

ADSC-ENRICHED AUTOLOGOUS FAT GRAFTING IN FACIAL REJUVENATION

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Introduction: Autologous fat transfer (AFT) is widely applied in facial rejuvenation due to its biocompatibility and capacity to restore age-related volume loss. Although patient satisfaction remains high, long-term predictability is limited by graft survival, with traditional techniques demonstrating approximately 50–60% volume retention at one year. To improve these outcomes, stromal vascular fraction (SVF) – enriched grafting, also referred to as cell-assisted lipotransfer (CAL), incorporates adipose-derived stem cells (ADSCs) in order to enhance tissue integration, angiogenesis and regenerative capacity. This paper analyzes the biological mechanisms and clinical outcomes of ADSC-enriched autologous fat grafting in facial rejuvenation.

Material and Methods: A structured literature review was performed focusing on publications from 2015 to 2025. Thirty-five records were identified through searches in PubMed, HINARI and Google Scholar using combinations of the terms “autologous fat grafting”, “adipose-derived stem cells”, “stromal vascular fraction”, “cell-assisted lipotransfer” and “facial rejuvenation”. After screening titles and abstracts, full-text articles were evaluated according to predefined inclusion criteria and eighteen publications met the eligibility criteria.

Results: ADSC enrichment improves graft performance through multiple mechanisms. These include stimulation of angiogenesis via increased secretion of vascular endothelial growth factor and fibroblast growth factor, reduction of oxidative stress and modulation of inflammatory pathways that facilitate tissue regeneration. Enhanced neovascularization improves oxygenation during the critical early ischemic phase, thereby supporting graft survival. Reported retention rates for CAL reached up to 88%, compared with 50–60% in conventional AFT, 6 months post-procedure. Patient satisfaction increased from approximately 81% with traditional grafting to 91.1% following ADSC enrichment. Histological findings demonstrated increased collagen and elastin deposition, improved dermal thickness and enhanced vascularization. While complications were not eliminated, they appeared reduced. Traditional AFT is associated with fat resorption, necrosis and infection, whereas CAL primarily reported lower incidence of these events and rare vascular embolism.

Conclusions: ADSC-enriched fat grafting enhances angiogenesis, dermal remodeling, and long-term volume stability compared with conventional techniques. Standardization of protocols and larger controlled studies remain necessary to define optimal clinical guidelines and confirm long-term safety and efficacy.

Keywords: autologous fat grafting, adipose-derived stem cells, stromal vascular fraction, cell-assisted lipotransfer, facial rejuvenation.