

Review Article

# The Healing and Aging-related Properties of Adipose Tissue Fragments Obtained through the Guided SEFFI Procedure's Mechanical Fragmentation are Facilitated by the Exosomes Present in the Final Injection

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Submitted: March 15, 2024

Approved: April 30, 2024

Published: May 01, 2024

How to cite this article: Casadei A, Gennai A, Bovani B, Pusceddu T, Sileo L, et al. The Healing and Aging-related Properties of Adipose Tissue Fragments Obtained through the Guided SEFFI Procedure's Mechanical Fragmentation are Facilitated by the Exosomes Present in the Final Injection. *J Stem Cell Ther Transplant*. 2024; 8: 010-015.

DOI: 10.29328/journal.jsctt.1001037

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Keywords: Fat grafting; Soft-tissue augmentation; Soft-tissue reconstruction; Regenerative medicine; ADSCs; Exosomes



## Abstract

The Injection of autologous Adipose-Derived Stem Cells (ADSCs) and Stromal Vascular Fraction (SVF) into dermal and subdermal layers can improve skin volume and rejuvenation. The SEFFI (Superficial Enhanced Fluid Fat Injection) technique, which involves minimal manipulation of autologous microfragmented adipose tissue, was utilized for harvesting and re-injection, using the SEFFILLER™ disposable medical device. Mechanical fragmentation of adipose tissue is a well-established surgical technique that stimulates tissue regeneration, filler, and biological activity. The study evaluated the biological properties (regenerative and anti-aging) of different harvest and processing fat graft methods among which the fragmented adipose tissue, specifically focusing on the presence of exosomes. Exosomes, nanometer-sized vesicles produced by cells for cellular communication, were found to contain miRNAs with anti-inflammatory, regenerative, and vascular content. The products' contained exosomes were confirmed in the study through electron microscopy, Western Blotting, gene expression, and sequencing of miRNA content.

The *in vitro* treatment of fibroblasts with exosomes obtained by this fragmentation technique showed a 23% greater increase in the production of hyaluronic acid, type I collagen, and elastin compared to other techniques. This research highlights the potential regenerative and anti-aging properties of exosomes obtained through mechanical fragmentation of adipose tissue for skin rejuvenation and skin repair.

## Introduction

The first use of autologous fat grafts was presented by Neuber in 1893 for the treatment of facial defects [1]. Subsequently, since the 1980s, lipoaspirate transplant procedures have been codified, and they have become common in cosmetic and reconstructive surgery clinical practice. Different technical variants and clinical applications have opened the horizons to unexpected perspectives, pushing surgical activity and research toward the frontiers

of regenerative medicine [2]. Regenerative medicine is a new treatment that has been developed to repair damaged tissue. This emerging field requires a reliable source of stem cells to heal and support the regeneration of damaged tissue. Adipose tissue stem cells are currently being considered an ideal source of Autologous Mesenchymal Stem Cells (ADSCs) [3], for clinical purposes, especially because they are easily obtained by liposuction under local anesthesia causing minimal discomfort to the patient compared to traditional methods of obtaining them [4].