PREOPERATIVE DIAGNOSIS (ES):, L4-L5 and L5-S1 degenerative disk disease/disk protrusions/spondylosis with radiculopathy.,POSTOPERATIVE DIAGNOSIS (ES):, L4-L5 and L5-S1 degenerative disk disease/disk protrusions/spondylosis with radiculopathy.,PROCEDURE:,1. Left L4-L5 and L5-S1 Transforaminal Lumbar Interbody Fusion (TLIF).,2. L4 to S1 fixation (Danek M8 system).,3. Right posterolateral L4 to S1 fusion.,4. Placement of intervertebral prosthetic device (Danek Capstone spacers L4-L5 and L5-S1).,5. Vertebral autograft plus bone morphogenetic protein (BMP).,COMPLICATIONS:, None.,ANESTHESIA:, General endotracheal.,SPECIMENS:, Portions of excised L4-L5 and L5-S1 disks.,ESTIMATED BLOOD LOSS:, 300 mL.,FLUIDS GIVEN:, IV crystalloid.,OPERATIVE INDICATIONS:, The patient is a 37-year-old male presenting with a history of chronic, persistent low back pain as well as left lower extremity of radicular character were recalcitrant to conservative management. Preoperative imaging studies revealed the above-noted abnormalities. After a detailed review of management considerations with the patient and his wife, he was elected to proceed as noted above.,Operative indications, methods, potential benefits, risks and alternatives were reviewed. The patient and his wife expressed understanding and consented to proceed as above.,OPERATIVE FINDINGS:, L4-L5 and L5-S1 disk protrusion with configuration as anticipated from preoperative imaging studies. Pedicle screw placement appeared

satisfactory with satisfactory purchase and positioning noted at all sites as well as satisfactory findings upon probing of the pedicular tracts at each site. In addition, all pedicle screws were stimulated with findings of above threshold noted at all sites. Spacer snugness and positioning appeared satisfactory. Electrophysiological monitoring was carried out throughout the procedure and remained stable with no undue changes reported.,DESCRIPTION OF THE OPERATION:, After obtaining proper patient identification and appropriate preoperative informed consent, the patient was taken to the operating room on a hospital stretcher in the supine position. After the induction of satisfactory general endotracheal anesthesia and placement of appropriate monitoring equipment by Anesthesiology as well as placement of electrophysiological monitoring equipment by the Neurology team, the patient was carefully turned to the prone position and placed upon the padded Jackson table with appropriate additional padding placed as needed. The patient's posterior lumbosacral region was thoroughly cleansed and shaved. The patient was then scrubbed, prepped and draped in the usual manner. After local infiltration with 1% lidocaine with 1: 200,000 epinephrine solution, a posterior midline skin incision was made extending from approximately L3 to the inferior aspect of the sacrum. Dissection was continued in the midline to the level of the posterior fascia. Self-retaining retractors were placed and subsequently readjusted as needed. The fascia was opened in the midline, and the standard subperiosteal dissection was then carried out to expose the

posterior and posterolateral elements from L3-L4 to the sacrum bilaterally with lateral exposure carried out to the lateral aspect of the transverse processes of L4 and L5 as well as the sacral alae bilaterally. _____ by completing the exposure, pedicle screw fixation was carried out in the following manner. Screws were placed in systematic caudal in a cranial fashion. The pedicle screw entry sites were chosen using standard dorsal landmarks and fluoroscopic guidance as needed. Cortical openings were created at these sites using a small burr. The pedicular tracts were then preliminarily prepared using a Lenke pedicle finder. They were then probed and subsequently tapped employing fluoroscopic guidance as needed. Each site was ""under tapped"" and reprobed with satisfactory findings noted as above. Screws in the following dimensions were placed. 6.5-mm diameter screws were placed at all sites. At S1, 40-mm length screws were placed bilaterally. At L5, 40-mm length screws were placed bilaterally, and at L4, 40-mm length screws were placed bilaterally with findings as noted above. The rod was then contoured to span from the L4 to the S1 screws on the right. The distraction was placed across the L4-L5 interspace, and the connections were temporarily secured. Using a matchstick burr, a trough was then carefully created slightly off the midline of the left lamina extending from its caudal aspect to its more cranial aspect at the foraminal level. This was longitudinally oriented. A transverse trough was similarly carefully created from the cranial point of the longitudinal trough out to the lateral aspect of the pars against the

foraminal level that is slightly caudal to the L4 pedicle. This trough was completed to the level of the ligamentum flavum using small angled curettes and Kerrison rongeurs, and this portion of the lamina along with the inferior L4 articular process was then removed as a unit using rongeurs and curettes. The cranial aspect of the left L5 superior articular process was then removed using a small burr and angled curettes and Kerrison rongeurs. A superior laminotomy was performed from the left L5 lamina and flavectomy was then carried out across this region of decompression, working from caudally to cranially and medially to laterally, again using curettes and Kerrison rongeurs under direct visualization. In this manner, the left lateral aspect of the thecal sac passing left L5 spinal nerve and exiting left L4 spinal nerve along with posterolateral aspect of disk space was exposed. Local epidural veins were coagulated with bipolar and divided. Gelfoam was then placed in this area. This process was then repeated in similar fashion; thereby, exposing the posterolateral aspect of the left L5-S1 disk space. As noted, distraction had previously been placed at L4-L5, this was released. Distraction was placed across the L5-S1 interspace. After completing satisfactory exposure as noted, a annulotomy was made in the posterolateral left aspect of the L5-S1 disk space. Intermittent neural retraction was employed with due caution afforded to the neural elements throughout the procedure. The disk space was entered, and diskectomy was carried out in routine fashion using pituitary rongeurs followed by the incremental sized disk space shavers as well

as straight and then angled TLIF curettes to prepare the front plate. Herniated portions of the disk were also removed in routine fashion. The diskectomy and endplate preparation were carried out working progressively from the left towards the right aspect of the disk across the midline in routine fashion. After completing this disk space preparation, Gelfoam was again placed. The decompression was assessed and appeared to be satisfactory. The distraction was released, and attention was redirected at L4-L5, where again, distraction was placed and diskectomy and endplate preparation was carried out at this interspace again in similar fashion. After completing the disk space preparation, attention was redirected to L5-S1. Distraction was released at L4-L5 and again, reapplied at L5-S1, incrementally increasing size. Trial spaces were used, and a 10-mm height by 26-mm length spacer was chosen. A medium BMP kit was appropriately reconstituted. A BMP sponge containing morcellated vertebral autograft was then placed into the anterior aspect of the disk space. The spacer was then carefully impacted into position. The distraction was released. The spacer was checked with satisfactory snugness and positioning noted. This process was then repeated in similar fashion at L4-L5, again with placement of a 10-mm height by 26-mm length Capstone spacer, again containing BMP and again with initial placement of a BMP sponge with vertebral autograft anteriorly within the interspace. This spacer was also checked again with satisfactory snugness and positioning noted. The prior placement of the spacers and BMP, the wound was

thoroughly irrigated and dried with satisfactory hemostasis noted. Surgicel was placed over the exposed dura and disk space. The distraction was released on the right and compression plates across the L5-S1 and L4-L5 interspaces and the connections fully tightened in routine fashion. The posterolateral elements on the right from L4 to S1 were prepared for fusion in routine fashion, and BMP sponges with supplemental vertebral autograft was placed in the posterolateral fusion bed as well as the vertebral autograft in the dorsal aspect of the L4-L5 and L5-S1 facets on the right in a routine fashion. A left-sided rod was appropriated contoured and placed to span between the L4 to S1 screws. Again compression was placed across the L4-L5 and L5-S1 segments, and these connections were fully secured. Thorough hemostasis was ascertained after checking the construct closely and fluoroscopically. The wound was closed using multiple simple interrupted 0-Vicryl sutures to reapproximate the deep paraspinal musculature in the midline. The superficial paraspinal musculature in posterior fashion was closed in the midline using multiple simple interrupted 0-Vicryl sutures. The suprafascial subcutaneous layers were closed using multiple simple interrupted #0 and 2-0 Vicryl sutures. The skin was then closed using staples. Sterile dressings were then applied and secured in place. The patient tolerated the procedure well and was to the recovery room in satisfactory condition.