

Case Report

Early lingual nerve suture under local anesthesia after wisdom tooth extraction: a case report

Aurélien Godard^{1,*} and Gaël Millot^{2,3}

¹ Oral surgery department, University hospital of Strasbourg, Strasbourg, France

² Oral surgery department, Henry Mondor university hospital, Assistance publique-Hôpitaux de Paris, Créteil, France

³ Private practice, Paris, France

(Received: 11 November 2022, accepted: 21 December 2022)

Keywords:
Surgical
complication / nerve
lesion / nerve repair
/ complication
management

Abstract – Introduction: Lingual nerve injury is one of the operative risks of mandibular wisdom tooth avulsion surgery. The anatomical relationship of the nerve to the medial side of the socket of the mandibular third molar must be known when performing the procedure. When a lesion occurs, the diagnosis may be delayed by the effect of anesthesia. In the case of a complete section, repair can be considered by direct suture of the nerve margins. It is recommended to perform this suture as soon as possible. In most cases, the lingual nerve suture is performed remotely and under general anesthesia. **Observation:** The case presented here describes the early repair of a lingual nerve transection after avulsion of a mandibular third molar. The procedure has been performed under local anesthesia one day after surgery and consisted of a direct suture using the previous surgical approach. **Conclusion:** This allows for a simplified treatment of this complication, thus shortening the management time.

Introduction

The lingual nerve is a sensitive and sensory nerve responsible for the tactile and thermic sensitivity of anterior two thirds of the tongue and a part of gustatory stimuli [1]. Its anatomical course begins in the thickness of the mobile part of the tongue to circulate in the buccal floor in sub-mucosal position above the mylohyoid muscle in the sub-mandibular space. In this space the nerve undercuts the canal of the sub-mandibular gland. Before entering in the pterygoid space the lingual nerve remains sub-mucosal and presents a close relationship with mandibular third molar socket [2]. It was found at the crestal level of the third molar in 8% to 17% of cases [3,4].

The mandibular nerve's branches injuries are the most frequent nerve lesion described all surgical practices combined [5]. Lingual nerve lesion is a classic and dreaded complication of mandibular wisdom teeth extraction procedure occurring between 0.5% and 8.9% of cases according some authors [2,6]. The mandibular wisdom teeth extraction procedure is the most frequent cause of lingual nerve injury.

If a direct nerve section is seen during a procedure, it's recommended to perform nerve suture as soon as possible. But most of the time, whether the procedure is performed under local or general anesthesia, the surgeon is aware of nerve injury at the post operative review. Some authors argues for early

nerve repair intervention after a monitoring period [7,8]. When early repair is decided the first operative challenge is the locating and confrontation of nerve fragments. Most of nerve suture procedures are performed under general anesthesia at least three months after the tooth extraction.

We report a case of lingual nerve section diagnosed during a mandibular third molar extraction procedure and its early direct suture under local anesthesia one day post operative with a positive outcome.

Observation

A left inferior third molar extraction was performed in a 26 years old male in the dental school clinic. A direct section of lingual nerve was observed during the procedure and the patient reported post operative immediate homolateral lingual anesthesia. The patient had no neurological disorder or systemic disease. A direct repair wasn't performed because the operator was untrained for this technic. The patient was referred to the oral surgery department one day post operative for clinical monitoring. The neurologic examination confirmed left hemi-lingual anesthesia without any sign of paresthesia or nerve's activity. Le nerve early reconnexion was decided. The lingual nerve exploration was performed under local anesthesia using previous surgical approach and lingual flap elevation. A block of the lingual nerve was performed using articaine hydrochloride with adrenaline solution. The nerve margins were easily located, as shown in [Figure 1](#), and a direct suture was

* Correspondence: dr.aureliengodard@gmail.com

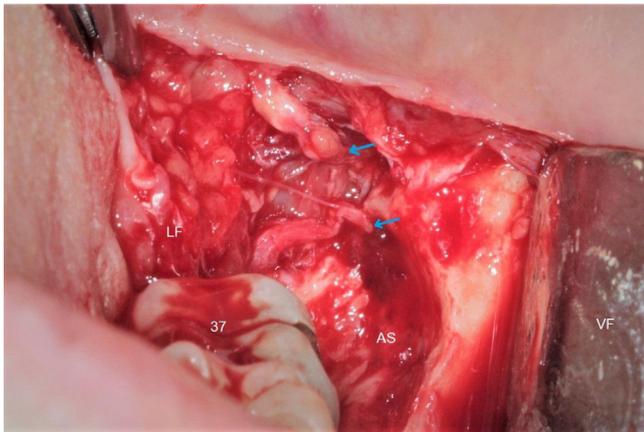


Fig. 1. Per operative view of the surgical access and location of the nerve ending. Blue arrows: nerve endings, VF: vestibular flap, LF: lingual flap, AS: alveolar socket, 37: left mandibular second molar.

performed under binocular magnifiers with 7/0 absorbable sutures. **Figure 2** shows an intra-operative view of the nerve suture. The patient was reviewed after one month post operative and reported partial recovery of subjective lingual tactile and gustative sensitivity with intermittent paresthesia. Different neurological tests have been carried out. It revealed an objective hypoesthesia with a decreased response to the prick test and a high discrimination threshold of two points. Hypoesthesia of the homolateral tongue tip persisted at the 6-month follow-up with a clear improvement of the prick test response and a lower two-point discrimination threshold. The surface concerned by the hypoesthesia was reduced and concerned the tip of the tongue. The gustative sensitivity was recovered ad integrum

Discussion

A peripheral nerve is constituted of multiple axons surrounded by endonevre which form nerve fibers. These fibers form fascicles and are surrounded by perinevre [9]. Nervous elementary lesions could be described by three lesion stages. Neuropraxy is a nervous sideration resulting in a benign disturbance without anatomical lesion. Axonomnesis is an axonal destruction preserving perinevre structure resulting in an interruption, followed by degeneration of the distal segment and neurotnmesis corresponding in a complete physical interruption of nervous fibers [10]. The Sunderland’s classification precises different stages of lesion.

Because of its anatomic position in contact with lingual cortical plate at variable level including crestal level or above the surgeon has to pay a particular attention to the lingual nerve during third molar extraction procedure [4]. It is most frequent cause of lingual nerve injury that could result of different mechanism including compression by a lingual retraction instrument or stretching by a mobile lingual cortical bone fragment [2]. These nerve traumas can lead to a temporary or definitive dysesthesia or partial tongue

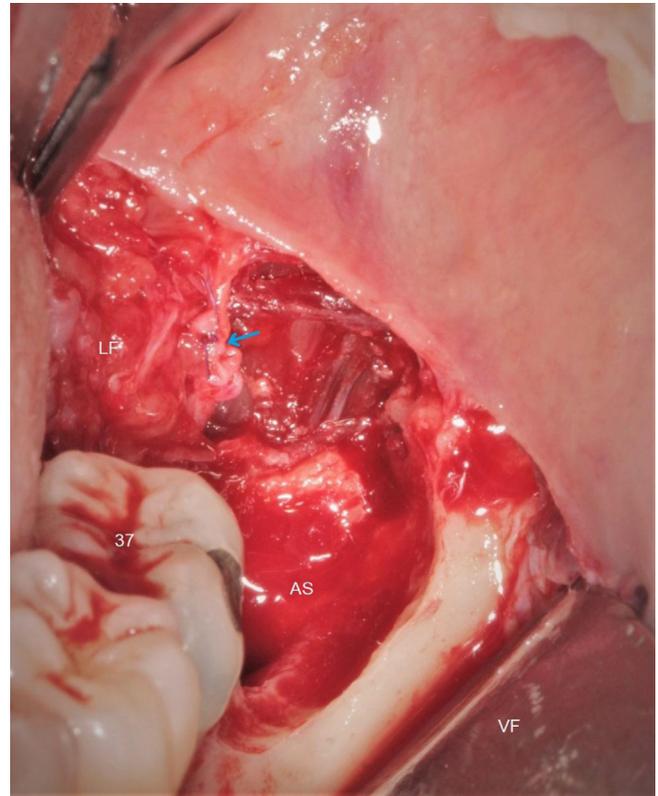


Fig. 2. Per operative view of the nerve suture. Blue arrow: nerve suture, VF: vestibular flap, LF: lingual flap, AS: alveolar socket, 37: left mandibular second molar.

anesthesia. Complete nerve section could result of the use of a rotative instrument or blade when incision is performed in distal and lingual retromolar soft tissue.

In literature review Pippi *et al.* reported temporary lingual nerve injury incidences ranged from 0.2% to 8.9% over 28 publications, excluding data of lingual split technic which is obsolete and dangerous technic. The incidence of permanent nerve damage was ranged from 0% to 1.7% [6]. The lingual nerve injury incidence is difficult to determinate because it depends on many patient, surgeon or intra-operative factors.

The most reported risk factors are patient’s anatomy especially unerupted, horizontal or distally impacted teeth and the crestal positioning of the nerve, the operator’s experience and a lingual flap raising [11,12]. The use of lingual periosteum retractor has been proposed as a means of protection. Its use is discussed and there is no evidence of a preventive effect on post-operative lingual paresthesia on this day there is no evidence of a preventive effect on post operative lingual paresthesia at this day [12]. Several flap designs are described but the incision should be made to the buccal gingiva [13]. Pippi *et al.* emphasize the increased risk of lingual nerve involvement by the bur during tooth sectioning or distal and lingual peri-radicular osteotomy. They suggest performing a subtotal lower third molar section and then complete the separation of fragments by using an elevator or another hand

instrument to prevent the iatrogenic intra-operative perforation of the alveolar wall at the level the lingual nerve running [6]. In our case the cause of the nerve injury seems to be a direct section during surgical approach and flap design with an incision too lingual and distal. It seems to be related to the incision pattern combined with crestal position of the nerve.

In the situation where the nerve section is diagnosed during the procedure most authors recommend an immediate microsurgical suture when operation is performed under general anesthesia [2,7,8,14]. The most frequent situation corresponds to the discovery of neuro-sensitive disorder at the time of post operative review. The monitoring of the neuro-sensitivity activity is then recommended with monthly intervals. The attitude is depending on clinical testing of nerve's activity, if spontaneous paresthesia or if a mechanical stimulation of the tongue results in a sensation reported by the patient then a partial remaining activity of the nerve can be supposed [8]. There is no consensus at this date about complete recovery time and perfect nerve repairs timing but many authors agree with a 6 month to 12 month interval [15]. It's recognized that results are decreased when the nerve repair is performed up one year after nerve injury [14,16]. At this day no studies comparing outcomes of repaired versus unrepaired damaged lingual nerves have been published. This comparison is made difficult because of the multiplicity of nerve injuries. It can be assumed that complete nerve transection is associated with a low potential for spontaneous recovery.

The simpler technic of nerve repair consists in a direct confrontation of trunks with epineural suture. This suture has to be performed without any tension, with the insertion four or six epineural suture using 7/0 to 8/0 polyamide monofilament [7,8]. If it's a deferred repair a neuroma appears on the nerve's endings and has to be removed before suture to avoid fibrous tissue's formation [2,8,17]. The tracking of nerve's endings could be difficult when inflammatory phenomena appears or due to margin's retraction [7]. When a direct confrontation and suture is not permitted due to nerve's retraction or partial destruction it's recommended to perform an autogenous nerve graft from great auricular or sural nerve [2,16]. Different surgical approaches are described, a lingual flap is elevated through an intrasulcular incision on the lingual side of the molars and can be extended to the front teeth. Backwards, the third molar approach is repeated and extended to the retromolar trigone or until coronoid process [2,7,16]. Garconnet *et al.* described the nerve exploration and microsurgical suture through a lingual floor mucosa approach [17]. At this day no publication reporting a deferred lingual nerve repair under local anesthesia has been found. In this case, it was decided to use the surgical access to the third molar socket that had just been performed in order to limit the scars while increasing the lingual detachment. This allowed nerve endings to be located and sutured directly under local anesthesia before the onset of edematous phenomena.

Conclusion

It is recognized that early restoration of nerve continuity greatly improves the chances of full recovery of lingual sensitivity. In the case of direct nerve transection, rapid specialized management seems to be a key element in reducing the sequelae associated with this iatrogenic event. Only some of the surgeons performing third molar avulsions have the technical facilities and skills to perform a microsurgical suture. Nevertheless, the placement of a suture on the accessible endings with the finest thread could facilitate the subsequent reconnection even under local anesthesia. Lingual nerve injury is one of the major complications of this procedure and should be seriously considered when determining the indication for mandibular wisdom tooth removal.

Authors' contribution

A. Godard: Data acquisition and interpretation, bibliography, writing original draft G. Millot: surgical operator, iconography, writing - reviewing and editing.

Conflict of interests

The authors have no conflicts of interest to declare.

Informed consent

Informed consent was obtained prior to the preparation of the case report, and the authors endeavoured all efforts to ensure anonymity.

Ethical statement

The ethical approval exemption was obtained from the Ethics Committee of Creteil university hospital.

Funding

This work did not receive any specific funding source.

References

1. Fagan SE, Roy W. Anatomy, Head and Neck, Lingual Nerve. In: StatPearls [Internet. Treasure Island (FL): StatPearls Publishing; 2022.
2. Gellée T, Bouaoud J, Touré G, Abdelqader S, Touré S, Roul-Yvonnet F, Schouman T, Goudot P. Lésions iatrogènes du nerf lingual. Chir Orale Maxillo-Faciale Internet. 2018; Disponible sur: [http://www.sciencedirect.com/science/article/pii/S2352-3999\(18\)75852-4](http://www.sciencedirect.com/science/article/pii/S2352-3999(18)75852-4)
3. Sittitavornwong S, Babston M, Denson D, Zehren S, Friend J. Clinical anatomy of the lingual nerve: a review. J Oral Maxillofac Surg 2017;75:926.e1–926.e9.
4. Hölzle FW, Wolff KD. Anatomic position of the lingual nerve in the mandibular third molar region with special consideration of an atrophied mandibular crest: an anatomical study. Int J Oral Maxillofac Surg 2001;30:333–338.

5. Benouaïche L, Michel B, Couly G. Risques de lésions du nerf lingual et de la corde du tympan en chirurgie orale et maxillofaciale. *Chir Orale Maxillo-Faciale* [Internet. 2007; Disponible sur: [http://www.sciencedirect.com/science/article/pii/S1283-0852\(07\)47063-X](http://www.sciencedirect.com/science/article/pii/S1283-0852(07)47063-X)
6. Pippi R, Spota A, Santoro M. Prevention of lingual nerve injury in third molar surgery: literature review. *J Oral Maxillofac Surg* 2017;75:890–900.
7. Yachouh J, Jammot P, Bensaha T, Goudot P. Lésions du nerf lingual lors de l'extraction d'une dent de sagesse inférieure. *Rev Stomatol Chir Maxillofac* 2006;107:393–396.
8. Robinson PP, Loescher AR, Yates JM, Smith KG. Current management of damage to the inferior alveolar and lingual nerves as a result of removal of third molars. *Br J Oral Maxillofac Surg* 2004;42:285–292.
9. Wavreille G, Baroncini M, Fontaine C. Anatomie, histologie et physiologie du nerf périphérique. *EMC – Appar Locomoteur* 2010;5:1–8.
10. Sunderland S. A classification of peripheral nerve injuries producing loss of function. *Brain* 1951;74:491–516.
11. Leung YY, Cheung LK. Risk factors of neurosensory deficits in lower third molar surgery: a literature review of prospective studies. *Int J Oral Maxillofac Surg* 2011;40:1–10.
12. Jerjes W, Upile T, Shah P, Nhembe F, Gudka D, Kafas P, McCarthy E, Abbas S, Patel S, Hamdoon Z, Abiola J, Vourvachis M, 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 molar surgery—revisited. *Oral Surg Oral Med Oral Pathol Oral Radiol Endodontology* 2010;109:335–345.
13. Ventä I. Current care guidelines for third molar teeth. *J Oral Maxillofac Surg* 2015;73:804–805.
14. Kushnerev E, Yates JM. Evidence-based outcomes following inferior alveolar and lingual nerve injury and repair: a systematic review. *J Oral Rehabil* 2015;42:786–802.
15. Ziccardi VB, Steinberg MJ. Timing of trigeminal nerve microsurgery: a review of the literature. *J Oral Maxillofac Surg* 2007;65:1341–1345.
16. Bagheri SC, Meyer RA, Khan HA, Kuhmichel A, Steed MB. Retrospective review of microsurgical repair of 222 lingual nerve injuries. *J Oral Maxillofac Surg* 2010;68:715–723.
17. Garconnet J, Foletti JM, Guyot L, Chossegros C. Suture du nerf lingual: note technique. *Rev Stomatol Chir Maxillo-Faciale Chir Orale* 2015;116:143–146.