INTRODUCTION: The ideal interbody graft material for anterior cervical discectomy and fusion (ACDF) remains to be identified. Purported advantages of dense cancellous allograft (DCA) include compressive strength similar to that of cervical vertebrae, which may lessen the likelihood of graft pistoning into adjacent vertebrae. Additionally, the trabeculated, porous structure of DCA is argued to promote early and more complete bone ingrowth. For the same reasons, however, it could be postulated that DCA may be more prone to collapse and resorption, leading to inferior fusion rates. The purpose of this study was to determine the radiographic outcomes (resorption and fusion rate) of DCA used in ACDF.

METHODS: DCA were used in 27 patients undergoing ACDF by a single surgeon at 40 levels between September 2003 - March 2005. All patients had supplemental plating with variable screw constructs. Flexion-extension radiographs and CT scans were obtained in all patients at final follow up, which averaged 15 months (range 12-26). All radiographs were reviewed independently by two authors. Fusion was determined by measuring the difference between two corresponding points on the tips of the spinous processes at the operative segments on flexion versus extension. These measurements were performed on printed, contrast-optimized and magnified images with digital calipers. The flexion-extension measurements were calibrated against measurements of the known pitch length of the screws in order to control for variations in radiographic technique. Sagittal CT reconstructions were evaluated over the central 10 mm of the graft for areas of resorption and bridging trabeculation spanning the endplates.

RESULTS: Resorption of the DCA was noted in 50% of the levels, and was classified as severe in 10%, moderate in 23%, and mild in 17% (Figure 1). Despite resorption, the fusion rate was 78% as determined by levels with <1 mm of flexion-extension motion, 95% as determined by levels with <2 mm of flexion-extension motion, and 85% as determined by sagittal CT scans demonstrating any areas of bridging trabeculae on all cuts spanning the central 10 mm of the graft. No patient required revision surgery for symptomatic pseudarthrosis. However, in only 53% of the levels did the bridging trabeculae cover ≥50% of the anterior-posterior depth of the disc space.
CONCLUSIONS: DCA demonstrated high rates of resorption at minimum 12 month follow up. Although the majority of segments went on to fuse according to three radiographic criteria, graft resorption created voids leading to incomplete bridging of less than 50% of the disc space in almost half of the operative levels. Caution should be used when considering DCA as grafting materials in ACDF.