

# The Effect of Weekly Risedronate on Periprosthetic Bone Resorption Following Total Hip Arthroplasty

A Randomized, Double-Blind, Placebo-Controlled Trial

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**Background:** Bone loss leading to late-occurring periprosthetic femoral fracture is a mode of failure in cementless total hip arthroplasty. The aim of this trial was to investigate the effect of a bisphosphonate, risedronate, on femoral periprosthetic bone resorption following total hip arthroplasty in patients with osteoarthritis of the hip.

**Methods:** We enrolled seventy-three patients between the ages of forty and seventy years who were scheduled to undergo total hip arthroplasty in a single-center, randomized, double-blind, placebo-controlled trial. Subjects were randomly assigned to receive either 35 mg of risedronate ( $n = 36$ ) or a placebo ( $n = 37$ ) orally once weekly for six months. The primary end point was the change in bone mineral density in Gruen femoral zones 1 and 7. Bone mineral density scans were made preoperatively and at two days and three, six, twelve, and twenty-four months postoperatively. Secondary end points included migration of the femoral stem and clinical outcome.

**Results:** Seventy of the seventy-three patients (thirty-three in the risedronate group and thirty-seven in the placebo group) were analyzed for the primary end point. The mean bone mineral density in zone 1 was 9.2% higher (95% confidence interval [CI], 4.2% to 14.1%) in the risedronate group than in the placebo group at six months postoperatively and 7.2% higher (95% CI, 1.0% to 13.3%) at one year. The mean bone mineral density in zone 7 was 8.0% higher (95% CI, 2.7% to 13.4%) in the risedronate group than in the placebo group at six months postoperatively and 4.3% higher (95% CI, -1.5% to 10.1%) at one year. Migration of the femoral stem, the clinical outcome, and the frequency of adverse events did not differ between the groups.

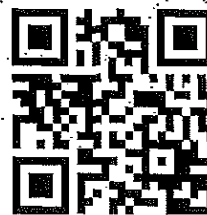
**Conclusions:** Risedronate taken once weekly for six months following total hip arthroplasty was effective in reducing periprosthetic bone resorption around an uncemented femoral stem up to one year after surgery but had no discernible effect on implant migration or clinical outcome. Future studies of bisphosphonate treatment following total hip arthroplasty should focus on clinically relevant end points such as the risks of fracture and revision arthroplasty.

**Level of Evidence:** Therapeutic Level I. See Instructions to Authors for a complete description of levels of evidence.

**A**daptive bone resorption around a femoral stem following total hip arthroplasty is a well-known phenomenon<sup>1,2</sup>. Since a well-fixed stem, which is stiffer than the

surrounding femur, bears the majority of the load on the femur, the surrounding bone is stress-shielded and disuse atrophy of the bone may result<sup>3</sup>. This locally induced osteopenia progresses

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A commentary by William G. Hamilton, MD, is linked to the online version of this article at [jbj.s.org](http://jbj.s.org).