

# Complete Non-Fusion of Sacral Lamina - A Case Study

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**Abstract:** *The sacrum is a triangular bone which is formed by the fusion of five vertebrae and forms the posterosuperior wall of the pelvic cavity. Developmentally it develops as a typical vertebra. The neural arches meet at the mid dorsal line to form the rudimentary spines. The medial sacral crest presents below a sacral hiatus which is arched and is produced by the failure of the lamina of the fifth sacral vertebra to meet in the median plane. If the laminae are not fused, then the sacral canal will be open. Clinicians need to be aware of such conditions as a number of neurological deficits can occur due to the above said condition.*

**Keyword:** Anesthesia, Clinicians, Lamina, Sacrum, Vertebrae.

## 1. Introduction

The sacrum is a triangular bone which is formed by the fusion of five vertebrae and forms the posterosuperior wall of the pelvic cavity. The bone is wedged between two hip bones. Developmentally it develops as a typical vertebra. The neural arches meet at the mid dorsal line to form the rudimentary spines. The medial sacral crest presents below a sacral hiatus which is arched and is produced by the failure of the lamina of the fifth sacral vertebra to meet in the median plane. If the laminae are not fused, then the sacral canal will be open. The spines of the sacral vertebrae are fused to form the medial sacral crest. The hiatus is one of the useful landmarks to give epidural analgesia<sup>1</sup>. Non-fusion of all the five laminae of the sacrum is observed posteriorly which will present a midline gap<sup>2</sup>. This condition is observed in spina bifida. These kinds of anatomical variations can cause lower backache<sup>3</sup> due to compression of the nerve roots and also may cause the failure of epidural analgesia<sup>4</sup> procedure.

## 2. Materials and Methods

During routine osteology classes for the first MBBS a sacrum was observed in which the sacral canal was absent.



Image 1: Absence of sacral canal due to non fusion of lamina

## 3. Discussion

The sacrum develops from the fusion of five vertebrae. After puberty the sacral vertebrae start fusing with each other. The primary centers which form the each half of the vertebral arch fuse posteriorly to form a complete sacral canal. Any defect in the formation leads to incomplete formation of sacral canal. In the present study one sacrum was found to have unfused lamina having an open sacral canal. The knowledge about the level of the sacral hiatus is important because it is useful in caudal analgesia procedure. The knowledge of structural modification is essential. In clinical practice it is very important because the success of the caudal epidural anesthesia depend upon such variations. Spina bifida occulta or cystica can be accompanied and

neurological deficits can be present in such cases<sup>5</sup>. Nutritional factors and environmental factors may play a major role in such deformities. Maternal Diabetes during pregnancy has been observed to cause sacral agenesis<sup>5</sup>.

#### 4. Conclusion

Clinicians need to be aware of such conditions and their frequency in the local populations because the success of caudal epidural anaesthesia and analgesia depends on the anatomical variations of sacral hiatus. Neurological symptoms may be caused due to such anomalies. There is a lot of future scope for such studies because local environmental factors and also nutritional factors are responsible for such anomalies which can be identified by further studies.

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