CASE REPORT

# Iatrogenic Tunnel Syndrome involving Left Inferior Alveolar Nerve Treated with Percutaneous Radiofrequency Ablation of Mandibular Nerve

Saka Dheeraj Kumar[1], Kethidi Karthika[2], Minal Chandra[3], Sudheer Dara[4]

DOI:https://doi.org/10.62848/bjpain.v2i1.4476

Received 15 february 2022
Accpeted 15 April 2022

*1 IAPM Fellow, Epione Center for Pain Relief & Beyond, Hyderabad, India*

*2 Consultant, Epione Center for Pain Relief & Beyond, Hyderabad, India*

*3 Senior Consultant, Epione Center for Pain Relief & Beyond, Hyderabad, India*

*4 Chief Consultant, Epione Center for Pain Relief & Beyond, Hyderabad, India*

**Correspondence**
Saka Dheeraj Kumar
dheerajkumar.saka@gmail.com

## Abstract

Tunnel Syndrome is described to an increased pressure on peripheral nerves, which leads to impaired neural microcirculation followed by focal demyelination. Such entrapment neuropathy is common in peripheral nerves as a sequel of surgical interventions or alteration in the anatomy. Inferior alveolar nerve is one of the commonest nerves to be involved due to its anatomical location. Percutaneous Radiofrequency Ablation is a non-surgical technique to provide good success in treating long standing neuropathic pain.

A 28-year-old female with inferior alveolar nerve entrapment following multiple surgeries to the left mandible, has presented to our clinic with symptoms of shock like pain and burning sensation over left mandible which aggravates on chewing on the same side, washing face and breeze of wind. Pain is intermittent, short-lasting episodes around 5-6 per day with maximum pain of NRS 8/10 and average NRS of 5/10. Patient was treated with anti-neuropathics and analgesics giving not much relief. Radio frequency ablation of Left mandibular branch of gasserion ganglion was done. Later on, two month follow up her pain score was 0/10.

Keywords: Tunnel syndrome, Iatrogenic, Inferior Alveolar Nerve, Secondary Trigeminal Neuralgia, Radiofrequency Ablation.

**Citation:** Kumar SD, Karthika K, Chandra M, Dara S. Iatrogenic Tunnel Syndrome involving Left Inferior Alveolar Nerve Treated with Percutaneous Radiofrequency Ablation of Mandibular Nerve Bangladesh J. Pain 2022; 2(1): 33-36. doi:10.62848/bjpain.v2i1.4476

## Introduction

Tunnel Syndrome is ascribed to an increased pressure on peripheral nerves, which leads to impaired neural microcirculation followed by focal demyelination[1]. Inferior alveolar nerve is one of the commonest peripheral nerves to undergo this syndrome as it is bounded within the limits of the mandibular canal and any compression in the canal due to edema or hematoma may lead to Tunnel syndrome.

Inferior alveolar nerve is a branch of mandibular nerve which is prone for damage during such surgeries leading to Tunnel syndrome if not diagnosed on time. Here we report a case of Tunnel syndrome involving inferior alveolar nerve treated with of mandibular nerve RFA[2]. The inferior alveolar nerve is a mixed sensory and motor branch of the posterior division of the mandibular division of the trigeminal nerve, located in the pteryogomandibular space of the oral cavity/masticator space.

## Case Report

A 28-year-old female presented with pain and burning sensation over left side of face along the mandibular margin, lower lip and upper gums. On examination, there was severe allodynia all over left mandible and pain score 8/10 in Numerical rating scale. She had undergone multiple surgeries in the past[3]. Left lower molar tooth extraction followed by Embolization of AV malformation (July 2016) mandible reconstruction with free fibula (Nov 2016), Infected mandibular plate removal (2017), ORIF of fracture free fibular graft (2017).

The pain started months after the last surgery done in 2017. Patient was treated with anti-neuropathics and analgesics giving not much relief. She underwent MRI brain which showed no anatomical defects. The pain score increased to 8/10 which hampered her daily life activities and so a radiofrequency ablation of left mandibular nerve was planned.

Informed and written consent was obtained and patient was instructed to be on empty stomach for 6 hours. All instructions regarding stimulation was explained, 22G IV cannula was secured, oxygen supplemented via nasal prongs and vital parameters were monitored. Patient was placed in supine position, foramen ovale was identified with C-ARM in submental & ipsilateral oblique view. Procedure was performed under antibiotic prophylaxis and following all aseptic precautions. After skin was infiltrated with 2% Lignocaine, a 5mm active tip SMK cannula was inserted. Once the position of needle was confirmed, sensory stimulation was done and paresthesia over left mandibular region was confirmed. After negative aspiration 1ml of 1% Lignocaine was injected and radiofrequency ablation was done for 60 seconds at temperature of 60 degrees[4]. Ophthalmic division involvement was evaluated by checking corneal reflex which was intact and second lesion initiated for 60 seconds at temperature of 65 degrees. Post procedure patient was observed for 2 hours and then discharged. T. Carbamazepine 200mg OD, T. Gabapentin/Nortriptyline 100/10mg OD, T. Duloxetine 20mg OD was prescribed to the patient[5]. The patient was followed up after 3 weeks and her NRS was 2/10. Later on, two month follow up her pain score was 0/10.

## Discussion

IAN descends medial to the LPt (Lateral pterygoid) at its lower border, the nerve passes between the SML (sphenomandibular ligament) and the mandibular ramus, and then enters the mandibular canal through the mandibular foramen. In the mandibular canal it runs downwards and forwards, generally below the apices of the teeth until below the first and second premolars, where it divides into the terminal incisive and mental branches. Because the IAN is a mixed nerve, it is suggested that during development, the sensory and motor fibers are guided separately, and take different migration pathways.

It was also found that the IAN may pass close to the medial part of the condyle. In joints with this nerve topography, a medially displaced disc could interfere mechanically with these nerves[6]. These findings could explain the sharp, shooting pain felt locally in the joint with jaw movements and the pain and other .sensations projecting to the terminal area of distribution of the nerve branches near the TMJ such as the ear, temple, cheek, tongue, and teeth.

Patients presenting with IAN entrapment need to be diagnosed early for full recovery.

Study by Renton[7] and coworkers state that peripheral sensory nerve injuries are more likely to be persistent when there is an increased duration between injury and reviewing of the patient.

Study by JIMOH and Elke Van[8] et al shows that only 50 % of the patients with nerve entrapment fully recover from after maxillofacial surgery and it is of utmost importance to obtain better techniques for localization of the inferior alveolar nerve before treatment.

In this study detection of nerve entrapment leading to neuropathic symptoms was detected by doing a diagnostic block and later treated with Radiofrequency ablation of v3 trigeminal ganglion site along with antineuropathics is the appropriate treatment for full recovery in this patient with late sequalae.

A further differential diagnosis to be considered is TMJ dysfunction[9]. The lingual nerve and IAN run in close proximity to the lateral pterygoid muscle and occasionally course through its inferior belly; TMJ dysfunction may cause protective muscle splinting or spasm resulting in nerve entrapment.

However, in our patient muscle spasm was absent and there was no tenderness over the TMJ, with pain present at rest and not aggravated by movement, making TMJ dysfunction unlikely as the cause of the symptoms.

Postprocedural inflammatory trigeminal neuropathies are probably underrecognized, considering their prevalence in other peripheral nerves. Kohjitani et al[10] reported a case of facial pain, weakness, and sensory changes after third molar extraction and attributed this to complex regional pain syndrome CRPS.

That case may in fact represent an inflammatory neuropathy with autonomic features similar to that of our patient, because CRPS is not associated with neurogenic muscular weakness.

In our patient there are no sudomotor and trophic changes which are seen in CRPS hence suggestive of neuropathic pain.

## Conclusion

Early diagnosis and treatment are the key to success in case of many nerve entrapment neuropathies when there is common clinical presentation i.e. trigeminal neuralgia symptoms, the treating physician should always rule out primary and secondary causes related to these symptoms. If there is history of trauma or surgical intervention then physician need to take help of patient history as well examination and appropriate investigation to conclude a diagnosis. Tunnel syndrome is one such entrapment neuropathy which is sequel of surgical interventions or alteration in the anatomy. Percutaneous radiofrequency ablation is a non-surgical technique to provide good success in treating long standing neuropathic pain.

## Declaration

### Ethics approval

Not Applicable

### Author contributions

Conception and development of the idea *SD, MC, SDK*
Writing - Original draft preparation *SDK, MC*
Review & editing *SD, MC, SDK and KK*

**Funding** None

**Conflict of interests** None

## References

1 Juodzbalys G, Wang HL, Sabalys G. Injury of the Inferior Alveolar Nerve during Implant Placement: a Literature Review. J Oral Maxillofac Res. 2011 Apr 1;2(1):e1.

2 Gauci C. Manual of RF techniques. Switzerland: Flivo Press; 2004.

3 Jerjes W, Upile T, Shah P, Nhembe F, Gudka D, Kafas P,McCarthy E, Abbas S, Patel S, Hamdoon Z, Abiola J, VourvachisM, Kalkani M, Al-Khawalde M, Leeson R, Banu B, Rob J, El-Maaytah M, Hopper C Risk factors associated with injury to the inferior alveolar and lingual nerves following third molarsurgery-revisited. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2010; 109:335–345

4 Sharma G, Dey S. Trigeminal Neuralgia:

Radiofrequency Ablation. J Recent Adv Pain 2018;4(1):36-38.

5 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;15:1013–1028.

6 Juodzbalys G, Wang HL, Sabalys G, Sidlauskas A, Galindo-Moreno P. Inferior alveolar nerve injury associated with implant surgery. Clin Oral Implants Res. 2013 Feb;24(2):183-90.

7 Renton T, Yilmaz Z. Managing iatrogenic trigeminal nerve injury: a case series and review of the literature. Int J Oral Maxillofac Surg. 2012 May;41(5):629-37.

8 Agbaje JO, Casteele EVD, Hiel M et at. Neuropathy of Trigeminal Nerve Branches After Oral and Maxillofacial Treatment. J. Maxillofac. Oral Surg. 2016; 15(3): 321–327. DOI 10.1007/s12663-015-0843-9