# The role of covering the facial nerve and parotid surface in prevention of the postparotidectomy complications

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**Background**
Few operations in the head and neck region present challenges such as parotidectomy. The tumors detected are usually benign and patients expect normal function postoperatively. Complications of parotidectomy can be divided into early and late complications. The most serious of late complications are Frey syndrome and cosmetic deformity. Our aim is to evaluate the role of dermal fat graft interposition in preventing postparotidectomy complications.
**Patients and methods**
This study included 72 patients with benign parotid tumors who were treated between May 2012 and December 2015 in the Department of General Surgery, Menoufia University Hospitals. These patients are randomly divided into two groups: group A (control group) included 36 patients treated with parotidectomy without using dermal fat graft, and group B (study group) included 36 patients treated with parotidectomy and interposition of dermal fat graft.
**Results**
Most of our patients were females in both groups (66.7 and 77.8%), respectively. The most common pathology was pleomorphic adenoma in both groups (61.1 and 66.7%). There are no statistically significant differences between both groups as regards the operative time and the incidence of facial nerve palsy. Group B (study group) had a significantly lower incidence of Frey syndrome compared with group A (control group) either by subjective or objective methods ($P$=0.011 and 0.002). There was also a significant reduction in the incidence of sialocele and cosmetic unsatisfaction in the study group ($P$=0.030 and 0.003, respectively).
**Conclusion**
The dermal fat graft is a simple idea for restoring facial contour and preventing the postoperative complications after parotidectomy.

**Keywords:**
dermal fat graft, Frey syndrome, parotidectomy

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## Introduction

Few operations in the head and neck region present challenges such as parotidectomy. The tumors detected are usually benign and patients expect normal function postoperatively. However, complications may arise [1]. Numerous reports in the literature have described the surgical technique and the oncological outcome; however, few reports have documented the complications of parotid gland surgery [2].

Complications of parotidectomy can be divided into early and late complications. The early complications include facial nerve dysfunction, hemorrhage, infection, seroma, sialocele, and salivary fistula. The late complications included Frey syndrome and cosmetic deformity [3].

Raw gland surface, left after removal of a parotid tumor or a portion of the gland, contributes to postoperative salivary leakage in the form of sialocele or salivary fistula. In addition, raw gland exposed to skin provides a ready pathway for postganglionic parasympathetic fibers to migrate from salivary tissue and cross-innervate facial sweat glands, resulting in gustatory sweating (Frey syndrome). The clinical signs include flushing and sweating at the skin of the parotid region during eating. The reported incidence of Frey syndrome is around 20–68% overall. The subjective and objective incidences are 38 and 86%, respectively [4].

The surgical depression caused by removal of the parotid gland is most noticeable immediately after the operation, when the surrounding skin is slightly edematous, enhancing the contrast. The magnitude of this depression depends on the amount of gland removed [5]. The aim of this work is to evaluate the



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role of dermal fat graft interposition in preventing postparotidectomy complications.

## Patients and methods

This study included 72 patients (aged 28–60 years) with benign parotid tumors who were treated between May 2012 and December 2015 in the Department of General Surgery, Menoufia University Hospitals.

These patients were randomly divided into two groups.

(1) Group A included 36 patients; parotidectomy was done without using dermal fat graft.
(2) Group B included 36 patients; parotidectomy was done with dermal fat graft.

All patients were examined thoroughly, investigated well, and informed consent was taken.

### Surgical technique

The preauricular–submandibular S-shaped incision was used in all patients.

The skin flap was raised above the parotid fascia and beyond the tumor to ensure complete exposure of the tumor.

Superficial parotidectomy or partial superficial parotidectomy was done in a standard manner according to the pathology.

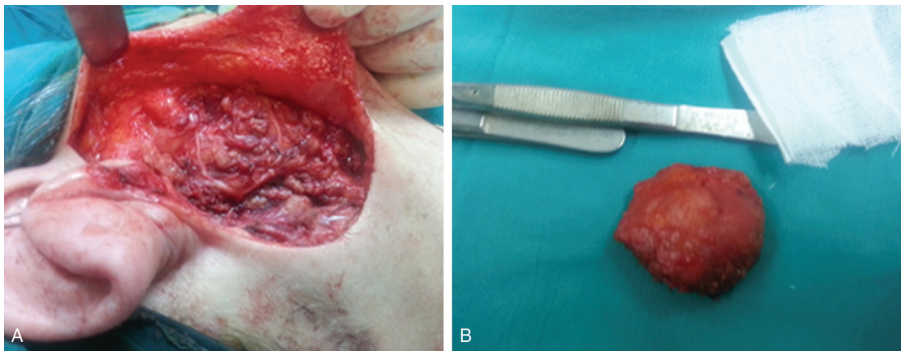
In partial superficial parotidectomy, only the tumor-bearing area of the gland parenchyma was excised with identification of the main trunk and adjacent branches of the facial nerve.

After complete removal of the tumor and involved parotid tissue, the size of the excised parotid and the cavity left after excision were roughly measured (Fig. 1).

In group B, dermal fat graft was harvested from the anterior abdominal wall and de-epithelized as usual. The size of the graft must be slightly larger (20%) than the excised part, because some shrinkage of the graft size occurred in the postoperative period (Fig. 2).

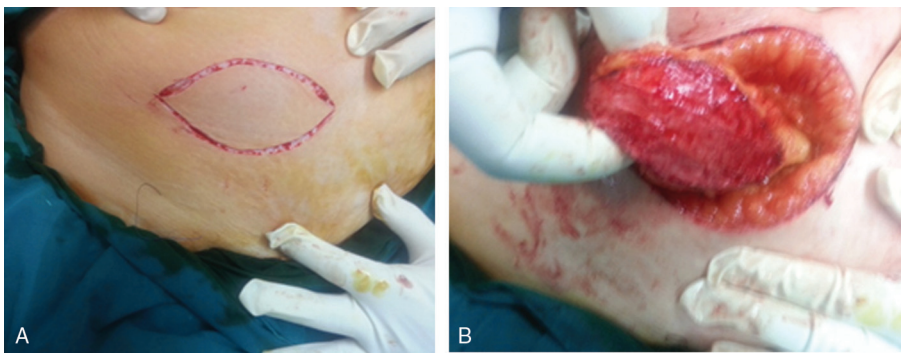
The parotid surface and the facial nerve were covered by the graft, which was sutured to the edge of the residual

**Figure 1**




(A) The cavity left after parotidectomy. (B) Estimation of the tumour size.

**Figure 2**




(A) Design of the graft. (B) Harvesting of the dermal fat graft.

parotid tissue by vicryl 4/0 to prevent graft displacement (Fig. 3).

Suction drain was placed and the skin and platysma were closed by vicryl 4/0 suture.

All patients were followed up in the immediate postoperative period and at follow-up visits for parotidectomy complications such as facial nerve palsy, seroma, sialocele, salivary fistula, wound infection, and Frey syndrome (Fig. 4).

Both subjective and objective (starch–iodine test) methods were used to assess the Frey syndrome.

### Ethical considerations

This study had been conducted after taking approval from the ethical committee of Faculty of Medicine in Al-Menoufia University and the competent authority of Al-Menoufia University Hospitals. Written consent was obtained from every patient for publication of this research and accompanying images.

## Results

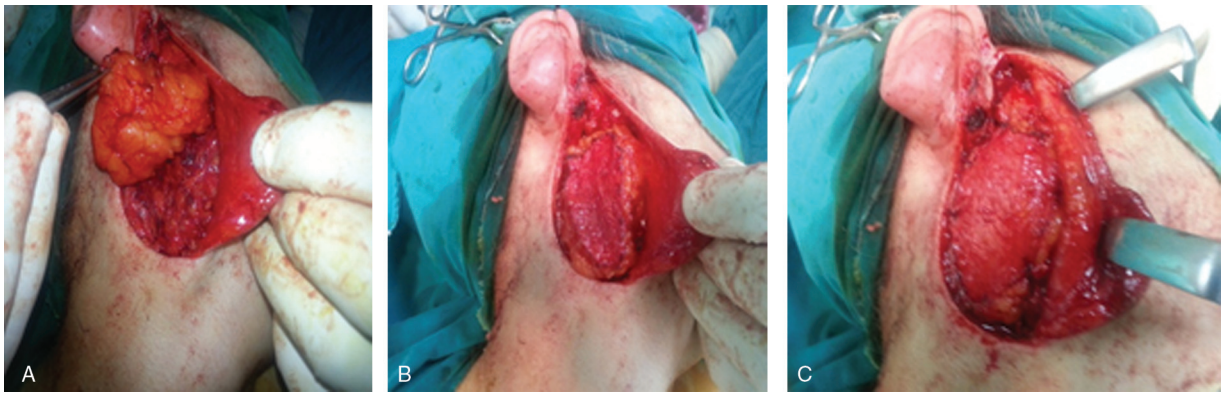
This study was conducted on 72 patients who complained of benign parotid swelling. The mean age was 40.77±5.26 and 40.30±4.92 years in control and study groups, respectively. In all, 22 (30.6%) patients were male and 50 (69.4%) patients were female. The most commonly encountered pathology was pleomorphic adenoma (50 patients, 69.4%). No significant difference as regards age, sex, and pathology were detected in both groups (Table 1).

Superficial parotidectomy was performed for 46 (63.9%) patients: 22 patients in the control group and 24 in the study group. Partial superficial parotidectomy was performed in 26 (36.1%) patients – 14 patients in the control group and 12 patients in the study group – with no significant differences between both groups ($P$=0.824) (Table 1).

There was no significant difference between both groups as regards the mean operative time. It was 97.0±8.14 and 100±6.79 min in the control and study groups, respectively ($P$=0.094) (Table 1).

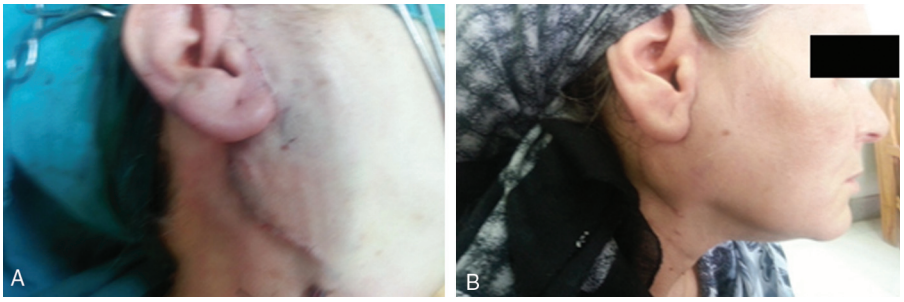
Transient facial nerve palsy occurred in seven (9.7%) patients; three of them were in the control group and four cases were in the study group, with no statistically significant difference between both groups. Sialocele occurred also in eight (11.1%)

**Figure 3**




(A) Placement of the graft. (B) The graft obliterates the cavity left after parotidectomy (C) Fixation of the graft by vicryl 4/0 to the residual parotid tissue.

**Figure 4**




(A) Immediate postoperative. (B) Two months postoperative.

**Table 1 General and operative characteristics of the studied groups**

| | Groups (*N*=36) | | | *P* value |
|---|---|---|---|---|
| | Study | Controls | Test of significance | |
| Age (mean±SD) | 40.30±4.92 | 40.77±5.26 | *t*=0.39 | 0.696 |
| Sex [*n* (%)] | | | $\chi^2$=0.26 | 0.609 |
| Male | 10 (27.8) | 12 (33.3) | | |
| Female | 26 (72.2) | 24 (66.7) | | |
| Pathological type [*n* (%)] | | | $\chi^2$=0.48 | 0.923 |
| Pleomorphic | 26 (72.2) | 24 (66.7) | | |
| Wartin | 4 (11.1) | 6 (16.7) | | |
| Lymphoepithelial | 4 (11.1) | 4 (11.1) | | |
| Follicular hyperplasia | 2 (5.6) | 2 (5.6) | | |
| Operation type [*n* (%)] | | | $\chi^2$=0.24 | 0.824 |
| Superficial parotidectomy | 24 (66.7) | 22 (61.1) | | |
| Partial parotidectomy | 12 (33.3) | 14 (38.9) | | |
| Operative time [mean±SD (range)] (min) | 100.0±6.79 (95–130) | 97.0±8.14 (90–120) | *t*=1.69 | 0.094 |

**Table 2 Postoperative complications**

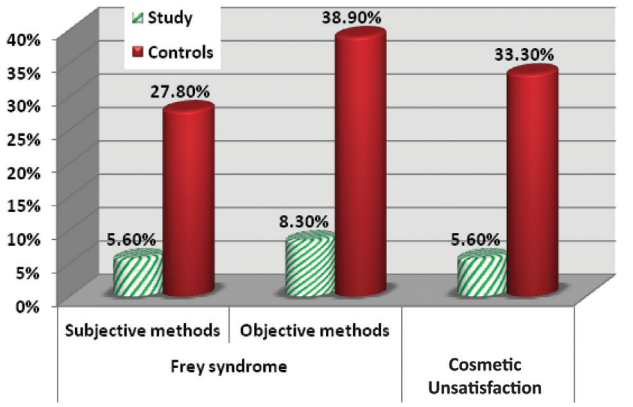
| Complications | Groups (*N*=36) | | | | | *P* value |
|---|---|---|---|---|---|---|
| | Study | | Control | | Test of significance | |
| Sialocele | 1 | 2.8 | 7 | 19.4 | Fisher's exact test=5.06 | 0.030* |
| Facial nerve palsy | 4 | 11.1 | 3 | 8.3 | Fisher's exact test=0.15 | 1.0 |
| Frey syndrome | | | | | | |
| Subjective methods | 2 | 5.6 | 10 | 27.8 | $\chi^2$=6.40 | 0.011* |
| Objective methods | 3 | 8.3 | 14 | 38.9 | $\chi^2$=9.31 | 0.002* |
| Cosmetic unsatisfaction | 2 | 5.6 | 12 | 33.3 | $\chi^2$=8.86 | 0.003* |

*Significant.

patients; seven cases were recorded in the control group in comparison with one case in the study group, with significantly higher incidence in the control group than in the study group (*P*=0.030) (Table 2).

Frey syndrome was recorded, by subjective method, in 10 (27.8%) patients in the control group in comparison with two (5.6%) patients in the study group and by objective method in 14 (38.9%) patients in the control group in comparison with three (8.3%) patients in the study group. Incidence of Frey syndrome by subjective and objective methods was significantly higher in group A (control group) than in group B (study group) (*P*=0.011 and 0.002). Two patients in group B had soft tissue deficits (manifested as cosmetic depression at the operative site), whereas it occurred in 12 (33.3%) patients in group A with significant differences between both groups (*P*=0.003) (Table 2 and Fig. 5).

**Figure 5**




Frey syndrome and cosmotic unsatisfaction in the studiied groups.

## Discussion

Salivary gland tumors mostly occur in the parotid gland (70–80%). Eighty percent of parotid tumors are benign and the most common benign tumor is pleomorphic adenoma [6]. Patients expect normal function and cosmosis postoperatively.

Complications of parotid surgery may be intraoperative or postoperative. Postoperative complications can be classified as early or late complications [7]. The late complications included Frey syndrome and cosmetic deformity [3].

One of the mechanisms of Frey syndrome is the aberrant regeneration of two different nerves because of defects in the parotid fascia after parotidectomy. The postganglionic parasympathetic nerve fibers connect with nerve fibers that innervate

the subcutaneous sweat glands, resulting in abnormal secretions from those glands during eating (flushing and sweating) [8].

Many flaps, including temporal fascia, fascia lata femoris, and sternomastoid myocutaneous flap, have been used as barriers between the parotid surface and the skin, but they had the disadvantage of the donor site morbidity. Synthetic materials, such as allogenic cellular matrix, have been used for the same purpose, but it is limited because its cost and its complications such as allergy [9].

In this study, attention was focused on the role of dermal fat graft in the prevention of postoperative complications.

In our study, by subjective method, the incidence of Frey syndrome was 27.8 and 5.6%, whereas by objective method the incidence was 38.9 and 8.3% in the control and study groups, respectively.

This is comparable to the studies conducted by Laccourreye *et al.* [10], Laskawi *et al.* [11], Hanna *et al.* [12], and Malatskey *et al.* [13], in which the incidence of Frey syndrome was 13, 11, 17, and 43%, respectively.

Incidence of Frey syndrome (by subjective and objective methods) was significantly higher in group A (control group) than in group B (study group).

In this study, the postoperative sialocele occurred in seven (19.4%) patients in the control group and in one (2.8%) patient in the study group. In the study by Rea *et al.* [14], 5.1% of their patients had sialocele and salivary fistula. The incidence of sialocele was significantly higher in the control group than in the study group. This is explained by the barrier effect done by the dermal fat graft in the study group, which decreases the incidence of Frey syndrome and sialocele.

As regards the cosmetic depression (soft tissue deficits), 12 patients in the control group had noticeable depression at the side of the face, whereas most of the patients in the study group noticed a mild elevation at the surgical site, which was related to the intended overcorrection by the dermal fat graft, as a portion of adipose tissue was shrinked over the few months after the operation and the patient restored the normal facial contour.

There was no significant difference between the studied groups as regards to the operative time and facial nerve palsy.

## Conclusion

The dermal fat graft is a simple idea for restoring facial contour and preventing the postoperative complications after parotidectomy.

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Nil.

#### Conflicts of interest

There are no conflicts of interest.

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