

Viability of Articular Cartilage Collected With The GraftNet™ Autologous Tissue Collector

Arthrex Research and Development

Background

The GraftNet device is used in-line with an arthroscopic shaver to collect resected tissue. This autologous, resected tissue can be used to backfill surgical sites or augment repairs. The purpose of this study was to evaluate articular cartilage viability when resected with a 5.0 mm bone cutter and collected with the GraftNet device.

Methods

Human cadaver taluses were obtained from 4 donors (JRF Ortho, Centennial, CO). Each talus was divided into 3 sections. Sections were resected with a 5.0 mm bone cutter in either forward or oscillating mode and collected into a GraftNet device using phosphate-buffered saline as the collection fluid. As a control, large sections of tissue were shaved with a scalpel.

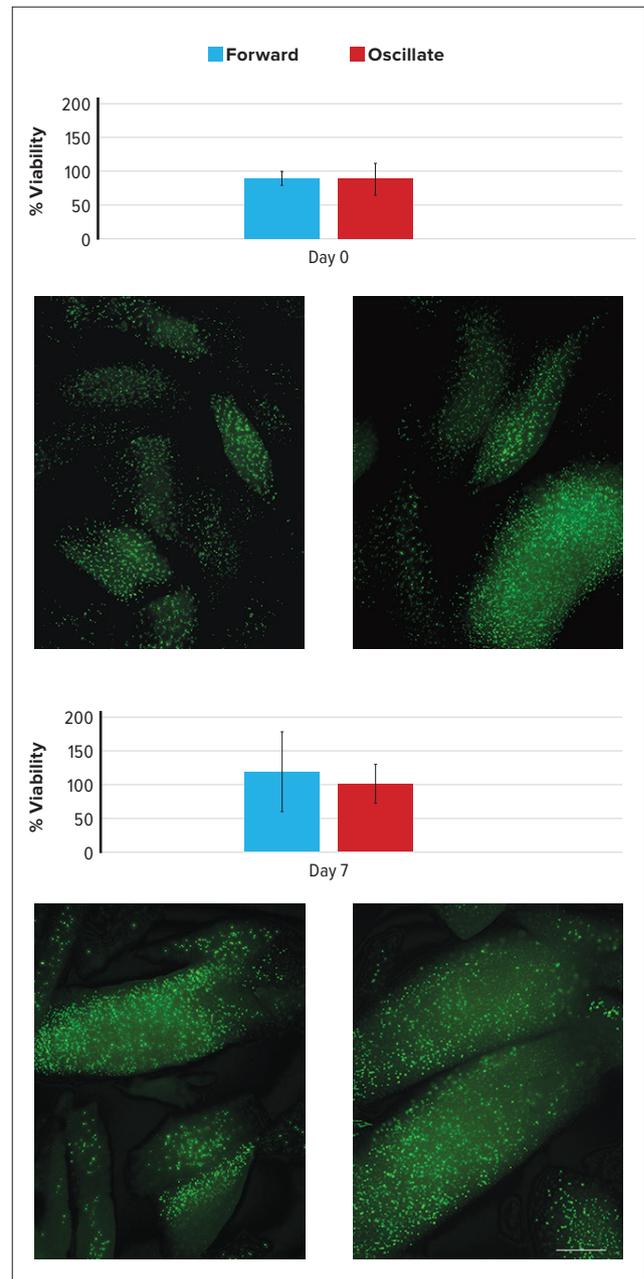
Aliquots of tissue from each group were weighed and used to determine viability (LIVE/DEAD) and relative metabolism (AlamarBlue reagent) immediately and after 7 days of culture to evaluate prolonged viability. Image analysis was used to determine the number of viable (green) to nonviable (red) cells. Viability in the particulate tissue was normalized to the viability of the control tissue. Reduction of the AlamarBlue reagent on a scale of 0-100% was calculated and normalized to the weight of the tissue.

A 2-way repeated measure ANOVA was used to determine any difference in day and cut mode with regard to normalized viability of resected cartilage and a paired *t* test was used to determine differences in metabolism.

Results

Viability of the resected cartilage was, on average, $93\% \pm 18\%$ of the shaved cartilage. Viability of resected cartilage was not significantly different at either time point or with either shaver mode ($P = .352$, $P = .312$, Figure 1).

Figure 1. Percent Viability Relative to Control



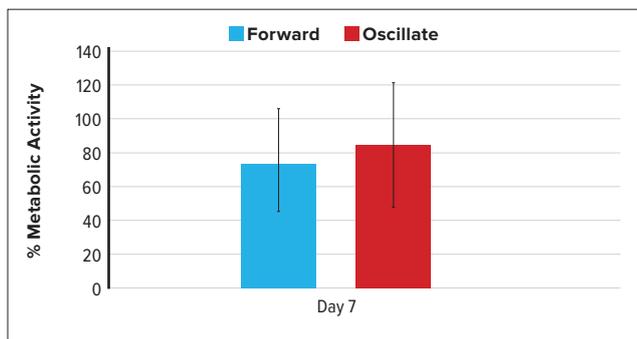
Viability of resected cartilage relative to control. Viable-only images are displayed with the scale bar on the lower right indicating 0.5 mm.





On day 7, metabolic activity was $80\% \pm 33\%$ of the activity observed at day 0. There was no difference in the ratio of metabolic activity when comparing the two cut modes ($p=0.586$, Figure 2).

Figure 2. Metabolic Activity After 7 Days of Culture Compared to Initial Activity



Metabolic activity of resected tissue after 7 days relative to initial activity.

Conclusion

The GraftNet™ device can be used to collect articular cartilage in conjunction with an arthroscopic shaver such as the 5.0 mm bone cutter. Viability and activity of the resected cartilage persisted over at least 7 days.