

Macrofat Vs Microfat in Reconstructive Surgery: Comparative Analysis Based on a Case Report

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ABSTRACT

Autologous fat grafting has become a fundamental tool in reconstructive and aesthetic surgery due to its biocompatibility, availability, and regenerative potential. Among its different modalities, macrofat and microfat have gained relevance because of their distinct biological properties and clinical applications. Macrofat is primarily used for structural volume restoration in deep planes, whereas microfat, due to its smaller particle size and higher stromal vascular fraction content, is more suitable for superficial applications and improvement of skin quality.

We present the case of a 58-year-old female patient with moderate facial aging characterized by volume loss in the midface, deep nasolabial folds, and skin quality deterioration. She underwent autologous fat grafting combining macrofat and microfat techniques. Macrofat was applied in deep planes to restore facial contour and structural support, particularly in the malar region, nasolabial folds, and mandibular line. Microfat was injected in superficial planes in the perioral and infraorbital regions to enhance skin texture and fine wrinkles.

Postoperative follow-up at 2, 6, and 12 weeks demonstrated satisfactory integration of the graft, with significant improvement in facial volume, contour, and skin quality, without complications such as fat necrosis, infection, or irregularities. The results remained stable at 3 months, with high patient satisfaction.

This case highlights the importance of a combined approach using macrofat and microfat to address both structural and superficial components of facial aging. The appropriate selection of technique, processing method, and injection plane is essential to optimize outcomes and achieve natural, long-lasting results in reconstructive facial surgery.

KEYWORDS: Autologous fat grafting, macrofat, microfat, fat transfer, facial rejuvenation, reconstructive surgery, stromal vascular fraction, tissue regeneration, fat graft, facial aging.

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INTRODUCTION

Autologous fat transfer has become a fundamental tool in reconstructive and aesthetic surgery due to its

biocompatibility, availability, and ability to restore volume, improve tissue quality, and promote regenerative processes. Following the technique described by Sydney Coleman, fat

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grafting has evolved significantly, giving rise to different processing and application modalities, among which macrofat and microfat stand out, each with specific indications depending on the reconstructive goal.

Macrofat is characterized by the transfer of adipocytes in larger volume and with less processing, which allows its use mainly in the restoration of contours and deep structural defects. On the other hand, microfat involves more refined processing of adipose tissue, generating smaller particles that facilitate its application in superficial planes, with greater precision and better integration into delicate tissues, in addition to a potential regenerative effect associated with the stromal vascular fraction.

Despite its widespread use, there is still controversy in the literature regarding the ideal indications, graft survival, and comparative clinical outcomes between both techniques, especially in the reconstructive setting. Appropriate selection of the type of fat graft can significantly influence functional and aesthetic outcomes, as well as complication rates.

In this context, the aim of the present study is to analyze the differences between macrofat and microfat in reconstructive surgery through the presentation of a case report, highlighting technical aspects, indications, clinical evolution, and outcomes, in order to provide practical evidence that may contribute to surgical decision-making.

CASE REPORT

We present the case of a 58-year-old female patient with no significant medical history, who presented for evaluation due to facial changes associated with aging, referring volume loss in the midface, deep nasolabial folds, atrophy in the malar and perioral regions, as well as skin thinning with mild laxity. Physical examination revealed signs of moderate facial aging, with volumetric deficit in deep and superficial compartments, resulting in alteration of facial contour and a tired appearance. Management with autologous fat grafting was decided, combining macrofat and microfat techniques with the aim of restoring structural volume and improving skin quality. Under local anesthesia with sedation, adipose tissue was harvested from the abdominal region by means of low-pressure liposuction using a blunt cannula. The obtained material was processed following Coleman centrifugation principles, separating fractions for its use as macrofat and microfat.

Macrofat was applied in deep planes, specifically in the malar region, nasolabial folds, and mandibular line, in order to restore volume and structural support. Subsequently, microfat was infiltrated into more superficial planes, mainly in the perioral region, fine rhytides, and infraorbital area, seeking to improve skin quality, texture, and transition between facial subunits. Infiltration was performed through multiple tunnels using a retrograde technique, avoiding overcorrection.

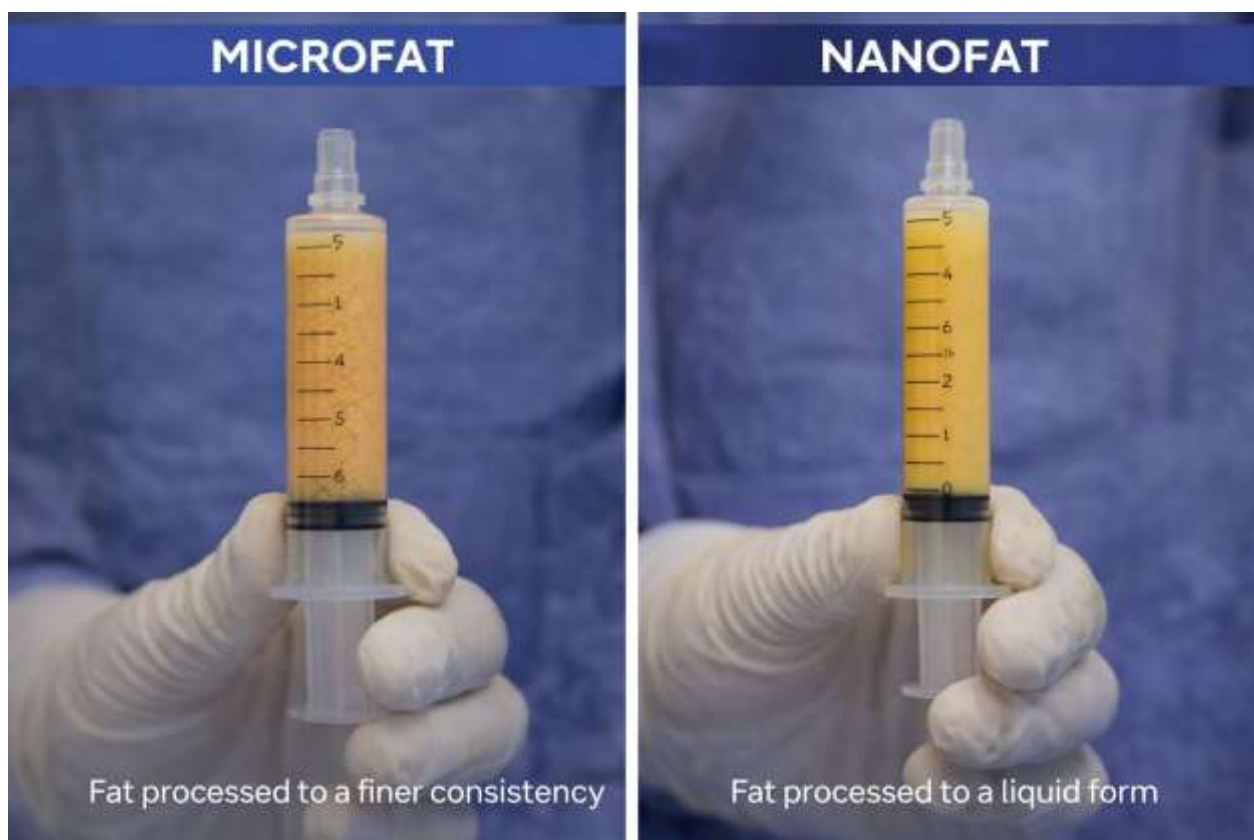


IMAGE 1: Differences between nanofat and microfat

The procedure was completed without immediate complications. During postoperative follow-up at 2 and 6

weeks, the patient showed adequate graft integration, with evident improvement in facial contour, attenuation of folds, and better skin quality, without evidence of fat necrosis,

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infection, or palpable irregularities. Greater volumetric persistence was observed in the areas treated with macrofat, while a notable improvement in skin texture was seen in the areas treated with microfat. At 3 months of follow-up, the results remained stable, with a high degree of patient satisfaction. This case illustrates the

usefulness of combining macrofat and microfat in the comprehensive management of facial aging, allowing treatment of both structural and superficial components and optimizing aesthetic and functional outcomes.

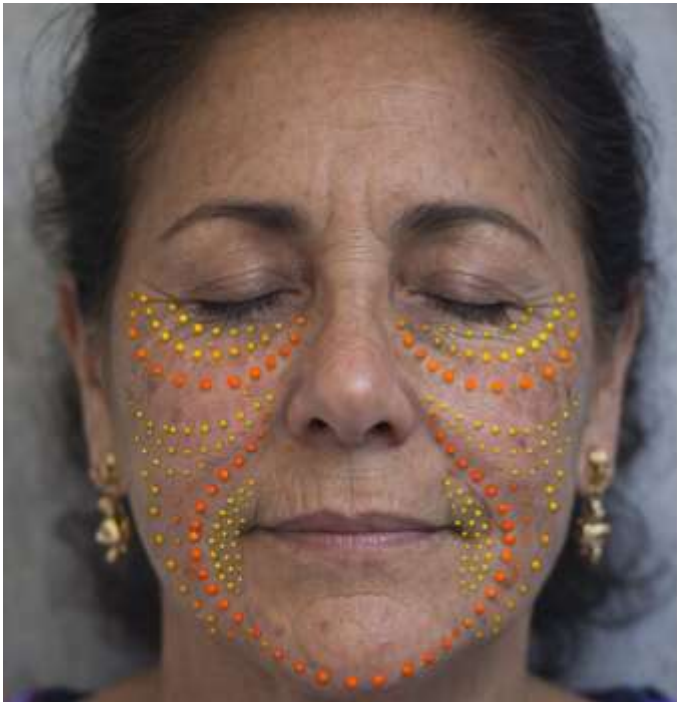


IMAGE 2: Placement of microfat and nanofat



IMAGE 3: Three months after fat grafting

DISCUSSION

Autologous fat transfer has evolved toward a more specific and targeted approach in which not only the transferred volume matters, but also particle size, processing method, and injection plane. In this context, differentiation between macrofat and microfat acquires clinical relevance, since each fulfills different functions within the reconstructive and aesthetic spectrum. The present case demonstrates that the combination of both techniques allows comprehensive treatment of both deep volumetric deficit and the quality of superficial tissues.

Several studies have pointed out that macrofat preserves a greater amount of intact adipocytes, which favors its function as a structural filler, whereas microfat, being more processed, presents a higher proportion of stromal cells and regenerative components, which translates into improvement in skin quality. This functional duality supports the combined use of both techniques in complex facial regions, as evidenced in our patient. Below are comparative tables summarizing the main differences, preparation techniques, and clinical applications of macrofat and microfat.

Table 1. General differences between macrofat and microfat

Characteristic	Macrofat	Microfat
Particle size	Large	Small
Processing	Minimal	Moderate
Cellular content	Predominantly adipocytes	Greater stromal fraction
Main use	Structural volume	Regeneration and fine contouring
Injection plane	Deep	Superficial
Precision	Low	High

Table 2. Preparation technique

Step	Macrofat	Microfat
Harvesting	Conventional liposuction	Conventional liposuction
Filtering	Basic	Refined

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Centrifugation	Yes (low manipulation)	Yes (greater processing)
Emulsification	No	Yes (optional)
Final size	2–4 mm	<1 mm
Instrumentation	Large cannulas	Fine cannulas

Table 3. Clinical indications

Region	Macrofat	Microfat
Malar region	Yes	Yes
Nasolabial folds	Yes	Yes
Mandibular line	Yes	No
Perioral region	No	Yes
Tear troughs	No	Yes
Fine wrinkles	No	Yes

Table 4. Advantages and disadvantages

Aspect	Macrofat	Microfat
Main advantage	Greater volume	Better integration
Duration	Prolonged	Variable
Risk of irregularities	Higher	Lower
Precision	Limited	High
Resorption	Moderate	Variable
Technique	Simpler	More demanding

Table 5. Expected clinical outcomes

Outcome	Macrofat	Microfat
Volume enhancement	High	Low
Contour improvement	High	Moderate
Skin quality	Low	High
Skin texture	Low	High
Natural appearance	Good	Very high
Combined application	Ideal	Ideal

Recent literature emphasizes that the success of fat grafting does not depend exclusively on the technique used, but rather on the correct indication, atraumatic tissue handling, and appropriate selection of the infiltration plane. Exclusive use of macrofat may be insufficient in areas where skin quality is a predominant factor, whereas microfat alone does not provide the structural support required in significant volumetric defects.

The present case reinforces the concept of multimodal treatment of facial aging, in which the strategic combination of macrofat and microfat allows more complete and harmonious results. Likewise, it highlights the importance of individualizing treatment according to the anatomical and functional needs of each patient, optimizing both aesthetic outcomes and patient satisfaction.

CONCLUSION

In conclusion, autologous fat transfer using macrofat and microfat techniques represents a complementary and non-exclusive strategy within reconstructive facial surgery. Macrofat provides adequate structural support by restoring deep volumes and redefining contours, whereas microfat

offers benefits in skin quality, improving texture, elasticity, and overall appearance due to its higher regenerative content. The case presented demonstrates that the combination of both techniques allows a comprehensive approach to facial aging, optimizing results from both the functional and aesthetic points of view. Appropriate selection of the type of graft, injection plane, and tissue processing are key factors that directly influence graft survival and patient satisfaction.

Therefore, the combined use of macrofat and microfat should be considered a fundamental tool in the plastic surgeon's armamentarium, allowing individualized treatment according to each patient's specific needs and achieving more harmonious, natural, and long-lasting results.

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