Case Report
pISSN 2383-9309 ▮ eISSN 2383-9317
J Dent Anesth Pain Med 2023;23(6):357-362 ▮ https://doi.org/10.17245/jdapm.2023.23.6.357

Peripheral nerve blocks for acute trigeminal neuralgia involving maxillary and mandibular branches: a case report

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Trigeminal neuralgia (TN) is neuropathic pain that affects the trigeminal nerve branches. Facial pain experienced by patients with TN is typically intense and excruciating. The second and third branches (maxillary and mandibular) are commonly affected. This case report focuses on the potential treatment options for acute TN attacks involving these branches. The proposed approach involves extra-oral peripheral blocks using local anesthetics. Pain levels were measured using a visual numeric scale (VNS) with potential side effects and other relevant documented information. The patients showed responses from high pain levels to almost complete remission (from 8 to 2 and from 10 to 2 on the final VNS), with no significant side effects. This technique provides immediate pain relief and complements oral medications by offering comfort and confidence until the desired drug effect is achieved.

Keywords: Facial Pain; Local Anesthesia; Neuropathic Pain; Trigeminal Nerve; Trigeminal Neuralgia

INTRODUCTION

The trigeminal nerve (the fifth cranial nerve) is primarily responsible for the general sensitivity of the face. The trigeminal nerve has three major branches: V1 (ophthalmic branch) in the upper third of the face, V2 (maxillary branch), and V3 (mandibular branch). Trigeminal neuralgia (TN) is characterized by neuropathic pain in the trigeminal nerve branches. The divisions most frequently involved in TN are the second (maxillary), which involves pain in the maxillary and middle third of the face, and the third (mandibular), which involves the mandible, part of the ear, posterior temporal region, and the lower third of the face [1].

Pain is usually intense, excruciating, often affecting daily life, and is described as one of the worst types of pain an individual can feel. According to the International Classification of Orofacial Pain, First Edition [2], TN is a disorder characterized by rapid and recurrent unilateral pain, such as electric shocks, with an abrupt onset and end, limited to the distribution of one or more divisions of the trigeminal nerve, and triggered by innocuous stimuli. It may develop for no apparent reason or may

Received: September 24, 2023 • Revised: October 18, 2023 • Accepted: October 30, 2023
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be the result of another disorder. In addition, there may or may not be concurrent ongoing pain of moderate intensity in the same region(s).

The pathology is subdivided into "classic," when it involves vascular lesions in the proximal region of the nerve at the base of the skull, and "secondary," when caused by an underlying disease, such as a tumor in the pontine-cerebellar angle, arteriovenous malformation or multiple sclerosis, and idiopathic if there are no abnormalities demonstrated by electrophysiological test or magnetic resonance imaging [3]. The pathophysiology of TN is uncertain, but, as mentioned, nerve compression at its point of entry into the central nervous system by vascular action is suggested, as well as tumor action or nerve demyelination [4].

Peripheral pain trigger zones have been described, usually in the nasal or perioral region ipsilateral to the pain, and are provoked by the light touch of these zones, which makes patients avoid them [1]. Although not all individuals with TN report these trigger regions, they suggest a peripheral mechanism for the pain process as well as possible peripheral pathways for therapeutic approaches, such as peripheral blocks with local drug infiltration [5,6].

The main treatment for TN is pharmacological, using either a single medication or a combination of drugs. Carbamazepine, an anticonvulsant, is generally considered the first-choice drug [1]. In cases where there is no response to these medications, relapse occurs, or severe side effects are experienced, more invasive strategies may be escalated. Unfortunately, the literature dedicated to the management of acute exacerbations of TN is limited [6,7]. This study discusses peripheral anesthetic procedures for acute TN exacerbations involving V2 and V3.

METHODS

The anesthetic techniques utilized in this study align with those described in the existing literature, but were simplified with lower drug doses and easily accessible instruments. The cases were obtained from the regular context of dental urgency/emergency care and included in the study when diagnosed with TN according to previously described criteria [2].

1. Anesthetic techniques

Extraoral anesthetic blockade techniques for the maxillary (V2) and mandibular (V3) branches of the TN were performed by trained professionals (authors and collaborators). The procedure followed techniques described in the literature [8-10] with minor modifications (Fig. 1).

The procedures were simplified for accessibility by using regular pieces of equipment and local anesthetics, such as lidocaine 2% or bupivacaine 0,5% (the latter for its extended duration of action), both with vaso-constrictors. This simplification enables it to be performed in traditional medical or dental office environments. A 0–10 visual numeric scale (VNS) [11] was used to assess pain levels before and after the blocks were performed, and additional information was provided along with potential side effects or adverse reactions to the procedures.

a) For the extraoral blockade of the maxillary nerve, after proper antisepsis, a 22-gauge 1.5 inch (25 × 0.70 mm) needle, compatible with a "Luer-Lok type syringe" (or the long needle commonly used in regular dental procedures, 38 mm with a caliber of 0.38 mm [27G × 1½] adapted to a regular carpule aspirating dental syringe) is inserted above the mandibular sigmoid notch. The insertion point could be at the midpoint or slightly in the medial direction. When the tip of the needle reached the lateral lamina of the pterygoid process of the sphenoid bone, it was gradually redirected posteriorly and superiorly to the pterygopalatine fossa. Ideally, there should be a sensation of entering an empty space that indicates entry into the pterygopalatine fossa. Once the needle was correctly positioned, a brief pre-aspiration was performed to check for the presence of blood and to prevent inadequate infiltration into the blood vessel. Subsequently, approximately 2 ml of anesthetic solution

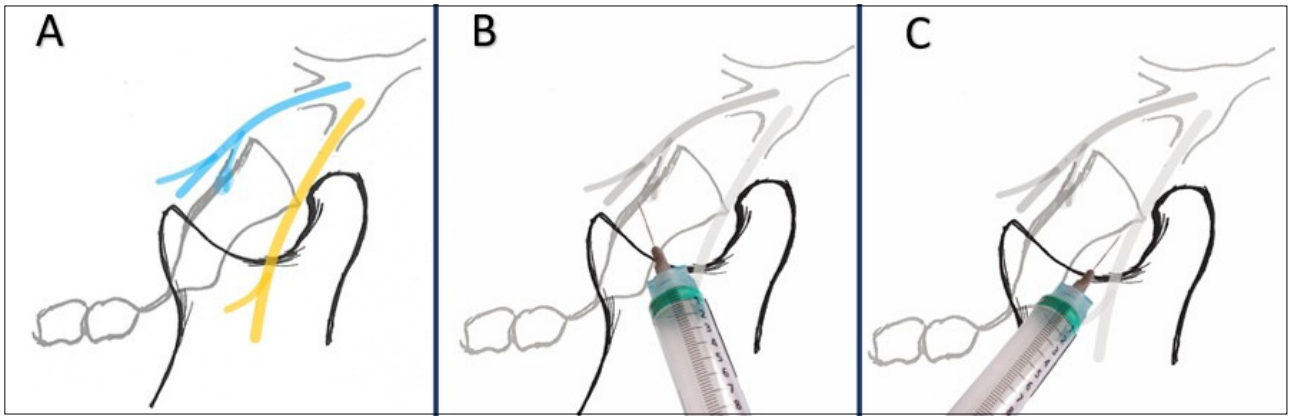

Fig. 1. (A) Maxillary (V2, blue line) and mandibular (V3, yellow line) trigeminal branches at the pterygoid plate level; (B) extraoral maxillary technique; (C) andextraoral mandibular technique. *Picture by the author

was injected.

b) For the extraoral mandibular nerve block, the same needle was inserted above the sigmoid notch, specifically at the midpoint. Subsequently, it was directed towards the pterygoid lateral plate using the same approach as before. Once the needle reached the pterygoid plate, it was slightly withdrawn and gradually redirected posteriorly in a step-by-step manner, exiting the posterior edge of the pterygoid plate in a horizontal direction. Subsequently, a brief aspiration was performed to check for the presence of blood, ensuring that the injection did not penetrate a blood vessel. Subsequently, 2 ml of the anesthetic solution was injected. It is important to note that the needle should not be inserted deeper than 5 cm for both techniques.

2. Care and contraindications

Anesthetic techniques are generally considered safe with minimal risks, and contraindications for anesthetic agents, related chemicals, and the patient's general health condition must be considered [6,12]. Furthermore, the operator must be aware of the anatomical structures near the needle path before the needle reaches the pterygoid lateral plate. Interference with these structures can result in discomfort, bleeding, bruising, or inadvertent intravascular puncture, leading to an overdose. Some relevant anatomical structures to be considered: internal maxillary artery, temporal vessels, transverse facial artery, foramen ovale, and foramen spinosum [8].

3. Observation

Although ultrasound imaging is considered an effective technical resource and is increasingly used as a guide for neural blocks in the orofacial region, the urgency of the peripheral blocks presented in this study, as well as the associated cost and limited availability of complex imaging technology during the procedures, justify the use of blind infiltration. As patients, in general, become "frozen" during a typical trigeminal neuralgia burst and avoid any movement like opening the mouth, an extraoral anesthetic approach is probably safer and more appropriate.

4. Ethical considerations

Ethical approval was obtained and patient confidentiality was ensured through data handling and informed consent. Patient identities were protected and informed consent forms (ICF) were obtained.

CASE 1

A 65-year-old retired female with a long history of left facial pain affecting both the V2 and V3 dermatomes, described as a shock-like sensation with burning characteristics between pain episodes rated eight on the

Fig. 2. Left mandibular nerve blockage. A regular carpule dental device and lidocaine 2% with epinephrine 1:100,000 were used.

Fig. 3. Left maxillary nerve block. A 22-gauge, 1.5-inch Luer-Lok needle in a 5 ml hypodermic syringe and lidocaine 2% with epinephrine 1:100,000 were used.

visual analog scale (VAS), presented at the hospital seeking relief. The patient had a medical history of previous neurological surgeries for branches of the TN, such as percutaneous rhizotomy with radiofrequency, which did not successfully reduce the pain. The patient was taking multiple medications and reported a stroke episode that occurred decades ago, which could have contributed to the deterioration of her pain. Depression and impairment in daily life have also been highlighted.

Because there were no contraindications, extraoral blockage of the left mandibular nerve was performed to alleviate the pain. This procedure partially reduced the pain from a level of 8 to 2 on the VAS within approximately 5 minutes of applying the solution, providing some relief for the patient for up to 24 hours, according to the patient. Further dental and medical appointments were scheduled for more peripheral infiltrations in the V2 and V3 branches based on the patient's needs and to adjust the pharmacological management. Ten months after the initial appointment, the patient remains monitored, and her complex case is constantly reviewed for potential new surgical or pharmacological approaches (Fig. 2).

CASE 2

A 45-year-old unemployed male presented to an emergency hospital with intense left facial pain in the maxillary dermatome (V2), described as a shock-like sensation that occurred in short episodes. The patient expressed fear of these pain episodes, which had started a few weeks prior and were triggered by seemingly trivial tasks such as shaving, touching the affected area, or yawning. Pain had a significant impact on the patient's quality of life, affecting daily routines, sleep, and professional life to the extent that he reported experiencing suicidal thoughts.

Because there were no contraindications, extraoral blockage of the left maxillary nerve was performed to alleviate the pain. This procedure successfully reduced pain from 10 to 2 on the VAS within approximately 3 minutes of administering the solution, providing near-complete relief for the patient. Subsequently, the patient underwent additional imaging examinations to rule out underlying structural neurological disorders (with no significant findings detected thus far) and had additional support for adjustments to medication dosage and psychological demands. The patient's condition remained stable at six months of follow-up (Fig. 3).

DISCUSSION

The literature on urgent treatments for acute TN is

scarce. This situation may leave patients with the unfortunate prospect of enduring their excruciating pain until adequate oral medication takes effect. Intravenous phenytoin [7], intranasal lidocaine 8% [13], and subcutaneous sumatriptan 3 mg [14] are options for this purpose, but evidence is limited.

The patient presented with a good immediate response to peripheral anesthetic interventions for acute V2 and V3 trigeminal neuralgia (10–2 and 8–2 on the VNS). Any variability may be indicative of technical issues or different levels of peripheral and central sensitization, leading to distinct pain perception and behavior. No relevant side effects or negative consequences were observed.

Given the high intensity of pain experienced by patients and its significant impact on their daily lives, healthcare professionals must prioritize immediate pain relief, even if only partial, to provide patients with a period of reduced pain. The urgency of treating acute TN is often underserved, and the proposed peripheral anesthetic technique offers immediate relief and complements pharmacological treatment. From there, adequate scientific-based, long-term treatment and follow-up are required. The techniques described here may be useful for alternative acute disorders or diagnosis of pain in the orofacial areas involving branches V2 and V3. Further research is required to investigate the efficacy and long-term outcomes of these approaches.

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AUTHOR CONTRIBUTIONS

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Renata Gonçalves Resende: Methodology, Resources, Supervision, Visualization, Writing - original draft, Writing - review & editing
Fernando Antônio de Souza: Methodology, Resources, Visualization, Writing - review & editing

FUNDING: This study received no external funding.

CONFLICTS OF INTEREST: The authors declare no conflict of interest.

ETHICAL APPROVAL: This study was approved by the Research Ethics Committee of the Hospital Metropolitano Odilon Behrens (HMOB), BH/MG, Brazil, ID code CAAE: 68600523.1.0000.5129.

ACKNOWLEDGMENTS: The authors would like to express their gratitude to the management of Hospital Metropolitano Odilon Behrens (HMOB), BH/MG, Brazil for providing personnel and all necessary resources for data collection. Additionally, we extend our thanks to the patients, whether directly involved in this study or not, for their commitment and contribution. Their willingness to provide data and support scientific advancement is greatly appreciated.

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