Original Article

Functional and aesthetic outcomes of dermofat graft reconstruction in limited parotidectomy defects: a cross-sectional study

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Background: To mitigate the cosmetic defect associated with parotidectomy, dermofat grafts have been utilized to restore the contour of the face and reduce complications such as salivary leak and Frey's syndrome. This study aimed to investigate post-operative cosmetic satisfaction and complications rates associated with this method in limited parotidectomies for benign tumours.

Methods: A cross-sectional study involving adult patients with benign parotid tumours undergoing parotidectomies with dermofat graft reconstruction between 2013–2021 was conducted. Patients were sent a questionnaire on donor site complications, gustatory sweating, and cosmetic satisfaction. Information on demographics, surgical details, tumour pathology and post-operative complications were gathered from existing records.

Results: In the study group of 79 patients, there was a low rate of local complications: parotid sialocoeles (10%, n=8), parotid wound infection (3%, n=2), and parotid haematomas (1%, n=1); and dermofat graft donor site complications of infection (5%, n=4), seromas (1%, n=1) and haematomas (0%, n=0). Some patients reported donor site pain (24%, n=19) or donor site numbness (33%, n=26). Most patients reported "good" or "very good" cosmetic satisfaction (85%, n=67). Only three patients reported gustatory sweating (4%, n=3).

Conclusions: Dermofat grafts are a reliable reconstruction method that allows for high patient cosmetic satisfaction and low post-operative complication risk.

Keywords: Dermofat graft; parotidectomy; outcomes; cosmetic satisfaction

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Introduction

The first-line treatment for benign parotid tumours is complete surgical excision with preservation of the facial nerve (1). Complications of parotid surgery include salivary leak and sialocoele, bleeding, infection, and Frey's syndrome. Parotidectomy can leave patients with an unsightly facial hollowing especially when large portions of the gland are removed. Various reconstructive methods have been described to restore the natural contour of the face and create a barrier between the parotid bed and skin to help prevent Frey's syndrome, including local flaps and tissue grafts (2-11). Each method has its benefits and disadvantages, and none have demonstrated clear superiority over the rest (12,13). One reconstructive method that has been described is using a dermofat graft from the abdomen which has appeal due to ease of donor site graft harvesting, ability to mould to the defect, and minimal donor site morbidity (12,14,15). Current publications on the complication rates and patient cosmetic satisfaction post-dermofat grafting are limited by their small and heterogeneous cohorts. This study aimed to assess the cosmetic satisfaction and complication rates associated with the use of dermofat graft reconstruction in limited parotidectomies for benign disease aetiologies. We present this article in accordance with the STROBE reporting checklist for cross-sectional studies (available at https://www.theajo.com/article/view/10.21037/ajo-23-30/rc).

Methods

Study design

A retrospective cross-sectional study using a self-developed questionnaire was generated. Patients were identified from the Sydney Head and Neck Cancer Institute Head & Neck Surgery Database. Inclusion criteria were patients aged over 18 years old who underwent limited parotidectomy with dermofat graft reconstruction for benign parotid tumours between 2013–2021 and consented to participate in the study. Exclusion criteria were patients under 18 years of age and all patients that had parotidectomy for cancer or for benign pathology that did not have a dermofat reconstruction. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The study was approved by the St Vincent's Hospital Human Research Ethics Committee (2021/ETH11634) and informed consent was obtained from all participants.

Surgical technique

The standard ablative technique is used to remove the parotid tumour. The dermofat graft is either taken from (I) the groin or iliac region or (II) periumbilical region according to surgeon preference but factors such as the amount of fat tissue and scar location are taken into account. After the parotid tumour is excised, an assessment is made as to the volume of the defect. An elliptical incision is placed with the size of the incision and depth matching the defect in the parotid gland. The next step is to remove the overlying epidermis whilst leaving the underlying dermis intact. Care must be taken in this step to make sure that all the epidermis is removed. This can be readily achieved by using the cutting setting on a monopolar diathermy and traction. Once the epidermis is removed, the base of the dermofat graft is transected in a horizontal plane parallel to the overlying dermis. Haemostasis is obtained at the donor site and then the donor site is closed in 2 layers. A drain is not required in the donor site. The dermofat graft is then placed in the parotid defect and trimmed to match the defect (*Figure 1*). Slight overfilling of the height of the defect with the dermofat graft is advised as the dermofat graft will shrink around 20% (16). With the dermal edge most superficial, the dermofat graft is sutured into position with radial absorbable suture (such as Vicryl) with care taken to avoid any sutures near branches of the facial nerve. A small drain is placed away from the facial nerve and the overlying skin is then replaced over the parotid bed and the skin closed as per the surgeon's preference. Wound closure strips (such as 3M Steri-Strips) are applied along the line of incision and routine antibiotics to cover skin organisms (cephalexin 500 mg three times daily for 7 days) are prescribed.

Population characteristics

Clinical records, operation reports and pathological reports were reviewed to gather demographic data (date of birth, gender, contact details), surgical details (surgery date and type, dermofat graft donor site) and pathological data (tumour histopathological type and size).

Post-operative complications

Information on post-operative complications from the donor site and parotid site, such as haematoma, infection,

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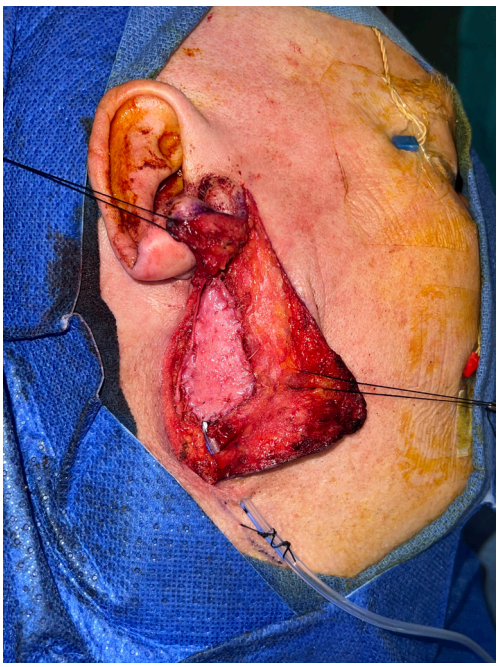

Figure 1 Intraoperative image showing left parotid surgical site with dermofat graft *in situ*. This image is published with the patient's consent.

Table 1 Characteristics of final study group

Characteristics	Value (n=79)
Age at surgery (years), mean ± SD	50±15
Gender (male:female), %	42:58
Years since surgery, median (range)	3.32 (8.18)
Surgery type, n [%]	
Superficial	70 [89]
Deep lobe	9 [11]
Dermofat graft donor site, n [%]	
Left iliac fossa	77 [97]
Periumbilical	2 [3]
Tumour type, n [%]	
Pleomorphic adenoma	60 [76]
Warthin's tumour	10 [13]
Other†	9 [11]
Tumour size (mm), mean ± SD	23±11

†, basal cell adenoma, oncocytoma, chronic sialadenitis. SD, standard deviation.

and seromas or sialocoeles, were gathered from the Sydney Head and Neck Cancer Institute Head & Neck Surgery Database and clinical records. Parotid seroma, salivary leaks, and sialocoeles were grouped together as "parotid sialocoeles" because it was not possible to distinguish between these retrospectively.

Patient-reported outcomes

A self-developed questionnaire was created and sent out to participants to obtain patient-reported outcomes on donor site issues (numbness, pain, and impact of scar), and issues relating to the parotid surgical site (gustatory sweating and cosmetic satisfaction). The patient experience of post-operative complications and concerns regarding the donor site scar was recorded on a four-point Likert scale from "not at all" to "severely" while the cosmetic appearance rating was recorded on a five-point scale of "very bad" to "very good". These terms were not objectively defined, rather patients were allowed to describe a severity variable relevant to them. These were distributed alongside an invitation letter and patient information sheet via email through the REDCap survey distribution system or post. If no response was obtained after three weeks, one contact attempt was made by phone to obtain verbal consent and questionnaire responses.

Statistical analysis

Descriptive statistics and frequency calculations were completed on IBM SPSS Statistics for Macintosh, version 26.0 (IBM Corp., New York, USA).

Results

Population characteristics

A total of 142 patients fulfilled the inclusion criteria and were approached for the study, of which 79 consented and returned the questionnaire. Only these 79 patients were included in the analysis; the other 63 were excluded. The final study group had a mean age of 50±15 years, of which 58% were female (*Table 1*). The majority of tumours were confined to the superficial lobe of the parotid gland (89%, n=70) while the remaining patients had a deep lobe parotidectomy (11%, n=9). The dermofat graft was harvested from the iliac region in most patients (97%, n=77) and the remaining patients had a dermofat graft harvested from the periumbilical area (3%, n=2). The most

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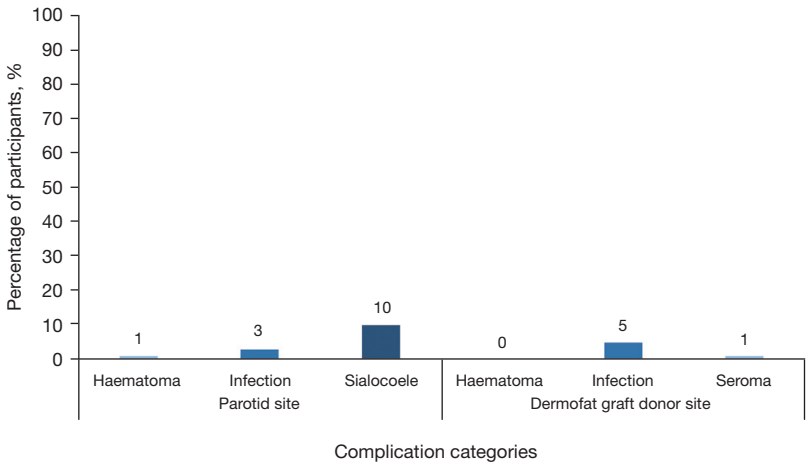

Figure 2 Post-operative complications after dermofat graft reconstruction.

common histopathological tumour types were pleomorphic adenomas (76%, n=60) and Warthin's tumours (13%, n=10). The mean tumour size was 23±11 mm.

Post-operative complications

The most common recorded complications were parotid sialocoeles (10%, n=8) and dermofat graft donor site infection (5%, n=4) (*Figure 2*). Two patients (3%) developed a parotid wound infection, one patient (1%) had a parotid haematoma, and a donor site seroma was recorded in one patient (1%). There were no instances of donor site haematoma requiring return to theatre or surgical/radiological intervention.

Patient-reported outcomes

Several patients reported experiencing numbness (33%, n=26) or pain (24%, n=19) at the dermofat graft donor site (*Figure 3*). Those who reported numbness experienced it mildly (23%, n=18) or moderately (10%, n=8). Those with pain experienced it mildly (19%, n=15) or moderately (5%, n=4). Three patients reported experiencing mild (3%, n=2) or moderate (1%, n=1) gustatory sweating. Most patients were satisfied with their post-operative cosmetic appearance (85%, n=67) while a few were not (4%, n=3). The scar at the dermofat graft donor site did not bother most patients (68%, n=54).

Discussion

Dermofat grafting was first described as a reconstructive method in 1931 for a frontal sinus fracture (17). Since then, it has been described in a variety of head and neck surgeries including parotidectomy (14,18,19). Existing reports on the complications and patient satisfaction with this reconstruction method, however, arise from small sample sizes and mixed cohorts (e.g., benign and malignant tumours, total and limited parotidectomies, combined reconstructive methods). This study is the largest Australian-based study dedicated purely to investigating the incidence of post-operative complications and patient-reported outcomes associated with dermofat graft reconstruction in limited parotidectomies for benign parotid disease.

This study demonstrated a low incidence of post-operative complications in patients with dermofat graft reconstruction. Our rates are lower than previously reported findings for donor site haematomas (0–4%), donor site seromas (0–5%), and parotid site haematomas (0–10%) (12,15,19-21). Our study also demonstrated a very low rate of parotid site infections, similar to published literature (19-21). This could be related to the relatively young mean age of our patient population (50 years), possibly reflecting a tendency to perform this procedure on younger patients who are thought to have lower risk of infection or graft-take failure. Our rate of parotid site sialocoeles of 10% is higher than other reported case series in the literature (12,20,21). The reason for this is unclear but may be due to some surgeon protocols of drain removal on Day 1 post-operatively or to an inflammatory effect of the dermofat graft. The risk of sialocoele is also related to tumour size and in our series, the mean tumour size was 23±11 mm (15,22).

One theoretical advantage of using a dermofat graft is potentially a lower risk of developing gustatory sweating

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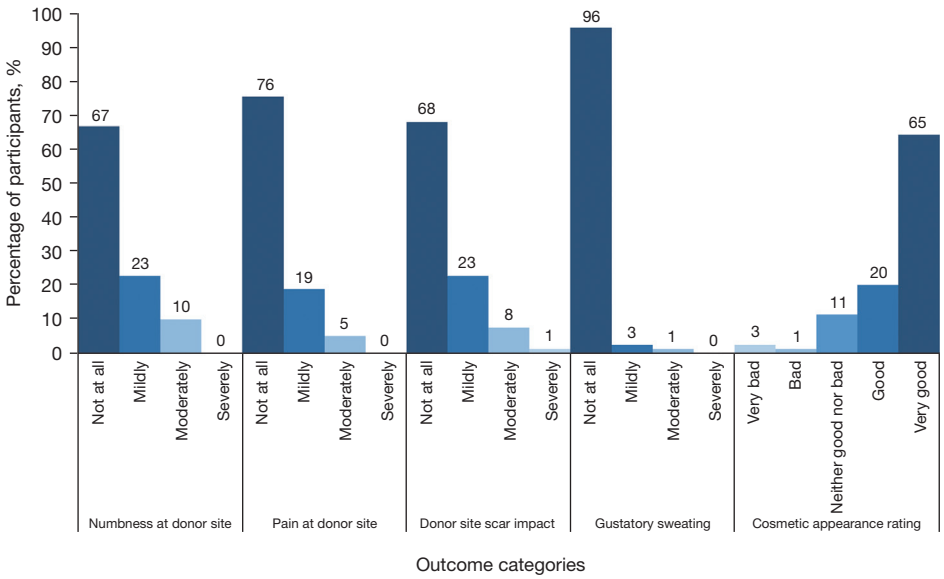

Figure 3 Patient-reported outcomes after dermofat graft reconstruction.

or Frey's syndrome as the graft provides a barrier between the remaining parotid tissue and the overlying skin surface and thus preventing aberrant neural connections between the remaining parotid gland and skin. Three patients in the current study reported experiencing gustatory sweating. This low incidence is consistent with published literature investigating dermofat grafts and Frey's syndrome (0–4.9%) (12,19-21). Another study that reported a subjective gustatory sweating rate of 19% included malignant tumours and total parotidectomies which are associated with higher rates of developing Frey's syndrome (23). A multivariate analysis of age, total parotidectomies, and dermofat grafting showed no relationship between dermofat grafting and gustatory sweating (21) whereas another study only found tumour size >4 cm, no disease pathology, resection type, previous radiotherapy or previous parotidectomy, corresponded with the development of Frey's syndrome (24). While a retrospective cohort study did not find dermofat grafts to reduce Frey's syndrome significantly compared to no reconstruction or reconstruction with a sternocleidomastoid flap (12), further research is needed into determining whether dermofat grafts are better than other reconstruction methods in preventing Frey's syndrome.

The main reason for performing dermofat grafting is to resolve the cosmetic defect of hollowing of the side of the face when reconstruction is not performed. Thus, the patient is restored with a normal symmetrical facial cosmesis. Our findings match the high cosmetic satisfaction rates reported in existing literature (12,19,20). Donor site complications perceived by the patients are also similarly low in terms of numbness and bother factor (23), but no other study has reported donor site pain.

The benefits of the dermofat graft reconstruction in parotidectomies include the ease of harvesting technique and short operating time in obtaining the graft compared to other techniques such as a temporoparietal flap (which puts the frontal branch of the facial nerve at risk) and a sternocleidomastoid rotation flap (which puts the spinal accessory nerve at risk). In benign parotid surgery, vascularised free flaps can be avoided unless indicated for extensive resections. Although not the aim of this study, in our experience, placing a dermofat graft does not impair revision parotid surgery and anecdotally makes revision surgery easier as the base of the dermofat graft is able to be lifted off the underlying facial nerve relatively easily with minimal scarring. In our institution, we don't recommend or utilise dermofat grafts in malignant parotid surgery due to the risk of fat necrosis if adjuvant radiotherapy is used.

Limitations

The external validity of this study is restricted by the inherent limitations of a voluntary survey such as volunteer bias, recall bias, and response bias. We attempted to mitigate this by maximising our sample size through

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different modes of survey distribution but still obtained relatively low response-to-no-response ratios. However, our cohort is certainly the largest amongst existing reports, which can allow for greater representative analysis. Additionally, further research may expand on this study by incorporating a comparison group so that statistical analyses of significant differences in post-operative outcomes may be ascertained.

Conclusions

Dermofat grafts are a useful reconstructive option for limited parotidectomy defects as they are associated with a low risk of post-operative complications and have a positive patient-reported outcome.

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Footnote

Reporting Checklist: The authors have completed the STROBE reporting checklist. Available at https://www.theajo.com/article/view/10.21037/10.21037/ajo-23-30/rc

Data Sharing Statement: Available at https://www.theajo.com/article/view/10.21037/ajo-23-30/dss

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Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at https://www.theajo.com/article/view/10.21037/ajo-23-30/coif). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The study was approved by the St Vincent's Hospital Human Research Ethics Committee (2021/ETH11634) and informed consent was obtained from all participants.

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