

A group or subgroup of [participants](#) in a clinical trial. Each group receives a specific intervention, study drug dose, or sometimes no intervention, according to the study protocol.

[Osteoporotic vertebral fractures](#) (OVFs) have become increasingly common, and previous nonrandomized and [randomized controlled trials](#) (RCTs) have compared the effects of [cement augmentation](#) versus nonoperative management on the clinical [outcome](#). This meta-analysis focuses on RCTs and the calculated differences between cement augmentation techniques and nonsurgical management in outcome (e.g., pain reduction, adjacent-level fractures, and quality of life [QOL]).

A systematic review was performed according to the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines, and the following scientific search engines were used: MEDLINE, Embase, Cochrane, Web of Science, and Scopus. The inclusion criteria included RCTs that addressed different treatment strategies for OVF. The primary outcome was pain, which was determined by a visual analog scale (VAS) score; the secondary outcomes were the risk of adjacent-level fractures and QOL (as determined by the EuroQol-5 Dimension [EQ-5D] questionnaire, the Oswestry Disability Index [ODI], the Quality of Life Questionnaire of the European Foundation for Osteoporosis [QUALEFFO], and the Roland-Morris Disability Questionnaire [RDQ]). Patients were assigned to 3 groups according to their treatment: vertebroplasty (VP), kyphoplasty (KP), and nonoperative management (NOM). The short-term (weeks), midterm (months), and long-term (>1 year) effects were compared. A random effects model was used to summarize the treatment effect, including I² for assessing heterogeneity and the revised Cochrane risk-of-bias 2 (RoB 2) tool for assessment of ROB. Funnel plots were used to assess risk of publication bias. The log of the odds ratio (OR) between treatments is reported.

After screening of 1,861 references, 53 underwent full-text analysis and 16 trials (30.2%) were included. Eleven trials (68.8%) compared VP and NOM, 1 (6.3%) compared KP and NOM, and 4 (25.0%) compared KP and VP. Improvement of pain was better by 1.31 points (95% confidence interval [CI], 0.41 to 2.21; $p < 0.001$) after VP when compared with NOM in short-term follow-up. Pain effects were similar after VP and KP (midterm difference of 0.0 points; 95% CI, -0.25 to 0.25). The risk of adjacent-level fractures was not increased after any treatment (log OR, -0.16; 95% CI, -0.83 to 0.5; NOM vs. VP or KP). QOL did not differ significantly between the VP or KP and NOM groups except in the short term when measured by the RDQ.

This meta-analysis provides evidence in favor of the surgical treatment of OVFs. Surgery was associated with greater improvement of pain and was unrelated to the development of adjacent-level fractures or QOL. Although improvements in sagittal balance after surgery were poorly documented, surgical treatment may be warranted if pain is a relevant problem.

[Level of evidence](#): Therapeutic Level I ¹⁾.

¹⁾

Halvachizadeh S, Stalder AL, Bellut D, Hoppe S, Rossbach P, Cianfoni A, Schnake KJ, Mica L, Pfeifer R, Sprengel K, Pape HC. Systematic Review and Meta-Analysis of 3 Treatment Arms for Vertebral Compression Fractures: A Comparison of Improvement in Pain, Adjacent-Level Fractures, and Quality of Life Between Vertebroplasty, Kyphoplasty, and Nonoperative Management. *JBJS Rev.* 2021 Oct 25;9(10). doi: 10.2106/JBJS.RVW.21.00045. PMID: 34695056.

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