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Case Report

A cause of entrapment of the lingual nerve: ossified pterygospinous ligament – a case report

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ABSTRACT

The ossification of pterygospinous ligament forms the pterygospinous bony bridge and pterygospinous foramen. In existence of bony bridge, some branches of the mandibular nerve may run through the pterygospinous foramen. In this case, the entrapment of the nerve may occur. During routine dissection of a male cadaver that had been fixed with 10% formaldehyde solution, unusual course of the lingual nerve was encountered. The pterygospinous bony bridge passed among the fibers of the lingual nerve and it divided it into two parts as anterior and posterior. The anterior fibers lied between tensor veli palatini and medial pterygoid muscles, and the bony bridge, vulnerable to the risk of compression. The ossified pterygospinous ligament may cause mandibular neuralgia. Besides, it can act as an obstacle for the mandibular nerve block. © **Neuroanatomy. 2009; 8: 43–45.**

Key words [pterygospinous ligament] [pterygospinous bridge] [mandibular nerve] [foramen ovale]

Introduction

The pterygospinous ligament extends from the pterygospinous process of the lateral lamina of the pterygoid process of the sphenoid bone, coursing inferior level of the oval foramen, to the spine of sphenoid bone in the infratemporal fossa. The ossification of ligament forms the pterygospinous bony bridge and pterygospinous foramen (Figure 1). In existence of this case, branches of the mandibular nerve innervating the temporal, masseter and lateral pterygoid muscles run through the pterygospinous foramen [1–5]. The lingual nerve is a branch of the mandibular nerve, itself a branch of the trigeminal nerve. The lingual nerve supplies sensory innervation to the mucous membrane of the anterior two-thirds of the tongue. It also carries nerve fibers that do not originate from the trigeminal nerve, including taste sensation to the anterior part of the tongue as well as parasympathetic and sympathetic fibers. It runs between the tensor veli palatini and lateral pterygoid muscles, where the chorda tympani joins it. Normally, the soft muscular tissue that covers the lingual nerve protects it against compression and tension. In existence of a pterygospinous bony bridge, the nerve can be entrapped between the bone and the pterygoid muscle during contraction. The entrapment of the lingual nerve causes numbness on its area of distribution and pain during talking. The ossified pterygospinous ligament is a major cause of the entrapment of the lingual nerve or a branch of the mandibular nerve. The ossified pterygospinous ligament or a wide lateral lamina may cause mandibular neuralgia [4–6]. Moreover, ossified pterygospinous ligament can constitute an obstacle for the mandibular nerve block that is a preferred method for pain relief especially for the fractures of mandible or cancer patients [1,2,7].

Case Report

During routine dissection of a Turkish male cadaver, which had been fixed with 10% formaldehyde solution, an unusual course of the lingual nerve was found on the left side. At first, the masseter and temporal muscles, zygomatic arch, ramus of the mandible and the lateral pterygoid muscle were removed. The branches of the mandibular nerve were identified. In this area, during the course of the lingual nerve, an entrapment of the nerve was noted. The pterygospinous bony bridge passed among the fibers of the lingual nerve and divided it into anterior and posterior parts. The anterior part passed medially, while the posterior part passed laterally to the bony bridge. These two parts joined at a level inferior to the bridge to form the lingual nerve. Thereby, the anterior fibers lied between tensor veli palatini muscle and the bony bridge, vulnerable to the risk of compression (Figure 2).

Discussion

There were many ligaments in the exocranial region. Ossification of these ligaments can be important as to relation with other anatomic structures. In adults, these ossifications lead to spoil of interrelations of the anatomic

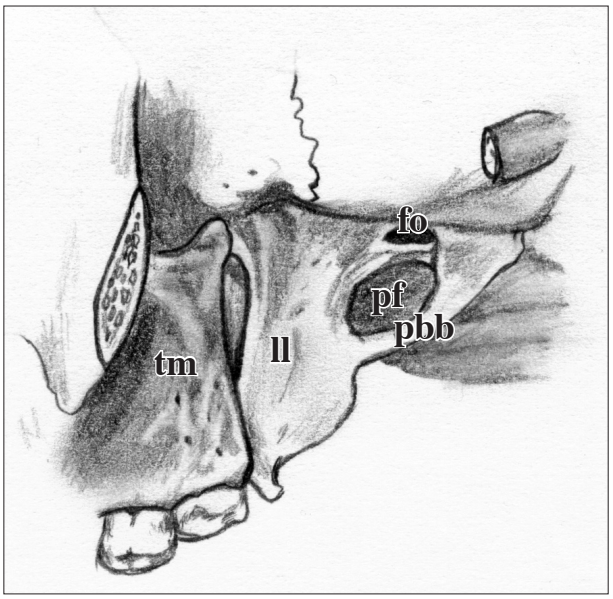

Figure 1. A pterygospinous bony bridge in the inner wall of the infratemporal fossa. *(**tm:** maxillary tuberosity; **ll:** lateral plate of pterygoid process; **fo:** foramen ovale; **pf:** pterygospinous foramen; **pbb:** pterygospinous bony bridge)*

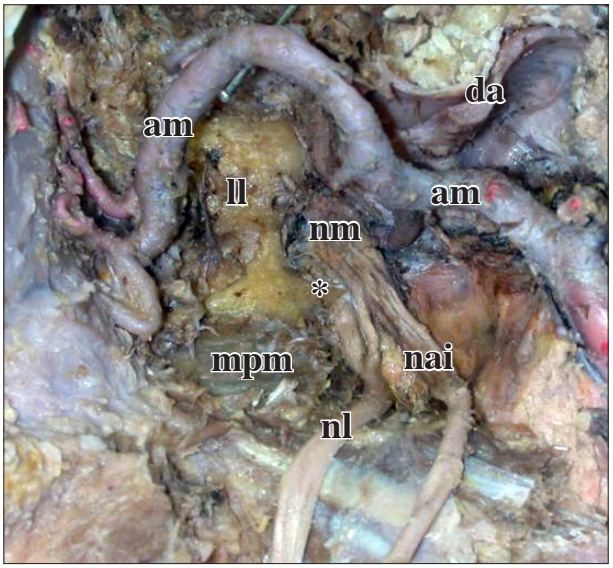

Figure 2. Dissection of the left infratemporal region. *(***:** pterygospinous bony bridge; **am:** maxillary artery; **da:** articular disc; **ll:** lateral plate of pterygoid process; **nm:** mandibular nerve; **nai:** inferior alveolar nerve; **nl:** lingual nerve; **mpm:** medial pterygoid muscle)*

configuration. Therefore, the knowledge of anatomy of the physician should be accurate. Anatomical variations and diversity are kept in mind that this provides success.

Pterygospinous and pterygoalar ligaments have been defined and examined by many researchers. Close location of these ligaments to the oval foramen and mandibular nerve makes them more important, especially if they get ossified. The complete or incomplete ossification of the ligaments can affect mandibular nerve and its branches by degrees. There were many publications about lingual nerve entrapment by a complete ossified pterygospinous ligament [1, 4–6,10].

According to Newton and Potts an ossified pterygospinous ligament can be an obstacle in a radiograpically guided trigeminal ganglion blockage [8] .

Kapur at al. informed that these bony bridges can be 3-3.5 cm in depth and may prevent anesthesia of mandibular nerve at the lateral subzygomatic approach. They found the frequency complete ossified pterygospinous ligament on left side as 0.98 %, on rigth side as 1.31 % [9].

Krmpotic et al. observed ossified pterygospinous ligament in 5 of 100 skulls. They emphasized that these bony bridges may be one of the reasons of the mandibular neuralgia [6].

Pinar at al. studied on 361 dry adult crania. They observed complete ossified pterygospinous ligament in 12, and incomplete ossified ligament in 35 samples. Also, they observed complete ossified pterygoalar ligament in 4, incomplete ossified pterygoalar ligament in 18 samples [2].

Peker at al. studied on 452 adult dry cranium and 9 fixed cadavers. They observed complete ossified pterygospinous ligament in 5.5 %, and complete pterygoalar bridges in 4.9 % of the cases. In their study, in 14 of the 452 skulls (3.1 %), complete pterygospinous osseous bridges were bilateral, whereas bilateral complete pterygoalar osseous bridges were found in 13 of the samples (2.9 %). The frequency of complete pterygospinous bony bridges was 4.2 % on the right side and 6.4 % on the left, whereas the frequency of complete pterygoalar bony bridges was 4.2 % on the right and 5.5 % on the left. Besides, a pterygoalar ligament found in white adult male cadaver was on the left side only. The course of the branches of the mandibular nerve was apparently affected by the ligament [10].

Nayak at al. investigated 416 dry human skulls for incomplete pterygospinous bony bar, incomplete pterygospinous foramen, complete pterygospinous bony bar and foramen. These variations were identified as 9.61 %, 3.84 % and 5.76 % respectively [11].

Lüdinghausen at al. reported the complete pterygospinous bony bar as 1.85 % on cadaver and as 6 % on dry human skulls [5].

Peuker at al. are the researchers who firstly showed complete ossified pterygospinous ligament and compression of lingual nerve between ossified ligament and medial pterygoid muscle by cadaver dissection [1].

Antonopoulou et al. presented ossified pterygospinous bridge and bar in a three dimensional (3D) reconstruction, in a computed tomography (CT) image, and photographed. They reported that incompletely ossified pterygospinous ligaments were determined in 25% of the skulls, complete ossified pterygospinous bridge were determined in 2% of the skulls, bilaterally [12].

As it is understood from former studies, the ossified pterygospinous ligament is an anatomical structure that was rarely observed. Thus, it should be kept in mind that

these bony bridges may be present in the infratemporal fossa. These may present an important anatomical cause of mandibular neuralgia. The pterygoalar bony bridge may act as a barrier to the passage of the needle through the foramen ovale, making it impossible to achieve successful transoval injections of anesthetics in trigeminal neuralgia [5–7,12]. Therefore, it is important for surgeons to know the types of the osseous bridges and their incidences, especially to those who deal with the above-mentioned procedure. We conclude that ossified pterygospinous ligament may be problem for anesthetists, neurologists and surgeons.

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