Neurology Asia 2026; 31(3) : 1207 – 1210

Ultrasound-guided glossopharyngeal nerve block for glossopharyngeal neuropathy: Safe and easy to use

[1]Oktay Faysal Tertemiz, [2]Sinem Akkaya

[1]University of Health Sciences, Izmir City Hospital, Pain Management Clinic, Izmir, Türkiye; [2]University of Health Sciences, Izmir City Hospital, Department of Anesthesiology and Resuscitation, Izmir, Türkiye

Abstract

A female patient who developed neuropathic pain in the left maxillary and left nasopharyngeal regions following a dental procedure was treated with carbamazepine, pregabalin, amitriptyline, and duloxetine. As the pain was resistant to medical treatment, a maxillary nerve block and a transnasal sphenopalatine ganglion block with radiofrequency thermocoagulation were performed. There was partial relief of pain. Since adequate improvement could not be achieved, a glossopharyngeal nerve block and Pulse Radiofrequency (PRF) were performed under ultrasound guidance. Significant improvement in pain was observed. In addition to treatments targeting the trigeminal nerve, it should be kept in mind that the glossopharyngeal nerve may also be affected, and a glossopharyngeal nerve block and RF neurotomy performed under ultrasound guidance should be considered as valid therapeutic options.

Keywords: Glossopharyngeal nerve block, persistent facial pain, sphenopalatine ganglion block, maxillary nerve block, interventional pain management, radiofrequency.

INTRODUCTION

Orofacial pain is a common, multifactorial clinical condition that can originate from dental, neurological, or musculoskeletal causes and significantly impairs the quality of life of affected individuals. Alternative approaches should be explored in such refractory cases. The glossopharyngeal nerve block is a well-established interventional technique primarily used for glossopharyngeal neuralgia and neuropathy.[1] In this case report, we present the successful management of a patient with a 2-year history of refractory pain in the left maxillary and left nasopharyngeal regions, following the failure of maxillary and sphenopalatine blocks, using a glossopharyngeal nerve block performed via the styloid process under ultrasound guidance.

CASE REPORT

A 46-year-old female patient presented to our pain clinic with complaints of severe, constant pain in the left maxilla, left jaw, and left side of the face. The patient had no known comorbidities. Radiological examinations, including magnetic resonance imaging (MRI) of the brain and maxillofacial region, revealed no anatomical abnormalities or nerve compression. Preoperative laboratory tests were within normal limits.

The pain began approximately one year ago following a routine dental procedure (tooth extraction) performed under local anesthesia. The pain was described as a sharp, constant pain localized to the left upper jaw and facial region, radiating to the palate, uvula, and left ear. Over the past six months, the patient had noticed that the pain worsened with swallowing (odynophagia). Medical treatment provided partial relief. The Visual Analog Scale (VAS) score decreased from 10 to 7. The patient's medical history included the use of Amitriptyline, Pregabalin, Duloxetine, Tramadol, and Carbamazepine—either in combination or alone—at various times for pain management. Finally, the regimen was adjusted to 60 mg/day of duloxetine, 600 mg/day of pregabalin, and 800 mg/day of carbamazepine. Following physical and neurological examinations that revealed hyperesthesia in the left maxillary region and nasopharynx, it was

Address correspondence to: Oktay Faysal TERTEMİZ, Şevket İnce Mahallesi, 2148/11. Sokak No:1/11, 35540 Bayraklı/İzmir, Turkey. Email: otertemiz@gmail.com

Date of Submission: 18 April 2026; Date of Acceptance: 26 April 2026

https://doi.org/10.54029/2026pvi

decided to administer a peripheral maxillary block and PRF as the initial treatment.

Initial interventions

On the day of the procedure, the patient was taken to the operating room and monitored. Under sedation and local anesthetic skin infiltration, a radiofrequency cannula of appropriate size was advanced through the maxillary notch. After confirming the localization of the maxillary nerve by eliciting a response to sensory stimulation at 50 Hz and 0.6 V, pulsed radiofrequency thermocoagulation was applied at 42°C for 6 minutes. Subsequently, a mixture of 2 cc of 0.25% bupivacaine and 1 cc of 4 mg dexamethasone was injected. The patient was discharged without any early complications. A patient whose pain had decreased over the course of a week and had a VAS score of 4 was found to have a VAS score of 7 at the follow-up visit one month later. Since adequate pain control could not be achieved, the patient underwent three sessions of transnasal sphenopalatine ganglion block, administered at 10-day intervals. However, the patient did not experience significant relief from the transnasal sphenopalatine block.

Glossopharyngeal nerve block

Consequently, an ultrasound-guided glossopharyngeal nerve block was planned. The procedure was performed under sterile conditions with monitoring via a 5-lead ECG, SpO_2, and blood pressure, and the left glossopharyngeal nerve was targeted under ultrasound guidance with light sedation and analgesia. The linear ultrasound probe was positioned between the mastoid process and the posterior border of the mandibular ramus. The ultrasound probe was maneuvered to obtain the clearest image. The carotid arteries and styloid process were identified. The needle's position was confirmed by applying sensory stimulation at 50 Hz to the glossopharyngeal nerve at 0.6 V to elicit a response (Figure 1).

Pulsed radiofrequency was applied for 6 minutes at 42°C. At the end of the procedure, a nerve block was performed using bupivacaine and dexamethasone. The patient tolerated the procedure well and was discharged with appropriate instructions. Three months later, a glossopharyngeal nerve block was repeated. Following this combined intervention, the patient reported a significant reduction in pain. VAS: 2. Carbamazepine and duloxetine were discontinued by gradually reducing the dose as part of the patient's medical treatment. The patient is currently taking pregabalin at a dose of 300 mg/day. During the last 6 months of follow-up, the VAS score has remained at 2.

DISCUSSION

Ultrasound-guided glossopharyngeal nerve block is a safe, radiation-free, reproducible, and effective treatment method. In this patient with glossopharyngeal neuropathy, the ultrasound-guided glossopharyngeal nerve block performed

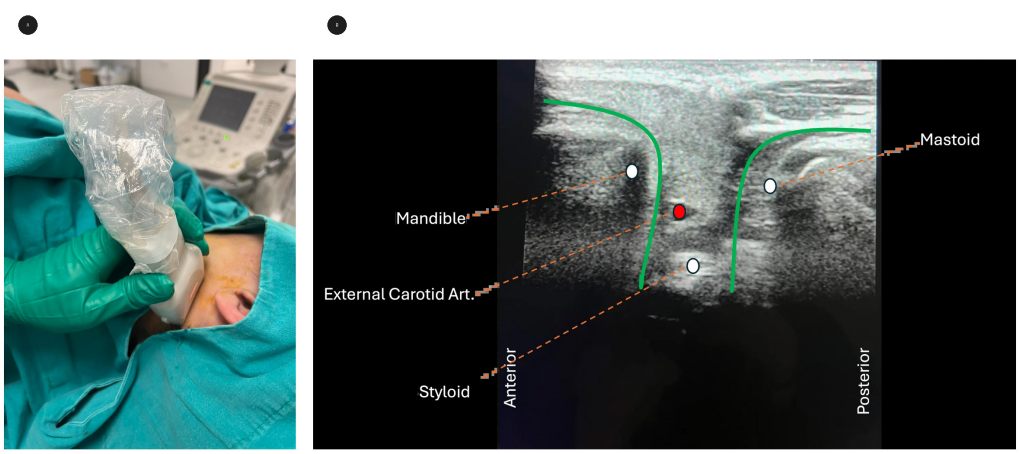

Figure 1. Ultrasound-guided glossopharyngeal nerve block procedure. (A) Probe positioning at the level of the styloid process in the lateral cervical region. (B) Real-time ultrasound image showing the mandible, mastoid, external carotid artery, and styloid process as key anatomical landmarks for accurate needle placement in the peristyloid approach.

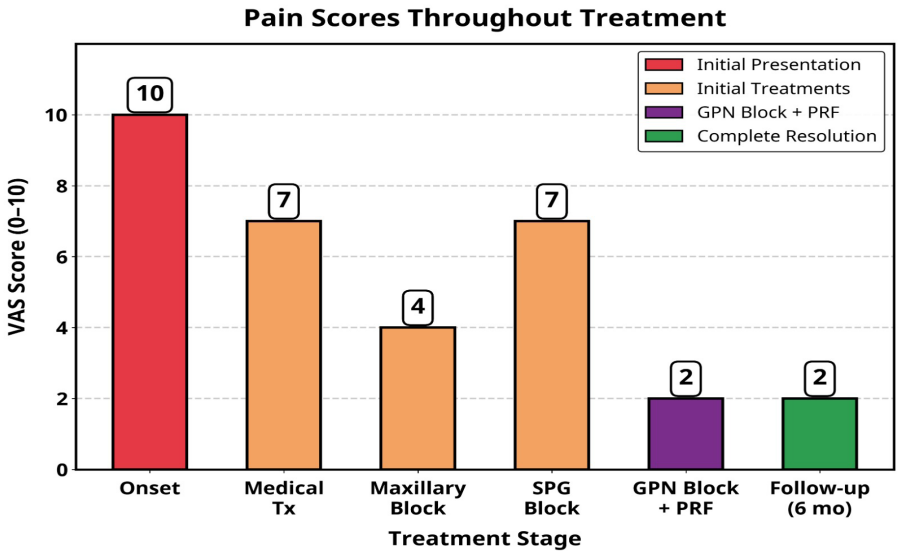

Figure 2. Treatment progress and pain scores from symptom onset to complete recovery

twice via the styloid process was found to be an effective and reliable method. Ultrasound-guided glossopharyngeal nerve block is considered a safer alternative compared to the intraoral technique and fluoroscopy. The sensory innervation of the craniofacial region is quite complex; while it is primarily provided by the trigeminal nerve (Cranial Nerve V), the glossopharyngeal (Cranial Nerve IX) and vagus (Cranial Nerve X) afferent fibers also make significant contributions. The glossopharyngeal nerve provides sensory innervation to the posterior third of the tongue, the palatine tonsils, and the mucosa of the oral cavity and pharynx.[2] Maxillary nerve and sphenopalatine ganglion blocks are among the nerve blocks used for facial pain with a trigeminal distribution.[3] However, these nerve blocks may not always provide adequate analgesia. The glossopharyngeal nerve block, typically reserved for glossopharyngeal neuralgia and specific oropharyngeal or head-and-neck pain syndromes, is a viable alternative method.[1]

As shown in Figure 3, in the peristyloid region, the glossopharyngeal nerve (CN IX) is in close anatomical proximity to the internal carotid artery, the external carotid artery, the internal jugular vein, the vagus nerve (CN X), and the hypoglossal nerve (CN XII), all of which are located immediately adjacent to the styloid process; therefore, ultrasound guidance is essential for protecting adjacent vessels and nerves during needle advancement. A glossopharyngeal nerve block can be performed using either an intraoral or peristyloid approach. Whether performed using the intraoral or peristyloid technique, a glossopharyngeal nerve block may lead to intravascular injection, hematoma formation, or upper airway obstruction due to accidental blockage of the vagus or hypoglossal nerves.[4]

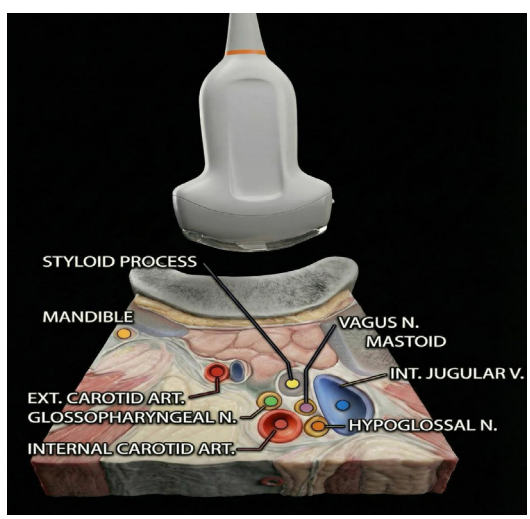

Figure 3. Three-dimensional anatomical illustration of the peristyloid region showing key neurovascular landmarks for ultrasound-guided glossopharyngeal nerve block.

Since the body of the glossopharyngeal nerve is located at the level of the styloid process or the internal carotid artery and vein, it requires a higher block position. Although a nerve trunk block is more effective than a block performed on a nerve branch, the risk of bleeding or local anesthetic side effects is higher during a superficial arteriovenous block puncture performed along the longitudinal axis of the internal carotid artery and vein. The transaxial styloid process block, which targets the styloid process, can significantly reduce the risk of vascular injury because the needle position can be adjusted along the posterior aspect of the styloid process once the tip reaches the styloid process. Therefore, ultrasound-guided styloid approach for the glossopharyngeal nerve is considered superior.[5] In our case, persistent localized pain in the maxillary and facial regions following dental local anesthesia was initially treated with maxillary and sphenopalatine blocks; however, these yielded inadequate clinical responses. The sequential application of a glossopharyngeal nerve block via the styloid process, guided by ultrasound, followed by the application of PRF, resulted in a significant reduction in the patient's pain. This outcome strongly suggests the complex interactions and cross-communication among different nerve pathways within the complex sensory network of the craniofacial region.

In fact, a distal glossopharyngeal nerve block under ultrasound guidance could have been performed in this case. This technique selectively blocks only the sensory branch of the glossopharyngeal nerve, thereby reducing the risk of complications. However, the effectiveness of the block is also reduced. For this reason, the peristylous approach is more effective.[6] We also performed a glossopharyngeal nerve block via the styloid process and administered PRF to our patient.

Our findings suggest that glossopharyngeal nerve block and PRF are potential and effective therapeutic options for cases of refractory facial pain developing after dental procedures. The use of ultrasound guidance enhances the safety and accuracy of the block, thereby minimizing the risk of complications associated with techniques relying on anatomical landmarks, such as accidental vascular puncture or blockage of adjacent nerves.

Persistent facial pain following dental local anesthesia can present a significant therapeutic challenge, particularly when it exhibits an atypical distribution and is resistant to standard treatments targeting the trigeminal nerve. This case demonstrates that interventions targeting the glossopharyngeal nerve can provide significant relief due to the complex central convergence of craniofacial sensory pathways. In conclusion, the glossopharyngeal nerve block performed via the styloid process under ultrasound guidance is a safe, radiation-free, repeatable, practical, and effective treatment method. Although a decision cannot be made based on a single case, it may be considered as a treatment option for patients with glossopharyngeal neuropathy.

REFERENCES

1. Wu Z, Liu J, Fang Q, Yang Y, Fan Y. Safety and efficacy of radiofrequency treatment for glossopharyngeal neuralgia: a systematic review and single-arm meta-analysis. *Neurosurg Rev* 2025; 48(1):341. doi: 10.1007/s10143-025-03490-5.
2. Sessle BJ. Acute and chronic craniofacial pain: brainstem mechanisms of nociceptive transmission and neuroplasticity, and their clinical correlates. *Crit Rev Oral Biol Med* 2000; 11(1): 57-91. doi: 10.1177/10454411000110010401.
3. Bautista AL, Coyne K, Bautista A, Abd-Elsayed A. Sphenopalatine ganglion blocks in headache management: a review. *Brain Sci* 2025; 15(7): 672. doi: 10.3390/brainsci15070672.
4. Bean-Lijewski J. Glossopharyngeal nerve block for pain relief after pediatric tonsillectomy: retrospective analysis and two cases of life-threatening upper airway obstruction from an interrupted trial. *Anesth Analg* 1997;84:1232-8. doi: 10.1097/00000539-199706000-00011.
5. Liu Q, Zhong Q, Tang GQ, He GH. Ultrasound-guided glossopharyngeal nerve block via the styloid process for glossopharyngeal neuralgia: a retrospective study. *J Pain Res* 2019;12:2503-10. doi: 10.2147/JPR.S214596
6. Low AL, Abdel AM, Nanda M, *et al*. Staining of hypoglossal and vagus nerves observed following ultrasound guided distal glossopharyngeal nerve block in cadavers. *J Clin Anesth* 2022;83:110986. doi: 10.1016/j.jclinane.2022.110986.