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VIDEO CASE REPORT

MULTI-STAGES AESTHETIC REFINEMENT FOLLOWING ANTEROLATERAL THIGH FREE FLAP FOR HEAD AND NECK RECONSTRUCTION

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ABSTRACT

Introduction: Multi-stages refinement of a bulky flap after composite defects reconstruction of multiple facial units has been a challenging situation. Goals including restoration of periorbital and malar area and redefining the aesthetic aspects of the units as well as the surrounding nasolabial area with multiple refinements and microfat graft.
Methods: A 50-year-old male patient with a history of solitary fibrous tumor underwent wide excision of left periorbital, infraorbital, lateral nasal sidewall, and malar area. The defect is enclosed with Anterolateral Thigh Free Flap (ALT). Bulkiness of the flap, sunken left nasolabial, and asymmetric alar nasal unit were found during outpatient follow-up. These problems lead to the necessity of refinement procedure to reduce the bulkiness to improve the aesthetic outcome of the patient. Microfat graft was the method chosen to volumized the sunken nasolabial and asymmetric alar nasal unit.
Results: Patient is satisfied with the result due to improvement of alar nasal unit's symmetricity and reduced bulkiness of the flap area. No complication was observed.
Summary: Meticulous planning and staging of the surgical refinement procedures in conjunction with microfat graft results in good aesthetic outcome and satisfies the patient and reduces the possibility of complications.
***Keywords**: Multistage reconstruction, Aesthetic Refinement, Microfat graft, Liposuction, Lipo-thinning, ALT free Flap, Contouring.*

Latar Belakang: Penyempurnaan multi-tahap pada flap tebal untuk defek komposit pada beberapa unit wajah merupakan situasi yang menantang. Tujuan penulis untuk pemulihan daerah periorbital dan malar dan mengembalikan aspek estetika pada daerah nasolabial dan sekitarnya.
Metodologi: Seorang pasien pria berusia 50 tahun dengan riwayat tumor fibrosa soliter menjalani eksisi luas periorbital kiri, infraorbital, dinding lateral nasal, dan malar. Defek ditutup dengan Anterolateral Thigh Free Flap (ALT). Flap tebal, daerah nasolabial kiri yang cekung, dan unit alar nasal asimetris ditemukan selama follow-up rawat jalan. Masalah-masalah ini mengarah pada perlunya prosedur perbaikan untuk mengurangi ketebalan agar meningkatkan estetika. *Microfat graft* adalah metode yang dipilih untuk mengisi volum nasolabial dan alar nasal yang cekung.
Hasil: Pasien puas dengan hasilnya karena peningkatan simetrisitas unit nasal alar dan berkurangnya ketebalan flap. Komplikasi yang dialami pasien tidak ada.
Ringkasan: Perencanaan dan pementasan yang teliti dari prosedur multi-stages refinement dalam hubungannya dengan microfat graft menghasilkan hasil estetik yang baik dan memuaskan pasien dengan kemungkinan komplikasi minimal.
***Kata kunci**: Rekonstruksi multi tahap, Refinisi Estetik, Microfat graft, Liposuction, Lipo-thinning, ALT free Flap, Contouring*

Conflicts of Interest Statement:
The author(s) listed in this manuscript declare the absence of any conflict of interest on the subject matter or materials discussed.

SUPPORTING INFORMATION
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INTRODUCTION

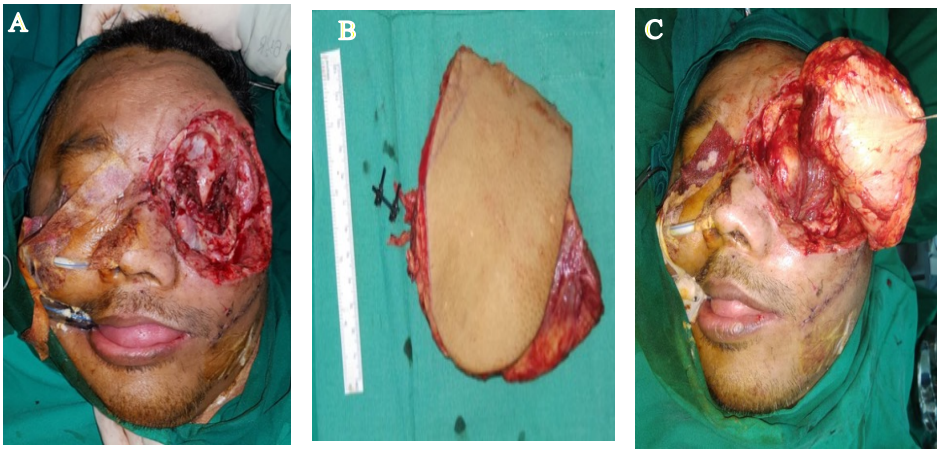
The main objectives of head and neck reconstruction with ALT free flap has shifted over the years from flap survival only to flap aesthetics, with the primary aims of improvement in functional and aesthetic outcomes following advanced reconstructions. Meticulous planning in multi-stages refinement play a major role, specifically for wide resection of tumor involving aesthetically critical areas such as the midface, that can comprise the orbital and periorbital area. The planning must also include the strategy to improve asymmetry in loss facial contour due to wide resection.

The ALT is planned to cover the expected large composite tissue deficits which includes skin, mucosa, soft tissue and bone for midfacial units especially along orbital, periorbital, malar and lateral nasal area.[1,2] The flap is known for its versatility of the flap thickness adjustment, while having a long as pedicle. The flap is amenable for multiple refinement procedures at least 3 months after the initial reconstructive surgery.[3] The donor-site scar of the flap is also arguably more acceptable.[4] However, bulkiness of the ALT is commonly observed. Bulkiness of the flap can be reduced by liposuction, a simple and effective method with minimal morbidity. Sagging of the flap is commonly observed following the first stage refinement.[4] Another challenge is the occurrence of facial units' asymmetry which commonly occured.

Lipoinjection technique can be used to augment the asymmetric facial contour in the complex facial units such as the nasolabial and nasal area. Microfat grafting, usually performed using a blunt injection cannula ranging from 0.7 to 0.9 mm to provide a smooth fat aliquot through these fine cannulas.[5] In this report, we present our experience in multi-stages aesthetic refinement using liposuction technique and microfat grafting to reduce bulkiness and volumize the asymmetric facial units.

PATIENT AND METHODS

A 50-year-old male patient with a history of solitary fibrous tumor, underwent wide excision of left periorbital, infraorbital, lateral nasal sidewall, and malar area. The patient was comparable to the type IV orbitomaxillectomy of the midfacial defects classification system and was reconstructed with ALT (**Figures 1**).[2] During our outpatient follow-up, bulkiness of the flap, sunken left nasolabial, and asymmetric alar nasal unit were observed. These problems lead to the necessity of refinement procedure to reduce the bulkiness and to symmetrize the nasal subunits to improve the aesthetic outcome of the patient. Patient was planned to have a minimum 2 stages of refinement procedure in 3 months and 6 months following the resection and reconstruction.



Figures 1. *(A)* The type IV orbitomaxillectomy midfacial defect. *(B)* ALT with Vastus Lateralis muscle component. *(C).* ALT free flap inset to defect.

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The first refinement procedure was performed 3 months following the first surgery, focused on reducing the bulkiness of the flap, using liposuction techniques utilizing the 2.4 mm cannula suction with Mercedes tip along the orbital area. The result from the first refinement procedures, necessitates further sequelae of refinements due to the remaining of bulkiness and the sagging of the flap as well as the sunken nasal and nasolabial area (**Figures 2**).

Figures 2. *(A)* Preoperative marking for the first lipo-thinning procedure, *(B)* the remaining bulkiness of infraorbital to lateral orbital and flap sagging.

The second refinement was 6 months after the resection, focused on lipothinning of the remaining periorbital, infraorbital, lateral orbital and malar area using the 2.4 mm cannula suction. The remaining sagging of the flap was excised and enclosed with the w-plasty technique (**Figures 3**).

Figures 3. *(A)* Pre-operative marking and design for the second refinement. The excision of sagging flap was enclosed with the w-plasty technique, the mapping of micro-fat graft injection in the sunken nasolabial to malar and lateral nasal wall. *(B and C)* immediate post-operative result post the second refinement.

The sunken nasolabial and lateral nasal wall were augmented by the microfat graft. The process of microfat harvesting were initialized by adapting the liposuction technique using the 2.4 mm cannula suction with Mercedes tip connected to a 20 mm syringe, the syringe then pulled out to create negative pressure then was locked by a backhaus towel clamp. The fat was harvested along the deep subcutaneous fat plane of the abdominal area. Careful measure was taken to perform the liposuction technique symmetrically to avoid contour deformity in the abdominal area. The fat graft is then rested and downsized using a 0.8 mm luer lock filtration device to minimize the size of fat lobule until the size reduced to 0.8 mm. The injection of the downsized fat lobule was using a 1 cc syringe connected to a 0.9 mm injection cannula to transfer the microfat.

The healing process was satisfactory with no complication and the patient was discharged with no significant occurrence of complication.

RESULTS

During the outpatient follow-up of the second refinement, patient had satisfactory aesthetic appearance of the flap. Significant loss of bulkiness was observed in the ALT flap and the more symmetrical nasal units were also recognized (**Figures 4**). Patient was pleased with his appearance and agreed to continue his treatment of eyebrow hairs transplantation. The wound healing process was also satisfactory.

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Figures 4. *(A-D)* The result of 2 weeks after the second refinement. The more symmetric alar nasal units and volumized nasolabial area with microfat grafting. The loss of significant bulk along the orbital area.

DISCUSSION

A challenging aesthetic demand from refinement procedures has become the main focus of recent head and neck reconstruction among plastic surgeon, especially in midfacial reconstruction. Patient satisfaction and post-operative results has led to modification of initial flap shape in many ways, through the application of multi-stages refinement that respond as an integral part to improve aesthetic results. The refinement procedures must be included in the discussion of the long-term treatment plan to meet the "replace like with like tissue" by applying three-dimensional refinement and precise tailoring for each patient.[8]

This patient undergoes two refinement procedures, the first major lipothinning and excess tissue excision were deemed not sufficient, but this was predicted before as the flap was too bulky. Allowing the flap to settle to its final shape before proceeding to the second refinements ensure safe contouring and predicted results. We used the 2.4 mm cannula suction for flap debulking with liposuction technique along the subtle orbital to periorbital area. We also performed excision of the excess sagging flap tissue and enclosed the flap with w-plasty technique to the infraorbital, medial orbital and lateral orbital rim (Figure 3). In larger hemifacial defects, experience in using liposuction, curetting, and sharp debridement using microdebrider, which commonly used for sinus surgery, has also led to satisfying results. The larger flap coverage, such as covering hemifacial to mandibular area also allowed the flap to be treated as the superficial musculoaponeurotic system (SMAS)/platysma layers that would follow the rhytidectomy-style to be reelevated and resuspended to the lateral orbital rim[4].

Our reports in using the lipo-thinning technique in conjunction with microfat grafting gave satisfactory results. During the harvesting process, numerous tools and technique has been adapted to obtain the desired smooth fat lobules for facial refinement, such as multiperforated liposuction cannula 3 mm in diameter with 1-2mm side holes diameter.[5,6] To support a gentle fat transfer, the fat lobule can be processed to become smaller in size to avoid difficulties in the passage through the cannula while transferring. The aspirated fat has to be filtered mechanically by the 0.8 mm luer lock device to produce a more liquid and smaller fat lobule, which is the micro fat.

There are major considerations in using the fat grafting technique such as fat emboli and fat necrosis. However, there are principles that can be adapted to avoid such things with the use of smaller syringe for great precision and injection of <0.1 ml/cm of graft delivery.[7] This has been the author's consideration of choosing microfat graft aside from the complexity of the subtle facial tissue deficiencies.

SUMMARY

Meticulous planning of refinement procedures in the effort to improve patient's satisfaction and aesthetic outcome must be included in the long-term treatment plan. Microfat grafting in conjunction with multi-stages lipo-thinning procedures offers the desirable aesthetic outcome with minimal post-operative complication.

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