



Original Research Article

Study on sacralization of 5th lumbar vertebrae on human cadavers in the region of TelenganaShone Vasudeo Durge^{1,*}¹Dept. of Human Anatomy, Prathima Institute of Medical Sciences, Karimnagar, Telangana, India

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ABSTRACT

Sacrum is made up of fusion of 5 sacral vertebrae, which gives strength to the human body and transmits the weight to pelvic girdle which is made up of three bones ilium, ischium and pubis. Lumbosacral transitional vertebrae are congenital anomalies seen in some individuals in such individuals sacralization of 5th lumbar vertebrae is seen and in such individuals low back pain is seen throughout there life.

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1. Introduction and Background

A healthy vertebral column of humans consists of 5 cervical, 12 thoracic, 5 lumbar vertebrae and one sacrum made of 5 vertebrae.

Lumbosacral transitional vertebrae are congenital anomalies of the lumbosacral region, which include sacralization of fifth lumbar vertebrae. This phenomenon was observed first time by Bertolotti. ² This condition occurs due to defect in the segmentation of the lumbosacral spineduring development. ^{1,2}

During the fourth week, sclerotome cells migrate around the spinal cord and notochord to merge with cells from the opposing somite on the other side of the neuraltube. As development continues, the sclerotome portion of each somite also undergoes a process called resegmentation. Resegmentation occurs when the caudal half of each sclerotome grows into and fuses with the cephalic half of each subjacent sclerotome. ³⁻⁵ Thus, each vertebra is formed from the combination of the caudal half of one somite and

the cranial half of its neighbour, if any defects occur in this fusion than it will lead into sacralization and lumbarization of vertebrae.

Thus, the present study is carried out to know the prevalence, importance and type of sacralization of the fifth lumbar vertebra, which will help the orthopaedicians, gynaecologist and anaesthetics, radiologist in there day to day work of treating patients and will help in making proper diagnosis and treatment of patients.

2. Materials and Methods

2.1. Study design

Cross-sectional study.

2.2. Source of data

All the cadaveric bones available in the Department of Human Anatomy, Prathima institute of medical sciences, karimnagar, telangana, India, after applying inclusion and exclusion criteria were included in the study.

* Corresponding author.

E-mail address: shone_durge@rediffmail.com (S. V. Durge).

2.3. Exclusion criteria

Damaged, mutilated, and deformed sacra were excluded.

2.4. Types of fusion were classified as follows

1. Complete fusion between the fifth lumbar vertebra and the first sacral vertebra.
2. Incomplete fusion between the fifth lumbar vertebra and the first sacral vertebra.
3. Bilateral sacralization consists of a bony union between the abnormal transverse process and the sacrum on both sides.
4. Unilateral sacralization shows a bony union between the abnormal transverse process and the sacrum either on right side or left side.

Table 1: Gender (sex)-wise distribution of sacralization of fifth lumbar vertebra (n = 100)

	Male		Female		Total	
	No	%	No	%	No	%
Prevalence of	100		66.67		50	
			33.33		150	
Sacralization of 5 th Lumber Vertbrae					100	
	15		71.43		6	28.57

Table 2: Classification of sacralization of fifth lumbar

Unilateral sacralization	Bilateral		
	Right	Left	Total
Sacralization			
Sex	9	4	2
Male	15	4	1
Female	6	13	3
Total	21		

Table 3: Type of sacralization of fifth lumbar vertebra among different gender

Total	Male	Female
Complete	7	3
10		
Incomplete	8	3
11		

3. Observations

1. Out of 21 sacralized bones, 2 bones showed bilateral sacralization and 19 bones showed unilateral sacralization (Table 2).

2. Out of 21 sacralized bones, 10 bones showed complete fusion between fifth lumbar vertebra and first sacral vertebra, and remaining 11 bones showed incomplete fusion between fifth lumbar vertebra and first sacral vertebra (Table 3).

4. Discussion

The present study shows that the incidence of sacralization of the fifth lumbar vertebra is 21, out of which 15 are male sacra and 6 are female sacra. Based on the literature, the incidence of sacralization varied by the following races. The incidence in our study was close to the races like Australian aboriginals 18%, Indians 16% reported by Mitchell and Bustami⁶ and much higher than the races like, Natives of Britain 8%, and Arabs 10%. The incidence of sacralization was close that reported by Steinberg 14%, Vandana Sharma 14%, and the incidence was higher than reported by Kim 1.7%, Hughes 9.2%, Hald 7.8%, Hahn 7.5%, Kubavat 11.1%, and Chithrika 5%.

5. Conclusion

Knowledge of sacralization is very important for orthopaedicians, anatomist, radiologists, forensic experts. We are presenting such variation with emphasis on its clinical relevance.

6. Source of Funding

None.

7. Conflict of Interest

None.

References

1. Bertolotti M. Contributo alla conoscenza dei vici di differenziazione regionale del rachide con special riguardo all'asimilazione sacrale della v. Lombare. *Lombare Radiol Med.* 1917;4:113-44.
2. Dullerud R. Diagnostic imaging in lumbago and sciatica. *Tidsskr Nor Laegeforen.* 1999;119(12):1778-81.
3. Sadler TW. Langman's medical embryology. 13th ed. Philadelphia (PA: Wolters Kluwer/Lippincott Williams and Wilkins; 2010. p. 142.
4. Singh R. Analytical view of the simultaneous occurrence of sacralisation and congenital anomalies. *Eur J Anat.* 2012;16(2):127-33.
5. Bustami F. The anatomical features and functional significance of lumbar transitional vertebra. *Jordan Med J.* 1989;23:49-59.

Author biography

Shone Vasudeo Durge, Associate Professor

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