Introduction: The main goal of treatment in early-onset scoliosis is to obtain and maintain curve correction while simultaneously preserving spinal, trunk, and lung growth. This study introduces a new surgical strategy, called the sliding-growing rod technique, developed to treat spinal deformities without necessity of repeated operative lengthenings. The results of patients treated with this technique for early onset spinal deformities with > 1 year follow-up was evaluated.

Methods: 11 (6F/5M) patients with early onset spinal deformities with a mean age of 5.8 (3-10) were evaluated. Surgical technique included placement of polyaxial pedicle screws with a muscle-sparing technique under fluroscopy. Following instrumentation precontoured proximal and distal rods placed and connected together with cantilever correction maneuver by side to side connectors (domino connectors) at the level just proximal to the distal two segments while applying gentle traction from head and both legs to facilitate correction. Domino connectors held the proximal rods in loose position whereas distal rods were kept fixed. The most proximal and most distal two segments were fixed and fused; the rest of the screws were left with unlocked set screws to allow vertical growth. This construction enables dynamic fixation in order to allow self growing and decrease the number of lengthening operations.

Results: The mean follow-up period was 14.8 months (12-19). The average preoperative main thoracic (MT) curve of 58.7° (38°-89°) thoracolumbar/lumbar (TL/L) curve of 43.4° (12°-88°) and were corrected to 24.5° (5°-59°) and 16.4° (3°-54°) respectively at the follow up. The mean correction rate was was %60.7 in MT and %68 in TL/L. Preoperative thoracic kyphosis of 35.1° (4°-86°) and lumbar lordosis of 55.3° (4°-89°) was maintained at 29.4° (20°-66°) and 55.7° (31°-70°) respectively. The mean increase in length was 1.14 mm (0.7-1.41 mm) per month and the mean increase in T1-S1 height was 1.28 mm per month. The mean number of pedicles screws placed segments were 13.6 (12-16). No patient had neurological impairments. There was no rod breakages or other implant failure and wound problems treated without surgery. This modification prevented 22 repeated planned lengthening procedures.

Conclusion: In this preliminary study, the sliding-growing rod technique with apical and intermediate anchors provided significant deformity control and prevented progression, maintained rotational stability and eliminate repeated lengthening surgeries.