

Chapter 2

In Situ Fusion L5 to S1

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DIAGNOSIS

Spondylolisthesis

COMMON INDICATIONS

- In symptomatic low grade Spondylolysis and listhesis of less than 30 %
- Pain unresponsive to nonsurgical methods
- Slip greater than 30–50 % in an immature child

POSSIBLE COMPLICATIONS

- Nonunion
- Cluneal nerve injury
- Infection

ESSENTIAL STEPS

1. Positioning.
2. Prepping and draping.
3. Skin incision.
4. Paraspinous muscle separation.
5. Exposure L5–S1 facet joints.
6. Exposure L5 transverse process and sacral ala.
7. Exposure iliac crest bone graft site.
8. Bone graft harvest.
9. Removal of L5–S1 facet joint.
10. Decortication L5 transverse process, sacral ala, and exposed lamina.

11. Bone graft placement in the facet joint and between the transverse process of L5 and the sacral ala.
12. Closure.

OPERATIVE NOTE

Preoperative Diagnosis: Spondylolysis L5–S1

Procedure: In situ posterolateral fusion L5–S1, iliac crest bone graft

Postoperative Diagnosis: Same

Description of Operation: The patient is taken to the Operating Room and after adequate general anesthesia, is placed prone on a four poster frame (Hall-Relton frame, Jackson table, etc.) with padding under the iliac crest and breast regions. Arms are abducted 20° and elbows flexed 110°. Padding was placed under the down legs and under the down arms. All bony prominences were well padded. The back was given a standard prep and draped free in the usual sterile manner.

A midline incision was made from L4 to S1. The incision was infiltrated with 1/500,000 epinephrine. Dissection was carried down through the subcutaneous tissues, down to the spinous processes of L4–S1. The skin and subcutaneous tissues were elevated off the lumbodorsal fascia approximately 2.5 cm to the right and left side of the midline. On the right side the subcutaneous tissues were also elevated to expose the right iliac crest region. Two hockey-stick incisions were made from the region of approximately the L4 spinous process, carried distally, and then medially toward the S1 spinous process. Each incision was made approximately 1.5–2 cm lateral to the midline. Finger dissection was used to dissect through the paraspinous muscles in a proximal to distal fashion. The L5–S1 joint was palpated through the incision and marked with a Keith needle. A check X-ray was taken to document the appropriate level. The paraspinous muscles were dissected bluntly up to the facet joint of L4–5 taking great care not to injure the capsule at the L4–5 joint. Using a Cobb elevator and bipolar and monopolar cautery, the L5–S1 facet joint was sharply incised and the capsule and soft tissues removed from the facet joint. The ala of the sacrum is exposed subperiosteally with a Cobb elevator; cauterizing all bleeders. The lamina and pars interarticularis defect [“or elongation”] was exposed subperiosteally with a Cobb elevator and/or with judicious use of cautery. The L5 transverse process was palpated and exposed subperiosteally from the base of the lateral aspect of the superior facet joint of L5, taking great care not to injure the capsule of the L4–5 facet joint. The same exposure was accomplished on both the right and left side.

All soft tissues were curetted free from the pars interarticularis defect with a fine curette. The skin and subcutaneous tissues were elevated on the right side with a Hibbs retractor to expose the posterosuperior iliac crest. The gluteal muscles from approximately 2.5 cm superolateral to the posterosuperior spine were incised with coagulation cautery. The incision with cautery was carried along the iliac crest to the posterosuperior and the posteroinferior spine. The outer table of the ilium was exposed subperiosteally. A Taylor retractor was placed into position in the superior aspect of the crest. This allowed exposure of the remainder of the iliac crest. Using a Cobb elevator, the periosteum was gently elevated off the outer table of the ilium down to the level of the sciatic notch. A second Taylor retractor was placed into position to allow complete exposure of the posterior aspect of the iliac crest. Osteotomes are used to remove the outer table of the ilium. This is done by first osteotomizing along the superior aspect of the crest from the posteroinferior spine to the posterosuperior spine of the iliac crest and then carrying the osteotomy along the superior aspect of the crest to the end of the incision. A second osteotomy cut was made approximately 1.5 cm proximal to the sciatic notch and carried approximately three quarters of the way across the crest. The outer table is then removed with straight and curved osteotomes. When the conjoined portion of the ilium is reached, a curved osteotome is used to detach the outer table fragment from the remainder of the crest. The medullary contents are removed by use of Piggott gouges, Capener gouges, ring curettes, and/or spoon curettes taking great care not to enter the sciatic notch or to injure the SI joint. Once all bone graft has been harvested, all bone bleeders were either cauterized or waxed off using bone wax. The wound was packed with thrombin-soaked Gelfoam until the end of the procedure.

Attention was then turned to the spine. The transverse process, sacral ala, and L5 lamina were decorticated using a dental burr. The cancellous bone graft was packed into the 5–1 facet joint, along the lamina and between the L5 transverse process and the ala of the sacrum. A small notch was made in the ala of the sacrum placing bone graft within this notch and anterior to the transverse process of L5 taking great care not to injure the nerve root just anterior to the transverse process. The remainder of the cancellous bone is packed in the lateral gutter, between the transverse process of L5 and the ala. This was followed by packing of the same area with cortical bone. The same procedure is done on both sides.

The wound was then irrigated with copious amounts of saline and antibiotic solution. The Gelfoam was removed from the iliac crest wound, and the wound was irrigated with copious amounts of saline and antibiotic solution. The gluteal muscles were reattached running 0 Vicryl sutures. The lumbodorsal fascia was repaired with running 0 Vicryl. The subcutaneous tissues were closed with 2-0 Vicryl over a medium Hemovac and the skin was closed with a subcuticular 3-0 Monocryl. The wound was dressed with Steri-strips, Xeroform or Adaptic, 4x4's, and a tape dressing.

Sponge counts were correct.

The patient was extubated and taken to the postoperative recovery room in good conditions.

No intraoperative complications.

Staff was present and scrubbed for entire procedure.

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