

Supplementary article data

Experimental models for cancellous bone healing in the rat

Comparison of drill holes and implanted screws

Magnus BERNHARDSSON, Olof SANDBERG, and Per ASPENBERG

Orthopaedics, Department of Clinical and Experimental Medicine, Faculty of Health Sciences, Linköping University, Linköping, Sweden.

Correspondence: magnus.bernhardsson@liu.se

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Surgery

The rats were anesthetized with isoflurane gas. Each rat received a subcutaneous injection of 7 mg oxytetracycline as infection prophylaxis and 0.015 mg buprenorphine as postoperative analgesic. Analgesic was given every 12 h over the following 48 h. Both hind legs were shaved and cleaned with chlorhexidine. The rat was placed in a surgical glove and holes were cut in it, through which the shaved legs were pulled. Sterile tape was wrapped around the paws and the legs were cleaned once more with chlorhexidine.

microCT

Specimens were analyzed by microCT (Skyscan 1174, v.2; Skyscan, Aarteseelaar, Belgium). Images of the bones with an isotropic voxel size of 12.5 μm were acquired at energy settings of 50 kV and 800 μA , using an aluminum filter of 0.5 mm, a rotation step of 0.4°, and a frame averaging of 3. The images were reconstructed with NRecon (Skyscan, v.1.6.8.0; Aarteseelaar) and corrected for ring artifacts and beam hardening. Calibration of bone mineral density (BMD) was carried out by scanning 2 hydroxyapatite phantoms of known density (0.25 and 0.75 g/cm^3). Analyses of total bone volume per tissue volume (BV/TV), BMD, and tissue mineral density (TMD) were performed in CTAn (Skyscan, v.1.10; Aarteseelaar).

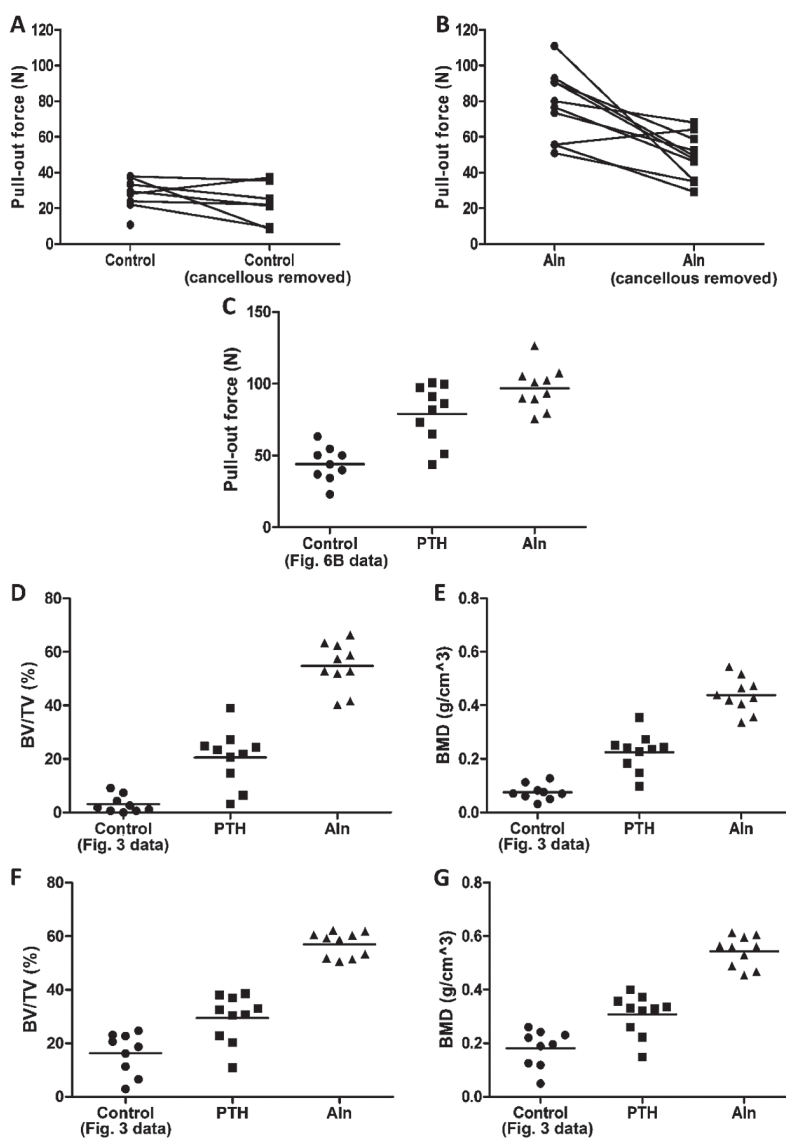


Figure 7. Pull-out force for metaphyseal screws 4 weeks after insertion, and microCT data from former drill holes in metaphyseal tibia after 4 weeks. Removal of cancellous bone reduced the pull-out force in the alendronate (Aln) group (panel B) but not in the saline controls (A), suggesting that alendronate increases the pull-out force by increasing cancellous bone in the marrow compartment. PTH and alendronate increased pull-out force compared to saline controls (C; control data from Figure 6B). PTH and alendronate substantially increased bone formation inside (D, E) and surrounding (F, G) the former drill holes, compared to saline controls (control data from 4-week data in Figure 3).