



# Editorial on “Use of S2-alar-iliac screws associated with less complications than iliac screws in adult lumbosacropelvic fixation”

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Lumbopelvic fixation remains a challenging and controversial topic because of the high mechanical demand around this area, high nonunion rate of lumbosacral junction and the invasive nature of the procedures. The indications for lumbopelvic fixation includes deformity, degenerative pathology, neoplasms, trauma, flat-back syndrome, pelvic obliquity, high-grade spondylolisthesis and infection in the lumbosacropelvic spine (1). There are multiple techniques exist for lumbopelvic fixation, including trans-iliac bars, iliac bolts and sacroiliac screws. With the advent of iliac screws in the early 2000s, several study reported improved outcomes compared with the Galveston technique. Iliac screws can offer better pull-out strength than the earlier Galveston technique and easier placement of modular components in lieu of complicated 3-dimensional contouring of rod (2,3). To improve the outcome, the S2-alar-iliac (S2AI) screw technique has been recently described and utilized as an alternative to the iliac screw, which has some advantages over the others including no offset modular connector required, less dissection and less instrumentation prominence. Early reports have also demonstrated decreased implant-related complications (4). Zhu *et al.* have indicated that it is feasible for S2AI screws to be used in Chinese adult patients and S2AI screw technique has theoretical advantages over traditional sacropelvic fixation techniques (5). Liu *et al.* also reported that S2AI is a powerful procedure for the treatment of kyphoscoliosis, which can readily correct the pelvic obliquity, achieves *en bloc* fusion and reduces the rate of implant failure (6).

Despite many studies have demonstrated the advantage of utilizing S2AI technique in lumbopelvic fixation, whether S2AI technique is superior in clinical and radiographic outcome is still controversial. In this context, Benjamin *et al.* performed a single-center retrospective cohort study comparing patients underwent lumbopelvic fixation utilizing iliac screw versus S2AI screw technique (7). They reported that patients utilized S2AI screws had lower rates of reoperation, surgical site infection (SSI) and symptomatic screw prominence. Significant improvements in visual analog scale (VAS) and ambulatory status were identified in both groups, but there are no statistically significant differences between the groups. This study suggested that lumbopelvic fixation utilized S2AI technique was associated with less complications, while achieving similar clinical and functional outcomes compared with iliac screw (IS) technique. To our knowledge, the study performed by Benjamin *et al.* is the largest study comparing the S2AI technique with IS technique. Patients' baseline characteristics were very similar, without statistical differences. This baseline characteristic permits for an accurate comparison between IS technique and S2AI technique.

This study also demonstrates multiple intrinsic limitations. (I) Although the results show that procedure utilizing S2AI technique have lower rates of complications, the procedure for patients were not randomized: five patients who were contraindicated for S2AI screws received iliac bolts. The contraindication including prior history of

high sacrectomy or sacral fracture which may associated with higher rates of complications in the IS group. This may bias the result. (II) Additionally, patients from both group consisted of multiple pathologies. Although statistically insignificant, there is a relatively higher rates of tumor pathologies within the IS group (20.0% vs. 6.2%,  $P=0.11$ ). The univariate analyses in this context showed that patients diagnosed as tumor preoperatively was associated with reoperation ( $P<0.1$ ). Since IS group has higher rates of tumor patients, this fact may associated with more complications compared with S2AI group. (III) To diagnose the sacroiliac joint pain, author administrate sacral compression test, thigh thrust test, and/or Patrick's test to all patients. In our opinion, diagnosis of the sacroiliac (SI) joint as the primary pain generator can be complex as patients often present with a combination of low back, groin, gluteal, and/or leg pain and the symptom profile may mimic other disorders of the lumbar spine and hip. It is appropriate that Author may confirmed the sacroiliac joint pain using intra-articular sacroiliac joint injection (8). (IV) Furthermore, previous study reported that none of their patient suffered from sacroiliac joint pain after lumbopelvic fixation utilized S2AI technique. Need to be address, all S2AI screws were inserted using stereotactic image guidance (O-arm Surgical Imaging System), which may avoided the cartilage violation (9).

Finally, S2AI technique has multiple advantages over IS technique but acquire similar clinical and functional outcomes. Future prospective studies with long-term follow-up will be necessary to identify the difference between these two techniques. Patients consist of homogeneous pathology will permit a more accurate result in the comparison. The CT scan of sacroiliac joint of patients utilized S2AI technique may require during the follow up to find out whether if there is sacroiliac joint fusion or degeneration, which may affect the functional outcomes.

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