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Case Report

Use of Deep Plane facelift technique for Resection of Facial Plexiform Neurofibromatosis: A Case Report

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Abstract: Facial plexiform neurofibromatosis presents a significant treatment challenge due to its infiltrative behavior and location in aesthetically sensitive region. These tumors lack clear boundaries, requiring meticulous surgical planning to balance tumor control and cosmetic outcomes. We report a 36-year-old male with a long-standing painless swelling on the left periorbital and temporal region.clinical findings and family history were consistent with neurofibromatosis type 1. A deep plane facelift approach was used for tumor debulking. histopathological confirmation was obtained. The patient had an uneventful recovery with excellent aesthetic results over a 15-month follow-up. The deep plane facelift technique offers a novel and effective approach for managing facial plexiform neurofibromatosis, preserving facial symmetry and minimizing scarring.

Keywords: Plexiform neurofibromatosis; Deep plane facelift approach; Benign tumors of the face.

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1. Introduction

Neurofibromas are benign, unencapsulated neoplasms that may present in localized, diffuse, or plexiform forms. The presence of plexiform neurofibromatosis is considered virtually pathognomonic for familial neurofibromatosis [1]. These tumors typically exhibit a soft consistency, affect the overlying skin, and generally remain mobile over the deeper soft tissues and facial skeleton.Although these tumors can be congenital, they frequently manifest during puberty and may continue to progress slowly throughout adulthood [2].

The primary therapeutic approach for plexiform neurofibroma is surgical resection [3]. Conservative local excision often provides adequate tumor control; however, in cases involving large or multifocal tumors, complete resection may not be feasible. In such instances, subtotal excision becomes a viable option, with a focus on preserving vital structures to maintain or improve both functional and aesthetic outcomes [4]. A major challenge in managing plexiform neurofibromatosis lies in achieving aesthetic satisfaction [5]. Direct excision may compromise facial aesthetics, which is often the primary concern for patients seeking intervention [6]. Skin grafts and free flap reconstructions can present significant technical challenges and may fall short in achieving satisfactory aesthetic or functional results. Limitations of these techniques include donor site morbidity, mismatched tissue characteristics, and complex postoperative care requirements [6].

The deep plane facelift approach offers wide and safe access for the resection of facial tumors, while preserving critical anatomical structures and delivering superior aesthetic outcomes. By dissecting beneath the superficial musculoaponeurotic system (SMAS) and releasing the facial retaining ligaments, this technique enables tension-free flap closure,

improved vascularity, and a reduced risk of complications such as skin necrosis or nerve injury.

Its ability to preserve facial nerve function and minimize visible scarring makes it especially beneficial for tumors located in cosmetically sensitive areas, such as the mid-face, periorbital region, and temporal zone. Clinically, it is particularly well-suited for the excision of benign and low-grade malignant tumors—such as plexiform neurofibromas and parotid gland lesions—allowing for simultaneous tumor removal and soft tissue repositioning, thereby restoring both function and facial harmony [7].

2. Case Report

A 36-year-old male presented with a painless swelling in the left periorbital and temporal regions, which had been present for several years. There was a positive family history of NF-1. Clinical examination revealed multiple café-au-lait spots with regular borders on the neck, as well as on the anterior and posterior aspects of the trunk (Figure 1), along with multiple cutaneous nodules (Figure 2).

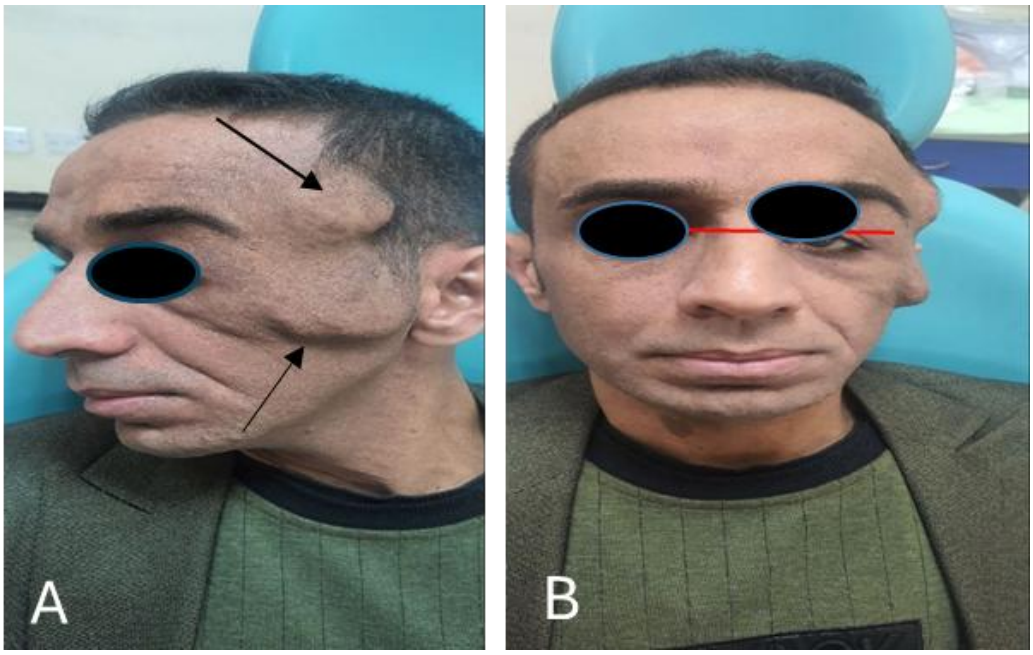
Figure 1. A and B. Café-au-lait spots (black arrows).

The patient had a large, soft mass on the left side of his face involving the temporal, zygomatic, and lateral orbital regions (Figure 3A). The mass was mobile, non-tender, and had a texture described as "a bag of worms." Examination of the ocular muscles was normal. Ophthalmic evaluation showed no abnormalities; however, mild hypoglobus was observed, attributed to the weight and gravitational pull of the mass (Figure 3B). The patient underwent MRI to rule out intracranial extension, which revealed that the tumor was located extracranially with no intracranial connection. The diagnosis was concluded as facial plexiform neurofibromatosis.

The treatment plan involved tumor debulking using a deep plane facelift approach under general anesthesia. This approach was selected to ensure adequate deep excision of the tumor and to achieve optimal aesthetic outcomes. The incision extended from the temporal region to below the lobule of the ear, followed by deep plane dissection beneath the superficial musculoaponeurotic system (SMAS) layer. The tumor was excised while preserving the integrity of the facial nerve branches.

Figure 2. Cutaneous nodules (black arrows).

Figure 3. A. Facial plexiform neurofibroma (black arrows). B. Left eye (hypoglobus).



Flap repositioning was performed, and excess tissue was removed. Deep-layer suturing was completed using Vicryl 3-0, and the skin was closed with Nylon 4-0. The patient was discharged in stable condition on the first postoperative day, with prescriptions for antibiotics, analgesics and steroids (Figure 4). The excised specimen was sent for histopathological examination, which confirmed the diagnosis (Figure 5). Follow-up over 15 months revealed no evidence of tumor recurrence or postoperative skin sagging (Figure 6).

3. Discussion

Facial plexiform neurofibromatosis is a rare but potentially disfiguring manifestation of neurofibromatosis type 1 (NF1), a genetic disorder characterized by the development of multiple benign tumors along peripheral nerves. Plexiform neurofibromas are complex

nerve sheath tumors that often infiltrate surrounding tissues and involve multiple nerve branches. When located in the facial region, these tumors can lead to significant functional and cosmetic deficits, including facial asymmetry, visual obstruction, and airway compromise. Most cases are present in early childhood and enlarge progressively. Diagnosis of NF1, including facial plexiform variants, is primarily clinical and guided by the National Institutes of Health (NIH) criteria [8- 9].

Figure 4. A and B. Day one post-operative view following deep plane facelift approach (black arrows).

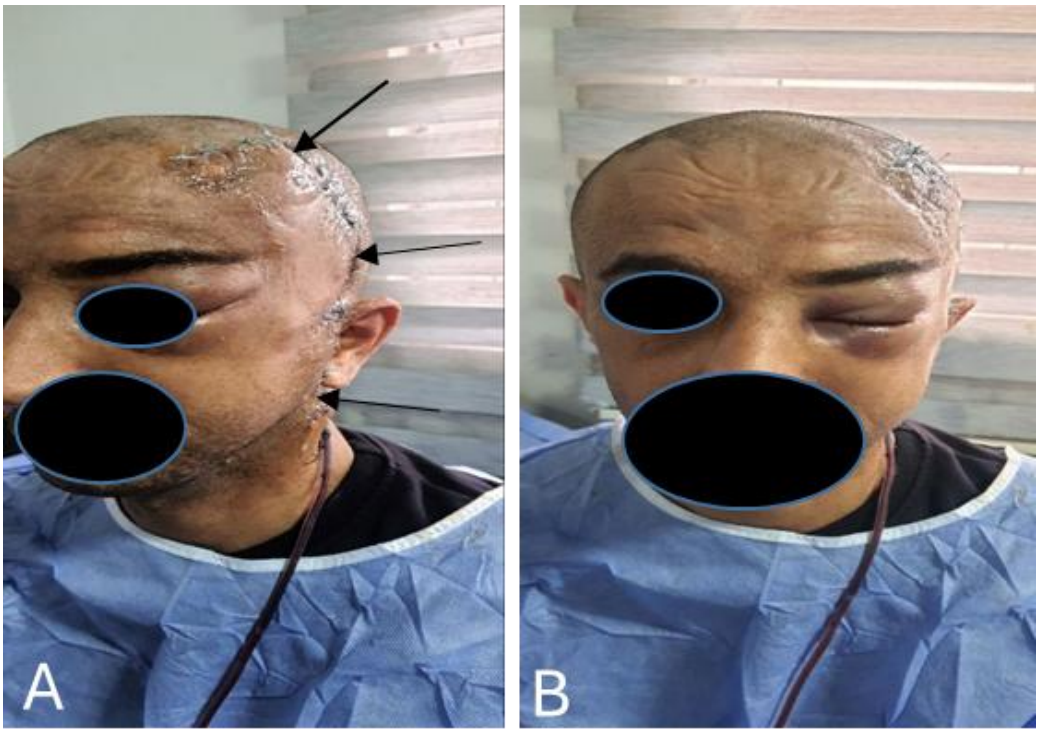


Figure 5. Histopathological picture of plexiform neurofibromatosis. H&E stain.

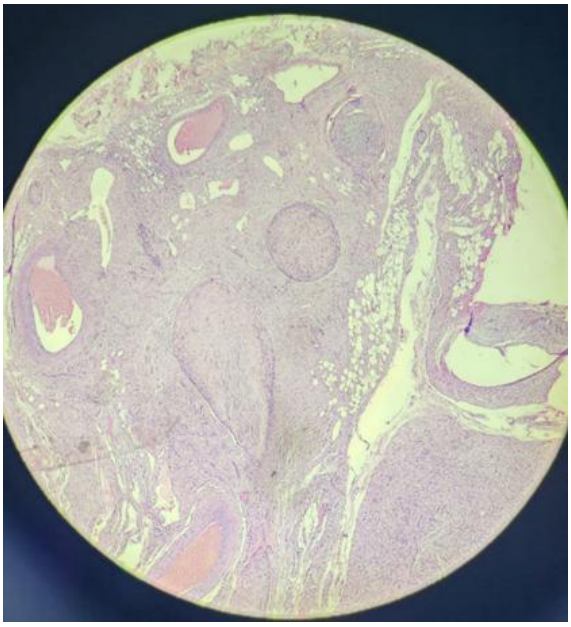
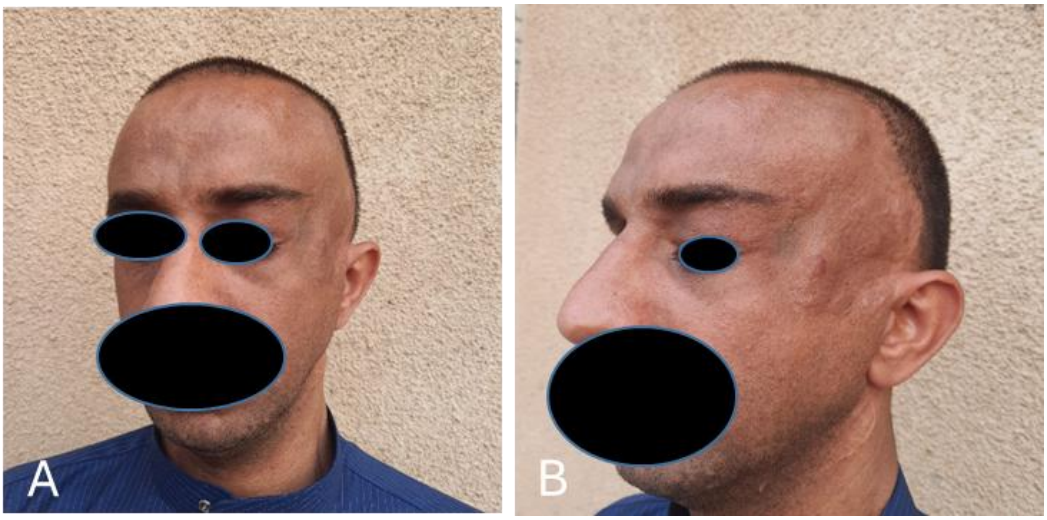


Figure 6. A. Facial plexiform neurofibroma (black arrows). B. Left eye (hypoglobus).



Surgical management of facial plexiform neurofibromas is challenging due to their diffuse growth pattern, lack of clear resection planes, and close association with critical neurovascular structures [10]. Complete excision is rarely feasible without risking substantial morbidity, and traditional approaches such as direct excision often yield suboptimal aesthetic outcomes—commonly resulting in visible scarring, contour deformities, and asymmetry.

In the present case, a deep plane facelift technique was selected over conventional methods such as direct excision or traditional facelift. While direct excision provides straightforward tumor removal, it often disregards the natural aesthetic architecture of the face, disrupting soft tissue balance and producing prominent scarring [11]. Traditional facelifts, which primarily address superficial skin and subcutaneous tissue, may not achieve the necessary depth or contour control required in such complex lesions.

By contrast, the deep plane facelift involves tissue elevation in the sub-SMAS (superficial musculoaponeurotic system) plane. This approach allows for safer and more effective debulking of tumor mass while preserving neurovascular structures and minimizing trauma to the overlying skin. Additionally, this technique supports better midface and jawline repositioning, especially important in cases involving the facial aesthetic subunits, such as the midface, periorbital region, and mandibular border. Preserving the integrity of these subunits during resection enhances natural facial contours and promotes postoperative harmony [12].

Recent literature suggests that deep plane facelifts offer superior outcomes in terms of long-term facial symmetry, lower rates of revision surgery, and reduced scarring when compared to traditional facelift [13]. In NF1 cases, although large-scale studies are limited, early evidence supports the technique's ability to manage mass effect while achieving aesthetic balance [14]. In our patient, recovery was uneventful with no perioperative complications. At 15-month follow-up, improvements in facial contour and symmetry were sustained, with no clinical signs of recurrence. Importantly, the patient expressed a high degree of satisfaction with the aesthetic results and reported improved self-image and social confidence. This aligns with a growing body of literature emphasizing the psychosocial benefits of reconstructive facial surgery, particularly in patients with congenital or disfiguring conditions. Enhancing facial appearance has been shown to significantly reduce social stigma, improve self-esteem, and alleviate symptoms of anxiety or depression [15].

Such outcomes contribute meaningfully to quality of life and are increasingly recognized as essential metrics of success in both aesthetic and reconstructive surgical practice [16]. However, the risk of recurrence remains a key limitation. Reported recurrence rates for plexiform neurofibromas range from 20% after complete resection to as high as 40% following subtotal excision [17]. The deep plane approach may mitigate some recurrence

risks by facilitating more thorough debulking while preserving anatomical boundaries, but further comparative outcomes studies are needed to substantiate this. Additionally, some patients may require secondary contouring procedures—such as autologous fat grafting or skin redraping—to refine aesthetic results over time. These are particularly relevant in younger patients or those with dynamic facial soft tissue changes postoperatively [18-19].

4. Conclusion

The deep plane facelift technique may be a valuable option in selected patients with facial plexiform neurofibromatosis, offering tumor debulking with enhanced cosmetic outcomes and minimized contour deformity. Further studies are needed to validate its long-term benefits.

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Research Ethics Committee Approval: We declare that the patient approved the study by signing an informed consent form, and that the study followed the ethical guidelines established by the Declaration of Helsinki.

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Conflicts of Interest: The authors declare no conflicts of interest.

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