



Contents lists available at ScienceDirect

# Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology

journal homepage: [www.journals.elsevier.com/journal-of-oral-and-maxillofacial-surgery-medicine-and-pathology](http://www.journals.elsevier.com/journal-of-oral-and-maxillofacial-surgery-medicine-and-pathology)



## Case Report

# Lingual reconstruction using a modification of the Harada technique: A case report



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## ARTICLE INFO

### Keywords:

Tongue  
Tongue diseases  
Maxillofacial Injuries

## ABSTRACT

The tongue is a vital and complex organ responsible for various functions, with sensory and motor properties in oral cavity. Different etiological factors, such as oncological resections, trauma, or lacerations can result in significant tissue loss. Currently, lingual reconstruction is a challenge for surgeons, as it aims to restore speech and swallowing while maintaining its role between the maxillary arches, aesthetic appearance, airway patency, and taste. Therefore, achieving ideal surgical outcomes is essential. A 56-year-old male patient consulted an emergency health center due to an accidental partial glossectomy of the anterior two-thirds of the tongue caused by a traumatic bite. The patient underwent surgical lingual plasty under general anesthesia using a modification of the technique described by Harada et al. Here, we present a case of a patient who underwent a traumatic partial glossectomy of the anterior two-thirds of the tongue, which was successfully reconstructed using a modification of the Harada technique.

## 1. Introduction

The tongue is a vital and complex organ responsible for various functions, with sensory and motor properties [1–3]. Different etiological factors, such as oncological resections, trauma, or lacerations can result in significant tissue loss [4]. Damage to this structure can partially or completely affect its functions, leading to complex situations that may require reconstruction. Restoring normal tongue function can be challenging due to its unique characteristics, and it can significantly impact a person's quality of life [3].

Currently, lingual reconstruction is a challenge for surgeons, as it aims to restore speech and swallowing while maintaining its role between the maxillary arches, aesthetic appearance, airway patency, and taste. Therefore, achieving ideal surgical outcomes is essential.

Here, we present a case of a patient who underwent a traumatic partial glossectomy of the anterior two-thirds of the tongue, which was successfully reconstructed using a modification of the Harada technique [5].

## 2. Case report

A 56-year-old male patient consulted an emergency health center due to an accidental partial glossectomy of the anterior two-thirds of the tongue caused by a traumatic bite (Fig. 1). After achieving hemostasis, preoperative blood tests were performed which were within reference ranges. A head and neck CT scan was taken to properly assess the extent of the lesion and rule out a possible hematoma in the floor of the mouth. Subsequently, the patient underwent surgical lingual plasty under general anesthesia using a modification of the technique described by Harada et al. The original technique consists of marked a wedge-shaped strip along the middle of the tongue and another crescent-shaped strip on the back of the tongue, resulting in a decreased tongue size [5].

However, for the modification, the original design was inverted (Fig. 2). The design of the modification consists of a wide curved "V" in an inverted form to the original Harada lingual reduction design (Fig. 2). The "V" design was marked with a dermatographic pencil on a clean surface, which has its base in the anterior part of the traumatized area and a

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Fig. 1. Traumatic amputation of the two anterior thirds of the tongue.

posterior vertex. The latter is composed of a new curved "V" of smaller size in the same direction as the original one, extending towards the lateral ends of the trauma wound, generating an image that resembles half of a flower (Fig. 2). The incision is made with the use of scalpel no.15 for the mucosa of the ventral and dorsal side of the tongue, making the design of the tissue to be resected. The incisions of the submucosal and muscular planes are made with an electroscalpel. Then a blunt dissection is performed between the submucosal and muscular plane of both lingual sides to optimize the final mucosal confrontation, verifying the symmetry and coincidence in the 3 directions of the space through temporary confrontation sutures in the mucosa with 2–0 silk. After verifying the above, vertical mattress sutures are made with 3–0 vicryl for the deep muscular plane, which are kept without closing with halsted mosquito clamps. Once the closure of the complete plane is achieved, surgical knots are tied from posterior to anterior ensuring that the tension of the threads is not lost. Next, the submucosal plane is closed in the ventral and dorsal region of the tongue with 3–0 vicryl sutures of the horizontal mattress type from posterior to anterior. Finally for the mucosa, individual discontinuous sutures are used, taking care that there is coincidence in the edges, and the symmetry and projection of the new tongue tip, making sutures with 4–0 vicryl on the ventral side and 3–0 vicryl on the dorsal side of the tongue. In addition, with the purpose of avoiding the opening of the wound, considering the large set of muscles that compose the tongue, a continuous scalloped suture with 4–0 vicryl is performed on the ventral side and individual discontinuous sutures with horizontal mattress for the dorsal side of the tongue.

The surgery was uneventful, and the patient had a favorable post-operative recovery. He was discharged on the second postoperative day and had follow-up visits at 7, 14, and 21 days, during which no signs of infection or dehiscence were observed. Subsequent follow-ups at three months showed highly satisfactory functional and aesthetic results for the patient (Fig. 3).

### 3. Discussion

When planning surgical lingual plasty, the evaluation of the size of the lingual defect becomes a fundamental factor to consider, as larger tissue loss will inevitably result in decreased tongue mobility, directly affecting swallowing function [4]. In the literature, reconstructions are commonly reported for glossectomies related to oncologic treatments and glosopathies due to syndromic macroglossia [6]. However, the surgical guidelines reported are perfectly applicable to patients with complex lingual trauma. The surgical design described in the presented clinical case resulted from a modification of the technique described by Harada et al. [5] performed by the author, which is used for reduction of tongue proportions.

In relation to traumatic injuries of the tongue, these are not very common, so there is scarce information in the literature and most of the works are focused on pediatric patients [7]. In a recent study by Okechi UC et al., it is reported that there is no previous literature search report on the prevalence of tongue laceration, therefore, it is not possible to



Fig. 3. Three months follow up after surgical intervention.

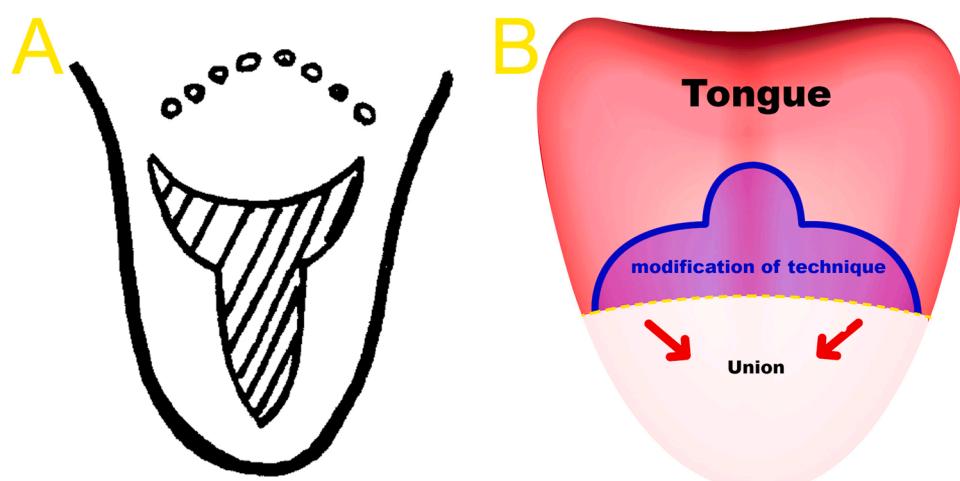


Fig. 2. A) Harada technique described in 1995 [5]. B) Modification of the lingual reconstruction technique proposed by Harada et al. [5].

find a definite prevalence, however, their study recorded a prevalence of 10.5% (37/353) of tongue laceration among all patients who presented with orofacial trauma during the study period [7].

Regarding the principles of lingual reconstruction, these follow a scale depending on the size of the defect, ranging from simple and small to large and complex [8]. For smaller defects, options such as primary closure and secondary intention closure are used [8]. On the other hand, for larger defects, reconstruction with free tissue grafts such as local flaps, regional rotational flaps, and microvascular free flaps are suggested, yielding excellent results [8,9].

On the other hand, cases of tongue reimplantation after traumatic and lacerating injuries have been reported. Hong et al., describes a case of a patient with schizophrenia who tried to cut his tongue with a scissors, causing a 3.5 cm amputation of the tongue, which was managed with a reimplantation, performing an anastomosis of the deep lingual artery and vein [10]. On the other hand, Hansen and Gál reported a tongue amputation 4.5 cm from the lingual apex due to a fall on a bicycle, which was also managed with reimplantation, both cases being successful [11]. In addition, the same reimplantation technique was used by Kim et al. who report a case of amputation in the context of a fight [12].

Despite this, an optimal reconstructive method has not yet been established based on the volume of lingual tissue resected, especially in cases of partial glossectomy and hemiglossectomy [13]. Here, we report a case with large lingual defect where optimal and functional reconstruction was achieved, facilitating primary closure and restoration of tongue functionality.

#### 4. Conclusion

Surgical planning of tongue defects must consider the size of the defect, as it is considered crucial to preserve mobility and swallowing. Our clinical case successfully modifies the Harada technique, demonstrating optimal reconstruction in the large defect presented. This approach allows primary closure to be achieved, in addition to restoring tongue functionality.

#### Ethics

The use of the clinical cases with their respective images is supported by the informed consent signed by the patient.

#### Funding

The authors declare that this work did not receive any funding for its

development and publication.

#### CRediT authorship contribution statement

Study design: GMM, PT, SN - Manuscript writing: GMM, PT, MG, TC - Has directed the drafting of the manuscript: PT, GMM, SN.

#### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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