In posterior only approach, what are the indications for only spinal stabilization; spinal stabilization with spinal column shortening; and spinal stabilization with anterior reconstruction?

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Why is this topic Important

- Spinal infections/tuberculosis present with varying degrees of vertebral destruction, instability, and deformity—requiring tailored surgical strategies.
- Posterior-Only Approach: Preferred for minimizing morbidity, but decision-making on extent of surgery remains challenging.
- Surgical Decision Dilemma:
  - When is stabilization alone enough?
  - When is spinal column shortening needed to close anterior defects?
  - When is anterior reconstruction mandatory to restore support and alignment?

Literature Review/ Process

PubMed

Clarivate Web of Science™

Cochrane Library

Scopus

Initial database screening resulted in 1712 articles of which were excluded 864 articles which after duplicate removal resulted in 848 articles that were subjected to tile and abstract screening.

We shortlisted 174 articles for full-text screening and selected 14 articles in the review that met the inclusion criteria.

Findings from Literature

- Ramakrishnan et al. conducted a prospective randomized study comparing posterior-only stabilization and global reconstruction (via all-posterior approach) in patients with thoracic and thoracolumbar spinal tuberculosis presenting with borderline vertebral body loss (VBL: 0.5–1). Both groups showed comparable neurological, functional, and radiological outcomes at final follow-up. Posterior-only stabilization had a shorter operative time and better ODI scores, while global reconstruction demonstrated marginally better kyphosis correction and maintenance. Fusion times were similar across groups.

Findings from Literature

- Guna et al. conducted a prospective study comparing three all-posterior surgical techniques for thoracolumbar spinal tuberculosis: (i) posterior instrumentation with anterior cage reconstruction, (ii) posterior instrumentation with anterior autologous bone grafting, and (iii) posterior column shortening without anterior reconstruction. Patients requiring anterior reconstruction typically had an average vertebral body loss (ABL) > 0.5 and a deformity angle > 30°. At 2-year follow-up, there was no significant difference in loss of correction among the three groups (3.4°, 3.2°, and 3.1° respectively; $p = 0.755$), and the final deformity angles were comparable. (3)
- The author also noted intraoperatively that when deformity exceeded 30°, posterior column shortening alone resulted in poor bone-to-bone contact and, in some cases, cord kinking. In such cases, anterior reconstruction with titanium cages improved deformity correction and spinal alignment by acting as a stable pivot.

Findings from Literature

- Xu et al. (13) demonstrated favorable clinical and radiological outcomes using single-stage posterior debridement and compact bone grafting with posterior column shortening in mono-segmental lumbar STB. Meanwhile, Subbiah et al. (14) proposed a therapeutic algorithm for posterior-only approaches: in cases with endplate and vertebral body involvement, anterior reconstruction was deemed necessary to restore spinal alignment and stability. Conversely, when involvement was limited to the disc space, posterior stabilization alone was considered sufficient.

Question:

In posterior only approach, what are the indications for only spinal stabilization; spinal stabilization with spinal column shortening; and spinal stabilization with anterior reconstruction?

Response:

- **Spinal stabilization alone is indicated in patients with severe pain and instability but with minimal destruction of vertebral bodies and when there is sufficient bone-on-bone contact.**

- **Spinal column shortening is appropriate when there is moderate vertebral body loss, and bone to bone contact can be achieved after debridement and posterior column shortening.**

- **However, in cases of substantial vertebral body loss (VBL > 0.5) or deformity > 30° that compromise bone-on-bone contact after posterior column shortening, anterior column reconstruction will be required.**

❖Vote:

Agree – 97.8%, Disagree – 0%, Abstain – 2.2%
(Unanimous Consensus)