continue treatment due to intolerable side effects.

The patient in this case study exemplifies a classic example of inadequate therapeutic response to carbamazepine, despite a 2-year treatment period, dose escalation, and combination therapy, which failed to provide pain relief.

Surgical interventions are considered when pharmacological management fails to control pain or when patients experience intolerable side effects. In such cases, peripheral procedures are often performed, particularly for patients who are not suitable candidates for or decline more invasive procedures. The available peripheral surgical options include cryotherapy, peripheral nerve blocks using neurolytic agents, and neurectomy.[2,12]

The indications for trigeminal nerve exploration, as outlined in a review article, include: (1) failure of conservative management strategies, (2) demonstration of transient pain relief with local anaesthetic nerve blocks, and (3) pain localized to a specific dermatomal distribution corresponding to the affected nerve branch.[13]

Neurectomy involves the surgical resection of a nerve segment, primarily aimed at alleviating neuralgic pain, particularly in cases involving the trigeminal nerve (fifth cranial nerve).[14] The primary goals of peripheral neurectomy are twofold: to resect as much of the affected nerve branch as possible and to prevent its subsequent regeneration. To achieve this, neurectomies are typically performed via surgical incisions made either at the supraorbital region or intraorally, depending on the specific nerve branches involved (e.g., infraorbital, alveolar, and lingual nerves). Under magnification, all affected branches are carefully divided and avulsed to ensure complete resection.[4] Neurectomy is typically performed in close proximity to the trigger zone. However, a notable challenge with this procedure is the high propensity for nerve regeneration, which can lead to recurrence of neuralgic pain. To mitigate this risk, it is essential to resect a substantial segment of the nerve, ideally exceeding 4 cm in length. In cases where the nerve traverses a bony canal, additional measures are necessary to prevent re-growth. This can be achieved by occluding the canal with materials such as sterile gold foil, bone wax, wooden dowels, or silicone inserts.[14]

In the case presented above, bone wax was utilized to occlude the mental foramen, proving to be a readily available and effective material that fit securely within the foramen. Additionally, the residual nerve stump can also be subjected to cauterization to further prevent nerve regeneration.[4]

When carefully selected and executed with meticulous nerve excision, neurectomy can provide sustained pain relief for a minimum of four years, with some exceptional cases experiencing even longer durations of pain freedom.[14]

Extracranial surgical procedures, including peripheral neurectomy and nerve avulsion, have associated limitations. These methods are only viable when the neuralgia affects the peripheral branches of the trigeminal nerve. A notable drawback of peripheral neurectomy is the potential for permanent sensory loss or deficiency. However, the procedure is relatively simple and safe, posing minimal risk even for elderly or debilitated patients. The benefits of peripheral neurectomy include instantaneous pain relief in most cases, with the resulting anaesthesia limited to a small facial area. Studies have shown promising outcomes, with one investigation reporting an 80% success rate using Ginwalla's method for inferior alveolar neurectomy. Overall, surgical therapy demonstrated a 75% success rate compared to medical therapy. Nevertheless, it is essential to acknowledge that peripheral procedures may potentially delay more definitive treatment.[7]

Despite the possibility of recurrences following peripheral neurectomies, research suggests that re-exploring and re-treating the affected area using the same method can lead to renewed pain relief.[4,7]

Given the patient's advanced age and diagnosis of trigeminal neuralgia (TN) confined to the mandibular branch, with no other abnormalities detected on MRI, peripheral neurectomy was deemed the most suitable treatment option. Alternatively, intracranial surgical interventions, which target the gasserian ganglion or posterior cranial fossa, could also be considered for managing trigeminal neuralgia.[1]

Microvascular decompression (MVD) is usually recommended for younger, healthier patients. However, for patients with minimal compression of the trigeminal sensory root or those who are not suitable candidates for microvascular decompression (MVD), partially sensory rhizotomy may be performed instead. In some cases, alternative procedures such as percutaneous ablative techniques or gamma knife radiofrequency may be considered when MVD is not possible.[6,12]

More invasive intracranial surgical procedures, which boast high success rates of 96-100%, also come with significant drawbacks. Complications such as anaesthesia dolorosa and cavernous sinus lacerations are notable risks. Furthermore, the patient's overall health must be satisfactory, which becomes increasingly important when considering the age of the patient, as trigeminal neuralgia predominantly affects older adults.[7]

Surgical intervention carries inherent risks, including the potential for permanent facial numbness, altered sensations, and residual deficits. Changes in sensation within the orofacial region can have far-reaching consequences, impacting daily activities such as speech, mastication, and social interactions. Even seemingly minor alterations can profoundly affect a patient's overall quality of life.[12]

Furthermore, surgical interventions often provide only temporary relief, with pain recurring after one or several years. This may necessitate repeat procedures, which can offer improved but still incomplete pain management. As a result, many patients continue to rely on pain medication even after undergoing surgery.[7] Therefore, treatments that offer the highest long-term efficacy while minimizing the risk of persistent facial sensory disturbances hold the greatest promise for patients.

4. Conclusion

Several factors contribute to the misdiagnosis of trigeminal neuralgia (TN), including the pain's referral to the teeth, the complex and varied presentation of orofacial symptoms, the condition's low incidence, and the limited clinical experience of dentists and physicians with trigeminal neuralgia. A comprehensive dental evaluation is crucial, as dental issues can trigger trigeminal neuralgia. A thorough clinical and radiographic examination is necessary to rule out oral pathology as the pain source. It is vital to avoid irreversible dental procedures until a definitive diagnosis is confirmed.

The treatment of trigeminal neuralgia (TN) is highly individualized, and no standardized protocols exist. Each patient requires a unique evaluation and approach. While medical therapy is an option, its effectiveness often diminishes over time due to the progressive nature of the condition. The uncertainty surrounding the exact cause of trigeminal neuralgia adds to the complexity of managing the condition. Each surgical approach offers potential benefits, but also carries risks of complications. While peripheral neurectomy may have its drawbacks, it's essential to acknowledge that current treatments for trigeminal neuralgia are imperfect, with some being merely symptomatic or overly invasive.

A thorough assessment of surgical indications and associated risks is crucial. Obtaining informed consent preoperatively and providing adequate postoperative follow-up care can help minimize the occurrence of neurosensory complications after surgery.

Peripheral neurectomy offers several advantages, including minimal stress, suitability for elderly patients, brief hospitalization, and targeted destruction of pain-causing fibers. This minor procedure can be performed comfortably under local anaesthesia. To ensure optimal results, patients with trigeminal neuralgia who undergo neurectomy require ongoing evaluation, follow-up care, and physical therapy.

Patients with trigeminal neuralgia (TN) often experience recurring pain. However, peripheral neurectomy using Dr. Ginwalla's technique has proven to be a highly effective and reliable solution, particularly for elderly and frail patients. This method offers long-term pain relief, rapid recovery, and minimal post-operative complications, making it a safe and cost-effective option. The patient's six-month pain-free

period serves as a testament to the lasting success of Dr. Ginwalla's technique, reaffirming its status as a good treatment option for mandibular neuralgia.

5. Source of Funding

None.

6. Conflict of Interest

None.

References

1. Cruccu G, Gronseth G, Alksne J, Argoff C, Brainin M, Burchiel K, et al. AAN-EFNS guidelines on trigeminal neuralgia management. *Eur J Neurol.* 2008;15(10):1013–28.
2. Fabiano JA, Fabiano AJ, Anders PL, Thines TJ. Trigeminal neuralgia with intraoral trigger points: report of two cases. *Spec Care Dentist.* 2005;25(4):206–13.
3. Brown C. Surgical treatment of trigeminal neuralgia. *AORN J.* 2003:78(5):744–58.
4. Nurmikko TJ, Eldridge PR. Trigeminal neuralgia--pathophysiology, diagnosis and current treatment. *Br J Anaesth*. 2001 Jul;87(1):117–32.
5. R. Dubner, Y. Sharav, R.H. Gracely, D.D. Price: Idiopathic trigeminal neuralgia: sensory features and pain mechanisms. *Pain*. 1987:31(1):23–33.
6. Mruthyunjaya B, Raju CG. Trigeminal neuralgia: A comparative evaluation of four treatment procedures. *Oral Surg.* 1981:52(2):126–32.
7. Khanna JN, Galinde JS. Trigeminal neuralgia: Report of 140 cases. *Int J Oral Surg.* 1985;14(4):325–32.
8. Ginwalla MSN. Surgical Treatment of Trigeminal Neuralgia of Third Division. *Oral Surg, Oral Med, Oral Pathol.* 1961:14(11):1300–4.
9. de Siqueira SRT, Nóbrega JCM, Valle LBS, Teixeira MJ, de Siqueira JTT. Idiopathic trigeminal neuralgia: clinical aspects and dental procedures. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2004;98(3):311–5.
10. Pemberton MN, Dewi PS, Hindle I, Thornhill MH. Investigation and medical management of trigeminal neuralgia by consultant oral and maxillofacial surgeons in the British Isles. *Br J Oral Maxillofac Surg*. 2001;39(2):114–9.
11. McLeod NMH, Tekeli KM, Cheriyan J. Trigeminal neuralgia: assessment and management by oral and maxillofacial surgeons in the United Kingdom. *Br J Oral Maxillofac Surg.* 2009;47(1):42–5.
12. Toda K. Operative treatment of trigeminal neuralgia: review of current techniques. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2008;106(6):788–805.
13. Ziccardi VB, Janosky JE, Patterson GT, Jannetta PJ. Peripheral trigeminal nerve surgery for patients with atypical facial pain. *J Craniomaxillofac Surg*. 1994;22(6):355–60
14. Sung RRY. Peripheral neurectomy as treatment for incipient trigeminal neuralgia. *Oral Surg Oral Med Oral Pathol.* 1951:4(3):296–302.

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