



## RESEARCH ARTICLE

### FORAMEN IN THE FUSED ARTICULAR PILLAR OF THE FIFTH LUMBER VERTEBRA- ROLE IN LOWER BACK ACHE

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#### ARTICLE INFO

##### Article History:

Received 26<sup>th</sup> March, 2018

Received in revised form

22<sup>nd</sup> April, 2018

Accepted 04<sup>th</sup> May, 2018

Published online 30<sup>th</sup> June, 2018

#### ABSTRACT

Foramen on the articular pillar formed by the fusion of the superior and inferior articular process is a rare finding. Compression of dorsal rami in such foramina may present as low back ache and fusion of the articular processes may limit the movement in the lumbosacral region. The embryological basis and possible functional significance has been appraised.

##### Key Words:

Superior Articular Process, Inferior Articular Process, Lumbar Vertebra, Low Back ache.

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Citation: Dr. Aritra Banerjee, Dr. Parul Kaushal and Dr. Raj D Mehra, 2018. "Foramen in the fused articular pillar of the fifth lumbar vertebra- Role in lower back ache", *International Journal of Current Research*, 10, (06), 70921-70922.

## INTRODUCTION

Anatomical variations in the lumbosacral region contribute ominously to lower back ache. The most commonly reported anomalies related to the fifth lumbar vertebra include sacralisation or spondylolysis (Nutter, 1913; Moore, 1925), besides agenesis, hemi vertebra, butterfly vertebra, block vertebra and other types related to the shapes and border of the body of vertebra (Kumar *et al.*, 1988). Asymmetry in the two inferior articular processes of a lumbar vertebra, with rudimentary left inferior articular process as has been reported (Das, 2006). Few studies have reported perpendicularly oriented foramina running lateral or posterolateral to the axial plane of the spinal canal in this sensitive region (Beers *et al.*, 1984; Singh, 2012; Mahato, 2014), however, none of the studies have reported parallel foramen located on fused articular process.

**Case Report:** During routine osteology teaching at the Department of Anatomy, we came across a variant structure in the fifth lumbar vertebra. The superior articular process (SAP) and inferior articular process (IAP) which are normally

separate, were fused and presented a well-defined oval foramen with 2 mm diameter, in between the inferior border of the SAP and the superior border of the IAP bilaterally. All the other features presented normal anatomy.

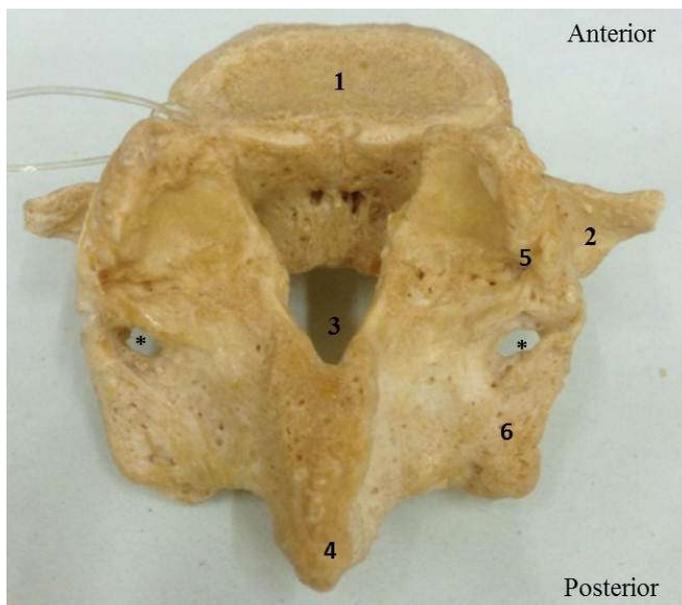
## DISCUSSION

Vertebrae develop from the sclerotome portions of the somites, which are derived from paraxial mesoderm. During the fourth week of intrauterine life, the sclerotome cells migrate around the spinal cord and notochord to merge with the cells from the opposing somites on the other side of the neural tube. As the development continues the sclerotome undergoes resegmentation such that upper part of the lower and lower part of the upper sclerotome contributes to the formation of one vertebra. Hence, the intersegmental arteries lie midway over the vertebral body and the spinal nerves emerge from the intervertebral disc. Patterning of the shapes of the vertebrae is regulated by the HOX genes (Sadler, 2007). A typical vertebra is ossified from three primary centres, one for the centrum and one for each half of neural arch. The neural arch of the fifth lumbar vertebra normally has two centres of ossification, one for each half, with line of division passing between the SAP and IAP (Nutter, 1913). The presence of foramina in the present case coincides with the line of fusion and indicates the partial fusion of the adjacent borders of these two centres of ossification.

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DOI: <https://doi.org/10.24941/ijcr.31109.06.2018>



**Fig. 1** Showing the foramen (\*) located in the articular pillar formed by the fusion of the superior articular facet (5) and inferior articular facet (6) in the fifth lumbar vertebra. 1: body; 2: transverse process; 3: vertebral canal; 4: spinous process

This fusion of the SAP and IAP is a rare occurrence and may affect movements such as flexion, extension, rotation. The dorsal aorta gives off intersegmental arteries at the level of upper four lumbar vertebrae. Hence, the fifth lumbar level receives blood supply from the lumbar branch of the iliolumbar artery and form vertical anastomotic channels (Beck, 1987). Therefore, the most likely content of these horizontally oriented foramina are the dorsal rami which supply the muscles and skin of the back.

Hence, acquaintance with such variations may be helpful to the radiologists in interpreting the radiographs of lumbar region, to orthopaedicians in diagnosis of low backache, to physicians in diagnosing the cause of neurological deficit in the lower limb, besides, aiding an orthopaedic and neuro surgeons intervening in this region. Authors have no conflicts to declare and no financial sources to declare. This work has not been presented at any conference

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