



## Case report

## Traumatic partial amputation of the tongue. Case report and literature review



José Roberto Hernández-Méndez <sup>a</sup>, María Rita Rodríguez-Luna <sup>a,\*</sup>,  
Joaquín Eugenio Guarneros-Zárate <sup>b</sup>, Mario Vélez-Palafox <sup>c</sup>

<sup>a</sup> Hospital Angeles Mocel, Facultad Mexicana de Medicina, Universidad La Salle, Posgrado, Mexico City, Mexico

<sup>b</sup> Hospital Angeles Mocel, Mexico City, Mexico

<sup>c</sup> Hospital Angeles Mocel, Plastic and Reconstructive Surgery, Mexico City, Mexico

## H I G H L I G H T S

- Tongue Anatomy.
- Traumatic injuries to the tongue.
- Management of tongue amputation.

## A R T I C L E I N F O

## Article history:

Received 23 September 2015

Received in revised form

4 December 2015

Accepted 17 December 2015

## Keywords:

Tongue trauma

Partial amputation of the tongue

## A B S T R A C T

**Introduction:** The traumatic injuries to the tongue can go from section to partial or complete amputation, the latter being a rare presentation in the setting of facial trauma or even in patients with mental illness. **Case report:** We present 25-year-old patient with traumatic partial amputation of the tongue who presented to the emergency department with successful surgical repair with good functional and esthetic outcome.

**Discussion:** The tongue can suffer a broad type of traumatic injuries, in the setting of active bleeding, the muscular planes must be closed with absorbable sutures to stop the hemorrhage and prevent hematoma formation. Tongue surgical repair in the setting of a total section requires integrity of arterial and venous flow, so anastomosis must be executed.

**Conclusion:** Amputation of the tongue can put the patient's life at risk and its management needs to be mastered by the surgeons treating polytraumatized patients.

© 2015 The Authors. Published by Elsevier Ltd on behalf of IJS Publishing Group Limited. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## 1. Introduction

Amputation of the tongue present in an ominous fashion, with pain, inability to articulate and intraoral massive bleeding that might jeopardize the patient's life in few minutes due to the difficulty to control hemorrhage, shock and direct threat to the airway. The term partial amputation, may cause some confusion, as defined as the loss of the organ that occurs as the result of an accident or injury; a *complete amputation* means a complete separation of a fragment thereof regardless of the axis of the injury, unlike a *partial amputation* in which the fragment distal to the laceration remains

attached from bands of soft tissue, that is the sense in which we use that term in this article [1].

Partial or complete lingual amputations present in an ominous fashion, with pain, inability to articulate and intraoral massive bleeding that might jeopardize the patient's life in few minutes due to the difficulty to control hemorrhage, shock and direct threat to the airway. With venous compromise massive swelling can predispose oropharynx obstruction with potential threat to the respiratory tract by itself. Prompt recognition with rapid nasotracheal intubation or surgical airway management must be attempted [2–5] Orotracheal intubation with direct laryngoscopy is an ill-advised choice in lesions located in the base of the tongue due to the possibility of clot dislodgment with life-threatening risks of aspiration and iatrogenic injury to the respiratory tract with the inability to visualize the laryngeal aditus. In our patient we decided

\* Corresponding author. Gelati 33, San Miguel Chapultepec, México D.F. Del. Miguel Hidalgo, CP. 11850, Mexico City, Mexico.

E-mail address: [rita.rodriquez.md@gmail.com](mailto:rita.rodriquez.md@gmail.com) (M.R. Rodríguez-Luna).

to use nasotracheal intubation. The lacerations of the tongue can be found in patients with oral self-mutilation with neurological conditions such as encephalitis [6], seizures [7], schizophrenia [8], Lesch-Nyhan syndrome [9] or as a result of maxillofacial trauma with tongue bite, like in our patient.

## 2. Case report

25-year-old female presenting to ER with a history of motor vehicle accident receiving frontal impact within the passenger cabin, causing the girl to bite her tongue with enough force to cause partial amputation. She remained conscious after the accident. She was unable to speak but without any respiratory distress or hemodynamic compromise. The physical examination revealed a clot at the dorsum of the tongue, which involved approximately the totality of its surface. CBC with Hemoglobin 14.1 g/dL, Hematocrit 42.3%. The Plastic and Reconstructive Surgery consultation was made and the tongue was exposed under general anesthesia in the operating room. The clot was removed, revealing a transverse partial-thickness laceration of 7 cm involving three quarters of the cross sectional area of the tongue located at the union of its medial and proximal thirds (Fig. 1). The superior longitudinal muscle suffered complete section with only partial section of the inferior longitudinal and transverse muscles and median fibrous septum. Dissection of the muscle was made with mobilization of the distal and proximal parts, with debridement of the necrotic tissue. The tongue was repaired by layers with simple interrupted Polyglactin 910 3-0 sutures (Figs. 2 and 3) with a time of surgery of 65 min.

In the postoperative period, she presented pain during the first 24 hours with tongue mobilization, which disappeared with the administration of non-steroidal analgesia. Important swelling was presented without respiratory compromise. The diet was initiated with rapid progression. She was discharged 72 hours post-operatively. She recovered uneventfully with good functional result.

## 3. Discussion

### 3.1. Tongue anatomy

The Tongue is a muscular unpaired organ, within the floor of the oral cavity. It has a wide range of mobility and its physiological properties allow it to be a central part of speech, swallowing and



Fig. 2. Approximation with deep polyglactin 910 sutures placed in layers.

protection of the upper respiratory airways. Hence its importance in daily life since its damage could cause devastating effects. Surgical attempts to achieve its functional integrity must be executed.

To fulfill its function, the tongue is an organ composed of multiple specific muscle bundles with different origins and specific arrangements. For its study, they have been classified into intrinsic and extrinsic muscle groups whose action allows such complex movements as only the tongue may have. In the setting of trauma, these muscles are hard to identify selectively so when surgical repair is attempted it is not essential to suture them in an individual manner. The repair is done trying not to leave dead space within the tongue.

The tongue receives terminal irrigation from the lingual arteries running along the longitudinal axis. It enters the floor of the mouth between the hyoglossus and the middle constrictor of the pharynx accompanied by the lingual veins. The lingual artery bends dorsally when the anterior border of the hyoglossus is reached, lying between the genioglossus and the inferior longitudinal muscle. The tongue possesses a very dense submucosal plexus and a rich anastomotic network. They supply the precious collateral flow to



Fig. 1. Dorsum of the tongue revealing a transverse partial-thickness laceration involving three quarters of the cross sectional area of the tongue located at the union of its medial and proximal thirds.

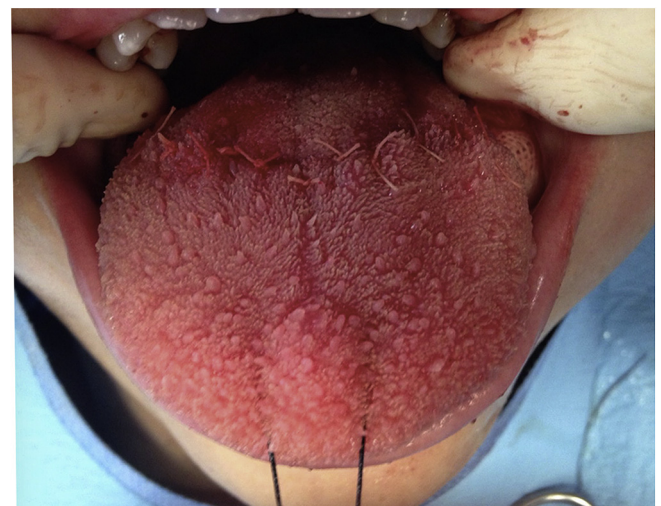


Fig. 3. Complete Repair showing appropriate continuity of the tongue.

the traumatized tongue. Named branches of the lingual artery are the dorsal, sublingual and deep lingual arteries. The venous return reaches the facial and retromandibular veins through the lingual veins, these are created from the dorsal lingual and deep lingual veins [10].

The innervation of the tongue is complex as are its functions. It has general somatic afferent innervation from the lingual nerve, which is part of the trigeminal system. The second type is special visceral afferent innervation from the facial gustative nerve: the chorda tympani running with the fiber of the lingual nerve. The last type of innervation is derived from the hypoglossal, the cranial nerve XII. This confers motor innervation to all the musculature of the tongue, except for palatoglossus, which is innervated by the vagus nerve [10].

### 3.2. Trauma to the tongue

The tongue can suffer a broad type of traumatic injuries, but they can be classified as Partial or complete lingual amputation. Donat et al., recommended in his chapter entitled “Injuries to the mouth, pharynx and oesophagus”, not to suture lacerations smaller than 2 cm, without active hemorrhage [11]. Combinations like pressure, cold, inactivity, as well as the role of tissue adhesives (2-Octyl Cyanoacrylate) have been recorded as a treatment to stop the bleeding [12,13,14]. Primary healing often occurs in such scenario due to the rich vascular supply to the tongue with minor scar. In deep lacerations, or in the setting of active bleeding, the muscular planes must be closed with absorbable sutures to stop the hemorrhage and prevent hematoma formation. Andreasen et al. [15] suggest suturing the dorsal injuries and the ones present along the lateral edge of the tongue. Powers et al. [16] suggests suturing the wounds of the tongue and placement of deep sutures by layers. Donat et al. [11] address to suture the wounds of more than 2 cm or when bleeding is important. English ensures that there is no need of suture with small lacerations and when wound margins are in proper proximity [4,12,13]. In addition to the previous recommendations Lamell and Fraone et al. recommend that in the setting of deep lacerations the repair must be done before excessive edema happens approximately within 8 h of injury, since delaying treatment past 24 hours would adversely affect the outcome [13].

In the setting of partial tongue sections the most common location of the lacerated tongue is the anterior dorsum, the median dorsum and the anterior ventrum. The frequency reduces from anterior to posterior on both surfaces [4]. In deep lacerations the muscular planes must be closed with absorbable sutures to prevent hematoma formation and muscle integrity. In the case of “small” amputated tongue measuring less than 2.5 cm, “super microsurgery” with reimplantation has been reported with microvascular anastomosis in injured vessels smaller than 0.8 mm with good results instead of simple closure of the lingual stump [17].

Buntic and Buncke reported the first successful tongue replantation in 1998, with microsurgical reconnection of lingual artery, and a venous autologous graft [3]. Besides, the delayed microvascular reconstruction with heterotopic grafts using *rectus abdominis*, *latissimus dorsi*, and *serratus anterior* muscles have been described with poor functional results [2,18,19].

Tongue surgical repair in the setting of a total section requires integrity of arterial and venous flow, so anastomosis must be executed. There have been reports where venous repair cannot be attained due to the severity of the injury, with subsequent massive lingual edema; medical leeches have been used postoperatively and replantation has been reported successful [8]. The anastomosis of the lingual artery and vein is difficult, anastomosis of both increase the rate of success. When a primary anastomosis of the vein cannot be achieved a vein graft can be applied.

According to Buntic, David and Egozi, when both arterial and venous injury exists in a complete or partial amputation, the repair requires restoring both flows. When this happens, at least it requires repair of one artery and one vein. They can be repaired ipsilaterally or in a crossed contralateral way. The blood supply of the tongue repaired in this way could be adequate [17].

In children, loss of lateral portions or tip of the tongue usually does not produce permanent deficit since tongue hypertrophy is established in a period of six months [4].

If the tongue is partially or completely sectioned, this may lead to oral cavity dysfunction and dramatic reduction in the quality of life. Surgical management with preservation of its functions must be achieved [3,19].

### 3.3. Postoperative care

Complications within 48 hours include edema, hemorrhage and aspiration of blood. Mild lingual edema can be control by ice or intravenous steroids. Other complications include dehiscence and infections. The use of prophylactic antibiotics remains controversial since there is little conclusive evidence that prophylactic antibiotics affect the rate of infection in mucosal wounds. In case of use the broad spectrum should include Gram-positive and anaerobic bacteria. Wounds heavily contaminated with 24-Hour delay of surgical debridement, injuries associated with jaw fractures, immunocompromised patients or sustained in human or animal bites should be considered as candidates to receive antibiotic treatment.

## 4. Conclusion

The lingual lesions may occur in a wide array of presentation, from injury requiring no surgical repair, through injuries that can affect the everyday life of the patient, to injuries that put at risk the patient's life and whose management needs to be mastered by the surgeon treating polytraumatized patients. In our patient partial amputation was the diagnosis since the tongue remained attached by the infero-lateral border in which the arterial and venous vessels run. There were no signs of vascular compromise and the lingual nerve was intact. The surgical correction was applied under general anesthesia, and moderate tongue swelling was developed without respiratory compromise [20].

### Ethical approval

Nothing to declare.

### Sources of funding

Nothing to declare.

### Author contribution

Roberto Hernandez-Méndez. Desing, Data, Writing.  
María Rita Rodríguez-Luna. Desing, Data, Writing.  
Joaquín Guarneros-Zárate. Data Writing.  
Mario Vélez-Palafox. Data, Writing.

### Conflicts of interest

Nothing to declare.

### Guarantor

Jóse Roberto Hernandez-Méndez.  
María Rita Rodríguez-Luna.

Joaquín Guarneros-Zárate.  
Mario Vélez-Palafox.

## Research registration unique identifying number (UIN)

researchregistry587

## References

- [1] Anon. Available at: <https://www.nlm.nih.gov/medlineplus/ency/article/000006.htm>. Accessed November 27, 2015.
- [2] Charles Davis, J. Armstrong, Replantation of an amputated tongue, *Plast. Reconstr. Surg.* 108 (2001) 190–193.
- [3] R.F. Buntic, H.J. Buncke, Successful replantation of an Amputated tongue, *Plast. Reconstr. Surg.* 101 (1998) 1604–1607.
- [4] U.M. Das, P. Gadicherla, Lacerated Tongue Injury in Children, *Int. J. Clin. Pediatr. Dent.* 1 (2008) 39–41.
- [5] B.M. Lo, B.H. Campbell, A traumatic swollen tongue, *Resuscitation* 81 (2010) 267. Elsevier Ireland Ltd.
- [6] Finger ST, Duperon DF. The management of self-inflicted oral trauma secondary to encephalitis: a clinical report. *ASDC J. Dent. Child.* 58:60–63.
- [7] Fenton SJ. Management of oral self-mutilation in neurologically impaired children. *Spec. Care Dent.*;2:70–73.
- [8] J.-M. Hong, S.-C. Eun, Self-mutilation of the tongue in a patient with schizophrenia. [Internet], *J. Craniofac. Surg.* 25 (2014) e116–e118.
- [9] M. Romero Maroto, C. Ruiz Duque, G. Vincent, et al., Management of oral lesions in Lesch-Nyham syndrome, *J. Clin. Pediatr. Dent.* 38 (2014) 247–249.
- [10] R.L. Drake, A.W. Vogl, A.W.M. Mitchell, Regional anatomy: oral cavity, in: *Gray's Anatomy for Students*, 2010, pp. 1037–1044. Second. Canada.
- [11] T. Donat, R. Maisel, R. Mathog, Injuries to the mouth, pharynx and esophagus, in: C. Bluestone, S. Stool, M. Kenna (Eds.), *Pediatric Otolaryngology*, WB Saunders, Philadelphia, 1996, pp. 1183–1184.
- [12] C.W. Lamell, G. Fraone, P.S. Casamassimo, S. Wilson, Presenting characteristics and treatment outcomes for tongue lacerations in children, *Pediatr. Dent.* 21 (1999) 34–38.
- [13] A. Patel, Tongue lacerations, *Br. Dent. J.* 204 (2008) 355.
- [14] M.G. Kazzi, M. Silverberg, Pediatric tongue laceration repair using 2-octyl cyanoacrylate (Dermabond®), *J. Emerg. Med.* 45 (2013) 846–848. Elsevier Ltd.
- [15] J. Andreasen, F. Andreasen, in: *Textbook and Color Atlas of Traumatic Injuries to the Teeth*, Mosby-Year Book, St Louis, 1994.
- [16] M. Powers, J. Bertz, R.J. Fonseca, Management of soft tissue injuries, in: R. Fonseca, E. Walker (Eds.), *Oral and Maxillofacial Trauma*, 48th, 1991. ed, WB Saunders, Philadelphia, 1991, pp. 616–648.
- [17] J.S. Kim, T.H. Choi, N.G. Kim, et al., The replantation of an amputated tongue by supermicrosurgery, *J. Plast. Reconstr. Aesthetic Surg.* 60 (2007) 1152–1155.
- [18] A.K. Patel, P. Chaturvedi, R.K. Panday, B. Sanyal, Autoamputation of the tongue, *Postgrad. Med. J.* (2001) 335.
- [19] E. Egozi, B. Faulkner, K.Y. Lin, Successful revascularization following near-complete amputation of the tongue, *Ann. Plast. Surg.* 56 (2006) 190–193.
- [20] D.G. Mark, E.J. Granquist, Are prophylactic oral antibiotics indicated for the treatment of intraoral wounds? *Ann. Emerg. Med.* 52 (2008) 368–372.