

Fusion for high-grade pediatric lumbar spondylolisthesis: A short case series with focus on the importance of S2 alar-iliac screws for pelvic fixation as a salvage strategy in revision spondylolisthesis cases.

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# Learning Objectives

Management of high grade pediatric lumbar spondylolisthesis

### Introduction

Literature pertaining to failed fusions and revision pediatric spondylolisthesis surgery is scarce. Salvage strategies in the form of iliac screws for the commonly occurring S1 screw failures have been described; however, limitations exist. We illustrate the utilization of S2AI screw as a salvage strategy in revision pediatric spondylolisthesis surgery.

### Methods

Three consecutive surgically managed pediatric high-grade spondylolisthesis patients were retrospectively analyzed. Pre -operative, post-operative and follow-up clinical and radiological data pertaining to the cases was retrieved from the hospital electronic database.

#### Results

All three patients were petite, pre-pubertal females (Risser grade I) presenting with symptomatic Meyerding grade IV spondylolisthesis at the L5-S1 level. As per the SDSG classification system, case 1 was type 6; while, cases 2 and 3 were type 5. Patients underwent successful operative management with wide decompression of neural structures, reduction of spondylolisthesis (to maximum possible extent) and posterior fusion. Case 1 had failed fusion at 12 months follow-up due to bilateral S1 screw breakage. The distal fixation at revision was achieved by utilizing S2-alar iliac screws as salvage strategy in order to get pelvic fixation into the construct.



: Imaging studies for Case 1 - (A) Preoperative standing lateral X-ray showing Grade IV L5-S1 spondylolisthesis; (B) Immediate post-operative standing lateral X-ray showing reduction of spondylolisthesis and L4-S1 posterior fusion; (C) X-ray at 18 month follow-up showing breakage of B/L S1 screws with increasing deformity associated with recurrence of back pain; (D) and (E) show antero-posterior and lateral standing Xrays of the salvage construct utilizing the iliac screw for additional support.

## Conclusions

Certain issues like incorporation of pelvic support in primary surgery remain contentious due to the thin built and prominent pelvic bones encountered in children. The S2 alar -iliac screw may be safely considered as a salvage procedure in cases of failed fusion or may even be incorporated to enhance the strength of the construct (by including pelvic support) in high grade pediatric spondylolisthesis in unbalanced spines.



Imaging studies for Case 2 – (A) Preoperative standing X-rays showing Grade IV lumbosacral spondylolisthesis and juvenile idiopathic scoliosis (45.3 degree);
(B) Immediate post-operative lateral X-ray showing partial reduction and posterior fusion; (C) Follow-up imaging at 12 months showing maintained reduction of listhesis. Right S1 broken screw noted.



Imaging studies for Case 3 – (A) Preoperative, (B) immediate post-operative and (C) 24-month follow-up standing lateral X-rays in an 11 year old female who underwent partial reduction and posterior fusion of Grade IV spondylolisthesis.