Surgical Management of Trigeminal Neuralgia via Infra-orbital Neurectomy with Foramen Obliteration: A Case Report

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Abstract **- Aims: To document the surgical management of a patient with recurrent trigeminal neuralgia involving the infra-orbital nerve using neurectomy and foramen obliteration.**

Presentation of Case: A 39-year-old male presented with intense, sharp, stabbing pain in the upper right region of the jaw, persisting for three months. The patient had a history of a previous Inferior Alveolar Neurectomy on the right side. Clinical examination led to a diagnosis of trigeminal neuralgia affecting the infra-orbital branch, satisfying Sweet's criteria. The patient underwent an infra-orbital neurectomy where the nerve was excised, and the foramen was obliterated using a 2.5 x 12mm screw and bone graft.

Discussion: Peripheral neurectomies serve as a safe and cost-effective option for patients, particularly in varying healthcare settings. While pain relief can last between 15 to 24 months, recurrence and sensory loss remain associated risks.

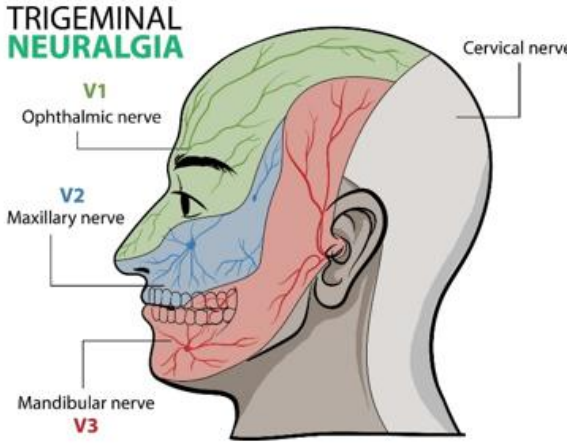
Conclusion: This case illustrates that infra-orbital neurectomy with foramen obliteration is a viable surgical intervention for pain relief in trigeminal neuralgia when medical management or previous interventions have not sufficed.

Index Terms **Trigeminal Neuralgia; Infra-orbital Neurectomy; Peripheral Neurectomy; Foramen Obliteration; Sweet's Criteria.**

I. INTRODUCTION

Trigeminal neuralgia is a chronic pain condition affecting the trigeminal nerve, often described as intense, sharp, or stabbing pain. The diagnosis is frequently clinical, relying on established guidelines such as Sweet's Criteria [1].

Peripheral neurectomies are considered a safe and cost-effective option for patients, including the elderly, those with medical co-morbidities, or in populations lacking access to highly skilled neurosurgical centers. This procedure involves the avulsion of the peripheral branch of the nerve. This case report discusses the management of a 39-year-old male with recurrent pain.



II. PRESENTATION OF CASE

Patient History and Examination A 39-year-old male patient reported to the department with a chief complaint of pain in the upper right region of the jaw, which had been present for three months. The patient was apparently asymptomatic until three months prior when he began experiencing intense, sharp, stabbing sensations throughout the face. The pain was notably triggered during face washing and exposure to cold air.

Medical and Dental History:

- Systemic: No relevant systemic medical history.
- Dental: History of Inferior Alveolar Neurectomy via Ginwala's approach on the right side.
- Habits: No history of tobacco chewing or smoking.

Clinical Findings: The clinical presentation satisfied Sweet's Criteria for diagnosis:

1. Pain is paroxysmal.
2. Pain is provoked by light touch to facial trigger zones.
3. Pain is confined to the trigeminal distribution.
4. Pain is strictly unilateral.
5. Clinical sensory examination is normal.

2.2 Surgical Procedure

An infra-orbital neurectomy was planned. The procedure followed these specific steps:

1. Incision and Exposure: Under local anesthesia, an incision was placed in the maxillary vestibule to access the infra-orbital region. A flap was reflected to visualize the surgical field.
2. Nerve Isolation: The infra-orbital foramen was located, and the main infra-orbital trunk was secured. Sub-branches were carefully dissected.
3. Neurectomy: The nerve was twisted and excised.
4. Foramen Obliteration: To prevent regeneration, the infra-orbital foramen was obliterated using a 2.5 x 12mm screw. This was augmented with Ossix bone graft.
5. Closure: The site was irrigated and sutured.

Figure -01 Incision

Figure-02. Flap Reflected & Dissection Done

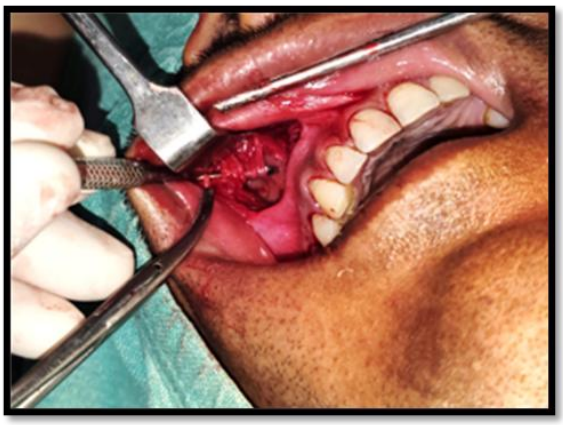


Figure – 03. Main Trunk

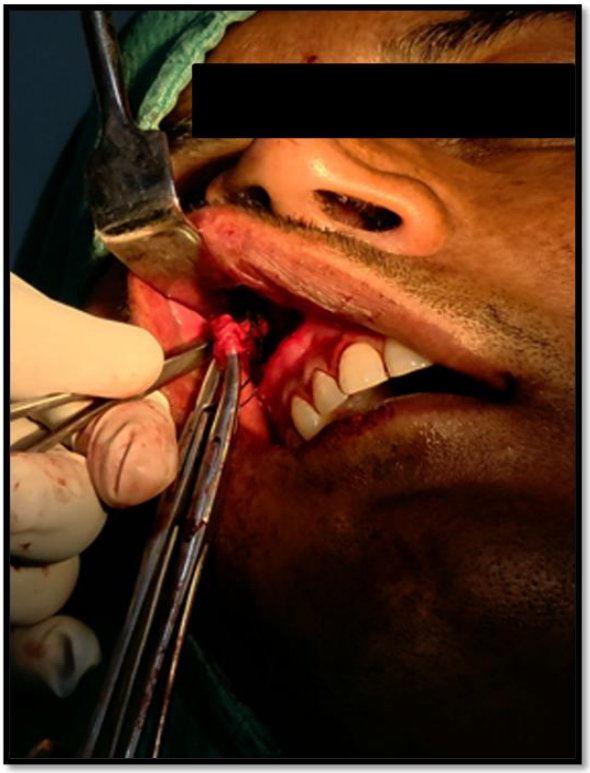


Figure – 04. Nerve Excised

Figure- 05. Obliterated With 2.5x12mm Screw with Ossix Bonegraft

Figure- 06 Closure Done with Continuous Locking Suture Technique

Figure- 07 Excised Nerve

III. DISCUSSION

Trigeminal neuralgia (TN) is widely recognized as one of the most debilitating facial pain conditions, significantly impairing a patient's quality of life. Diagnosis is primarily clinical, relying on detailed history taking and adherence to established guidelines such as Sweet's criteria, which differentiate typical TN from other facial pain syndromes [1, 2]. While the primary mode of management is pharmacotherapy using anticonvulsants like carbamazepine, resistance to medication or intolerable side effects often necessitates surgical intervention [3].

Surgical options for TN range from central procedures, such as microvascular decompression (MVD), to peripheral interventions. While MVD is often considered the gold standard due to its ability to address the root cause (vascular compression), it carries risks associated with craniotomy and is not always feasible for elderly patients or those with significant medical comorbidities [4, 5]. In contrast, peripheral neurectomies offer a minimally invasive, safe, and cost-effective alternative, particularly in rural or resource-scarce settings where neurosurgical facilities may be limited [6, 7].

In the present case, the patient underwent an infra-orbital neurectomy. Peripheral neurectomy involves the avulsion of the nerve branch involved in the pain trigger. Studies by Ali et al. and Shah et al. have documented the efficacy of this approach in rural practices, noting immediate pain relief in the majority of subjects [6, 8]. Mason and Khanna et al. further support the utility of neurectomy for neuralgia of the second and third divisions, citing it as a valuable procedure when major neurosurgery is contraindicated [9, 10].

However, the major limitation of peripheral neurectomy is nerve regeneration, leading to the recurrence of pain. The literature indicates that pain relief typically lasts between 15 to 24 months before regeneration occurs [11]. Oturai et al. reported recurrence rates as high as 78% in a long-term follow-up comparison with alcohol blocks and radiofrequency coagulation [12]. Similarly, Cerovic et al. argued that while the treatment provides relief, the high rate of re-innervation challenges its long-term success [13].

To mitigate the risk of recurrence caused by nerve regeneration, this case employed the technique of

foramen obliteration. Historically, methods to obstruct the foramen included the use of gold foil, bone wax, or silicone. Ginwala advocated for the surgical treatment of the third division with specific attention to preventing regrowth [14]. In modern practice, the use of titanium screws or bone grafts creates a physical barrier against the proximal stump of the nerve re-entering the canal. Yasir et al. recently compared obturation materials, suggesting that rigid barriers like titanium screws may offer superior resistance to nerve proliferation compared to softer materials like gutta-percha [15]. By placing a 2.5 x 12mm screw and augmenting it with a bone graft, this case aimed to extend the pain-free interval beyond the typical 2-year window reported in studies by Yuvaraj et al. [16].

It is essential to acknowledge the trade-off inherent in this procedure: the exchange of paroxysmal pain for permanent or semi-permanent numbness (anesthesia or paresthesia) in the distribution of the infra-orbital nerve. Nilesh notes that while sensory loss is inevitable, most patients report a significant improvement in quality of life due to the cessation of the lancinating pain [17]. Furthermore, Malik and Majeed emphasize that for refractory cases, the benefits of immediate pain cessation outweigh the discomfort of sensory loss [18].

IV.CONCLUSION

Infra-orbital neurectomy combined with foramen obliteration represents a viable, safe, and effective surgical intervention for refractory trigeminal neuralgia, particularly in cases where neurosurgical decompression is not feasible. While recurrence remains a challenge due to the regenerative capacity of peripheral nerves, the addition of mechanical obstruction—such as the titanium screw and bone graft utilized in this case—may serve to prolong the pain-free period. Careful patient selection and counseling regarding postoperative sensory deficits are imperative for successful outcomes.

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