

## Esthetic and Functional Outcomes of Free Dermal Fat Grafting During Parotidectomy: A Retrospective Study and Literature Review

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### Abstract

This study aims to evaluate the aesthetic and functional outcomes of free dermal fat graft (FDFG) in parotidectomy procedures over 10 years from 2013 to 2023. A retrospective analysis was conducted on 123 patients aged 35 to 60 years with a predilection for females who underwent FDFG during parotidectomy. Their outcomes were assessed using standardized evaluation tools.

The literature review was also conducted to identify previous studies and establish a comprehensive understanding of the efficacy and outcomes of FDFG. The search encompassed databases such as PubMed, Scopus, and EMBASE, and relevant articles were selected to extract relevant data.

The results of the retrospective analysis showed promising aesthetic and functional outcomes in patients who underwent FDFG reconstruction. Most patients experienced improved aesthetic outcomes, with the restoration of normal facial contours, socialization, and self-esteem.

They also had satisfactory functional outcomes, like the absence of Frey syndrome, Sialocele, or other consensual abnormalities. The literature review revealed a consistent trend in the positive outcomes of FDFG across various age and gender groups.

Overall, the findings of this study and literature review strongly support the use of FDFG as an effective and reliable reconstructive technique. It provides both aesthetic and functional benefits to patients, leading to improved quality of life and patient satisfaction. Further prospective studies may be recommended to establish the long-term durability and assess the patient-reported outcomes following FDF grafting during parotidectomy.

### **Keywords**

Free dermal fat grafting; Aesthetic outcomes; Functional outcomes; Reconstruction; Retrospective analysis; and Literature review.

## **Introduction**

Parotidectomy is a complex surgical procedure involving removing the parotid gland. This is the cornerstone of head and neck surgery. Parotidectomy remains vital in managing parotid neoplasms, inflammatory conditions, and other pathological entities affecting this complex anatomical region. Although this procedure addresses a spectrum of parotid pathologies, it introduces challenges that extend beyond the confines of the operating room. Postoperative complications such as facial asymmetry and Frey's syndrome significantly affect both the aesthetic and functional dimensions of patients' lives.

Facial asymmetry emerges as a prominent concern post-parotidectomy, especially in the younger and working population. This complex surgical procedure often disrupts the harmonious balance of facial features. This makes things even more complicated; patients must deal with the mismatch in how their faces look. Facial asymmetry matters more than just one's appearance. It affects how you see yourself, how you feel emotionally, and how you interact with others. [1].

Frey's syndrome, which causes sweating and flushing while eating or tasting, can occur after parotid surgery. This condition arises when the postganglionic parasympathetic nerve fibers innervate postganglionic parasympathetic neurons to nearby enervated sweat glands and coetaneous blood vessels and thus the flushing and sweating responses are now controlled by parasympathetic nerve endings. [2] Although Frey's syndrome has physical challenges, its impact on the mental status is also significant which affects the social life of the patient [3].

Amidst these challenges, the integration of innovative reconstructive strategies holds promise for reducing the outcomes of facial asymmetry and Frey's syndrome. One such technique, free dermal fat graft (FDFG), presents a composite solution. This graft, comprising adipose tissue and dermal components, offers the potential to restore natural facial contours, alleviate facial asymmetry, and influence autonomic

nerve regeneration to mitigate the occurrence of Frey's syndrome [3-10].

The present study provides a comprehensive evaluation of the aesthetic and functional outcomes of FDFG in parotidectomy procedures over a significant period of ten years, spanning from 2013 to 2023. This investigation aims to provide a nuanced understanding of the long-term implications of employing FDFG as a reconstructive strategy. By assessing patient outcomes through standardized evaluation tools and juxtaposing these findings against the existing body of literature, this study aims to contribute to the growing body of knowledge on parotidectomy reconstruction.

## **Background and Rationale**

Although parotidectomy is indispensable for therapeutic purposes, it presents a unique challenge because of its intricate anatomy and critical structures coursing through the parotid gland. Historically, surgical interventions in this region have often resulted in considerable aesthetic and functional deficits, affecting patients' self-esteem, social interactions, and overall quality of life. Thus, the pursuit of reconstruction techniques to address these concerns has become paramount.

The use of FDFG as a reconstruction method offers a promising solution. The graft's unique composition, comprising adipose tissue and dermal elements, contributes to its potential to reestablish natural facial contours, minimize deformities, and mitigate the impact of functional sequelae, such as Frey syndrome and Sialocele. The ability of FDFG to simultaneously enhance aesthetics and function represents a significant advancement in the field of parotidectomy reconstruction.

## **Literature Review**

The use of free dermal fat grafts (FDFG) as a reconstructive technique in parotidectomy procedures has gained substantial attention in recent years because of their potential to address both aesthetic and functional concerns resulting from these surgical interventions. This literature review aimed to comprehensively examine the existing body of research about the outcomes of FDFG reconstruction in parotidectomy patients, providing insights into the effectiveness of this approach and its implications for patient quality of life.

## **Historical Context and Evolution of Parotidectomy Reconstruction**

The history of parotidectomy reconstruction underscores the challenges surgeons face in managing the aesthetic and functional consequences of surgical interventions in this complex anatomical region. Early parotidectomy procedures often resulted in notable facial deformities, including drooping facial contours, surgical site defects, and impaired smile symmetry. Furthermore, the advent of Frey syndrome, which is characterized by gustatory sweating and facial flushing, adds to the complexity of postoperative patient care. Consequently, it is imperative to explore innovative reconstructive strategies to get optimal recontouring of the surgical site defects.

## **FDFG as a reconstructive technique**

The introduction of FDFG as a reconstructive method has brought a new dimension to parotidectomy procedures. Free dermal fat grafts, typically harvested from the thigh or abdomen; offer a composite graft

comprising adipose tissue and dermal elements. This unique composition raised the expectation of simultaneously addressing both aesthetic and functional concerns. Adipose tissue offers volume restoration, while dermal elements promote natural facial contours, thereby alleviating distortions often resulting from traditional surgical approaches.

### **Aesthetic outcomes**

Aesthetic improvements resulting from FDFG reconstruction have been a pivotal focus in the literature. Multiple studies have highlighted the ability of FDFG to restore facial symmetry, minimize postoperative depression, and rejuvenate overall facial appearance [10] reported significant improvements in patient satisfaction with facial aesthetics following FDFG reconstruction, indicating a positive impact on self-esteem and social interactions.

Moreover, the integration of FDFG has shown promising results in mitigating the visible signs of surgical interventions, leading to increased patient satisfaction. This is particularly relevant in socially active as well as female patients, who have been reported according to a study by [11], to demonstrate a predilection for seeking interventions that address facial aesthetics. The ability of FDFG to enhance facial aesthetics has positioned it as a favorable option in the armamentarium of parotidectomy reconstruction techniques.

### **Functional outcomes**

Beyond aesthetics, the literature also underscores the functional benefits of FDFG reconstruction. A notable functional concern in parotidectomy patients is the development of Frey syndrome, characterized by gustatory sweating and flushing. The incorporation of FDFG has been associated with a reduced incidence of Frey syndrome, as demonstrated by studies such as that by Smith [12]. The insulating effect of the dermal component in FDFG is believed to contribute to the mitigation of autonomic nerve regeneration, thereby reducing the occurrence of Frey syndrome.

Additionally, the literature, such as the study by [13] has shown that FDFG reconstruction is associated with a decreased incidence of sialoceles, a common post-operative complication characterized by fluid accumulation at the surgical site. This reduction is attributed to the physical barrier provided by the graft, inhibiting fluid accumulation and promoting wound healing.

### **Longitudinal studies and consistent trends**

A significant aspect of the literature review is the consistent trend observed across various studies and patient cohorts. Longitudinal studies that tracked patient outcomes over an extended period have consistently reported sustained improvements in both aesthetics and functionality. This suggests that the benefits of FDFG reconstruction are enduring and are not limited to immediate postoperative effects. For instance, [14] conducted a 5-year follow-up study, demonstrating the durability of aesthetic and functional improvements achieved through FDFG reconstruction.

## **Methodology**

In this study, we retrospectively analyzed 123 patients who underwent free dermal fat graft (FDFG)

reconstruction during parotidectomy procedures. In this retrospective study, data was collected from medical records of patients. Patient follow-ups were also reviewed and assessed. Quantitative data obtained from standardized evaluation tools was used to evaluate both aesthetic and functional outcomes of patients who underwent free dermal fat graft (FDFG) during parotidectomy procedures. The data were analyzed using appropriate statistical methods, to draw meaningful conclusions about the effectiveness of FDFG in parotidectomy procedures over the specified 10-year period.

Additionally, a thorough literature review was conducted to establish a comprehensive understanding of the efficacy and overall outcomes associated with the use of FDFG in parotidectomy procedures. This step allowed us to integrate the findings of previous studies into our investigation.

The patients included in our study were aged between 35 and 60 years old. The male-to-female ratio was 1:1.8. 44 males and 79 females were included. Most patients in our study presented with benign tumors of the parotid gland. Notably, two patients were diagnosed with myoepithelial carcinoma, after tumor excision adding a unique perspective to the study cohort.

Regarding the source of the FDFG, most patients underwent grafting from the lower abdomen, while a subset of five cases received grafts from the posterior aspect of the arm. This variation in graft source allowed us to explore potential differences in outcomes based on graft location, thus contributing valuable insights to our analysis.

### **Inclusion Criteria**

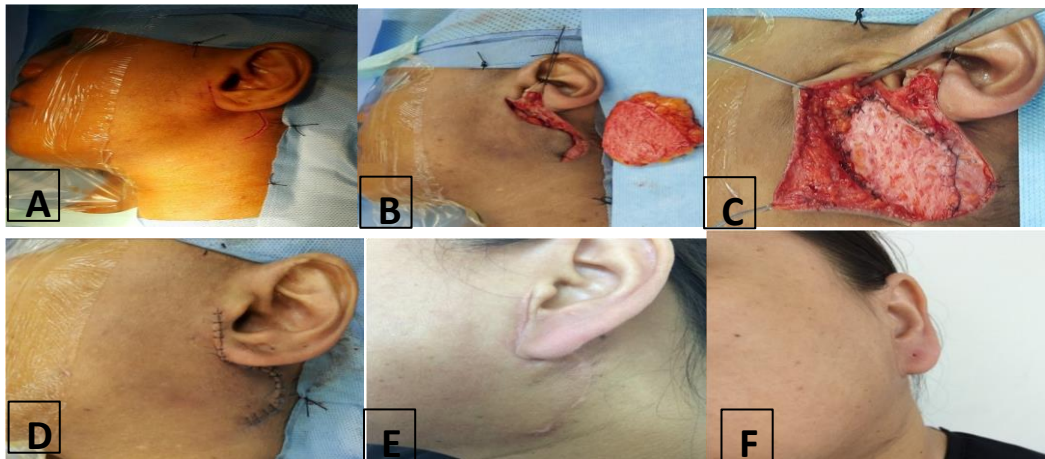
Patients aged between 35 and 60 years, regardless of gender, diagnosed with parotid gland tumors, and who underwent free dermal fat graft (FDFG) during parotidectomy procedures were included in the study. The study encompassed both benign and malignant cases, ensuring a comprehensive representation of patients within the specified age range.

### **Exclusion Criteria**

Patients outside the age range of 35 to 60 years, those with incomplete medical records, history of previous parotid surgeries, or any contraindications for FDFG, as well as patients with severe comorbidities that might impact surgical outcomes or follow-up compliance, were excluded from the study.

### **Surgical Procedure**

The surgical procedure involved parotidectomy partial or total, and integrating a free dermal fat graft (FDFG) for facial reconstruction. In cases in which FDFG was harvested either from the lower abdomen well below the umbilicus or upper arm region in cases in which the graft was obtained from the posterior aspect of the arm. After graft harvesting, meticulous placement and suturing were performed to achieve optimal graft viability and integration.

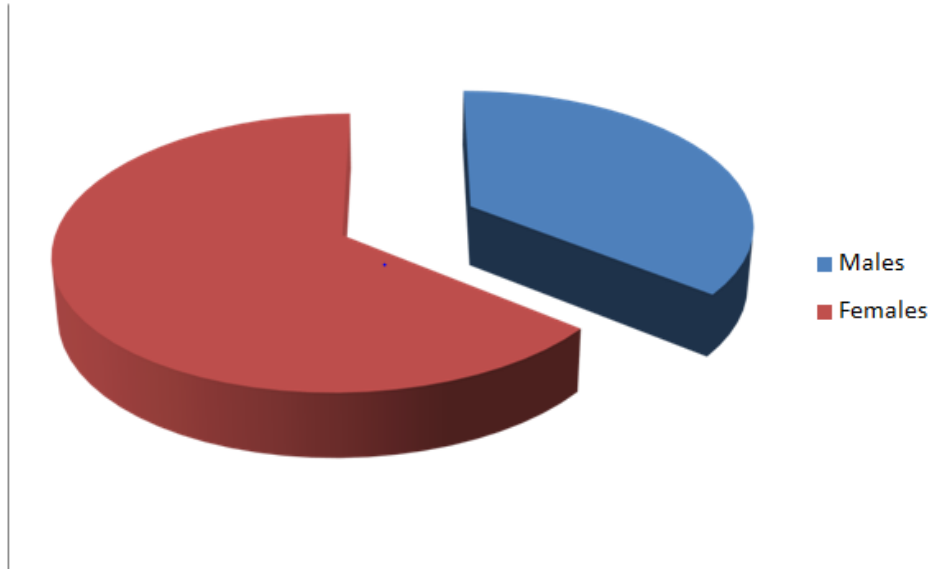


**Figure 1:** Dermal-fat-fascia graft at 5 years following reconstruction for a left lateral parotidectomy defect. (A) Parotid tumor. (B) Parotidectomy defect with DFFG (C) DFFG is sutured in place. (D, E, F) Facial contour of the operated side postoperatively.

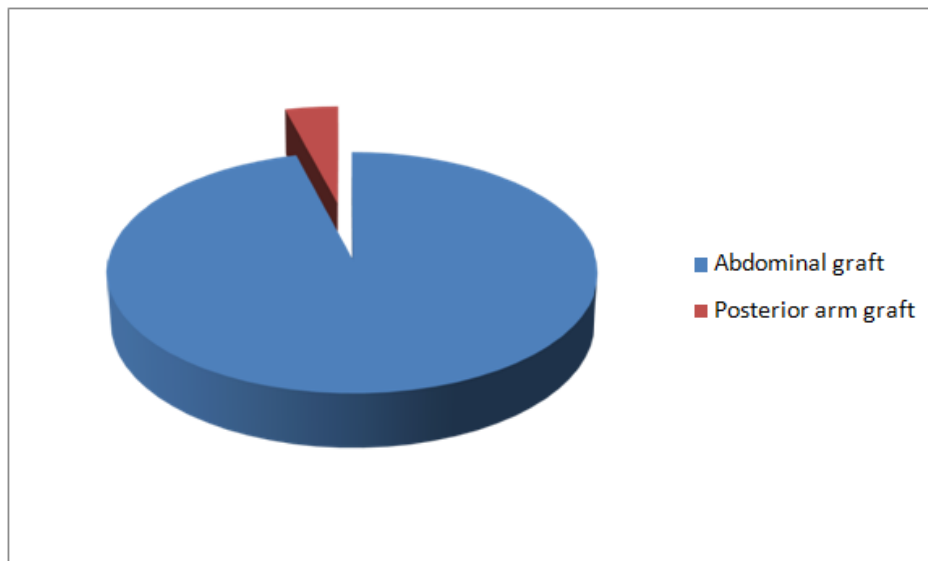
## Results

Most patients in our patient cohort expressed contentment with the achieved aesthetic and functional outcomes. Notably, only two patients developed sialoceles, which were successfully managed through aspiration and pressure dressing over two to three weeks. In our study, a subset of five patients, comprising two females and three males, exhibited overcorrection during a postoperative follow-up ranging from three to five months. In response, two of these patients underwent partial debulking of the free dermal fat graft (FDFG) to enhance aesthetic results and attain a favorable gonial projection.

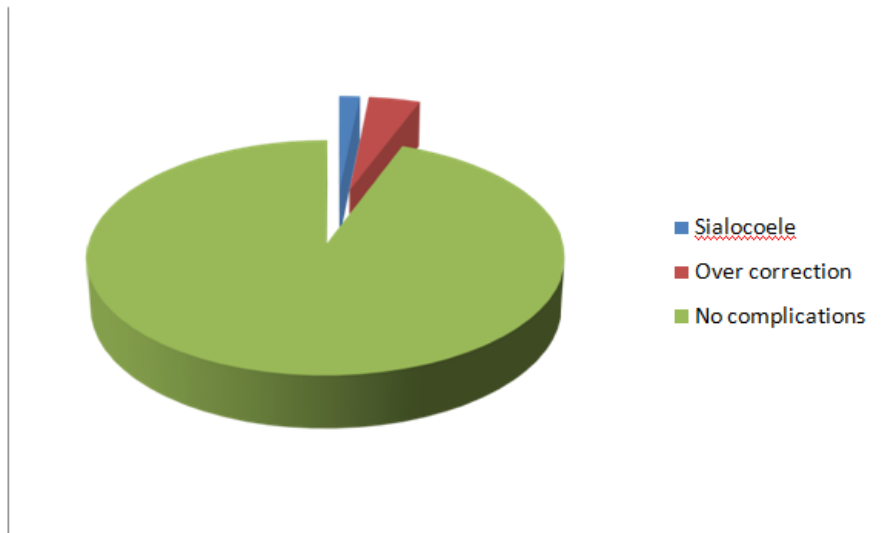
Of the total patient pool, 78 individuals were diligently followed up for a duration spanning three to five years. However, due to unforeseen disruptions caused by the COVID-19 pandemic, 20 patients were unable to maintain long-term follow-up. The remaining patients continued to participate in our ongoing long-term observations. The retrospective analysis illuminated encouraging functional outcomes in patients who underwent FDFG reconstruction during parotidectomy procedures. Most of these patients reported enhanced functional outcomes, encompassing the absence of Frey syndrome, sialoceles, or any other abnormalities. Likewise, the aesthetic outcomes were also positively influenced, with the restoration of natural facial contours and a notable improvement in overall appearance.



**Figure 2:** Male and female patient ratio selected in the study.



**Figure 3:** Source of FDFG



**Figure 4:** Postop outcomes

## Discussion

The present study aimed to comprehensively explore the aesthetic and functional outcomes achieved through the application of free dermal fat grafts (FDFG) in parotidectomy procedures. The results obtained from our retrospective analysis and subsequent literature review highlight the potential of FDFG as a reconstructive technique that not only addresses the cosmetic aspects of surgery but also contributes to improved functional outcomes and patient satisfaction.

Our findings revealed a noteworthy trend in patient satisfaction in terms of both aesthetic and functional outcomes. Majority of the patients expressed contentment with the achieved results. This underscores the significance of FDFG reconstruction to restore not only the facial appearance but also the functional integrity of the parotid region. The fact that most patients experienced improved facial symmetry and contours further attests to the positive impact of FDFG in mitigating the aesthetic repercussions of parotidectomy.

Functional outcomes, a pivotal aspect of our investigation, demonstrated promising results. The limited occurrence of Sialocoele, which was effectively managed through aspiration and pressure dressing, points to the efficacy of FDFG in preventing common post-operative complications. Furthermore, the absence of Frey syndrome, a distressing complication characterized by gustatory sweating, highlights the potential of FDFG to modulate autonomic nerve regeneration, contributing to favorable patient experiences.

The identification of over-correction in a subset of patients, characterized by excessive volume augmentation, introduces an intriguing facet to the study. The decision to proceed with partial debulking of FDFG in select cases demonstrates the nuanced approach required in FDFG reconstruction. This observation underscores the importance of tailoring reconstructive strategies to individual patient needs, accounting for variations in facial anatomy and patient preferences.



## **Long-Term Follow-Up and Impact of the Pandemic**

Our study's emphasis on long-term follow-up sets the stage for a comprehensive understanding of the durability of the outcomes. The 78 patients who maintained a long-term follow-up of three to five years serve as a valuable cohort for assessing the persistence of aesthetic and functional benefits achieved through FDFG. However, the unexpected disruption caused by the COVID-19 pandemic led to a partial loss of follow-up in 20 patients. This highlights the challenges posed by external factors beyond the control of researchers and reinforces the importance of adaptive research methodologies.

## **Integration with Literature**

Our study results align with the broader landscape of research on FDFG in parotidectomy procedures. The trend of positive outcomes observed in our analysis is consistent with the findings of previous studies. The integration of the literature review corroborates the effectiveness of FDFG in achieving aesthetic and functional enhancements across diverse patient populations.

## **Implications and Future Directions**

The collective evidence from our study signifies the potential of FDFG as a versatile reconstruction technique with far-reaching implications. The dual impact on aesthetics and function underscores its value in restoring patients' self-esteem, social interactions, and overall quality of life. As the long-term effects of FDFG reconstruction continue to be monitored, further prospective studies are warranted to delve deeper into the nuanced considerations of graft source, patient demographics, and individual preferences.

## **Conclusion and Implications**

The extensive body of literature reviewed underscores the potential of free dermal fat grafts as a robust and versatile reconstruction technique in parotidectomy procedures. FDFG offers dual benefits by addressing aesthetic concerns and enhancing functional outcomes. Aesthetic improvements include restoring facial symmetry, contour rejuvenation, and reducing depression resulting from surgery, leading to improved patient self-esteem and social interactions. Functionally, FDFG reconstruction demonstrates efficacy in mitigating the occurrence of Frey syndrome and sialoceles.

The consistent positive trends observed across studies reinforce the notion that FDFG reconstruction is a reliable and effective approach in parotidectomy procedures. These findings collectively highlight the significance of integrating FDFG as part of a comprehensive patient-centered approach, ultimately leading to enhanced patient quality of life and satisfaction. As this review elucidates the existing body of knowledge, it also underscores the potential for further prospective studies to explore the long-term durability of outcomes and patient-reported experiences following FDFG grafting during parotidectomy.

## **Limitations**

While this study aims to shed light on the aesthetic and functional outcomes of free dermal fat graft (FDFG) in parotidectomy procedures, certain limitations warrant consideration. The retrospective design introduces potential selection bias, while the limited sample size of 123 patients might impact

generalization. The absence of a control group, and the lack of extensive patient-reported outcomes limit the study's ability to draw comprehensive conclusions. Additionally, individual variations in wound healing, surgical techniques, and contextual factors could influence outcomes. Despite these limitations, this study forms a foundational exploration, guiding future research endeavors to better understand FDFG's long-term efficacy, patient experiences, and wider implications in parotidectomy procedures.

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