Bilateral Paraspinous Lumbosacral Approach

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The most commonly used approaches to this area are the direct paraspinous muscle-splitting incision and the more lateral approach, which elevates and dissects under the lumbosacral muscle (Fig. 49.1). The muscle-splitting incision affords not only alar transverse exposure for fusions but also excellent exposure for laminectomy[1,2]. The more lateral approach removes a bicortical portion of the posterior superior iliac spine, attempts to preserve muscle and fascial integrity, and allows excellent exposure of the tips of the transverse processes to the facet joints.[3,4] There is probably no great advantage to preserving the denervated muscle with the more lateral approach. We recommend the more lateral approach for alar transverse fusion and the muscle-splitting incision when laminectomy and root exploration are needed in addition to fusion.

1. Position the patient prone on the table with an appropriate operating frame.
2. After adequate prepping and draping, make a curved paraspinous incision approximately three fingerbreadths from the midline, L4 to S2 (Fig. 49.2).
3. Cut through skin and subcutaneous tissue to the lumbar fascia. The posterior superior iliac spine is in the inferior portion of the wound. Palpate the transverse process of L5 and L4. Remove the fascial insertions on the iliac crest and reflect medially with a small sliver of bone (Fig. 49.3).
4. With an elevator, dissect subperiosteally both the inner and outer tables of the posterior iliac crest to a depth of 2 to 3 cm.
5. Osteotomize the ilium with an osteotome, beginning at the medial portion of the posterosuperior iliac spine not involving the sacral iliac joint and extending approximately 5 to 6 cm on the iliac crest.
   Caution: *The clunial nerves will be in the lateral aspect of the wound and must be avoided. A safe margin of error is approximately one handbreadth lateral to the posterosuperior iliac spine*[1].
6. Remove the bicorticate iliac spine graft. The incision in the paraspinous fascia is extended cephalad on the lateral border facet to the proximal level of the L4 transverse process. Medially, the interlaminar areas can be exposed for a canal decompression or a laminectomy (Fig. 49.4).
7. Dissect under the fascia through the muscle with a finger or blunt instrument and sweep the muscle tissue from lateral to medial off the transverse processes. Dissect bluntly until the exact location of the transverse process is identified, then dissect with an elevator the muscle and fascial tissue from the transverse process.
8. Identify the L5–S1 facet joint. Lateral to this is the alar of the sacrum; cephalad to this is the transverse process of L5 (Figs. 49.5, 49.6).
   Caution: *Beware of the first posterior sacral foramen and its vessels. Avoid this by staying cephalad in the area of the ala of the sacrum.*
9. Elevate the soft tissue from the dorsal surface of the transverse process of L5, the ala of the sacrum, and the L5–S1 facet joint. If L4 is to be fused, the same exposure should apply to the L4 transverse process and the L4–L5 joint.
   Caution: *Beware of the vessels between the transverse process of L5 and the ala of the sacrum. Avoid breaking the transverse process and causing bleeding anterior to the intertransverse muscles. The spinal nerves are anterior in the retroperitoneal space. Penetration of the retroperitoneal space in this area is possible.*
10. Use a Hibbs or self-retaining Gelpi-type retractor to open the wound. Do not expose areas not to be fused. For fusions in this area, be sure the so-called gutter between the base of the transverse process and the base of the superior articular process is completely cleaned of soft tissue.
11. Closure: Reapproximate the lumbar fascia to the fascial tissue in the area of the removed posterosuperior iliac spine.

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Laminectomy and Root Exploration Combined with Fusion

1. The approach is essentially as described above with a curved incision made through the lumbar fascia.
2. Open the fascia and dissect with your finger directly through the muscle to the transverse process of L5. Palpate the L5–S1 facet and ala of the sacrum.

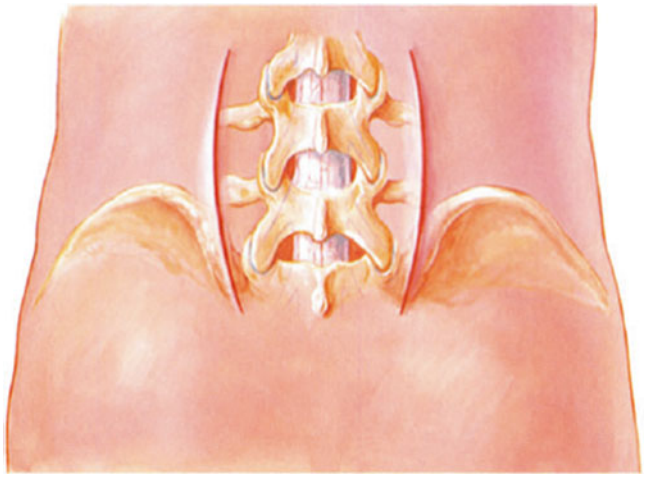

Fig. 49.1 The skin incisions on the bilateral paraspinous approach to the lower lumbar spine may be one of two types: (1) a lateral incision three fingerbreadths from the midline designed to include the iliac crest in the wound while the iliac crest is removed and dissection performed under the paraspinous musculature from lateral to medial; (2) a more medial paraspinous approach designed for muscle splitting and direct approach to the facet joint and transverse processes without including the iliac crest through that incision. A midline incision may be used for a bilateral paraspinous fusion. The incision must be long to allow adequate lateral retraction to help develop the incision in the lumbodorsal fascia and lateral approach to the paraspinous musculature

3. With the periosteal elevator, remove the muscle attachments to the posterior elements in this area and expose the bone of the lamina, facet joint, and transverse process. Use a self-retaining Gelpi retractor to expose the posterior elements. No attempt is made to expose the spinous process tips.
4. Removal of the lamina and canal exploration should proceed as described in Chapters 34 and 35.
5. A separate fascial incision should be made over the outer table of the iliac crest for the fusion. Remove the periosteum from the outer table, split the outer table, and obtain the graft.
6. Closure: Resuture the lumbar fascia and close the skin.

Midline Skin Incision

1. Often bilateral alar transverse fusions are done through a midline incision. Also, exposure of the ala of the sacrum may be needed for hook insertion for Harrington instrumentation. A sufficient longitudinal skin incision is required to allow full exposure under the skin and subcutaneous tissue.
2. When the pathology does not require a midline fascial incision, the same curved-type paraspinous fascial incision described above can be made bilaterally for the alar transverse fusion in combination with the midline skin and subcutaneous incision.
3. For pathology that requires a midline fascial incision such as a total laminectomy or Harrington instrumentation, cut directly to the spinous process and use a periosteal elevator to clean the muscle tissue from medial to lateral off the

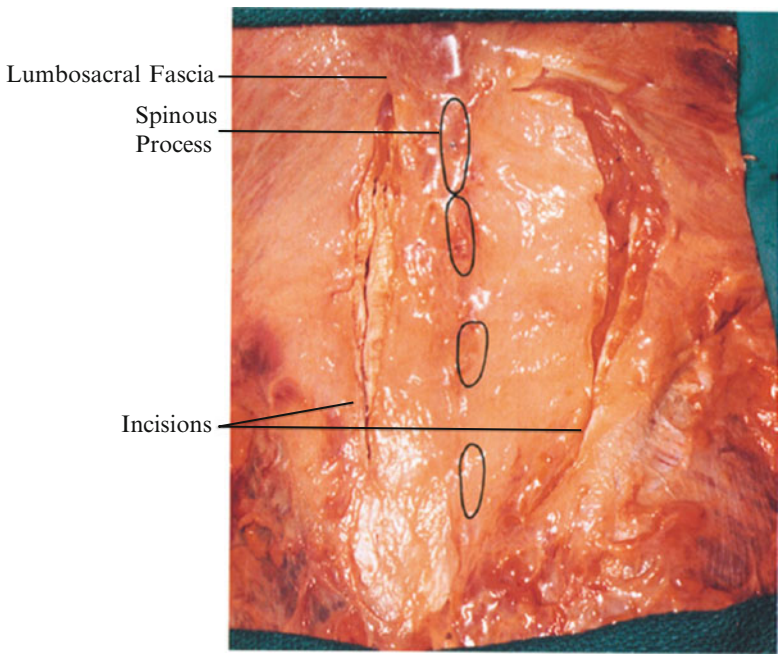

Fig. 49.2 The paravertebral fascia incisions

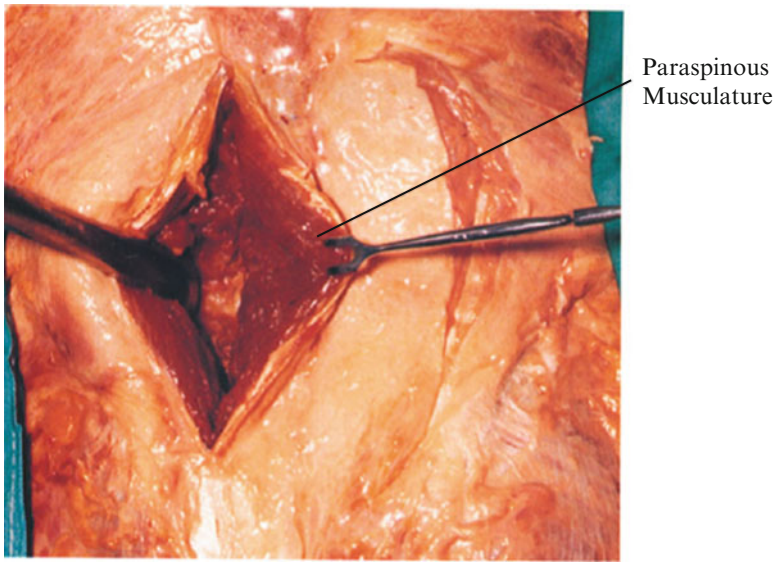

Fig. 49.3 The more medial paraspinous muscle-splitting incision. Open the fascia and dissect with your finger directly through the muscle to identify the L5–S1 facet, the ala of the sacrum lateral to that facet, and the L4–L5 joint cephalad. Remove the muscle attachments to the facets and transverse processes from L4 to the sacrum

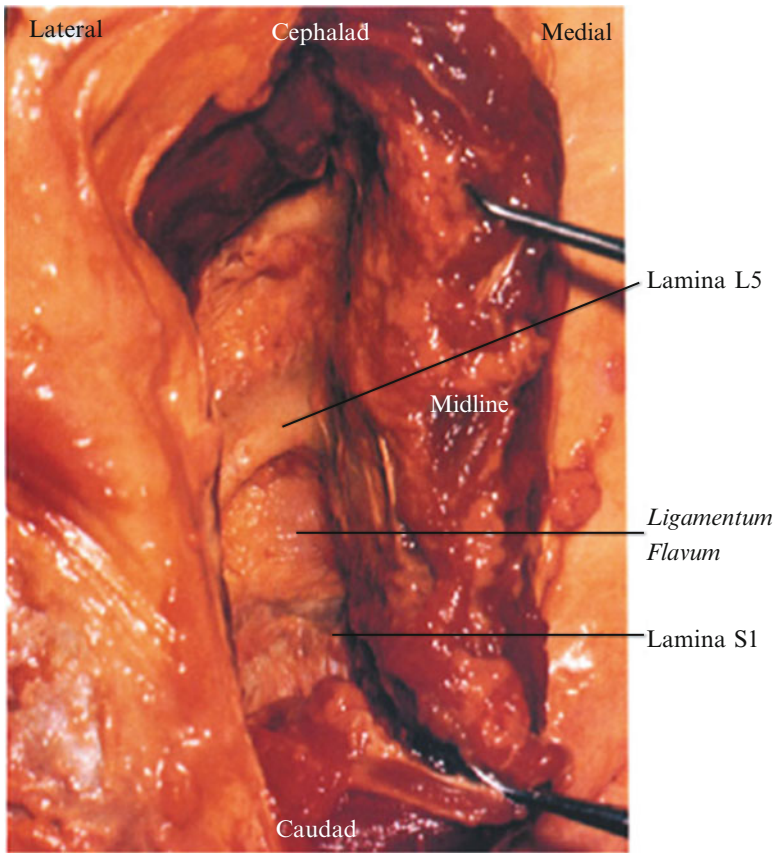

Fig. 49.4 If a decompression is to be done, dissect more medially and clear the laminae of soft tissue

spinous processes, lamina, and dorsal surface of the sacrum. Muscle and fascia must be elevated medial to lateral out to the tips of the transverse processes. Bleeding is often encountered underneath the large amount of laterally retracted muscle and fascia and subcutaneous tissue.

4. Identify the transverse process of the 5th lumbar vertebrae. Locate this by identifying the L4–L5 facet. Use the base of the superior articular process of L5 to find the transverse process of L5. For the deepest L5 with partial sacralization of the transverse process of L5, the intertransverse space caudad to the transverse process of L5 may be minimal.
5. Identify the L5–S1 facet joint and the superior articular process of S1. The ala of the sacrum is much like a transverse process of S1 and is lateral and caudad to the superior articular process of S1.

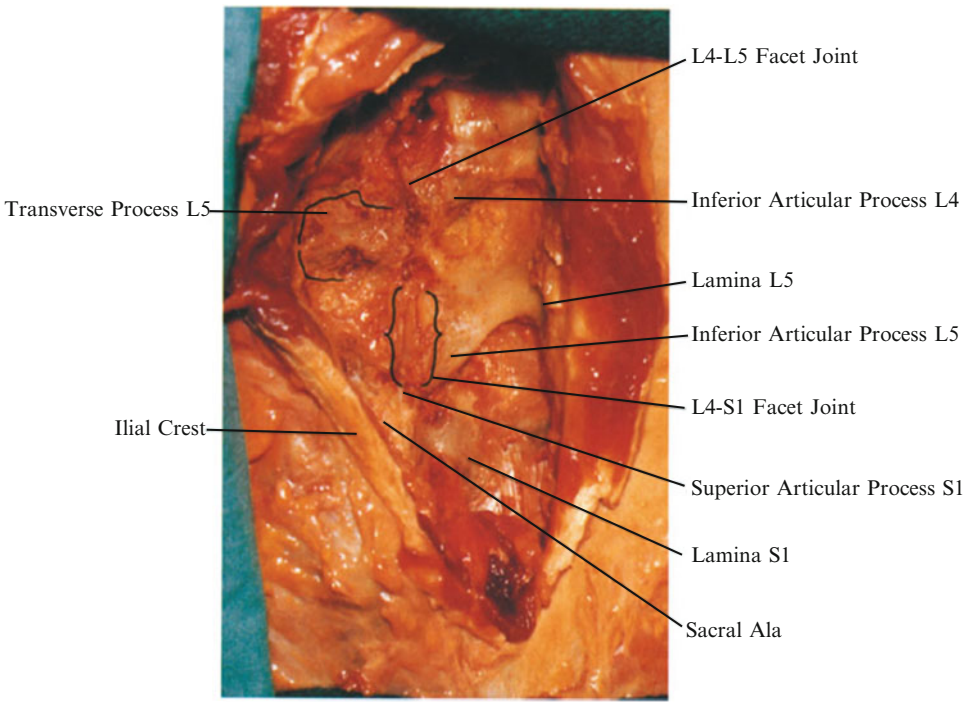

Fig. 49.5 Identify the L5–S1 facet. Lateral to this facet is the ala of the sacrum, and cephalad to this is the transverse process of L5. Beware of the first posterior sacral foramen and its vessel. Avoid this by staying cephalad at the level of the ala of the sacrum. Elevate the soft tissue from the dorsal surfaces of the transverse processes of L5, the ala of the sacrum, and the L5–S1 facet. Beware of the vessels between the transverse processes of L5 and the ala of the sacrum. Avoid breaking the transverse process. Spinal nerves are anterior in the retroperitoneal space and must be protected

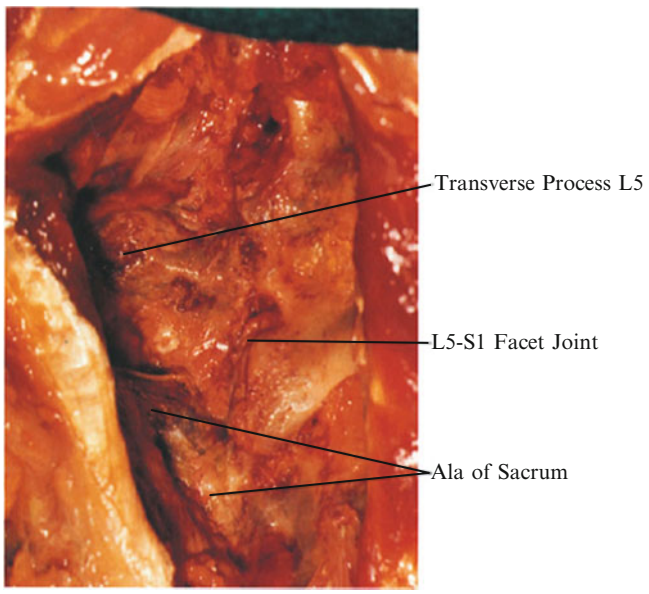

Fig. 49.6 A better view of the ala of the sacrum. For the more lateral approach, remove the medial 5–6 cm of the iliac crest using an osteotome. *Caution:* The clunial nerves will be in the lateral aspect of the wound and must be avoided. The safe margin of error is approximately one hand-breadth lateral to the posterosuperior iliac spine. Removal of the posterosuperior iliac spine improves visualization. Then continue the exposure of the transverse processes, facets, and ala of the sacrum

Caution: *Beware of the dorsal foramen of S1 and its accompanying vessels.*

6. Dissect with a periosteal elevator laterally from the superior articular process of S1 to the ala of the sacrum. Verification by X-ray is very difficult, as in many cases the projection of the ala is on the anterior surface of the sacrum.
7. Remove the fascial attachments to the edge of the ala anteriorly and posteriorly with a periosteal elevator. Beware of bleeding in the intertransverse area between L5 and the ala. Packing of these areas when bleeding starts is often of greater benefit than excessive electrocautery. The retroperitoneal space and 5th lumbar nerve root are anterior to the structures and should not be violated in the approach.
8. With identification of the L5–S1 facet, the transverse process of L5, and the ala of the sacrum, any necessary procedure in this area can be completed.
9. Closure: Allow muscle layers to fall together; close fascia, subcutaneous tissue, and skin.

Remember:

1. Position the fascial incision so as to allow full retraction and proper exposure under the lumbar fascia.
2. Use finger palpation to identify the important structures, that is, transverse process of L5, L5–S1 facet joint, and ala of the sacrum.
3. Removal of a bicorticate posterosuperior iliac spine enhances exposure.
4. Use packing with hemostatic material when possible to control bleeding.
5. Avoid fracture and damage to the transverse process.
6. Expose the transverse process but beware of vessels and spinal nerves anterior to the intertransverse musculature.