The Impact of Liposuction Technique, Centrifugation and Freezing in Adipose Tissue Viability

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Abstract

Background: The ideal technique for obtaining, processing and storing aspirated adipose tissue to use as grafts is controversial in the literature. This is due to the variety of methods available for collecting and processing fat, combined with the lack of a standardized measurement tool to allow us to compare the different techniques (1-5).

Objectives: The main goal of this study was to evaluate the viability of aspirated adipose tissue and stem cell density, using variations in the suction technique. The secondary end point was to evaluate cell viability after centrifugation and freezing at 20 ° C without cryopreservation agents.

Methods: Ten female patients between 18 and 55 years of age were included. Adipose tissue was obtained by central suction or syringe with 3 different types of cannula (1.8 mm Coleman, Mercedes 3 and 4 mm). Five samples were centrifuged at 1200G x 3 min and 2 samples were frozen for a period of 1 to 3 months.

Tissue viability was assessed by XTT assay quantifying mitochondrial activity and by conventional histology (score of tissue integrity).

Stem cell density was assessed by enzymatic digestion with collagenase, set in a culture medium for 7 days and counted on a Neubauer chamber.

Results: The highest viability was obtained by the 4 mm cannula versus smaller diameter cannulas in XTT (Figure 1) and histological assessment (0.61 vs 0.45 p=0.03, 2.9 vs 3.7 p=0.007 respectively). The highest density of progenitor cells was also obtained with the 4 mm cannula (4.1 x 10^4 cells / ml vs. 1.3 x10^4 cells /ml, p = 0.041) (Figure 2). There was no statistically significant difference between the use of central suction o syringes suction. After centrifuging the samples obtained with the 4 mm cannula, there was an improvement in the viability evaluated by XTT (0.54 vs. 0.7 p = 0.018). No cell activity was found after freezing the samples using this methodology.

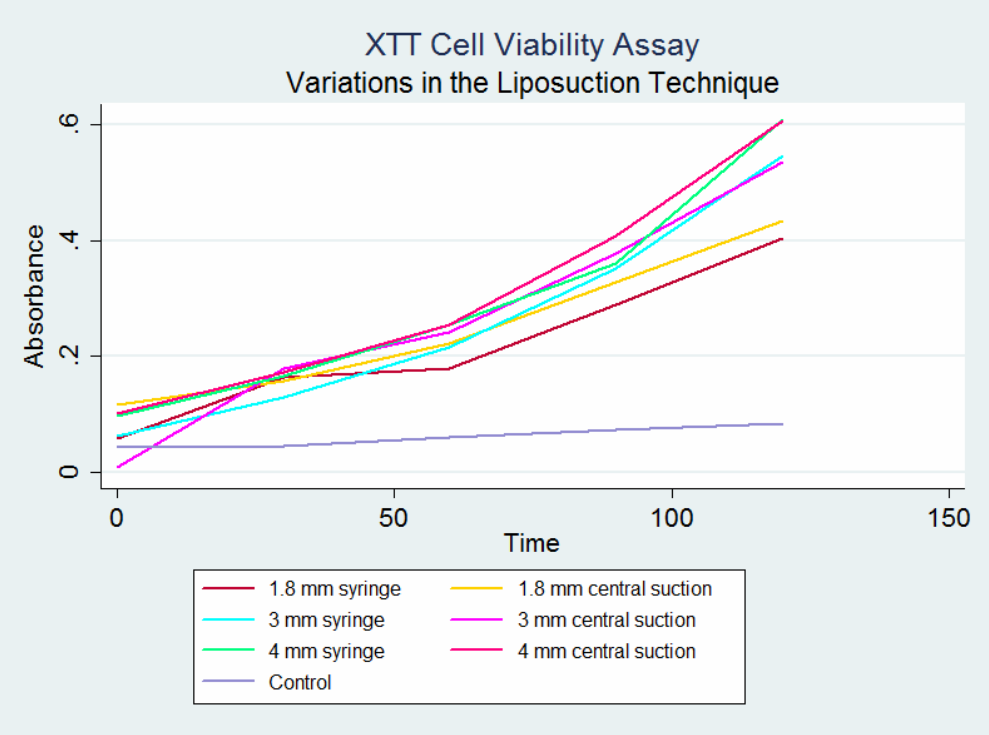

Figure 1. XTT cell viability assay

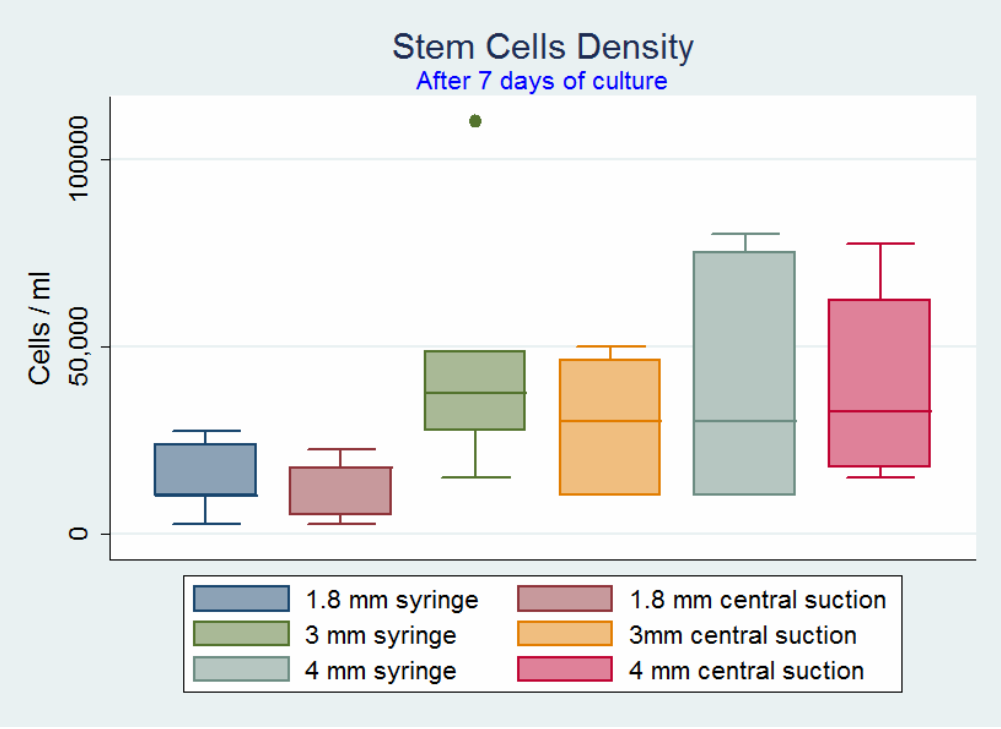

Figure 2. Stem cells density

Conclusions: The use of larger diameter canullas provides better tissue viability, regardless of the type of suction. We would recommended the use of centrifugation with the proposed parameters. This study does not provide evidence for adipose tissue freezing in commercial refrigerators without cryopreservation agents.

References

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