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Successful hair transplantation following repeated lipostructure in a case of morphea *en coup de sabre*: a multidisciplinary and regenerative approach

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Ethics approval and consent to participate: this case report did not require formal ethical committee approval. Written informed consent was obtained from the patient for all diagnostic and therapeutic procedures.

Consent for publication: the patient gave her written consent to use her personal data for the publication of this case report and any accompanying images.

Availability of data and materials: all data generated or analyzed during this study are included in this published article.

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Abstract

We describe the successful combination of repeated autologous lipostructure and hair transplantation in a case of morphea *en coup de sabre*, highlighting the regenerative benefits of a multidisciplinary approach. A 40-year-old woman with long-standing, stable frontoparietal and frontotemporal atrophy and alopecia underwent four fat grafting sessions using the Coleman technique over five years. Nine months after the final procedure, she received follicular unit extraction (FUE) hair transplantation with 1,600 grafts. The postoperative course was uneventful, with rapid and stable regrowth observed from the third month. At 12 months, the aesthetic outcome was excellent, with nearly complete graft survival and high patient satisfaction. This is the first reported case of FUE transplantation following multiple lipostructure sessions in morphea *en coup de sabre*. Fat grafting may enhance graft take by improving dermal quality and vascularization. This combined approach offers a promising solution for scarring alopecia in selected, stable patients.

Introduction

Morphea *en coup de sabre* is a linear variant of localized scleroderma that typically presents in childhood and progresses with periods of activity and quiescence. It affects the frontoparietal scalp and forehead, often resulting in a linear zone of alopecia, dermal atrophy, and underlying soft tissue or bony involvement. The disease is frequently disfiguring and emotionally distressing, especially in female patients.[1] Medical treatment during the active phase includes corticosteroids and immunosuppressants, aiming to halt progression.[2,3] Once the disease stabilizes, reconstructive options may be considered to address cosmetic concerns. Traditional surgical techniques, while effective, are often invasive.[4-6] More recently, autologous fat grafting (lipostructure) has emerged as a minimally invasive technique with both volumetric and regenerative potential.[7-10] Despite isolated reports of hair transplantation in this context,[6,11,12] no previous case has combined multiple sessions of lipostructure followed by hair restoration surgery.

Case Report

A 40-year-old woman of Russian origin presented with two stable atrophic depressions of the scalp: a sagittal midline depression in the frontal area and a transverse depression over the right frontotemporal region (Figure 1). The first lesion appeared at age 6, while the second emerged 15 years later. Neither lesion had been associated with pruritus or pain. Autoimmune screening (ANA, ENA, RF) was repeatedly negative. The clinical diagnosis of morphea *en coup de sabre* was made years earlier. The patient was treated with multiple courses of corticosteroids and methotrexate,[2,3] achieving disease stabilization. From 2018 to 2023, she underwent four autologous fat grafting

procedures using the Coleman technique,[10] aimed at restoring soft tissue volume and improving the quality of the recipient area. Each procedure provided incremental improvement, although some degree of resorption was noted. With disease quiescence maintained for over nine months after the final lipostructure session, surgical hair restoration was planned. The scarred recipient area measured 38 cm^2, and a density of approximately 42 follicular units per cm^2 was targeted. A total of 1,600 follicular units were harvested using follicular unit extraction (FUE) with a flag-pattern shave (Figure 2). Grafts were placed using Lion implanters. Due to the altered tissue consistency, graft insertion required increased precision and delicacy. Postoperative healing was uneventful. Remarkably, the patient exhibited rapid follicular regrowth beginning within three months, bypassing the expected telogen effluvium phase. At the 12-month follow-up, graft survival appeared close to 100%, with excellent aesthetic integration and high patient satisfaction (Figure 3).

Discussion

The "*en coup de sabre*" variant of morphea poses unique challenges in aesthetic management. Linear dermal and subcutaneous atrophy, coupled with alopecia, results in a conspicuous cosmetic defect. While systemic treatments can stabilize disease activity, they offer limited benefit in reversing established scarring or alopecia.[1-3] Reconstructive options have traditionally included excisional surgery, skin grafts, and tissue flaps.[4-6] These procedures, although effective, are invasive and may not be suitable for all patients. Autologous lipostructure has gained attention for its dual volumetric and regenerative properties, particularly through the stromal vascular fraction of adipose tissue, which may modulate local inflammation and improve dermal architecture.[7-10] Hair transplantation in scarring alopecia remains controversial, with graft survival heavily dependent on recipient bed quality. Literature on hair transplantation in morphea *en coup de sabre* is limited to three cases.[11-13] Park *et al.*[11] reported 85% graft survival at 10 months. Dai *et al.*[12] reported 86.7% at 12 months. A third case initially showed positive results, but graft failure occurred at four-year follow-up (personal communication). To our knowledge, our case is the first to combine multiple lipostructure sessions with subsequent FUE transplantation. The regenerative effect of fat grafting likely enhanced the vascularity and elasticity of the scarred tissue, improving graft retention. Rapid follicular regrowth and long-term stability suggest this multidisciplinary approach may offer superior outcomes in selected patients.

Conclusions

Hair transplantation in stabilized morphea *en coup de sabre* is feasible and can yield excellent cosmetic results. Pretreatment with repeated autologous fat grafting may significantly enhance the

recipient site, facilitating graft survival and natural integration. This case underscores the value of combining regenerative and surgical strategies in managing cicatricial alopecia. Further studies are warranted to validate these findings and establish standardized protocols.

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Figure 1. Clinical presentation after four autologous fat grafting procedures, before hair transplantation.

Figure 2. Clinical presentation immediately after hair transplantation, showing both the recipient and donor areas.

Figure 3. Clinical presentation 12 months after hair transplantation.