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Short Communication

Complex facial reconstruction with invasive and non-invasive conventional interventions

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ABSTRACT

Background: Despite the obvious advantages, face transplantation requires strict patient selection to guarantee optimal outcomes. Therefore, it is not suitable for all patients with severe facial disfigurements. Simultaneously, conventional plastic and reconstructive surgery techniques, as well as medical spa techniques, have evolved, offering minimally invasive treatment of complex deformities.

Methods: The entire face of a young woman was severely disfigured because of a mistreated juvenile acne, with severe ectropions, oral incompetence and substantial midfacial tissue defect. We are describing the reconstruction with a combination of conventional reconstructive methods, such as scar release, skin transplantation, local flaps, medical needling and lipofilling.

Results: Oral competence, unhindered breathing and adequate lid closure was achieved. Previously unable to participate in social life in any meaningful way, our patient was able to reintegrate fully and take a job.

Conclusion: For selected patients, combined, invasive and non-invasive conventional techniques can provide satisfying outcomes in complex facial reconstruction. Modern regenerative approaches such as lipofilling and medical needling should be considered as integral parts of treatment strategies.

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Introduction

The face represents both personal identity as well as the interface for social interaction; therefore its functional and aesthetic integrity is of utmost importance.¹

Aetiologies for facial deformities requiring reconstruction are trauma, burn injury, infection, tumor excision, scarring as well as hereditary causes.

While conventional reconstructive methods were able to cover local or regional defects and to a certain extent restore functionality, aesthetic results have been limited.² With the advent of vascularized composite tissue allotransplantation, face transplantation evolved as a potent treatment modality to address functional as well as aesthetic aspects in selected cases.^{3,4} Although there are overall good outcomes, this option remains reserved for only a limited number of patients due to necessary strict inclusion and exclusion criteria, as well as difficult tissue donor procurement.⁵ The need for specialized surgical centers and long-term side effects of immunosuppression still limit the broad application of this technique.⁴

At the same time conventional plastic and reconstructive surgery techniques and regenerative strategies have also evolved, offering new possibilities for reconstruction.⁶

With these, extraordinary functional and aesthetic results can still be achieved in patients with severe facial disfigurements for whom face transplantation is not an option.

Based on a case study we report a combination of multiple conventional reconstructive and regenerative minimal invasive interventions in total restoration of the face.

Methods

A female patient with significant learning difficulties was presented at our outpatient clinic with a central destruction of her face. Severe tissue loss was evident, which included lips, oral vestibulum, the nose, and had led to an extreme ectropion on both eyes. The soft tissue and skin of the residual face and forehead was scarred and fibrosed (Figure 1a and b). A severe juvenile acne of the face had been treated in a nonmedical, lay fashion by the parents, using tape occlusion of the necrotizing pustulas leading to a severe necrosis of the central facial areas.

All options for reconstruction were discussed including free flaps and composite tissue (face) transplantation. Finally, we decided to approach the problem by conventional methods after intense discussion with the legal guardian.

In the first step, release of fibrotic scars around the everted oral mucosa (Figure 2a) and the eyelids enabled reconstitution of the oral vestibulum and conjunctiva by multiple abdominal full thickness skin grafts (Figure 2b–d). The nose soft tissue and skin envelope was reconstructed applying a Washio flap with rib cartilage grafts two months later (Figure 2e). A forehead flap was not possible to raise due to excessive scarring. The very distant portion of the Washio flap destined for the right nose tip failed partially. To enhance the residual scars and correct for volume deficits multiple lipofillings (5 sessions with 250 ml fat in total) were applied to the reconstructed nose and periorally (Figure 3a and b). Fat microinjections corrected lip incompetence.

Additionally, medical needling with a 2.5 mm device was used for the entire face to improve texture (Figure 4a and b). A total number of 12 surgical procedures was necessary to achieve the final result.

Results

The patient was fully rehabilitated as related to oral competence, speech, breathing and eye closure. The aesthetic appearance allowed the patient to take on a job in an office with customer contact. No further measures were requested by either the patient or her legal custodian. Remarkably even basic facial mimics reappeared (Figure 4c).



Figure 1. (a, b) Severe tissue loss including lips, oral vestibulum, nose and extended ectropium on both eyes. A severe juvenile acne of the face had been treated in a nonmedical lay by tape occlusion of the necrotizing pustulas leading to a severe necrosis of the central face. The soft tissue and skin of the residual face and forehead was scarred and fibrosed limiting reconstruction by local tissue.



Figure 2. Near total face reconstruction by conventional and regenerative techniques.

In the first step release of fibrotic scars around the ectropionized oral mucosa (a) and the eyelids enabled reconstitution of the oral vestibulum and conjunctiva by multiple abdominal full thickness skin grafts (b–d). Nose soft tissue was reconstructed by a Washio flap and rib cartilage grafts as a forehead flap was not possible to raise due to excessive scarring (e).



Figure 3. To enhance the residual scars and correct for volume deficits multiple lipofillings were applied to the reconstructed periorally (a) and nose (b) as depicted two months postoperatively.

Discussion

Despite the gold standard of composite tissue allotransplantation, individual cases can be managed by conventional plastic surgery. Combined old (grafts, flaps) and more recent medical-spa like techniques (lipoinjection, medical needling) represent a powerful tool-set to obtain satisfactory functional and aesthetic results.^{6,7}



Figure 4. Additionally medical needling was used for the total face to improve texture (a). Adequate functional outcome of eye and mouth closure was achieved (b). Full rehabilitation with aesthetic appearance allowing to work in public (c).

Patients who cannot fulfil the strict selection criteria for a face transplant or are not interested in such an extensive procedure, are still in dire need of satisfactory treatment options, the likes of which we have described here.

In the case presented, the severe disfigurement appeared to be an indication for a composite tissue allograft. However, patient related factors prohibited further pursuit of this approach. Scar release created a condition that allowed us to follow a less invasive conventional reconstructive strategy. Full thickness skin grafts and a Washio flap for soft tissue reconstruction enabled us to provide sufficient resurfacing of the total face.⁸ The complete destruction of pliable soft tissue and subcutaneous fat tissue required stepwise softening of the skin. This was achieved through multiple steps of lipofilling and medical needling. Both techniques have been shown to efficiently and effectively improve skin and scar quality.^{9,10} Additionally this allowed for simultaneous, adequate volume correction. As a less invasive technique, medical needling can provide a final touch up to the areas.¹¹

Modern, minimal invasive, regenerative approaches such as lipofilling and medical needling can add substantial further improvement to the treatment of complex deformities and should be considered an integral part of individualized treatment strategies.

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None of the authors has a financial interest in any of the products, devices, or drugs mentioned in this manuscript.

Contribution

All listed authors have made substantial contributions to all of the following: (1) the conception and design of the study, or acquisition of data, or analysis and interpretation of data, (2) drafting the article or revising it critically for important intellectual content, (3) final approval of the version to be submitted.

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