

## STUDY OF ANOMALIES OF CERVICAL VERTEBRAE

Sween Walia <sup>\*1</sup>, Bhawani Shankar Modi <sup>2</sup>, G.S. Bindra <sup>3</sup>, Shikha Sharma <sup>4</sup>.

<sup>\*1</sup> Assistant Professor, Punjab Institute of Medical Sciences, Jalandhar, Punjab, India.

<sup>2</sup> Demonstrator, F H Medical College & Hospital, Tundla, UP, India.

<sup>3</sup> Professor, F H Medical College & Hospital, Tundla, UP, India.

<sup>4</sup> Professor, F H Medical College & Hospital, Tundla, UP, India.

### ABSTRACT

**Introduction:** Fused cervical vertebrae may be congenital. This anomaly may be asymptomatic, or it may also appear with manifestations of serious clinical features such as myelopathy, limitation of the neck movements, muscular weakness, atrophy and neurological sensory loss, or may be associated with syndrome such as Klippel-Feil.

**Materials and Method:** This study included 350 cervical vertebrae from department of anatomy of various medical institutions.

**Result:** We found complete ossification of anterior as well as posterior longitudinal ligaments in cervical vertebrae. Some other fusion anomalies are also found in same vertebrae.

**Conclusion:** The present study highlights the ossification of anterior and posterior longitudinal ligaments in the region of cervical vertebrae as a part of diffuse idiopathic skeletal hyperostosis.

**KEY WORDS:** Fused cervical vertebrae, congenital, myelopathy, Klippel-Feil, diffuse idiopathic skeletal hyperostosis.

**Address for Correspondence:** Dr. Sween Walia, Assistant Professor, Punjab Institute of Medical Sciences, Jalandhar, Punjab, India.

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### INTRODUCTION

Cervical vertebrae are characterized by small body, triangular spinal canal, larger and narrower lamina, foramina transversaria, superior articular facet directed backward and upward, inferior articular facet directed forward and downward [1-4]. The most common fusion is between the second and third cervical vertebrae. Ossification of the anterior longitudinal ligament (OALL) has not been widely described since it is rarely symptomatic.

Fusion of vertebrae may be congenital or acquired. It may be a complete fusion of bodies

or neural arches. It is difficult to conclude whether the fusion is developmental or post inflammatory. Ossification of paravertebral ligaments is associated with Forestier disease and Ankylosing Spondylitis. Ossification of the ligamentum flavum (OLF) is a pathological condition that causes neurological symptoms (radiculopathy and/or myelopathy) and usually occurs in the thoracic and less frequently in the cervical spine. Mechanical stress, growth factors and trauma, are the most common reason for the development of ossified ligamentum [5,6]. Neurological complications from

Ossification of the anterior longitudinal ligament (OALL) are rare. The most common symptoms of OALL are compression of the oesophagus and trachea. Although fewer than 10% of patients require surgical decompression of these structures, aspiration pneumonia and suffocation by aspiration of food have been described. It typically affects males over 60 years of age [7].

The anterior longitudinal ligament is one of the important ligaments in the spinal column that provides stability to the spine. The anterior longitudinal ligament runs along the front of each vertebral body and disc extending from the base of skull to the sacral promontory. Forestier's disease, also known as diffuse idiopathic skeletal hyperostosis (DISH), is an idiopathic abnormality in which exuberant ossification occurs along ligaments throughout the body, but most notably the anterior longitudinal ligament of the spine [8].

## MATERIALS AND METHODS

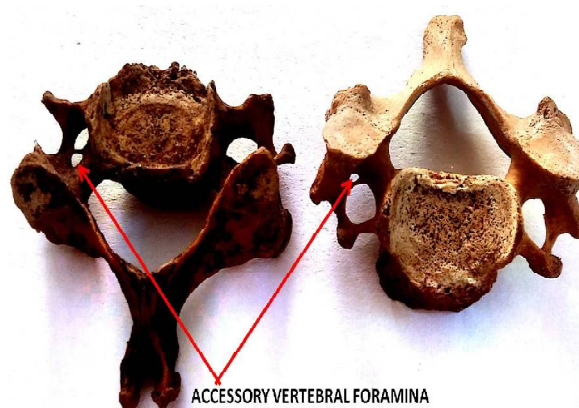
The study was carried out on cervical vertebrae includes 350 dried cervical vertebrae of both sexes. These cervical vertebrae were studied from department of Anatomy of MMIMSR, Mullala (2013-14) during the research work on bones cleaning [9], Haryana institute of medical sciences, Kaithal (2014-15) during the set up of osteology lab and FH medical College, Tundla (2015-16) during routine survey of the osteology lab

## RESULTS

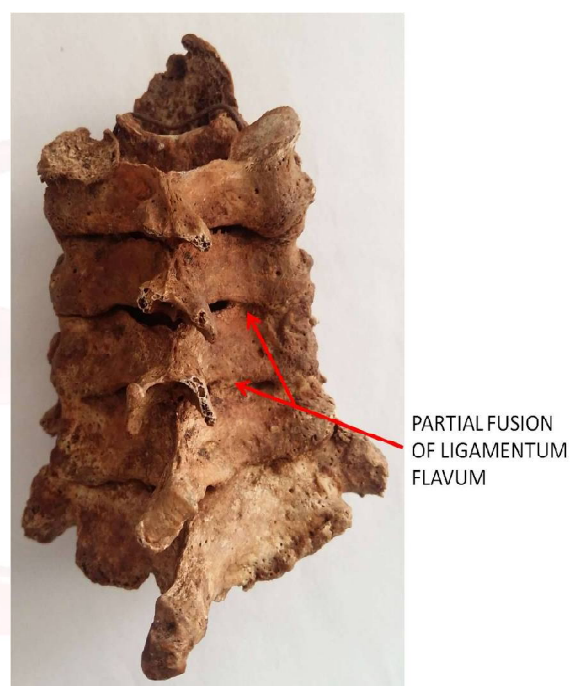
In this research we found various anomalies in cervical vertebrae and their ligaments. These are.

S.No.	Anomalies	No. Of Vertebrae
1	Complete ossification of posterior longitudinal ligament	11 (3.14%)
2	Complete ossification of Anterior longitudinal ligament (fig.4)	09 (2.57%)
3	Complete ossification of ligamentum flavum on left side (fig.2)	05 (1.43%)
4	Complete ossification of ligamentum flavum on right side (fig.2)	04 (1.14%)
5	Partial Ossification of ligamentum flavum on right side (fig.3)	05 (1.43%)
6	Accessory Transverse foramina on right side (fig.1)	05 (1.43%)
7	Accessory Transverse foramina on left side (fig.1)	03 (0.86%)

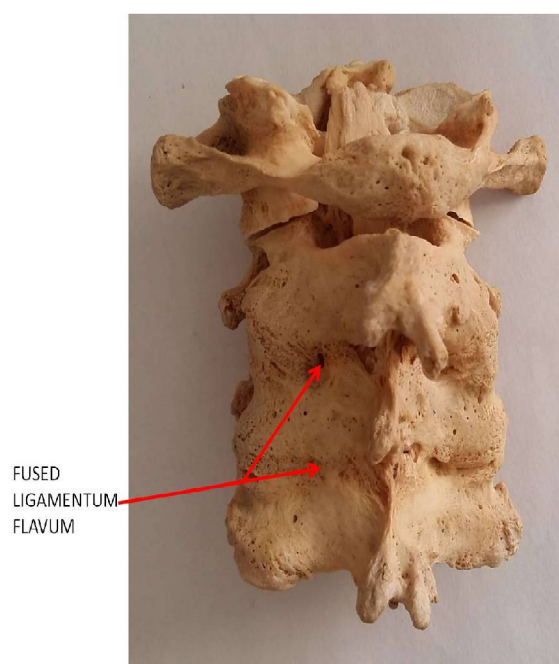
**Fig.1:** Accessory vertebral foramina.



**Fig. 2:** Complete fusion of ligamentum flavum.



**Fig. 3:** Partial Fusion Of Ligamentum Flavum.



**Fig. 4:** Complete fusion of anterior longitudinal ligament



## DISCUSSION

Embryologically, if two adjacent somites or their associated mesenchyme do not separate properly, a segmentation defect will occur. These defects are classified depending on the region and quantity of vertebrae affected. The vertebral column is formed from the sclerotome of the somites during 3<sup>rd</sup> week of intra uterine life [8]. Most cases of OLF [9] occur in the thoracic spine or the thoracolumbar spine and rarely in the cervical spine [10].

## CONCLUSION

The present study concentrates on the ossification of anterior and posterior longitudinal ligaments in the region of cervical vertebrae as a part of diffuse idiopathic skeletal hyperostosis. Ossification of ligamentum flavum in the cervical spine segment is rare, the interesting finding in our series was that we encountered two patients with OLF in the cervical spine. Further research and studies of OLF cases are necessary for early and correct diagnosis and therapy, in order to avoid a poor clinical outcome.

**Conflicts of Interests:** None

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