

Compression of Intercalary Allografts with Magnetic Lengthening Nails, Mid-term Results with a Comparison of Techniques

Lee Zuckerman, MD
lzuckerm@usc.edu

What was the question?

Using magnetic growing intramedullary nails to compress an intercalary allograft may improve union rates and decreased complications. The purpose of this study is to evaluate union rates, complications, and mid-term results of this technique. In addition to this, a subset analysis of patients who underwent routine compression post-operatively compared to those who did not is presented.

How did you answer the question?

A retrospective review of 16 patients with 33 osteotomy sites on 7 femurs, 9 humeri and 1 tibia was performed. The average age was 36.7 (9–73) with an average follow-up of 47.2 months (7–102). Thirty osteotomy sites were primary resections, one site was a chronic non-union previously treated with a carbon fiber nail, and two sites were for a revision of a previously fractured intercalary allograft. The average allograft length was 14.8 cm (6.5–29). All nails were compressed intraoperatively. Ten patients did not undergo routine post-operative compression. Eight patients underwent routine compression, including 2 patients who required revision surgery after not undergoing compression due to hardware complications. Radiographs were evaluated to determine union rates, time to union and to evaluate for both early and late complications.

What are the results?

Thirty out of 33 sites (90.9%) were healed at final follow-up, whereas 28 of the sites (84.8) healed with a single surgery. When comparing the union rates of the 2 groups, 14/14 (100%) of routine compression group healed compared to 16/21 (76.2%) who did not undergo routine compression ($p=0.069$). One of the nails failed in a patient who had routine compression compared to 3 that failed in the non-routine compression group. All 4 patients underwent revision surgery. Two of the 3 patients in the non-routine group subsequently underwent routine compression and healed uneventfully whereas the remaining patient did not undergo compression and the revision hardware failed. The patient in the compression group that underwent revision had routine compression and healed uneventfully. No other complications occurred in the routine compression group. Other complications in the non-routine group included 1 fracture through the allograft after a fall, 1 wound dehiscence, the backing out of 4 screws/pegs with one that required removal, and fracture of 1 screw. There was no evidence of reabsorption of any of the allograft, recurrent tumor, or infections at final follow-up.

What are your conclusions?

In this series, there was a union rate of 91% of patients healed at final follow-up with 85% after a single surgery. The use of routine post-operative compression improved the rate of healing to 100% compared to 76% which approached significance. The complications in the routine compression group, including hardware complications were decreased. Routine post-operative compression appears to improve the union rates and decrease the complications of this technique although further study is needed.