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Tenotomy of deep belly of the temporalis muscle for treating acute trigeminal neuralgia

Abstract

Background: The author describe a technique for tenotomy of Deep Belly of the Temporalis muscle for treating acute Trigeminal Neuralgia of the maxillary branch.

Methods: Eight with trigeminal neuralgia at maxillary branch without another reason to suffer this disease. After a 1-cm inner side of cheek incision is made, blunt dissection is performed toward the Coronoid Process. The inferior tendon of deep belly of the temporalis muscle was identified and it was cut.

Results: This eight patients obtained a value of VAS=0 and completely resolution of theirs painful condition and functional resolution at two months after the surgery.

Conclusions: Tenotomy of deep belly of the temporalis muscle is a good method to treat acute TN specially when 1) Were discarded all the different causes of Trigeminal Neuralgia of maxillary branch 2) Exist a close relationship between deep belly of the temporalis muscle and maxillary nerve.

Keywords: trigeminal neuralgia, temporalis muscle, tenotomy

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Introduction

Tenotomy of deep belly of the temporalis muscle was mentioned in a previous publication.[1] This surgical approach can be used to treat patients with trigeminal neuralgia (TN) at maxillary nerve whom have a close relationship between deep belly of the temporalis muscle (DBTM) and maxillary nerve near to *foramen rotundum* (Figure 1) and others reasons to diagnose TN were discarded. When DBTM offers a close anatomical relation between maxillary nerve and their structure tenotomy of the lower tendon of this structure may be indicate in patients who suffers TN.[1] This surgery can be performed with the patient in a state of local anesthesia. The aim of this study is to show if there are changes related to the application of this surgery and the diminution of pain in patients with acute TN. The hypothesis is if we produce an atrophy of DBTM by tenotomy of his lower tendon we could obtain a decompression of maxillary nerve in patients with TN at this branch. We will describe this minimally invasive approach for performing DBTM tenotomy.

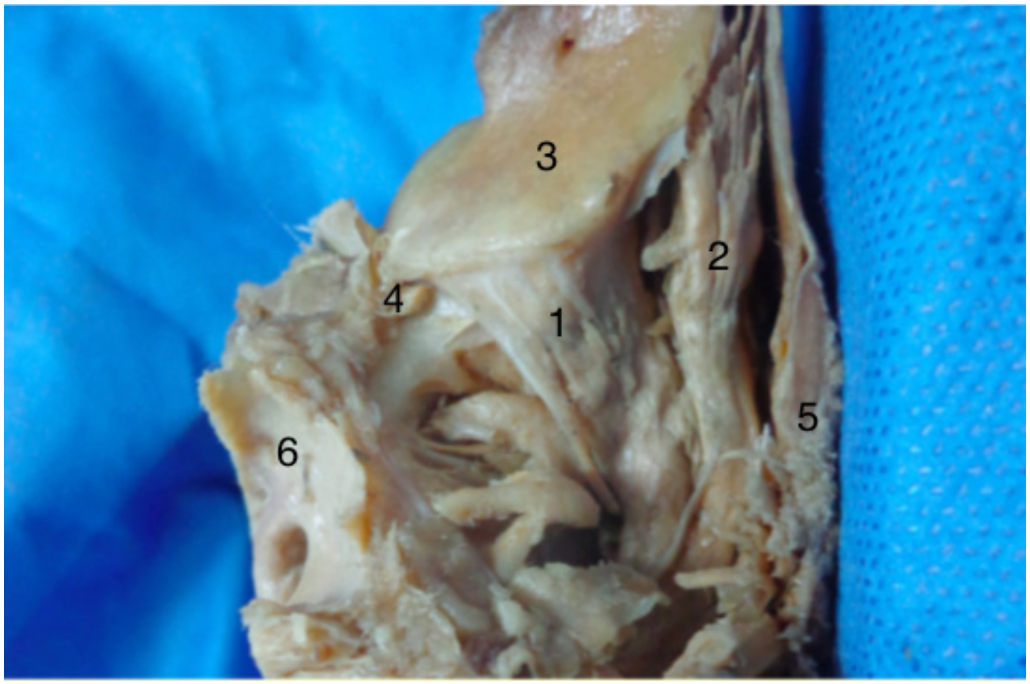

Figure 1 Anatomical specimen. Anterior view. the following structures can be observed: 1.Deep belly of Temporalis muscle 2.Temporalis Muscle 3.Greater wing of the sphenoid bone 4.- Maxillary nerve 5. Zygomatic arch 6 Posterior wall of the maxillary sinus.

Materials and methods

It was performed a *prospective observational consecutive cases*, 8 patients who were suffering TN (3 men and 5 women. All patients who participated in this study were invited due to high level of pain suffered. Prior to do the tenotomy all the steps were explained clearly to patients. The patients with TN were treated with tenotomy of DBTM at the same side affected. This study adhered to the tenets of the Declaration of Helsinki.

Surgical technique

Local anesthesia is placed at the inner side of coronoid process at side affected. The patient mouth is opened at maximal aperture with the patient totally located in a supine position. A palpation of the inner side of coronoid process was made.[3] A cranio-caudal incision of 1 cm was made only in the mucosa (Figure 2). Then proceeds with surgical blunt dissection with round-tipped scissors until reaching the inferior tendon of the DBTM (Figures 3&4). This tendinous portion is isolated and the tenotomy is performed. This area is compressed for one minute and then the surgical wound is closed with 3-0 silk (buccinator muscle and oral mucosa) (Figure 5).

Results

Table 1 shows the VAS value measured in the group of patients, previous at surgery and after application of the Tenotomy of DBTM.

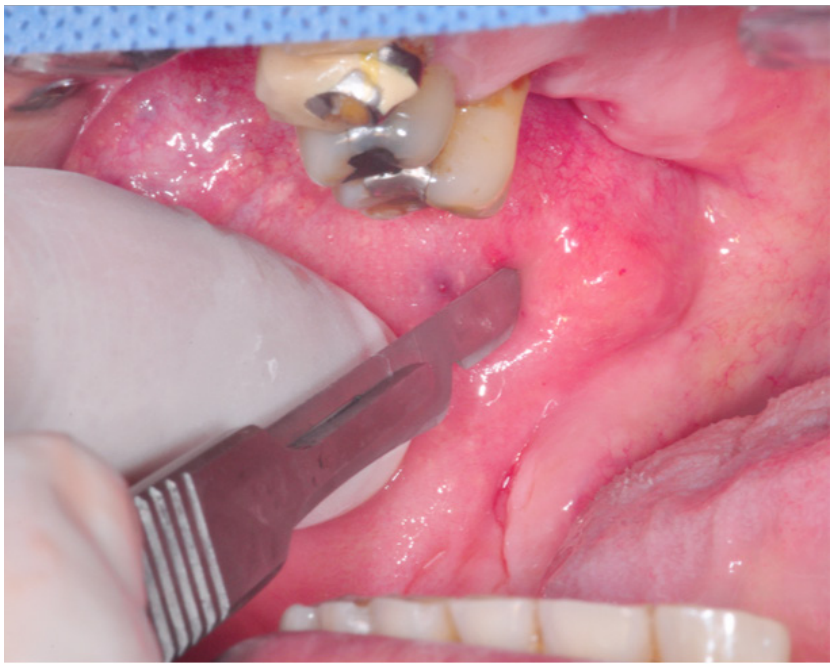

Figure 2 Photograph showing the site of the incision on the inner side of the cheek. A 1-cm vertical incision is made along this area, using the palpation described.

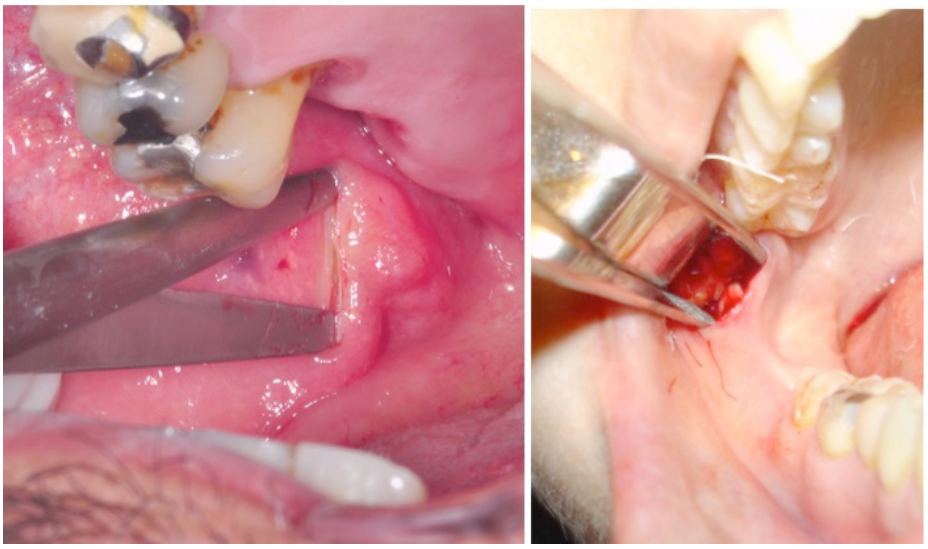

Figure 3&4 Intraoperative intraoral image illustrating minimally invasive DBTM tenotomy performed with dissection using a scissor. B: Intraoperative intraoral image illustrating the isolate lower tendon of DBTM.

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Figure 5 Intraoperative intraoral image illustrating suture of the wound and the end of surgery.

Table 1 VAS value measured in patients, previous at surgery and after application of the Tenotomy of DBTM. In bruxers patients the number of bruxism events previous an after the surgery

Ag e	Sex	Side affected	VAS one year previous at tenotomy
62	F	Right	10
41	M	Left	10
63	M	Right	10
60	F	Left	10
63	F	Left	10
63	F	Left	10
62	F	Right	10
35	M	Rigth	10

Discussion

Trigeminal Neuralgia (TN), also named *tic doloreux*, is an uncommon neurological disease that can cause intense pain along the distribution of one or more branches of the trigeminal nerve. This neuropathy can affect the nerve from its origin in brainstem to its peripheral branches. The commonest cause is vascular compression by tortuous vessel (superior cerebellar artery) or an inflammatory cause like meningitis.[5] However, etiology and pathogenesis of TN are still not clear.[4] A possible cause of TN of the second branch of the trigeminal nerve could be ascribed to anatomical reasons. Indeed, in 1996, Dunn et al.[5] reported the discovery of a unknow masticatory muscle originating from the greater wing of the sphenoid bone and inserting distally on the coronoid process of the mandible. Groscurth.[6] also found previous reports on the same muscle belly, published in the 19th century by Henle.[7] Shimokawa et al.[8] emphasized a constant relationship between deep belly of the temporalis muscle (DBTM) and the main part of the temporalis muscle (TM). The DBTM is located on anterior-medial aspect of main portion of TM.

The muscular fibbers descend laterally and slightly posteriorly to converge on the temporal crest of the mandible. Laterally, the deep belly is closely related to the medial surface of TM. Zenker.[9] described a round tendinous arch involving the exit of maxillary nerve. Posteriorly Geers et al.[10] described how the superior-medial limit of the DBTM comes close to the *foramen rotundum* and maxillary nerve. The same author found a 4 to 7-mm-wide space containing adipose tissue frequently separates DBTM and maxillary nerve. But in one cadaveric sample the medial limit of the superior insertion of the belly consisted, on both sides of the skull, of a thick, well-individualized tendinous arch connecting the infratemporal surface of the greater wing to the medial limit of the foramen rotundum at the root of the pterygoid process.

If exist traction of maxillary nerve by DBTM, it is possible to propose found results like the work done by Guo et al. In 2012[11] Who carried out a study of a maxillary nerve compression model in non-human primates *Macaca fascicularia*. The ipsilateral maxillary nerve appeared to show signs of increased sensitivity, as behavioral avoidance was evident, and the electrophysiological response profile of the ipsilateral nerve was different from that of the contralateral nerve. The results of surgical treatment applied were the same described before by Fuentes et al.[1] In This series of cases we applied this surgery at patients with non-chronic features of pain. After the surgery the patients does not showed any functional alteration.

Conclusions

Orofacial conditions of pain are a significant clinical problem. Tenotomy of DBTM is an easy surgery and may be useful in some patients. Tenotomy of DBTM offers a safe way to reduce the activity of DBTM rapidly. The results of this study indicate that Tenotomy of DBTM may help to resolve some cases of acute TN. The underliying effects of tenotomy of DBTM are not still understood and must be well described at future.

Conflicts of interest

The authors certify that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript.

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