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## Letter to the Editor

### Lumbosacral transitional vertebrae: variations in low back structure, biomechanics, and stress patterns

To the Editor,

The article “Partial lumbosacral transitional vertebrae: 2 cases of unilateral sacralization” by Dr Jeffrey M. Muir is an important clinical report. Although the relationship between lumbosacral transitional vertebrae (LSTV) and low back pain (LBP) is debated, association of LSTV with altered low back biomechanical equilibrium cannot be denied.

A few observations on LSTV in concurrence with the report:

1. In light of recently published data, the prevalence of LSTV in the population seems to be greater in comparison to what had been reported in the past.<sup>1-3</sup>
2. Accessory L5/S1 articulations form the bulk of the LSTV population followed by sacralization of L5 and lumbarization of S1 vertebrae.<sup>1,4</sup> In each of these 3 groups, unilateral variations are encountered more commonly than their bilateral counterparts.
3. Asymmetrical biomechanical alterations, as one would suspect, could be associated primarily with the unilateral LSTV. The side bearing the additional L5/S1 relationship (unilateral pseudoarticulation, sacralization, or lumbarization) would transmit larger proportion of load on that side.<sup>4,5</sup> This would possibly result in, as Muir has observed in both of his cases, (a) lateral tipping of the iliac crest(s) to the same side and (b) the *convexity* of a scoliotic curve (if at all subjectively present) directed towards the side of the unilateral transition. This author has observed discrete side-related variations (in area and of vertical positioning) of the sacral auricular surfaces in context of LSTV. In cases of unilateral sacralizations, it is interesting to note that fusion of the ends of L5 transverse process to the sacral ala augments the auricular area on that side only.<sup>5</sup> Muir has reported an additional, small sacroiliac (SI) articulation in his case 2. Unilateral increase in the auricular area most

probably results in (a) increased loading of that joint, (b) greater wear and subsequently irritation of the joint, (c) greater fixation on examination, and possibly (d) increased one-sided muscle activity. The increased vertical iliac dimension reported by Muir possibly could be accounted for by the increase in the vertical extension of the SI joint surface with incorporation of the sacralized L5 transverse process into the SI joint. It would be interesting to note any comparative increase in the trabecular bone density in the ilium on the affected side.<sup>6</sup>

4. Unilateral sacralization would probably “fix” the L5 on top of the S1 too rigidly to elicit or appreciate compromise of movement in any spatial axis, exclusively at the L5/S1 junction. Any restriction to overall ipsilateral bending on the affected side may result from muscle soreness or related SI joint pain in a situation with unilateral sacralization. On the other hand, it is likely that an L5/S1 unilateral pseudoarticulation would not only restrict ipsilateral side bending mechanically, but additionally may also severely restrict lateral bending or axial rotation because of the pain originating from the inflamed pseudoarticulation (and/or from the ipsilateral dysplastic facets that often coexist with such LSTV<sup>7</sup>) with any effort for such movement. The LSTV probably impose movement restrictions also by modifying the overall configuration of the lumbar spine secondary to losing or adding vertebral components.<sup>8</sup> This document is of immense value to clinicians and researchers probing possible relationships between LSTV and LBP.

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