

## Mini Review - Sacral Fractures After Lumbosacral Fusions

Andrei F. Joaquim

Andrei F. Joaquim, Neurosurgeon – Spine Division, Department of Neurology, Discipline of Neurosurgery, State University of Campinas (UNICAMP), Campinas SP, Brazil.

**Conflict-of-interest statement:** The author(s) declare(s) that there is no conflict of interest regarding the publication of this paper.

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**Correspondence to:** Andrei F. Joaquim, Neurosurgeon – Spine Division, Department of Neurology, Discipline of Neurosurgery, State University of Campinas (UNICAMP), Campinas SP, Brazil.  
**Email:** [andjoaquim@yahoo.com](mailto:andjoaquim@yahoo.com)  
**Telephone:** +55-19-35217905

**Received:** April 27, 2017

**Revised:** May 15, 2017

**Accepted:** May 16 2017

**Published online:** August 28, 2017

### ABSTRACT

Sacral fractures may be complication of lumbar and lumbosacral fusions, increasing costs and morbidity of spinal surgeries. The most common risk factors for sacral fractures are obesity, sagittal unbalance, poor bone quality and a long fusion. Clinical presentation generally consists of a new low back or buttock pain after some days/ weeks or months after an index lumbar procedure. Although plain radiographs may diagnosis sacral fractures, CT scan with reconstruction is the image modality of choice for these injuries. Treatment may consist in pain management in mild and aligned fractures or surgical revision, including extending the posterior fusion with iliac fixation. Understand the nuances involved in sacral fractures after fusions are important to try to avoid this complication and, when it happens, performed the adequate diagnosis and management.

**Key words:** Sacral fractures; Diagnosis; Management; Treatment

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Joaquim AF. Mini Review - Sacral Fractures After Lumbosacral Fusions. *International Journal of Orthopaedics* 2017; **4(4)**: 786-787  
Available from: URL: <http://www.ghrnet.org/index.php/ijo/article/view/2051>

### MINI REVIEW

Lumbar fusions to treat degenerative lumbar disease are one of the most common spinal procedures performed around the world<sup>[1]</sup>. Lumbar and lumbosacral (LS) fusions may result in higher stress forces at the spinal levels near the fusion segments, which increase the risks of adjacent spinal stenosis, disc degeneration and also junctional fractures<sup>[2,3]</sup>. Potential causes for the higher risk of spinal changes in the adjacent fusion areas are the abnormal distribution of the forces (such as the body weight), overloading the normal or near normal spine below and above the fusion levels. The risk of spinal fractures after LS fusions increases in patients with osteoporosis, obesity, sagittal spine unbalance and long fusions (more than five levels) without iliac fixation<sup>[2,4,5,6]</sup>. The estimate incidence of sacral fractures is about 1.3% after short segmental fusions and up to 3.1% in long fusions<sup>[7]</sup>.

Sacral fractures after fusion should be suspected in patients who had unspecific new buttock or low back pain after some days, weeks or even months of the index surgery<sup>[2,3,4]</sup>. Radiculopathy may also occur. The pain intensity is variable, from mild to severe, sometimes with intractable pain. Diagnosis of sacral fractures after lumbar fusions can be made using simple plain radiographs. However, the best radiological method for diagnosing sacral fractures is CT scan with reconstruction, especially in the setting of previous instrumentation<sup>[7]</sup>.

Conservative treatment of sacral fractures after LS fusions has been reported with or without using a brace with thigh extension, in patients without severe misalignment and mild or controlled pain. However, the majority of the cases were treated successfully with a posterior revision surgery and extension of the instrumentation to the pelvis, with fracture healing<sup>[7,8]</sup>. Lag screws directly to the sacral fractures were also reported anecdotally by some authors<sup>[9,10]</sup>.

By this time, the best way to prevent sacral fractures is to understand the risk factors, avoiding, for instance, stopping long fusions at S1 and adequate correction of sagittal unbalance. Additionally, it is important to treat osteoporosis and obesity to potentially decrease complications. Further comparative studies are also necessary to clarify the best treatment options.

## REFERENCES

1. Deyo RA, Mirza SK, Martin BI, Kreuter W, Goodman DC, Jarvik JG. Trends, major medical complications, and charges associated with surgery for lumbar spinal stenosis in older adults. *JAMA* 2010; **303**: 1259-65. [DOI:10.1001/jama.2010.338]; [PMID: 20371784]
2. Chen WJ, Lai PL, Niu CC, et al. Surgical treatment of adjacent instability after lumbar spine fusion. *Spine (Phila Pa 1976)* 2001; **26**: E519–E524. [PMID: 11707723]
3. Schlegel JD, Smith JA, Schleusener RL. Lumbar motion segment pathology adjacent to thoracolumbar, lumbar, and lumbosacral fusions. *Spine (Phila Pa 1976)* 1996; **21**: 970–981 [PMID: 8726202]
4. Park P, Garton HJ, Gala VC, Hoff JT, McGillicuddy JE. Adjacent segment disease after lumbar or lumbosacral fusion: review of the literature. *Spine (Phila Pa 1976)* 2004; **29**: 1938–1944. [PMID: 15534420]
5. Khan MH, Smith PN, Kang JD. Sacral insufficiency fractures following multilevel instrumented spinal fusion: case report. *Spine (Phila Pa 1976)*. 2005; **30(16)**: E484-8. [PMID: 16103844]
6. Yasuda T, Hasegawa T, Yamato Y, Kobayashi S, Togawa D, Banno T, Arima H, Oe S, Matsuyama Y. Lumbosacral Junctional Failures After Long Spinal Fusion for Adult Spinal Deformity-Which Vertebra Is the Preferred Distal Instrumented Vertebra? *Spine Deform.* 2016; **4(5)**: 378-384. [DOI: 10.1016/j.jspd.2016.03.001]; [PMID: 27927496]
7. Klineberg E, McHenry T, Bellabarba C, Wagner T, Chapman J. Sacral insufficiency fractures caudal to instrumented posterior lumbosacral arthrodesis. *Spine (Phila Pa 1976)*. 2008; **33(16)**: 1806-11. [DOI: 10.1097/BRS.0b013e31817b8f23]; [PMID: 18628715]
8. Khanna AJ, Kebaish KM, Ozdemir HM, Cohen DB, Gonzales RA, Kostuik JP. Sacral insufficiency fracture surgically treated by fibular allograft. *J Spinal Disord Tech.* 2004; **17(3)**: 167-73. [PMID: 15167330]
9. Noh T, Chedid MK. A novel technique to repair a transverse sacral fracture in a previously fused lumbosacral spondylolisthesis. *Surg Neurol Int.* 2016; **21(7)**: S914-S916. [DOI: 10.4103/2152-7806.194519]; [PMID: 28028448]
10. Koh YD, Kim JO, Lee JJ. Stress fracture of the pelvic wing-sacrum after long-level lumbosacral fusion: a case report. *Spine (Phila Pa 1976)*. 2005; **30(6)**: E161-163. [PMID: 15770169]

**Peer reviewer:** Mohamed Abdel-Wanis