

Ponte osteotomy

The posterior closing wedge osteotomy was first described in 1984 by Alberto Ponte for the treatment of flexible Scheuermann's kyphosis in skeletally mature patients ¹⁾.

The bone resection involves the inferior articular processes of the cephalad vertebra and the superior articular processes of the caudal vertebra. The ligamentum flavum is resected in its entirety to allow for maximum coronal and sagittal deformity correction ²⁾.

The Ponte approach is most useful for gradual correction over multiple levels. The osteotomies are sequentially closed allowing for gradual compression of the posterior elements that are hinged in the posterior column. In the lumbar spine, it can yield 5° to 15° of correction per level ³⁾.

One of the arguments against posterior only surgery for large deformity correction and fusions has been the lack of anterior column mobilization and support as well as the bony apposition needed for arthrodesis. However, in a large series of patients treated with the Ponte technique for adolescent idiopathic scoliosis, no patients lost correction or developed a pseudoarthrosis although the average starting position was in sagittal balance ⁴⁾.

In Scheuermann's kyphosis, the same surgical group showed effective deformity correction and stable fusion masses in all 17 patients. ⁵⁾

Most importantly none of these patients developed neurologic compromise during or after their deformity correction.

Case series

A study prospectively enrolled 17 consecutive patients with Scheuermann kyphosis who were treated with the Ponte procedure by the senior surgeon at one institution. Standardized radiographic analysis was performed and included full-length coronal and sagittal radiographs preoperatively, postoperatively, and at final follow-up. Analysis also included the correction obtained through the most severe, wedged segments of the deformity by the osteotomies.

Seventeen patients had the Ponte procedure satisfactorily performed. No patient needed an anterior approach to achieve sufficient correction or fusion. There were no reoperations for nonunion or instrumentation failure. Correction of the instrumented levels was 61% and of worst Cobb was mean 49%. The apex of the deformity was measured over the most deformed 3 to 7 wedged segments. The average correction across the apex was 9.3 degrees per osteotomy (range 5.9 to 15). No patient lost more than 4 degrees of correction through their instrumented and fused levels. There were no neurologic complications. There was one late infection with a solid fusion treated with instrumentation removal and intravenous antibiotics.

Using thoracic pedicle screw instrumentation as the primary anchor, the Ponte procedure was successfully performed in 17 consecutive patients for Scheuermann kyphosis with no exclusions for the size or rigidity of the kyphosis. Results were as good as anterior/posterior historical controls with excellent correction and minimal loss of correction at final follow-up. This procedure avoids the morbidity and extended operative time attributed to the anterior approach ⁶⁾.

Case reports

A 24-year-old man presented with progressive [back pain](#) and a fixed severe thoracolumbar [kyphosis](#) centered at the L2-L3 disc space seven years after removal of instrumentation for intractable infection following correction of [Scheuermann's Kyphosis](#). The patient also demonstrated [pseudoarthrosis](#) of the posterior thoracolumbar fusion bed. The original operative plan was to perform a vertebral column resection (VCR) of L2 to correct his severe kyphosis. During preparation for the VCR, the patient's deformity corrected completely after insertion of blunt distraction paddles for the interbody fusion after the [Ponte osteotomy](#) at L2-L3. A VCR was avoided, and the construct was able to be completed with simple rod insertion and posterolateral fusion.

The described technique achieved 69 degrees of correction at the L2-L3 disc space without any remodeling of the surrounding vertebrae. The C7 plumb line was normalized, and the patient was able to stand upright with horizontal gaze and without pre-existing discomfort. At the six-month follow-up, the patient reported a significant improvement in pain and was able to resume normal activities ⁷⁾.

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