

## Letter: Sacroplasty Augmentation of Instrumented Pelvic Reconstruction After High Sacrectomy: A Technical Case Report

To the Editor:

We have read the article titled “Sacroplasty Augmentation of Instrumented Pelvic Reconstruction After High Sacrectomy: A Technical Case Report”<sup>1</sup> with great interest. The authors presented a novel reconstruction technique using cement (poly(methyl methacrylate) [PMMA]) sacroplasty to augment pelvic instrumentation after high sacrectomy for treating sacral solitary fibrous tumor.<sup>1</sup> They have suggested that PMMA provides a biomechanically stronger construct that could prevent the need for fusion of the mobile segments of the lumbar spine after high sacrectomy.<sup>1</sup>

Tumors of the sacrum and related anatomical structures are rare; because of relative resistance to chemotherapy and radiotherapy, most of the primary sacral tumors require radical en bloc resection.<sup>1,2</sup> Not only the tumors invading the sacropelvic region alone themselves but also their surgical resections can significantly affect the biomechanical alterations.<sup>3</sup> Fourney et al<sup>2</sup> categorized sacral resections by the localization of the tumor: midline and eccentric. The midline group was further divided into low, middle, and high sacral amputations; total sacrectomy; and hemicorporectomy.<sup>2</sup> Because of functional outcomes of nerve root sacrifice, the type of midline sacral amputation was described by the level of nerve root sacrifice, not by the level of the osteotomy.<sup>2</sup> Therefore, a high sacral amputation involved the sacrifice of at least 1 S2 nerve root. To provide disease-free margins, the high sacral osteotomy occasionally crossed the body of S1 (above 1 anterior sacral foramen), resulting in sacrifice of one of the S1 nerve roots. If neither S1 nerve roots could be spared, then total sacrectomy was performed.<sup>2</sup> To preserve mechanical support and ambulatory functions, lumbopelvic fixation is recommended in patients who undergo total sacrectomy.<sup>2</sup> Besides, because of the instability in the sacropelvic junction resulting from the weakening of pelvic ring, and the increased risk of postoperative sacral fracture,<sup>4</sup> lumbopelvic stabilization should be considered in cases of high sacral amputations above S1 foramina, total sacrectomy, extended total sacrectomy, and eccentric tumors involving sacroiliac joint only in one side.<sup>3</sup>

In their unique case, Sacino et al<sup>1</sup> performed an L5 laminectomy, skeletonized the S1 nerve roots, and disconnected the thecal sac below S1. They excised the tumor in en bloc fashion with preservation of S1 nerve roots. Because more than 50% of posterior S1 and S2 vertebral bodies were resected, a sacroplasty to reconstruct the sacrovertebral bodies was performed. For pelvic ring reconstruction, bilateral S2 alar iliac screws along with a horizontal rod and fibular structural allograft were conducted.<sup>1</sup> They have also mentioned that “as the extent of resection involved over half of the S1 body, pelvic reconstruction was performed; however, with the use of PMMA, there was no need for extending the fusion to the lumbar spine.”<sup>1</sup>

Although it has been stated in the article, we were in doubt about the indication(s) of sacropelvic fixation when we evaluated the imaging studies. As was mentioned in the article, preoperative MRI showed a sacral mass originating in the spinal canal that extends into the posterior vertebral bodies at S1 and S2. The mass laterally displaced the S1 nerve roots and partially encased the left S2 nerve root, and a noncontrast computed tomography scan revealed bony remodeling of the sacrovertebral body and posterior elements predominantly at S2.<sup>1</sup> Postoperative views showed resection and reconstruction in the early period and no evidence of tumor recurrence and S1 foramen reconstruction at 4 mo.<sup>1</sup> When given postoperative scans were evaluated in detail, rather than a high sacral bony amputation, sacral laminectomies and partial sacrovertebral body excisions were performed. Of note, both sacroiliac joints and ligaments and the anterior and distal parts of the sacrum were seen to be kept intact. Because bilateral S1 nerve roots were preserved, this type of sacrectomy might be named as “high” regarding the classification,<sup>2</sup> but it is not suitable to use the term “bone amputation” in the presented case with anatomically intact pelvic ring, remaining anterior and caudal sacrum with their ligaments. Although Sacino et al<sup>1</sup> did not perform a whole cut under the S1 vertebral body, it has been shown in biomechanical studies that sacropelvic stability is preserved even after the sacral resection through the S1 foramen; in other words, by leaving the S1 vertebral body intact, lumbopelvic fixation can be avoided.<sup>5,6</sup> Following these, it is difficult to figure out why this patient underwent sacropelvic fixation. The decision for performing the latter could be because of the following reasons: (1) detected instability throughout the surgery—on this occasion, *we would like the authors to share more evident imaging studies*, and (2) pathology might be revealed as meningeal solitary fibrous tumor requiring adjuvant radiotherapy,<sup>7</sup> so a prophylactic fixation for prevention of insufficiency fracture might have been performed; however, in this instance, *only PMMA augmentation of the sacrovertebral bodies seem to be effective rather than adding instrumentation, which might put the patient under the risks of hardware-related and allograft-related complications*.






In conclusion, because this article has been presented by a highly experienced spine tumor center that guides and drives us as treating physicians, clarifying the abovementioned issues would be relevant for the treatment plan of future patients. We thank the authors for sharing their great experiences and looking forward to receiving their valuable comments.

### Funding

This study did not receive any funding or financial support.

### Disclosures

The authors have no personal, financial, or institutional interest in any of the drugs, materials, or devices described in this article.

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