# Efficacy and Safety of Posterior Versus Combined Posterior and Anterior Approach for the Treatment of Spinal Tuberculosis: A Meta-Analysis

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**Key words**
- Meta-analysis
- Posterior approach
- Posterior and anterior approach
- Spinal tuberculosis

**Abbreviations and Acronyms**
CI: Confidence interval
MD: Mean difference
OR: Odds ratio
TB: Tuberculosis

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OBJECTIVE: **Surgical treatment is an important strategy for the treatment of spinal tuberculosis (TB). Several approaches have been reported for the surgery. However, no single study has had a large enough sample population to definitively determine whether the single posterior approach is as effective and safe as the combined posterior and anterior approach for the treatment of spinal TB. A meta-analysis was conducted to evaluate the clinical efficacy and safety of posterior versus combined posterior and anterior approach for the treatment of spinal TB.**

METHODS: **In this meta-analysis, electronic databases, such as PubMed, MEDLINE, EMBASE, Google scholar, and Cochrane library, were searched to select the potentially relevant reports that compared the outcomes of the posterior approach (group A) with the combined posterior and anterior approach (group B) in the treatment of spinal TB. Relevant journals and references were also searched manually. Data extraction and quality assessment were according with Cochrane Collaboration guidelines. Outcome assessments were operation time, blood loss, correction of angle, loss of correction, hospital stay, fusion time of the grafting bone, neurological improvement, and complications after surgery. Results were expressed as odds ratio for dichotomous outcomes and mean difference for continuous outcomes with 95% confidence interval.**

RESULTS: **Five controlled clinical trials published between 2012 and 2014, involving 253 patients (group A, 129; group B, 124) with spinal TB were retrieved in this study. The overall meta-analysis showed that there were significant differences ($P< 0.01$) between groups A and B in operation time, blood loss, hospital stay, and complications after surgery. However, no significant differences ($P> 0.05$) were observed in correction of angle, loss of correction at the final follow-up, fusion time of the grafting bone, and neurological improvement after surgery between groups A and B.**

CONCLUSIONS: **The posterior approach appeared to have the same clinical efficacy, but with less operation time, blood loss, hospital stay, and complications compared with the combined posterior and anterior approach in the treatment of sinal TB. However, more high-quality, randomized controlled trials are required to compare these approaches and guide clinical decision-making.**

## INTRODUCTION

Spinal tuberculosis (TB) is a common extrapulmonary manifestation of the disease, which is found in approximately 50% of the bone and joint of patients with spinal TB, with 75% of cases accompanied by paraspinal abscess (11). It is generally accepted that spinal TB is the most dangerous of any bone and joint TB because of its ability to cause bone destruction, deformity, and paraplegia (9). At present, potent antituberculous chemotherapy remains an irreplaceable treatment for TB spondylitis. However, in some cases surgical treatment is an essential strategy (12, 16, 22). Various surgical interventions have been reported in patients with spinal TB. The anterior approach to the spine allows direct access to the infected focus and is convenient for debriding/reconstructing the defect (1, 8). However, it may reduce the biomechanical stability of the spine and it is common to find residual kyphosis at the end of treatment (17). The combined anterior and posterior approach helps overcome the stability-related drawbacks of the anterior approach and recently has been popular (7, 13, 23). The single posterior approach is an effective and safe method in treatment of spinal TB (15).

Whether the clinical outcomes of the single posterior approach for the treatment of spinal TB are superior to the combined posterior and anterior approach still remains a subject of controversy (20, 24-27). To achieve an integrative understanding of the clinical response of patients who underwent the posterior approach (group A) or the combined posterior and anterior approach (group B), a systematic review of relevant controlled trials and a meta-analysis was conducted to clarify the differences in these 2 approaches.

**Table 1.** Characteristics of Studies Included in the Meta-Analysis

| Study | Country | Type of Study | Sample Size | Age (year) | Follow-up (month) | Location of Tuberculosis | Medical Treatment | Bone Graft | QAS |
|---|---|---|---|---|---|---|---|---|---|
| Zhang et al., 2012 (26) | China | Retrospective cohort study | 20/16 | 68.4 (65—76) | 35.1 (26—45) | Thoracic spine | Chemotherapy 3—5 weeks before surgery, 12—15 months after surgery | Bicortical iliac bone allograft | 18 |
| Wang et al., 2013 (24) | China | Retrospective study | 60/55 | 48.6 (18—76) | 21.3 (12—36) | Thoracic and lumbar spine | Chemotherapy 2—4 weeks before surgery, 9—12 months after surgery | Strut grafts | 16 |
| Soares do Brito et al., 2013 (20) | Portugal | Retrospective study | 11/15 | 46.7 | 4—24 | Thoracic and lumbar spine | 14 months | — | 12 |
| Zhang et al., 2013 (28) | China | Retrospective study | 19/18 | 41.2 (6—63) | 46.6 ± 16.7<br>47.5 ± 15.0 | Lumbar spine | Chemotherapy 3 weeks before surgery, 12—15 months after surgery | Titanium mesh cage filled with bicortical iliac bone allograft/ allograft | 17 |
| Zeng et al., 2014 (26) | China | Retrospective study | 19/20 | 41 (20—75)<br>38.5 (19—67) | 39.1 ± 12.0<br>40.7 ± 12.4 | Lumbosacral spine | Chemotherapy 2—4 weeks before surgery, 9—12 months after surgery | Allogeneic iliac bone/allograft bone | 18 |

QAS, Quality assessment score.

**Table 2.** The Clinical Outcomes in Group A Versus Group B of Studies Included

| Study | Operation Time (minutes) | Blood Loss (mL) | Correction of Angle (°) | Loss of Correction (°) | Hospital Stay (days) | Fusion Time (months) | Fusion Rate (%) | Neurological Improvement | Complications |
|---|---|---|---|---|---|---|---|---|---|
| Zhang et al., 2012 (26) | | | | | | | | | |
| Group A | 262.1 ± 43.5 | 632.5 ± 227.0 | 9 ± 3.4 | 2.7 ± 1.9 | 18.8 ± 2.7 | 8.1 ± 1.8 | 100 | 7/14 | 3 |
| Group B | 445.6 ± 91.4 | 1159.4 ± 349.4 | 9.4 ± 4.2 | 3.2 ± 1.4 | 22.9 ± 3.5 | 7.8 ± 1.7 | 100 | 7/11 | 12 |
| Wang et al., 2013 (24) | | | | | | | | | |
| Group A | 160.4 ± 20.5 | 760.7 ± 146.2 | 14.1 ± 6.4 | 1.7 ± 0.8 | 13.6 ± 3.2 | 9.7±2.5 | 95 | 36/45 | 1 |
| Group B | 231.4 ± 27.3 | 1023.8 ± 197.9 | 14.7 ± 9.1 | 2.1 ± 0.9 | 18.7 ± 3.6 | 7.8±2.1 | 100 | 34/44 | 5 |
| Soares do Brito et al., 2013 (20) | | | | | | | | | |
| Group A | — | — | 12.7 ± 4.7 | 4.9 ± 2.1 | — | 10.6 ± 2.1 | 100 | 2/3 | 1 |
| Group B | — | — | 8.7 ± 3.6 | 2.6 ± 1.4 | — | 10.6 ± 2.2 | 100 | 1/2 | 1 |
| Zhang et al., 2013 (28) | | | | | | | | | |
| Group A | 207.9 ± 30.9 | 409.5 ± 107.9 | 22.7 ± 6.8 | 1.6 ± 0.6 | — | 8.3 ± 1.7 | 100 | 15/17 | 0 |
| Group B | 349.7 ± 38.9 | 840.0 ± 168.7 | 21.1 ± 5.9 | 1.3 ± 0.5 | — | 7.9 ± 1.9 | 100 | 15/16 | 0 |
| Zeng et al., 2014 (26) | | | | | | | | | |
| Group A | 163.7 ± 72.9 | 283.0 ± 80.5 | 7.9 ± 3.5 | 1.2 ± 0.82 | 14.2 ± 1.3 | 6.6 ± 1.8 | 100 | 16/17 | 4 |
| Group B | 347.5 ± 76.2 | 380.0 ± 252.5 | 7.3 ± 3.1 | 1.06 ± 0.7 | 17.5 ± 4.3 | 6.4 ± 1.4 | 100 | 17/18 | 10 |