

Title : An Ossified Pterygospinous Ligament – A Case Report

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Abstract-

Study of the base of skull always remains the centre point of attraction for many anatomists since ages. Accordingly many attempts have been made to study skull from time to time. On the base of skull usually there is ligament extending between a Pterygoid process (an irregular posterior border towards its upper part) of lateral pterygoid plate and the spine of sphenoid bone called Pterygospinous ligament. It extends backwards and laterally. This ligament sometimes get ossified. When it gets ossified there is formation of Pterygospinous bony bar and this can convert it into Pterygospinous foramen (Civinini's foramen) through which branches of Mandibular nerve can pass. The mandibular nerve, lingual nerve, chorda tympani nerve may get compressed here producing various clinical symptoms, which in turn depends upon dimensions of foramen and grades of compression. This is important for radiologist, maxillofacial surgeons, dental surgeons and anaesthetists.

Key word : Pterygospinous ligament, Pterygospinous bar, Pterygospinous foramen, spine of sphenoid , Mandibular nerve.

Introduction : Among the axial skeleton of vertebrates, the skull is most modified part. This skull always remains the centre point of attraction for many anatomists and anthropologist since ages. But the study of individual bones and their ligaments have not received attention so much.

As we know that the sphenoid bone is present at the centre of the base of skull, rather it is "wedged" in between frontal, temporal and occipital bones. It presents with centrally located body. It has two wings, one is greater and other is smaller. Both spread

laterally. Also it present with two Pterygoid process named as medial and lateral Pterygoid plates. The medial pterygoid plate is narrower and longer. The lateral pterygoid plate is broad, thin and everted^[1]. The pterygoid process coming from its irregular posterior border get connected with the spine of sphenoid by the ligament called as Pterygospinous ligament. Sometimes this Pterygospinous ligament can get ossified.^[2] This ossified Pterygospinous ligament can compress nearby neurovascular structures. This ossification may be complete or incomplete. Due to this ossification the Pterygospinous bony bar get formed which later on forms foramen named Pterygospinous foramen for the passage of muscular branches to the muscles of mastications.



Fig 1 : pterygospinous foramen

It is very close to oval foramen through which mandibular nerve is coming out with its various branches. Also the lingual and chorda tympani nerve is running through this infra temporal region. So whenever this ligament get ossified, the mandibular nerve along with lingual and chorda tympani nerve may get entrapped causing mandibular neuralgia and numbness over its area of distribution on tongue with disturbed taste function and pain during talk respectively. The ossified ligament can cause obstacle for the mandibular nerve block also, which is a preferred method for pain relief for fractures of mandible or cancer patients.^[2]

Case Report : When we were arranging the osteology section in our departmental museum region wise, one intact skull came under observation where there was a connecting bony bridge on left side between the lateral pterygoid plate and spine of sphenoid bone. For the

same we saw on right side, but it was absent on right side. so we were very interesting to know about this additional bony bridge between this two bony processes. It was very close to foramen ovale. When measured by vernier calliper, it was about 13mm in length. Due to this bony bridge there was also formation of two small foramen of 2-3 mm size and one large of 5-6 mm size.

When we went under some past references regarding this additional bony bar, we come to know that it is nothing but an ossified Pterygospinous ligament.^[2] It happens very rarely and it was present in this case. Whenever this ligament get ossified, it is the major cause of an entrapment of mandibular nerve and its various branches like muscular and lingual nerve along with chorda tympani. Additionally this can cause obstacle for giving mandibular nerve block also so we studied this case in detail.

Discussion : The ligaments are the fibrous bands connecting the adjacent bones which forms the important part of joints. But when they get ossified, they may lead to clinical symptoms. There are several ligaments in relation to sphenoid bone at the base of skull, such as Pterygospinous, interclinoid, caroticoclinoid and Pterygoalar ligaments. The Pterygospinous ligament is found to have some muscle fibres which are also get ossified sometime.^[1,2]



Fig2– An arrow shows Ossified Pterygospinous ligament.

The Pterygospinous ligament described by Civinini in 1835 (cited by Tebo)^[3] is directed from spine of sphenoid to pterygoid process, when ossified, establishing the Pterygospinous foramen also named

as Civinini's foramen and Pterygospinous bar. This foramen gives passage for mandibular nerve and its various branches which can get compressed and produces clinical conditions like lingual numbness, speech impairment, mandibular neuralgia etc.^[4] The incidence of this Pterygospinous bar and foramen has been reported by different authors with different results.



Fig. 3 shows complete view of skull with Pterygospinous ligament with foramen on left side.

J. F. Wood^[5] reported 8% Pterygospinous ligament ossification in Hawaiian skulls. While Kromptotic-Nemanic *et al.*^[6] studied 100 skulls and out of that he found only in 5 skulls the ossified Pterygospinous ligament and also emphasized that this bony bridge may be one of the reasons of Mandibular neuralgia, Kapur *et al.*^[4] studied 305 Croat skulls. He reported prevalence of 18.36% of Pterygospinous bar. He found complete ossification in 3.6% skull. (1.31% on right and 0.98% on left side) Incomplete type was found in 14.7% skulls. They emphasized that the presence of such ossified Pterygospinous ligament may prevent anaesthesia of mandibular nerve at the lateral subzygomatic approach, Pekeret *et al.*^[7] studied 452 adult human dry skulls in Anatolian population and observed completely ossified Pterygospinous ligament in 5.5% skulls. He also noted that the course of the branches of mandibular nerve was apparently affected by ligament. Atamaz-pinar *et al.*^[8] found this ossified Pterygospinous ligament in 12 cases out of 361 dry skull and incompletely ossified ligament in 35 cases. Ludinghausen *et al.*^[9] reported this ossified Pterygospinous ligament in 6 of the 100 human dry skulls and 1.85% in cadavers. Nayak *et al.*^[10] examined

416 dry skulls of Indian (Dravidian) origin for this Pterygospinous bony bar and found total incidence to be 9.6%. Antonopoulou *et al.*^[11] observed 50 Greek dry skulls and reported complete ossified Pterygospinous ligament in only 1 skull bilaterally and incomplete ossification in 25 out of 50 cases.

This osseous variations are important not only in anatomy but also in clinical practice. The presence of complete or incomplete Pterygospinous bar is related with some important structures present in this region like mandibular nerve and its branches, otic ganglion, middle meningeal artery and vein, tympanic nerve and medial and lateral pterygoid muscles. These structures may get compressed against these bony formations and can produce many clinical symptoms like pain, especially during chewing, and could provoke trigeminal neuralgia.

Considering the close relationship of chorda tympani nerve, it may also get compressed by the anomalous bar of bone and may result in abnormal taste sensation in the anterior two thirds of the tongue.^[12] Such ossified ligament may produce obstacle in giving anaesthesia in case of treatment of trigeminal neuralgia or giving mandibular nerve block.

So it is understood from above discussion that the ossified Pterygospinous ligament is an anatomical structure present in infra temporal fossa. It is rarely present. But whenever it present, it can cause mandibular neuralgia. So it is very important in view of surgeons, anaesthetists and dentist to have a knowledge of this ossified Pterygospinous ligament in infra temporal fossa region.

Conclusion : The Pterygospinous ligament is present at the base of skull in infra temporal region. It extends between the spine of sphenoid and pterygoid process of lateral pterygoid plate.

It can be ossified rarely. Whenever ossified it produces Pterygospinous bony bar and foramen which can compress nearby structures like mandibular, lingual and chorda tympani nerve producing clinical symptoms. Also it can constitute obstacle for mandibular nerve block.

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**"FATHER OF
MODERN
AMBULANCE
SERVICES"**

William A. Hammond

- (28 August 1828 – 5 January 1900)
- An American military physician and neurologist.
- During the American Civil War he was the eleventh Surgeon General of the United States Army (1862–1864) founder of the Army Medical Museum
- He designed superior ambulance-wagon.
- In the history of ambulances this was the first purpose built ambulance. He demanded (and got) one ambulance for every 150 soldiers and got two medical supply wagons for each regimental corps. His improved transportation system proved so good that at the battle of Antietam (September 1862) his stretcher bearers and ambulance-wagons had every one of the Union Army's 9420 wounded soldiers off the battlefield before the day ended. This was a remarkable feat in the early history of ambulances.
- That's why he is considered the Father of Modern Ambulance Services.
- (source: "History of Queensland Ambulance Service". Queensland Ambulance Service. Retrieved 2007-06-16.)

AMBULANCE

Ambulances were first used for emergency transport in 1487 by the Spanish although the more proper term is ambulance wagon. The word ambulance originally meant a moving hospital which follows an army in its movements. Later this term was referred to as field hospitals where ambulance wagons delivered patients.

During the Crusades of the 11th Century, the Knights of St John received instruction in first-aid treatment from Arab and Greek doctors. The Knights of St John then acted as the first emergency workers, treating soldiers on both sides of the war of the battlefield and bringing in the wounded to nearby tents for further treatment. The concept of ambulance service started in Europe with the Knights of St John, at the same time it had also become common practice for small rewards to be paid to soldiers who carried the wounded bodies of other soldiers in for medical treatment.

(source:

Ortiz, Captain Jose M (October–December 1998). "The Revolutionary Flying Ambulance of Napoleon's Surgeon" 8. pp. 17–25.)

