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**Spinal Fusion with EXPEDIUM™ 4.5mm Titanium Rod System**

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*FIGURE 1A. Pre-op radiography.**FIGURE 1B. Pre-op radiography.**FIGURE 2. Pre-op MRI.***History**

A boy has type I mucopolysaccharidosis. He has been treated with enzyme replacement (L-iduronidase, "Aldurazyme®") by his geneticist. He is ambulatory, stable, growing and doing well. He never developed cervical instability or stenosis. His valgus knees have improved dramatically with hemiepiphysodesis. He has had a progressive kyphoscoliosis which is typical of this condition. Early in childhood he wore a thoracolumbar orthosis in an attempt to stop progression of this deformity. However it was not tolerated, ineffective, and stopped a year later. His curve has been progressive, measuring 65 degrees kyphosis (apex L3) and 45 degrees lumbar scoliosis. It causes him pain and inability to stand straight. His geneticist felt that his stable medical situation warranted surgery to halt this progressive deformity. His weight was 47 kg and height was 48 inches.

**Radiology**

Preoperative radiographs are shown in figures 1A and 1B. His preoperative MRI showed significant apical (L2-3) vertebral deformity, and bulging of the discs causing ventral impression on the thecal sac, as shown in figure 2. He had no spasticity or focal weakness. He was incontinent at baseline.



FIGURE 3A. Post-op radiography.

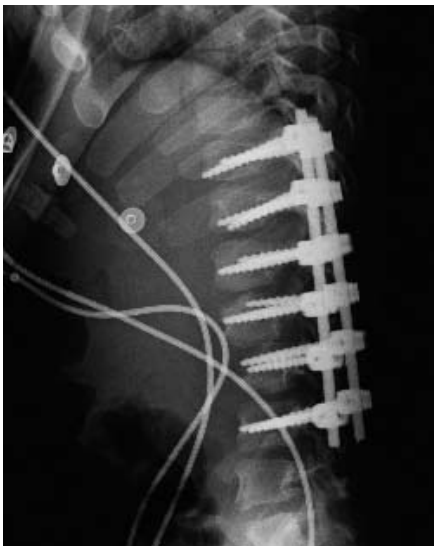


FIGURE 3B. Post-op radiography.

## Surgical Procedure

He underwent a posterior spine fusion from T11-L4. There was no infusion to the sacrum because of his age and mobility. Wide posterior releases allowed significant correction of the kyphosis. Pedicle screws were placed bilaterally in each level so that we could segmentally translate and correct the wedged vertebrae as shown in figures 3A and 3B. The pedicles were very small, sclerotic and difficult to cannulate. We used 4.35 and 5mm wide, 25-35mm screws for this procedure. No cross-connectors were used because of the segmental screws. Transcranial motor and sensory spinal cord monitoring was performed and was uneventful throughout the case. The rod properties allowed harmonious correction of the deformity and prevented the formation of a junctional kyphosis.

## Results

He also underwent revision of one of his hemieiphysesodesis screws at each knee. The blood loss for the entire surgery was 250cc. He spent one day in the intensive care unit. He was mobilized without a brace. He began ambulating on post operative day 3. He was discharged on postoperative day 5 without complications.