ABSTRACT

AIM: To study the incidence of sacralisation in dry bones.

INTRODUCTION: Sacralisation means addition of sacral elements by the incorporation of fifth lumbar vertebra. Sometimes the transverse process becomes unduely elongated and fuse with ilium or sacrum, or both. The clinical significance of sacralisation of lumbar vertebra lies in the findings that it causes fifth lumber nerve compression resulting in pain along the sciatic nerve distribution.

MATERIAL & METHODS: The study included examination of 65 dry sacra. Non-pathological sacra of both sexes were included i.e. 51 male & 14 female.

OBSERVATION: Total incidence of sacralisation was observed to be 13.84 % in the present study. Out of 9 sacralised bones, 7 (77.77%) bones showed bilateral sacralisation, whereas 2 (22.22%) bones showed unilateral sacralisation.

DISCUSSION: J. L. Bron, in a systematic review on the subject, analyzed all relevant studies from 1986 till 2006 and documented that the mean prevalence of sacralisation to be 12.3 %.

CONCLUSION: The study concludes that the incidence of sacralisation in Gujarat is significantly high. Reports in 2012 and this study have constantly showed the incidence to be above 10 %.

Key words: Sacralisation, lumbar vertebra, sacrum
INTRODUCTION

Of late years the condition known as Sacralisation of the lumbar vertebra has come into considerable prominence on account of the fact that radiography has thrown its beam of light upon a condition about which previously very little was known, and which most certainly is entirely undiagnosable without an x-ray examination and is rarely if ever suspected of being present from any symptoms which may be complained of.

Until recent years there was very little literature on the subject, and practically all there was, was purely anatomical. Thus the Index Medicus from 1917 to 1920, inclusive, gives no references under the heading of Sacrum or Sacralization, but in 1921 a considerable number of papers are recorded.¹

The late Professor Paterson, of Liverpool University, published a monograph in the Scientific Transactions of the Royal Dublin Society in 1893, on the Sacrum i.e., two years prior to the discovery of x-rays. He points out in this paper, which is a very elaborate one, that the lateral mass of the sacral region equals (or represents) the transverse processes and ribs of the thoracic portion of the spine; he figures two unilateral and three bilateral cases of sacralization, and one embryo of seven months with the unilateral condition.²

In 1979, Bertolotti was the first to describe an association between LSTV (Lumbosacral Transitional Vertebra) s and low back pain (LBP). However, this has remained a matter of debate in the literature for almost a century now.³

Because it articulates or fuses the sacrum, a lumbosacral transitional vertebra is an important part of the weight-bearing platform. Repetitive flexion and extension stress the transitional lumbosacral osseous complex, which is delineated superior disc space above the vertebra and inferiorly by the sacroiliac joint. Stress is greatest at the superior disc space and the articulation between the transitional transverse process and sacrum.⁴

Spondylolisthesis is a complication documented arising as a result of sacralization.⁵

MATERIAL & METHODS

The project “A study on sacralisation of lumbar vertebra” was carried out in Smt. B. K. Shah Medical Institute and Research Centre, Piparia, Gujarat.

The study included examination of 65 dry sacra.

Non-pathological sacra of both sexes were included i.e. 51 male & 14 female

The sacra available in the department of Anatomy, SBKSMI&RC, and Piparia were selected for the study.
The analyzed data was recorded and tabulated for observation and interpreted in the light of relevant precedence.

**Exclusion criteria:**
1) Natural, accidental, operative and pathological manipulations of bones.

**Inclusion criteria:**
1) Both sexes and all races.

**OBSERVATIONS**

65 sacra were included in the present study. Of them, 51 were male and 14 were female sacra.

It was observed that out of 65, 9 (13.84 %) sacra showed sacralisation. (Table 1) (Figure 1)

8 sacralised bones were male and 1 female.

Out of 9 sacralised bones, 7 (77.77 %) bones showed bilateral sacralisation, whereas 2 (22.22 %) bones showed unilateral sacralisation. (Table 2)

**DISCUSSION**

This anatomic variant is reported as having an incidence of 4% to 21%. Recently very high incidence of 30% has been reported.³

The range of findings may be attributed to the difference in inclusion criteria, diagnostic criteria, imaging techniques where live subjects were made to participate.

Bertolotti (1917)⁸ described the relationship between the low back pain and sacralisation of fifth lumbar vertebra. In young patients with back pain the possibility of Bertolotti’s syndrome should always be taken in account.

Hsieh et al found a prevalence of 4% in mainly Chinese population with anteroposterior plain radiograph for diagnosis.⁶

J. L. Bron, in a systematic review on the subject, analysed all relevant studies from 1986 till 2006 and documented that the mean prevalence of sacralisation to be 12.3 %.³

Kubawat Dharati et al have reported the incidence of sacralisation in Gujarat to be 11.1%⁷

Present study found an incidence of 13.84 %, which very well falls within the documented range, and close to the global mean percentage.

The incidence in our study was much higher than that 3.6 % reported by Moore and Illinosis (1925)⁵

Table 3 shows a comparison of various studies with our study, and is self-explanatory.
CONCLUSION

The study concludes that the incidence of sacralisation in Gujarat is significantly high. Reports in 2012 and this study have constantly showed the incidence to be above 10%.

The present study shows that the incidence of sacralisation of fifth lumbar vertebra is 13.84%, which is more in males than female. Based on the literature, sacralisation varied by race and incidence, in our study was close to the Arabs 10% reported by Bustami (1989)¹.

Due to sacralisation of fifth lumbar vertebra may cause greater difficulty during labour because of less mobile pelvis & may cause low back pain.

This study can be of use as a prelude to any type of experimental work in biomechanics, and therapeutic purpose in low back pain.

Many unexplained cases of low-back pain, especially in young adults, may be investigated and treated keeping sacralisation as one of the etiologic factor.

However, the low number of samples may be one reason attributed to high incidence recorded in this study. Inclusion of more number of samples, and undertaking radiographic studies in live adults may substantiate or fine-tune the documented evidence.

Table 1: Sex wise distribution of sacralisation

<table>
<thead>
<tr>
<th></th>
<th>Male (%)</th>
<th>Female (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sacra studied</td>
<td>51(78.46%)</td>
<td>14(21.53%)</td>
<td>65 (100%)</td>
</tr>
<tr>
<td>Sacralisation</td>
<td>8 (12.30%)</td>
<td>1(1.53%)</td>
<td>9 (13.84%)</td>
</tr>
</tbody>
</table>

Table 2: Classification of sacralisation (total 9 sacra)

<table>
<thead>
<tr>
<th></th>
<th>Male (%)</th>
<th>Female (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unilateral sacralisation</td>
<td>1(11.11%)</td>
<td>1(11.11%)</td>
<td>2 (22.22%)</td>
</tr>
<tr>
<td>Bilateral Sacralisation</td>
<td>7 (77.77%)</td>
<td>0 (0%)</td>
<td>7 (77.77%)</td>
</tr>
</tbody>
</table>
Table 3: Comparison of various studies on sacralisation since 1986\textsuperscript{3, 7}

<table>
<thead>
<tr>
<th>First author</th>
<th>Year</th>
<th>Number Patients</th>
<th>Sacralisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kubawat</td>
<td>2012</td>
<td>189</td>
<td>21 (11.1%)</td>
</tr>
<tr>
<td>Hughes</td>
<td>2006</td>
<td>500</td>
<td>46 (9.2%)</td>
</tr>
<tr>
<td>Steinberg</td>
<td>2003</td>
<td>464</td>
<td>65 (14%)</td>
</tr>
<tr>
<td>Kim</td>
<td>2003</td>
<td>690</td>
<td>12 (1.7%)</td>
</tr>
<tr>
<td>Chithriki</td>
<td>2002</td>
<td>441</td>
<td>22 (5.0%)</td>
</tr>
<tr>
<td>Santiago</td>
<td>2001</td>
<td>138</td>
<td>16 (11.6%)</td>
</tr>
<tr>
<td>Peh</td>
<td>1999</td>
<td>129</td>
<td>8 (6.2%)</td>
</tr>
<tr>
<td>Hald</td>
<td>1995</td>
<td>5781</td>
<td>451 (7.8%)</td>
</tr>
<tr>
<td>Hahn</td>
<td>1992</td>
<td>200</td>
<td>15 (7.5%)</td>
</tr>
<tr>
<td>Leboeuf</td>
<td>1989</td>
<td>530</td>
<td>29 (5.5%)</td>
</tr>
<tr>
<td><strong>Present Study</strong></td>
<td><strong>2012</strong></td>
<td><strong>65</strong></td>
<td><strong>9 (13.84%)</strong></td>
</tr>
</tbody>
</table>

Figure 1: Sacralised lumbar vertebrae.

REFERENCES


4) Leonard P. Connolly, MD; Pierre A. d’Hemecourt, MD; Susan A. Connolly, MD; Laura A. Drubach, MD; Lyle J. Micheli, MD; and S. Ted Treves, MD. Skeletal scintigraphy of young patients with low back pain and a Lumbosacral transitional vertebra. J Nucl Med 2003; 44:909-914.


