



Case Report

Autologous Fat Grafting as a Reconstructive Strategy in Romberg Syndrome: A Case-Based Review

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Abstract

Introduction: Romberg syndrome (progressive hemifacial atrophy) is a rare, acquired disorder characterized by slowly progressive unilateral atrophy of the skin, subcutaneous tissue, and underlying soft tissues of the face. Clinical presentation is highly variable, with disease onset typically occurring during childhood or adolescence, followed by spontaneous stabilization in adulthood. The etiology remains unknown, and treatment is individualized based on the extent of deformity and patient-specific functional and aesthetic concerns. **Case Report:** We present the case of a 28-year-old woman with left-sided hemifacial atrophy consistent with Romberg syndrome. Clinical examination revealed marked soft tissue volume loss, facial asymmetry, a malformed left auricle, and atresia of the external auditory canal. The patient underwent autologous fat grafting for facial reconstruction. Postoperatively, she demonstrated significant restoration of facial volume and symmetry, with excellent aesthetic results and high patient satisfaction. **Discussion:** Reconstruction of facial deformities associated with Romberg syndrome remains challenging. This case highlights autologous fat grafting as an effective and minimally invasive technique for restoring facial contour and improving aesthetic outcomes. A concise review of the clinical features, pathogenesis, and current management strategies for Romberg syndrome is also presented.

Keywords: Romberg syndrome; Progressive facial hemiatrophy; Microsomia hemifacialis; Autologous fat grafting

Introduction

Romberg syndrome, also known as Parry–Romberg syndrome, is a rare acquired disorder characterized by progressive hemifacial atrophy of variable severity. The condition typically presents during the first or second decade of life and gradually stabilizes, often resulting in significant aesthetic and functional impairment. It occurs more frequently in females. Although the exact pathogenesis remains unclear, several mechanisms have been proposed, including autoimmune, traumatic, neurovascular, infectious, and sympathetic nervous system–related processes.

Reconstructive management remains challenging and is tailored to the severity of tissue loss and the patient’s functional and aesthetic

needs. A variety of reconstructive techniques have been described, including autologous fat grafting, dermal fillers, alloplastic implants, local flaps, and microvascular free tissue transfer.

We present the case of a patient with Parry–Romberg syndrome successfully treated with autologous fat grafting, highlighting the aesthetic outcome and reviewing the current literature on reconstructive approaches for this rare condition.

Case Presentation

We report the case of a 28-year-old woman who presented with left-sided progressive hemifacial atrophy associated with a congenital malformation of the left external ear (microtia) and atresia of the external auditory canal. The patient first noticed progressive facial asymmetry approximately 20 years prior to presentation, after which she underwent multiple consultations and diagnostic

evaluations without a definitive diagnosis.

Clinical examination revealed marked soft tissue deficiency involving the left hemiface, predominantly affecting the malar and mandibular regions, while the overlying skin appeared unremarkable. Additional findings included left-sided microtia with complete atresia of the external auditory canal. The patient had ipsilateral conductive hearing loss requiring the use of a hearing aid.

Her medical history was significant for scoliosis. She denied any history of facial trauma, infection, surgery, or other precipitating events preceding the onset of her symptoms.

Computed tomography of the temporal bones demonstrated marked hypopneumatization of the left mastoid with a markedly reduced number of mastoid air cells, near-complete atresia of the external auditory canal, and congenital deformities involving the middle and inner ear structures, in addition to the external auricular malformation. Mild residual pneumatization of the left temporal bone was present but was insufficient to support normal auditory function. These imaging findings correlated with the clinical findings of left-sided microtia and external auditory canal atresia.

Following evaluation by a multidisciplinary team, including a maxillofacial surgeon, the available reconstructive options were discussed with the patient. She elected to undergo staged facial reconstruction with autologous fat grafting and was subsequently referred to our clinic for treatment.

Given the extent of the soft tissue deficiency and the patient's preference for a minimally invasive reconstructive approach, autologous fat grafting was selected. Following infiltration of the donor site with approximately 500 mL of tumescent solution

containing 2% lidocaine with epinephrine (1:200,000) diluted in lactated Ringer's solution, adipose tissue was harvested from the infraumbilical region using a 2-mm blunt multiport cannula through two small access incisions. A total of 230 mL of lipoaspirate was obtained and subsequently processed by decantation and mechanical emulsification.

Recipient-site access was established through 2-mm stab incisions placed at strategically selected entry points. Processed adipose tissue was injected with a blunt single-port cannula into the superficial soft tissue planes of the temporal, malar, superior cheek, and perioral regions using a multilayered fanning technique to achieve uniform volume restoration and optimal contour. Approximately 60 mL of processed fat was transferred. Mild overcorrection was intentionally performed to compensate for the anticipated partial resorption of the graft. The procedure was completed without intraoperative complications.

Postoperatively, the patient was instructed to apply cold compresses, receive anti-edematous therapy, and avoid strenuous physical activity. Recovery was uneventful, with no donor- or recipient-site complications, including infection, hematoma, fat necrosis, contour irregularities, or wound-healing disturbances.

Clinical follow-up was performed at 2 weeks, 1 month, 3 months, and 6 months postoperatively. Progressive improvement in facial symmetry and restoration of soft tissue volume were observed throughout the follow-up period. Comparison of preoperative and postoperative photographs demonstrated a marked improvement in facial contour and overall aesthetic appearance (Figure 1). As expected, partial graft resorption occurred, and a second session of autologous fat grafting was performed 3 months after the initial procedure to further optimize volume restoration.



Figure 1: Clinical photographs obtained before and 2 days after autologous fat grafting for left-sided Parry–Romberg syndrome. **(A)** Preoperative frontal view demonstrating marked left hemifacial soft tissue atrophy with facial asymmetry, most pronounced in the malar and mandibular regions. **(B)** Postoperative frontal view showing improved facial volume restoration and enhanced symmetry. **(C)** Preoperative oblique view highlighting left-sided soft tissue deficiency and loss of facial contour. **(D)** Postoperative oblique view demonstrating restoration of facial fullness and improved contour of the left cheek and lower face following autologous fat grafting.

At the most recent follow-up, 6 months after the initial procedure, the aesthetic results remained stable with improved facial symmetry and contour. The patient expressed a high level of satisfaction with the outcome, and no evidence of disease progression or procedure-related complications was observed.

Discussion

Parry–Romberg syndrome (PRS), also known as progressive hemifacial atrophy, is a rare acquired disorder characterized by progressive unilateral atrophy of the facial soft tissues and, in some patients, the underlying musculature, cartilage, and osseous structures. The condition most commonly presents during the first or second decade of life, with a female predominance. Disease progression generally continues for several years before spontaneously stabilizing. Although the exact etiology remains unknown, several pathogenic mechanisms have been proposed, including autoimmune, traumatic, infectious, neurovascular, sympathetic nervous system, and genetic factors. The marked clinical heterogeneity of PRS suggests that multiple mechanisms are likely contribute to its development [1-4].

The primary objective of treatment is restoration of facial symmetry and soft tissue volume after the disease has entered its inactive phase. Because no single reconstructive technique is universally applicable, management should be individualized according to the severity of the deformity, the presence of skeletal involvement, patient expectations, and surgeon experience [2,5].

Autologous fat grafting has become one of the preferred reconstructive techniques for patients with mild-to-moderate PRS because of its minimally invasive nature, low donor-site morbidity, and ability to achieve natural-appearing contour restoration. In addition to volumetric augmentation, adipose tissue contains adipose-derived stem cells that may promote tissue regeneration and improve skin quality. The principal limitation of this technique is the unpredictable degree of postoperative graft resorption, frequently necessitating staged or repeat procedures to achieve durable correction [6-9].

The timing of reconstruction is another important consideration. Most authors recommend delaying definitive reconstruction until the disease has reached a stable or inactive phase, as continued progression may compromise long-term aesthetic outcomes. Nevertheless, autologous fat grafting is particularly well suited to PRS because it can be performed in a staged fashion, allowing gradual refinement of facial contour while accommodating postoperative graft resorption [2,5].

Injectable dermal fillers may provide temporary correction in selected patients with mild deformities or in those seeking a nonsurgical approach. However, because of their transient effect and progressive resorption, they are generally less suitable for patients with more extensive soft tissue loss [5,10].

For patients with severe facial atrophy accompanied by substantial soft tissue and skeletal deficiencies, microvascular free tissue transfer remains an important reconstructive option. Commonly

used flaps, including the anterolateral thigh, scapular, and parascapular flaps, provide durable volume replacement and permit correction of significant contour deformities. However, these procedures are technically demanding and are associated with longer operative times, prolonged recovery, donor-site morbidity, and the potential need for secondary revision procedures [5,11,12].

A particularly noteworthy aspect of the present case was the coexistence of PRS with ipsilateral congenital microtia and complete atresia of the external auditory canal. Although PRS has been associated with mandibular hypoplasia, dental abnormalities, ocular involvement, and facial skeletal asymmetry, congenital auricular malformations have only rarely been reported. Whether this finding represents an unusual phenotypic manifestation of PRS or the coexistence of two distinct developmental disorders remains uncertain. Regardless, the combination of progressive hemifacial atrophy and congenital auricular deformity substantially increased the complexity of both the diagnostic evaluation and reconstructive planning. This case therefore highlights the importance of comprehensive multidisciplinary assessment involving plastic and reconstructive surgeons, maxillofacial surgeons, otolaryngologists, and radiologists to establish an accurate diagnosis and develop an individualized treatment strategy.

In the present case, autologous fat grafting was selected because the patient exhibited predominantly soft tissue volume loss without significant skeletal deficiency requiring complex reconstruction. This approach provided effective restoration of facial contour while avoiding the morbidity associated with microsurgical free tissue transfer. The postoperative course was uneventful, with no donor- or recipient-site complications, including hematoma, infection, fat necrosis, or contour irregularities. The patient reported a high level of satisfaction with the aesthetic outcome, and postoperative assessment demonstrated marked improvement in facial symmetry and soft tissue volume. As anticipated, partial graft resorption necessitated a second fat grafting procedure three months after the initial operation. Nevertheless, the overall aesthetic outcome remained favorable, supporting previous reports that identify autologous fat grafting as an effective first-line reconstructive strategy for patients with mild-to-moderate PRS [6-9, 13].

Although satisfactory correction of the facial soft tissue deficiency was achieved, additional staged reconstruction remains feasible. Future interventions may include patient-specific alloplastic implants to augment the midface and mandibular contour, as well as auricular reconstruction and, if appropriate, reconstruction of the external auditory canal. Such procedures may further improve facial symmetry, hearing rehabilitation, and overall patient satisfaction.

Conclusion

Parry-Romberg syndrome presents unique reconstructive challenges because of its variable clinical manifestations and progressive soft tissue loss, necessitating individualized treatment planning. This case demonstrates that staged autologous fat grafting is a safe, minimally invasive, and effective technique for restoring facial contour and symmetry in patients with stable disease. Although repeat procedures may be required to compensate for graft resorption, lipofilling provides durable aesthetic improvement with minimal morbidity and high patient satisfaction. Furthermore, this case highlights the rare association of PRS with ipsilateral microtia and external auditory canal atresia, emphasizing the importance of comprehensive multidisciplinary evaluation and personalized reconstructive planning in patients with complex craniofacial deformities.

Ethics Approval Statement

The study did not require review board oversight per institutional and federal guidelines, with all procedures adhering to institutional policies and the Helsinki Declaration.

Patient Consent Statement: Waived

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