

Ginwalla's Technique Revisited

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Abstract: Clinicians frequently come across patients with Trigeminal Neuralgia (TN) in their daily practice. Most frequently pain is the leading symptom of TN. Sometimes it is caused by other diseases. In everyday clinical practice, it is important to diagnose and treat TN properly. Several issues regarding diagnosis, pharmacological treatment and surgical treatment of TN are still unsettled. This article provides an overview of clinical practice, diagnostic procedure and treatment strategy for TN and also reinforces the importance of programs that alert patients and health professionals about TN and the sequelae of iatrogenic procedures that guide patients to the proper treatment and that contribute to an improved understanding of this excruciatingly painful condition. Significance and reliability of Ginwalla's technique of peripheral neurectomy is also highlighted.

Keywords: neuralgia, neurectomy, oral, pain, surgery, trigeminal.

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I. Introduction

TN is defined as "sudden, usually unilateral, severe, brief stabbing recurrent pains in the distribution of one or more branches of the trigeminal nerve".^[1]

It is an electric shock or knife like pain evoked by activities such as shaving, brushing the teeth or moving trigger zones.^[2] Primary or Idiopathic TN does not have a clear cause. It is generally accepted that TN is a consequence of vascular compression and demyelination of the trigeminal nerve.^[3]

Peripheral neurectomies of the affected branches were attempted for the first time in the 18th century with variable success. Mainly employed by present day maxillofacial surgeons, the technique is too under-reported to allow evaluation of its usefulness against other treatments.^[4]

This article reveals the success of Peripheral inferior alveolar neurectomy performed in an elderly women diagnosed to have TN who had earlier undergone medical therapy for the same but with inadequate therapeutic response.

II. Case Report

A 70 year old female was referred to the maxillofacial unit with a complaint of severe pain on the left side of face from past one week. The pain radiated towards angle of the jaw and forehead on the same side. Patient was diagnosed to have TN of the third branch 4 years back and was placed on Tegretal 200mg twice daily regime initially, followed by combination therapy (Carbamazepine and Baclofen) since then. Even after increasing the dosage and placing the patient on combination therapy, the patient did not find relief from pain. Patient had undergone total extraction 4 years back to get relief from pain on advice of a local dentist. At presentation, pain had increased in intensity from past one week and was periodic, lancinating type, aggravated on eating, speaking and touching left cheek region. Pain did not cross the midline. Patient also complained of inability to open the mouth because of severe pain and grieved about painful swallowing. Pain was accompanied by a brief facial spasm or tic. Patient also reported that stimuli as mild as light breeze provoked pain. At presentation the patient was elderly and moderately built. She exhibited frozen mask like face, and had an expression filled with agony. On extraoral examination, pain was initiated on touching trigger zones. The trigger zones were found on the lower lip and cheek region on the left side. Patient was asked to perform various facial muscle expressions to check for the other precipitating factors. The presence of neuralgia was checked in relation to first and second branches of trigeminal nerve but showed negative response. Stimuli included hair movement and skin displacement with calibrated von Frey hairs, air puffs, and a tuning fork. Noxious heat, cooling and warming shifts at 10 ° C/set rates were also performed.^[5] The patient showed positive response to

the above tests and the trigger zones were also confirmed. As the patient complained of difficulty in mouth opening, TMJ examination was performed which revealed no abnormality. On further examination, no musculoskeletal pathology was detected. On intraoral examination, the patient was completely edentulous and had no other significant findings.



Fig 1 Preoperative photograph of the patient.

The orthopantomograph of the jaw showed no abnormality. MRI of brain was done to rule out structural and compressive lesions affecting the trigeminal nerve. The MRI showed no significant findings. Then the patient was subjected to peripheral nerve block test with lignocaine (LIGNOX 2%). Following the block, the neuralgia was not precipitated on stimulating the trigger zones and also the patient had brief relief from pain in relation to the mandibular nerve.

The case was discussed with the neurosurgeon regarding results of various diagnostic tests and was referred to them to investigate further. After conducting thorough examination and various neurological tests, the neurosurgeons ruled out other cranial nerve dysfunctions and pathologies and confirmed TN affecting mandibular nerve.

The various treatment modalities available, their outcome and the expenses involved were discussed with the patient. The patient opted for peripheral neurectomy which was less expensive, simple, yet effective and less invasive treatment for neuralgia.^[6, 7] After attaining informed consent, presurgical work up was done and the patient was posted for peripheral neurectomy under general anaesthesia.

Dr M.S.N.Ginwalla of India was a pioneer surgeon in the field of Maxillofacial and Plastic Surgery in the 19th century. He published an article on peripheral neurectomy in TN cases in the year 1961 in Triple O. He claimed that his technique had given a uniformly good result with no recurrence of any symptoms postoperatively.^[8] Hence in our case, it was decided to approach the nerve intraorally via Dr Ginwalla's technique.

In this technique, an incision was made intraorally on the anterior border of the ascending ramus, extending from below the coronoid process, downward, and slightly medially until it reached the body of the mandible at the angle. At that point the main incision was divided, one fork went over the ridge lingually and the other similar went over the ridge buccally, so that it sort of straddled the ridge like an inverted Y. The incision gave a better exposure on the field. Next, by means of dissection, the incision was deepened on the medial aspect of the ascending ramus. The temporalis and medial pterygoid muscles were split and divided at their insertion and the inferior alveolar nerve was located. Once the inferior alveolar nerve was located, it was followed and freed both upward and downward towards the mandibular foramen. A heavy linen thread was looped around the nerve

Two such loops were thrown around the nerve. The proximal loop was carried up as high as possible and knotted, the distal knot was applied a little lower, and the nerve was divided between the two knots. The proximal knot was cut short, and that end of the nerve retracted upwards. The ends of the distal knot were kept long and secured with haemostat. At that time, a small incision was made in the buccal sulcus, and in the mental foramen region the nerve was exposed. The nerve was then teased out of the foramen, grasped by two haemostats, and divided between them. The distal end of the nerve was wound around and avulsed, thereby doing away with peripheral branches of the nerve. After this was done we returned to the first site of operation.

The divided nerve end before it entered the mandibular foramen, was grasped by a haemostat and wound around it very slowly until the entire nerve of the length of the canal was avulsed out. The mental foramen was obliterated by means of titanium 2mm x 8mm screw. Toileting of the wound was done with saline, haemostasis was achieved and wound was closed with absorbable sutures.

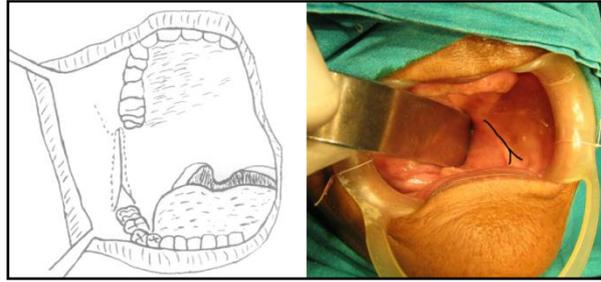


Fig 2 Diagrammatic representation of Ginwalla's incision in his original article and in the patient.

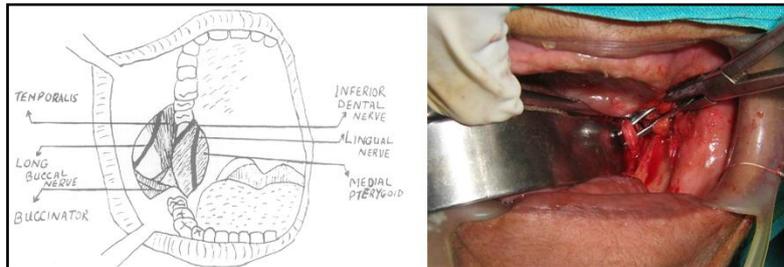


Fig 3 Inferior alveolar nerve identification as given in Ginwalla's original article and in the above reported case.

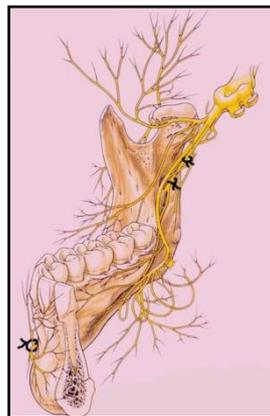


Fig 4 Diagrammatic representation depicting the site of tying the linen threads.



Fig 5 Winding of mental nerve using a haemostat.

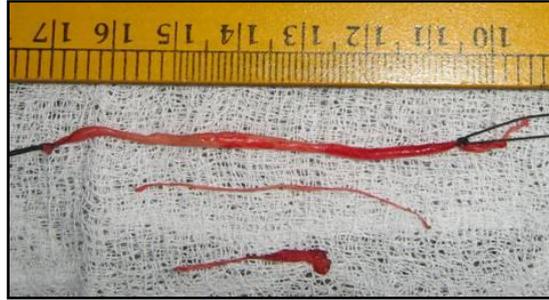


Fig 6 Specimen showing transected inferior alveolar nerve and mental nerve.

Postoperatively the patient was advised not to have very hot diet. Recovery was uneventful and the wound healing was satisfactory. Patient was discharged on the 3rd post operative day with total relief of neuralgic pain. Nevertheless patient complained of paresthesia on the left side of lower face and is on regular follow up from past two years.



Fig 7 2 years post op radiograph showing the titanium screw in situ.

III. Discussion

The most dreadful facial pain is that of TN which has defied the clinician for centuries. It is interesting to note that even though the trigeminal nerve is a mixed type of nerve, it is only the sensory part that is involved. The disease is characteristic in its clinical behaviour and might express in various forms. It is the excruciating pain that brings the patient to the clinician and many times from one clinician to the other, trying various medicines in search of relief.^[7]

TN may mark as musculoskeletal pain, lock jaw or Temporomandibular Dysfunction or may be associated with intraoral trigger points.^[2,5,9] In one of the study, 6 of the 48 patients became edentulous owing to the dental procedures for Idiopathic TN treatment. There was a significant statistical correlation between the number of patients who underwent dental treatments and the duration of Idiopathic TN ($P = .004$).^[9]

The same was in the above reported case where in the patient had to pay a heavy price by undergoing total extraction as a sequelae of misdiagnosis. The patient was totally edentulous from past 4 years with no relief in pain and was deteriorating in health.

No specific tests for the diagnosis of TN exist till date. There is no excuse for not carrying out a clinical examination including assessment of cranial nerve function.^[4] Definite facial sensory loss or other cranial nerve dysfunction, if it cannot be explained by a previously known injury to the nerve, should prompt cerebral imaging.^[4] Computerized tomography of the craniofacial region and elective MRI for all patients to exclude an uncommon mass lesion or aberrant vessel compressing the nerve roots is mandatory.^[2, 10]

Referral to a neurosurgeon may be indicated for patients whose conditions prove refractory to medical treatment.^[2]

In the above reported case, all the necessary and available investigations were performed to come to a diagnosis. After ruling out any other cranial nerve dysfunction or pathology, the patient was confirmed to have TN of mandibular nerve.

The pathogenesis and pathology of this disease is still enigmatic and has become a major problem for research workers and clinicians. The management of TN is difficult. The rapid establishment of a correct diagnosis and prompt institution of treatment are of paramount importance because the symptoms are so severe. One of the reasons why clinicians have probably failed to cure TN is lack of organic substrate against which treatment can be instituted. A plethora of treatments have been advocated, hypothesised and justified by different workers pointing out the amount of confusion in the management of TN. An ideal treatment is one which provides no morbidity and preserves the normal sensation of the face. Such a sensation-preserving, absolutely safe and permanently successful treatment does not yet exist.^[7]

No medicinal therapy has a curative effect. Carbamazepine and to some extent di-phenyl hydantoin give a symptomatic relief. Carbamazepine, currently the drug of choice, cannot relieve pain in all cases. Besides this, it has so many side-effects that it is often necessary to withdraw the drug. In case of long-term therapy, bone marrow depression is known to occur and some fatal cases have been reported.^[7] Most other anti-epileptic drugs used in TN are less effective and are best considered either in addition to carbamazepine or as an option when it cannot be used because of side effects or allergy. Failure of the first drug in management is generally described as "inadequate therapeutic response" or "inability to continue treatment due to side-effects".^[11]

In the above reported scientific case, though the patient was placed on carbamazepine from past 4 years, she showed no resolution or relief from pain even after increasing the dose or when placed on combination therapy. Hence she can be considered as a perfect example for patients showing inadequate therapeutic response for a given drug over a period of time.

Surgical approaches to pain management are performed when medication cannot control pain or patients cannot tolerate adverse effects of medication. Peripheral procedures are usually performed in patients not suitable for or not willing to have other invasive procedures. The peripheral surgical treatments include cryotherapy; peripheral nerve block with alcohol, phenol or glycerol and neurectomy.^[2, 12]

Criteria for trigeminal nerve exploration as given in one of the review article are: failure of non-operative treatments, the ability to control pain temporarily with local anesthetic nerve blocks, and pain generally located within the anatomical distribution of the affected nerve.^[13]

Neurectomy is the excision of a section of a nerve for the relief of the neuralgia especially that of the fifth nerve.^[14] Specific objectives of peripheral neurectomy are to eliminate as much as possible of the affected nerve branch and also to attempt to block its regeneration. Neurectomies are performed through an incision made at the eyebrow (supra-orbital nerve) or intraorally (infra-orbital, alveolar and lingual nerves). All branches are divided and avulsed under magnification.^[4] It is performed close to the trigger area. After neurectomy, the affected nerve has a very strong tendency to regenerate causing recurrence of the neuralgic pain. To prevent this recurrence, a considerable section of the nerve, 4 cm at least, should be excised. When the nerve happens to occupy a bony canal, the canal should be plugged tightly with sterile gold foil, bone wax, wooden sticks or silicone plugs.^[14, 4]

In the above reported case, we used titanium screw to block the mental foramen as they are biocompatible, easily available and snugly fit into the foramen. The remnant of the nerve may also be cauterized.^[4]

With proper selection of cases and thorough excision of the nerve; neurectomy may give relief of pain for at least four years or longer. A few fortunate cases can be found in the records.^[14]

Extracranial surgery including peripheral neurectomy and nerve avulsion has its own limitations. It is feasible only when the neuralgia involves the peripheral branches of the trigeminal nerve. Peripheral neurectomy may result in a deficiency of total loss of sensation permanently. However, it is a simple and safe procedure. Peripheral neurectomy is a minor operation with little risk, even in elderly and debilitated patients. Relief from pain is instantaneous in most instances and the resulting anaesthesia involves only a small area of the face. In one of the study, where they used three approaches to inferior alveolar neurectomy, it was reported that Ginwalla's method gave 80% success and 20% failure rate and the overall success rate of surgical therapy was about 75% when compared to medical therapy. Nevertheless, credence must be given to the view that a peripheral procedure may delay radical treatment.^[7]

Though there are evidences of recurrences after peripheral neurectomies, re exploration and dealing with them in the same way is said to lead to pain relief.^[4, 7]

As the patient was an elderly patient diagnosed to have TN of only the mandibular branch with no other abnormalities detected in MRI brain, the optimum treatment considered for her was peripheral neurectomy, The other option for TN is intracranial surgeries, which may be defined as procedures at the level of the Gasserian ganglion or in the posterior cranial fossa.^[1]

Microvascular decompression (MVD) is generally performed when the patient is healthy and relatively young. Partially sensory rhizotomy is performed in addition to, or instead of MVD in patients in whom significant compression of trigeminal sensory root doesn't exist or in whom MVD is technically not feasible. Percutaneous ablative procedures and gamma knife radiofrequency are also performed when MVD cannot be performed.^[6, 12]

More radical intracranial surgery, where relief is stated to be 96% -100%, has its own drawback. Complications such as anaesthesia dolorosa, laceration to the cavernous sinus are not uncommon. In addition to this, the patient's general condition has to be satisfactory. This aspect becomes more important when the age factor of the patient is considered, as trigeminal neuralgia is more common in the older group of patients.^[7]

Surgery exposes the patient to operative risks and the risk of permanent, residual facial numbness and dysesthesias. Changes in feeling in the orofacial region may interfere with speaking, chewing and social interactions. Even apparently minor changes can significantly affect a patient's quality of life.^[12]

Moreover, the various operations often fail after 1 or several years of initial relief. This requires a repeat procedure, often with improved but still incomplete results. Many patients require pain medication even after surgery.^[4,7] For this reason, procedures with the best long - term success and the least risk of a residual facial dysesthetic syndrome are the most promising.

IV. Conclusion

Referral of the TN pain to the teeth, the complexity and variability of their orofacial presentation, the low incidence of TN, and the limited clinical experience of dentists and physicians with this specific neuralgia are other factors contributing to the misdiagnosis. A dental evaluation is essential, as dental pathology can be a trigger for TN. A thorough clinical and radiographic examination must be performed to eliminate oral pathology as the source of pain. It is essential to avoid irreversible dental treatment until a definitive diagnosis has been established.^[2, 5]

No strict rules exist in treating a patient with TN and each patient should be evaluated individually.^[12] Although medical therapy is available, it gradually becomes less effective because of the progressive nature of the TN.^[3] To add on to the dilemma, the exact etiology of the disease is still unknown. Each type of surgery carries with it potential benefits as well as risks of complication. While there may be many reasons for us to spurn the idea of peripheral neurectomy, we must realize the fact that none of our present treatments of TN is ideal or specific, some of them are crude and symptomatic and the others are too extensive procedures.^[14]

An accurate evaluation of surgical indications and their associated risks should be carried out. Preoperative informed consent and sufficient postoperative follow-up should help to reduce the frequency of neurosensory disturbances post operatively.^[9]

Peripheral neurectomy carries little stress, can be performed in the elderly, requires minimal hospitalization time and can produce selective destruction of pain fibres. Peripheral neurectomies are minor operation that may be performed comfortably even with local anaesthesia. Any patient suffering from trigeminal neuralgia and treated for the same requires constant evaluation; follow up and physiotherapy for an effective outcome following a neurectomy.^[4, 14]

Recurrence of neuralgic pain is not uncommon in patients suffering from TN .Peripheral neurectomy via Dr Ginwalla's technique has proved to be one of the safest, least expensive and most reliable operations for TN in elderly and debilitated patients. The technique produced long lasting pain relief with fast recovery and minimal post op complications.^[8] The above said patient is free from pain from past two years. Hence Dr Ginwalla's technique though an old technique, still proves to be the best treatment for mandibular neuralgia.

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