

Augmentation of Intertrochanteric Fractures

Scientific Update

The use of bone grafts such as allograft or synthetic grafts in various fracture management cases has been well documented as advantageous for complimenting the implant while providing a biologic graft for bone remodeling.¹ The studies below help lay the foundation for how the use of a bone void filler in cases of intertrochanteric hip fractures can be a cost-effective solution for reducing the risk of cut-out and improving patient outcomes.²⁻⁴

Is calcium phosphate augmentation a viable option for osteoporotic hip fractures?

Kim SJ, Park HS, Lee DW, Lee JW

- › Retrospective review of 82 patients treated with a proximal femoral nail (PFN) for unstable intertrochanteric fractures; 40 patients received the same implant with calcium phosphate for augmentation
- › The augmented group demonstrated increased mobility scores 6 months postoperatively.
- › Radiographic imaging at 6 months postoperatively showed significantly less femoral shortening and varus collapse in the augmented group.

Takeaway: The augmentation of poor-quality bone in intertrochanteric fractures can provide improved stability of the construct and reduce patient complications.

Osteoporos Int. 2018;29(9):2021-2028. doi:10.1007/s00198-018-4572-z

Implant augmentation for trochanteric fractures with an innovative, ready to use calcium-phosphate-cement

Fuchs A, Langenmair E, Hirschmülle A, Np S, Konstantinidis L

- › Dynamic biomechanical evaluation of using a calcium phosphate cement as a biologic alternative to polymethylmethacrylate for augmentation of and intramedullary nail with a trochanteric fracture model.
- › In the augmented group, there were significantly fewer instances of cut-out (2/8 vs 6/8).
- › Addition of calcium phosphate offset the negative effect of low bone mineral density to aid in improving initial stiffness. Full loading could be achieved earlier with increased initial stiffness.

Takeaway: Calcium phosphate provides biological advantage in fracture management and, biomechanically, has demonstrated efficacy in reducing the incidence of cut-out.

J Orthop Bone Res. 2019;1:104.

Unstable trochanteric fractures augmented with calcium phosphate cement. A prospective randomized study using radiostereometry to measure fracture stability.

Mattsson P, Larsson S

- › Evaluated 21 patients with unstable intertrochanteric fractures treated with a sliding screw device alone or the same device augmented with calciumphosphate cement
- › At 1 week, 6 weeks, and 6 months, patients in the augmented group had significantly less translation (medial and lateral) of the femoral head and neck fragment.

Takeaway: Augmentation of the intertrochanteric fracture demonstrated improved fracture stability from the day after surgery until fracture healing.

Scand J Surg. 2004;93(3):223-228. doi:10.1177/145749690409300310



COST-EFFECTIVENESS OF AUGMENTATION OF INTERTROCHANTERIC FRACTURES

Cost-effectiveness of cement augmentation versus no augmentation for the fixation of unstable trochanteric fractures

Joeris A, Kabiri M, Galvain T, Vanderkarr M, Holy CE, Plaza JQ, Tien S, Schneller J, Kammerlander C

- › European-based case analysis on the cost-benefits and quality-adjusted life-years (QALYs) with augmentation of unstable trochanteric fractures
- › Fixation with augmentation reduced the mean total cost per patient and resulted in an incremental benefit of quality-adjusted life-years (QALYs), most notably helping decrease revision procedure instances.

Takeaway: Augmentation can reduce the occurrence and costs of revision surgery, while also improving patient health outcomes.

J Bone Joint Surg Am. 2022;104(22):2026-2034. doi:10.2106/JBJS.21.01516

Cost-effectiveness and budget impact of cement augmentation for the fixation of unstable trochanteric fractures from a European perspective: cost-effectiveness and budget impact of cement augmentation in Europe

Radcliffe G, Trouiller JB, Battaglia S, Larrainzar-Garijo R

- › European analysis of the economic benefits augmentation can provide vs no augmentation
- › Augmentation was shown to be cost-effective in that a decrease in hospital length of stay and revision surgery incidence was observed compared to the nonaugmented group.

Takeaway: Augmentation of intertrochanteric hip fractures provided efficacy in reducing costs associated with prolonged hospital stays and revision surgery cases.

Injury. 2024;55(12):111999. doi:10.1016/j.injury.2024.111999

References

1. Bajammal SS, Zlowodzki M, Lelwica A, et al. The use of calcium phosphate bone cement in fracture treatment. A meta-analysis of randomized trials. *J Bone Joint Surg Am.* 2008;90(6):1186-1196. doi:10.2106/JBJS.G.00241
2. Kim SJ, Park HS, Lee DW, Lee JW. Is calcium phosphate augmentation a viable option for osteoporotic hip fractures?. *Osteoporos Int.* 2018;29(9):2021-2028. doi:10.1007/s00198-018-4572-z
3. Mattsson P, Alberts A, Dahlberg G, Sohlman M, Hyldahl HC, Larsson S. Resorbable cement for the augmentation of internally-fixed unstable trochanteric fractures. A prospective, randomised multicentre study. *J Bone Joint Surg Br.* 2005;87(9):1203-1209. doi:10.1302/0301-620X.87B9.15792
4. Fuchs A, Langenmair E, Hirschmülle A, Np S, Konstantinidis L. Implant augmentation for trochanteric fractures with an innovative, ready to use calcium-phosphate-cement. *J Orthop Bone Res.* 2019;1:104.