

## Case Report

# SACRALISATION OF LUMBAR VERTEBRAE

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### ABSTRACT

**Background:** Lumbar backache is a very common problem nowadays. Sacralisation of lumbar vertebrae is one of the cause for that. During routine osteology teaching a sacrum with incomplete attached lumbar 5 vertebrae is seen.

**Observation:** Incompletely fused L 5 vertebrae with sacrum is seen. The bodies of the vertebrae are fused but the transverse process of left side is completely fused with the ala of sacrum. But on the right side is incompletely fused.

**Conclusion:** The person is usually asymptomatic or may present with symptoms which include spinal or radicular pain, disc degeneration, L4/L5 disc prolapse, lumbar scoliosis and lumbar extradural defects. In transitional lumbosacral segmentation, it was observed that the lumbosacral intervertebral disc is significantly narrowed. The incidence of disc herniation is found to be higher and can occur even at young ages. There was also relationship established between transitional vertebrae and the degree of slippage in spondylolytic spondylolisthesis. In addition, this anomaly has known implications in the field of disc surgery.

**KEYWORDS:** Radicular Pain, Scoliosis, Herniation, Spondylolytic.

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### INTRODUCTION

In modern life backache is common complaint. Low back pain (LBP) is quite a common ailment affecting about 80% of the population in their life time [1]. One of the causes is sacralization of lumbar vertebra. Lumbosacral transitional vertebrae (LSTV) occur as a result of congenital anomaly in the segmentation of the lumbosacral spine. LSTV includes either the involvement of L5 in sacrum or S1 into the lumbar vertebrae. Sacralization means addition of sacral elements by the incorporation of Fifth lumbar vertebra. The incorporation of the fifth lumbar vertebra with the sacrum may be unilateral or bilateral producing partial or complete sacralisation. Complete sacralization consists of complete bony union between the abnormal transverse

process and the sacrum. Incomplete sacralization shows a well defined joint line between the process and the sacrum. Bertolotti 1<sup>st</sup> observed the LSTV and stated that these abnormal vertebrae may produce low back pain due to arthritic changes which occur at the site of false articulation[2]. LSTV are common with the prevalence ranging from 1-20% [3, 4]. Some previous workers have suggested the role of LSTV in low back pain [5, 6], whereas others have contradicted the role of LSTV [6,7]. This case is been highlighted to help clinicians to rule out LSTV/ sacralisation while diagnosing a case of low back pain.

### CASE REPORT

During routine study of osteology in the Department of Anatomy, ASCOMS, Jammu, a sacrum

with partial fusion of Lumbar 5 vertebrae was seen. The case is of sacralisation of lumbar vertebrae or LSTV.

### OBSERVATIONS

The body of the sacrum and L5 not fused but the transverse process on left side was completely fused and on right side not fused.

Measurement of vertical length of Lumbar 5 vertebrae- 5.0cm

Measurement of distance between transverse processes of L5 vertebrae- 5.7cm

Measurement of vertical and transverse diameter of intervertebral foramina-

Left- 1.5cm and 0.6cm

Right- 1.5cm and 1.65cm

**Fig. 1:** Showing Sacralisation of Lumbar Vertebrae.



### DISCUSSION

To understand the LSTV or sacralisation, we need to know the embryological origin of lumbar vertebrae. It commences at 3rd week of intrauterine life. All vertebrae originate from somites that form along the cranial-caudal axis, on either side of the notochord, from presomatic mesoderm. These somites differentiate further into dermomyotome (future inner dermis and muscle) and sclerotome. Each sclerotome consists of loosely packed cells cranially and densely packed cells caudally. Some densely packed cells move cranially opposite the center of myotome where they form intervertebral disc. The remaining densely packed cells fuse with the loosely arranged cells of immediately caudal sclerotome to form mesenchymal centrum,

body of vertebra. The mesenchymal cells surrounding the neural tube form neural arch. Ossification of vertebra begins in 8<sup>th</sup> week & ends by 25<sup>th</sup> year. There are two primary centers & five secondary centers present in each vertebra[8]. Secondary centers are one for the tip of spinous process, one for the tip each transverse process & two each for annular epiphyses. The primary cause of LSTV is cranial shifts that mean sacralization of the last lumbar vertebrae & partial shifts which mean unilateral fusion of the transverse processes. Literature is unclear about exact origin of LSTV; it is likely a product of both genetic predisposition (Hox gene product concentration) and developmental influences. Various studies have been done to find out the causes, incidence and clinical features of sacralisation of lumbar vertebrae. Kharinar and Nachale found 6.6% of cases in their study[9]. Which Correlate with the observations done by Chet Savage(7%, 2005)[10]. Magora and Schwartz found 20.8% sacralization in his study[11]; Sacralization was found in 11.1% cases by Kubavat dharati et al [12]. Peter et al reported 6.2% sacralisation[13]. Otani *et al.* stated that a lumbosacral transitional vertebra was found more often in patients with disc herniation (17%) than in the control group(11%)[14].

The person is usually asymptomatic or may present with symptoms which include spinal or radicular pain, disc degeneration, L4/L5 disc prolapse, lumbar scoliosis and lumbar extradural defects [15]. In transitional lumbosacral segmentation, it was observed that the lumbosacral intervertebral disc is significantly narrowed[16,17,18]. The incidence of disc herniation is found to be higher and can occur even at young ages [19,20,21]. There was also relationship established between transitional vertebrae and the degree of slippage in spondylolytic spondylolisthesis [22]. In addition, this anomaly has known implications in the field of disc surgery. There are reports of surgery being performed at the wrong lumbar level [23] and the presence of a transitional vertebra may contribute to this error. It has been demonstrated that the discs immediately above the transitional vertebra were significantly more degenerative (disc protrusion or extrusion)

compared with the disc found between the transitional vertebra and the sacrum [24,25]. Also, nerve root canal stenosis has been found at the level suprajacent to the transitional vertebra [24]. According to Castellvi *et al.* the transitional vertebrae cause abnormal torque movements above these anomalous vertebrae, a fact that could result in disc degeneration [26]. Aihara *et al.* in an anatomical study of 70 cadavers claimed that the iliolumbar ligament at the level immediately above the transitional vertebra is much thinner and weaker than in cadavers without a lumbosacral transitional vertebra[25].

LSTV therefore may be one of the causative factors for low back pain and the importance of its identification in patients with low back pain cannot be ignored. Complications of sacralization of 5th lumbar vertebra causes pain are actual pressure on nerves or nerve trunks, ligamentous strain around the sacralization, compression of soft tissues between bony joints, by an actual arthritis if a joint is present, by a bursitis if a bursa is present. Failure to recognize & to find LSTV during spinal surgery may have serious complications. LSTV is associated with disc herniation, sciatic pain in some individuals. During delivery of baby, pelvis fails to expand in sacralization.

Pain erupts 1st time in young age & frequently history given is pain for few years. The improper formation and union of somites can cause vertebral abnormalities, including block vertebrae, cleft vertebra, and unilateral and bilateral hemivertebrae[27]. Lumbar spine experiences more abuse from normal functions than any other part of human skeleton[19,20]. According to M.U. Eyo *et al.* to be able to give support to and bear the weight of the body, the integrity of all the vertebrae in the spine, particularly in the lower back must be maintained[28, 29].

**Conflicts of Interests: None**

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