The Egyptian Journal of Hospital Medicine (April 2022) Vol. 87, Page 1023-1026

Surgical Procedures for Prevention of Frey's Syndrome after Parotidectomy Surgery: Review Article

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ABSTRACT

Background: Treatment options for benign and malignant parotid gland neoplasms include superficial and whole parotidectomy, however patients often suffer from facial contour deformation in the preauricular and retromandibular regions, as well as Frey's syndrome. Preauricular flushing and sweating following parotid surgery has been noted as a possible side effect. Once thought to be extremely rare, it has been found to occur anywhere from 4% to 62% in post-parotidectomy patients within the first six to 18 months following surgery. These outcomes have been attempted to be avoided by the use of certain intraoperative procedures. Dermal-fat-free grafts, fascia lata grafts as well as superficial flaps of the musculoaponeurotic system, vascularized fat grafts, temporoparietal fascia flaps, as well as implants of polytetrafluoroethylene are a few of the other options available.

Objective: To evaluate aesthetic and functional outcomes after the use of either superiorly based sternocleidomastoid muscle flap or free abdominal fat after parotidectomy.

Methods: The databases were searched for articles published in English in 4 data bases; PubMed, Google scholar, Egyptian Knowledge Bank and Science direct. Boolean operators (AND, OR, NOT) had been used such as [Frey's Syndrome AND Parotidectomy Surgery OR Prevention of Frey's Syndrome] and in peer-reviewed articles between January 2001 and October 2020.

Conclusion: Superiorly based Sternocleidomastoid muscle flap improves facial deformity following either superficial or total parotidectomy by lowering the occurence of Frey's syndrome objectively as well as subjectively compared to risks of postoperative complications at the donor site associated with free abdominal fat reconstruction, which has a high incidence of partially fat absorption or liquefaction.

Keywords: Parotidectomy, Frey's syndrome.

INTRODUCTION

Parotidectomy-related complications include paralysis of fascial nerve, salivary fistula, as well as Frey's syndrome, infection and masseteric depression, in addition to return of the tumour in the area where it was removed. Complications following surgery on the parotid gland can have negative impacts affecting one's life quality and may be disfiguring [(1)].

Lucie Frey originally reported the auriculotemporal syndrome, now known as Frey's syndrome, in 1923. Preauricular flushing and sweating following parotid surgery has been noted as a possible side effect. It has been found to occur in 4% to 62% of post-parotidectomy patients within the first six to 18 months following surgery. These outcomes have been attempted to be prevented using a variety of intraoperative procedures. Dermal-fat-free grafts, fascia lata grafts, superficial flaps of the musculoaponeurotic system, vascularized fat grafts, temporoparietal fascia flaps, as well as implants of polytetrafluoroethylene are a few of the other options available [(2)].

Frey's syndrome has a wide range of prevalence. 23 percent of patients self-reported Frey's syndrome while 62 percent of cases were found to have positive Minor's iodine starch tests [(3)]. After a gustatory stimulus, there are clinical signs such as sweat, flushing, and heat of the preauricular and temporal regions. When a branch of the auriculotemporal nerve is injured, abnormal regeneration of cut postganglionic parasympathetic fibres develops between the otic ganglia and the subcutaneous arteries. Eating and mastication stimulates skin glands and veins because of this aberrant communication [(4)].

Surgical procedures for prevention of Frey's syndrome:

To prevent Frey's syndrome and depression in the masseteric zone, there have been a variety of methods. In order to prevent Frey's syndrome, there are these techniques that separate the skin from the parotid bed and transplant tissue (autogenous or alloplastic) to the site of the parotidectomy [(4)]. Allografts and autologous tissue are just two of the materials that can be used to fill in soft tissue gaps left by cosmetic surgery (like collagen, hyaluronic acid and alloderm) [(5)]. The nasolabial flap, the palatal pedicled flap, the buccal fat pad, the temporalis muscle, and the fascia flap are among the local flaps that have been employed. The nasolabial flap and the buccal fat pad are two of the most commonly used regional flaps in cosmetic surgery. The flap's movement is limited by the volume and form of the material it can hold; this is a major drawback. Reconstruction of small soft tissue abnormalities with pedicled flaps is not frequently employed [(5)].

In a study by **Hegazy *et al.*** [(6)] the traditional approach (Group 1) and a modified technique were both used to perform superficial parotidectomy for benign parotid neoplasms (Group 2). Both groups' results were compared. The prevalence of Frey's syndrome was

Received: 28/09/2021
Accepted: 26/11/2021

evaluated between the two approaches. The modified group had a much reduced incidence of subjective Frey's syndrome than the original group. Facial dissections are not required to create a parotid gland fascia flap in order to avoid damaging the nerves that supply the ears' auditory system. The abnormal sympathetic fibre regeneration is prevented by suturing this fascial flap back to the parotid bed, reducing the prevalence of Frey's syndrome.

It was tried and found to be effective to insert surgically a fascia lata graft. The possibility of facial nerve paralysis during reoperation following a superficial or comprehensive parotidectomy is a major barrier to its use. As an alternative, it has been suggested that a pedicled temporal fascia be used in this treatment [(6)].

a) Sternocleidomastoid Flap:

Frey's syndrome can be prevented using the sternocleidomastoid muscle flap [(7)]. A cleavage line between the two heads is preferable when dividing the muscle along its long axis in the upper region of the neck. Anterior muscle tissue is then transplanted into the parotidectomy site via pedicling superiorly or inferiorly and transposing [(8)].

b) Superficial Temporal Fascia Flaps:

The temporoparietal fascia flap has been used in head and neck reconstruction for decades. It has a good blood supply and is thin, broad, and pliable. Based on the position of the superficial temporal artery pedicle, the flap can encompass different temporal tissue layers. Many reconstructive operations can benefit from this flap's benefits and low donor site morbidity [(9)].

In contrast, the use of a superficial temporal fascia flap lengthens the treatment and raises the likelihood of additional aesthetic difficulties [(9)].

c) Dermal Fat Grafts and Alloderm:

Maxillofacial soft tissue abnormalities have been effectively repaired with dermal fat grafts. In addition, there is an abundance of tissue, no morbidity, and great tissue adaptation to the donor site. Suturing is made much easier and more precise thanks to the dermal component [(5)].

As a preventative measure against Frey's syndrome, some writers advocated the use of allogeneic acellular dermal matrix as a filler in the remaining defect [(10)].

With the easy use of alloderm (a donor site morbidity-free, acceptable to the body and readily absorbed by the target tissues), there is no need for an additional operational time, donor site morbidity, or donor site scarring. However, a large quantity of alloderm is required to fill in the surgically created concavity, and seroma risk is significantly increased in patients with alloderm [(10)].

d) Superficial Musculoaponeurotic System (SMAS) Flaps:

Postauricular hair incision is used to begin the subcutaneous dissection for the face lift, a tiny layer of fat is applied to the skin flap to provide adequate blood flow, just as a full-thickness transplant. In order to remove the zygomatic ligament, it is cut across the nasolabial fold and dissected over the zygoma. Anatomical details are gleaned from dissection by releasing the mandibular ligament. To separate the SMAS and skin attachments, a vigorous undermining is required. As a starting point, a transverse incision across the SMAS is made near the zygomatic arch's inferior margin. A vertical incision is also performed along the posterior edge of the platysma in the preauricular region. Under direct vision, the SMAS is elevated from the parotid fascia. The SMAS flap is used to treat the ensuing retromandibular depression when the dissection is complete. The retromandibular groove is thickened by advancing the myoaponeurotic SMAS flap after it has been mobilised. Drainage is injected into the wound prior to stitching up the wound [(11)].

A hematoma or seroma should grow beneath SMAS since it is too thin to fill in the contour defect according to some authors and then organise to fill in the deficiency in order to operate as an active membrane for directed tissue regeneration [(12)].

e) Cervicofacial and Cervicodeltopectoral Flaps:

Skin grafts or local flaps from the face cannot sufficiently correct cutaneous abnormalities caused by excision of clinically invaded skin by a parotid carcinoma. Because of the high expectations on facial aesthetics, skin grafts are rarely an option, and local flaps can only provide a limited amount of skin for transplantation [(13)].

For a successful cheek reconstruction, it is critical to restore the skin's natural colour and texture as well as its volume. Other considerations include avoiding distortion of nearby structures (e.g. avoiding lower lid ectropion), allowing facial movement and hair-bearing skin in men to be replaced, among others, by supplying flexible and thin skin [(14)].

f) Fat grafting:

Although free grafts of fat tissue have been employed since the 19th century, surgeons have never fully embraced the method. Because of the high failure rate and the risk of infection, the approach has always been constrained. Coleman explained how long-lasting benefits can be achieved using structural fat grafting. With an emphasis on careful fat cell harvesting, processing, and transplantation, he developed his own unique approach to the procedure. Fatty tissue grafting is currently a well-known technique in cosmetic surgery and research is underway to turn structural fat grafting into a regenerative process employing stem cells, platelet derivatives and other fat graft additives. There is less of a fibroblastic reaction when fat is transplanted

rather than dermal fillers like collagen or hyaluronic acid, which merely fill the volume of the face [15].

Parotidectomy's concave deformity can be corrected via free abdominal fat transfer. Other advantages of FAT repair include a minimally invasive donor site incision with no concomitant morbidity from harvest, safe, uncomplicated method, decreased expense, long-term survival, fewer rejections, and a consistency similar to parotid tissue [16].

It's difficult to predict the effectiveness of autologous fat transplants, and doctors disagree on the best way to harvest and handle fat grafts. Transferred fat survival has been improved by numerous efforts and approaches, such as atraumatic liposuction techniques, fat washing to remove inflammatory mediators, centrifugation, and incubation of fat grafts with different bioactive agents [17].

Figure (1): The periumbilical fat donor site. Maximizing exposure while minimising the look of the incision is achieved with a circular cut [16].

Figure (2): Fat graft from the periumbilical region of the abdomen was harvested [16]

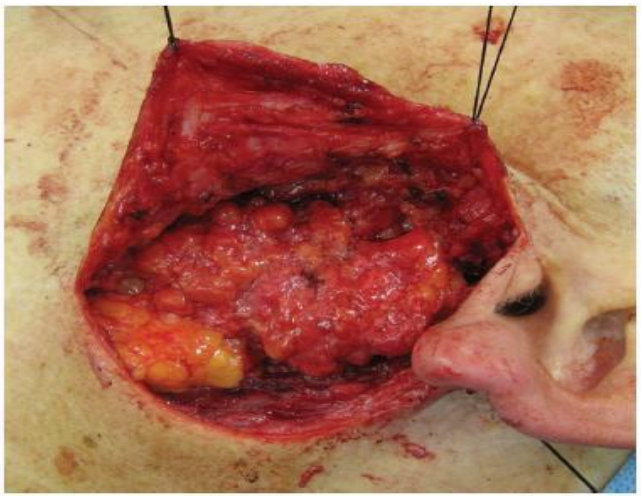

Figure (3): An FAT graft was used to fill in the gap left by a total parotidectomy [16].

Fat is absorbed when broken or bloody fat, infection, incorrect technique, and fat from fibrous areas like the upper belly, upper back, and subscapular fat are used. Absorption of fat is a result of these factors [18].

If sharp devices are utilised for fat transfer, hematomas or seromas can occur. Compression and aspiration of hematomas and seromas can be performed, and asymmetry can be caused by the inappropriate application of external pressure garments, such as fat absorption, fat hypertrophy, or atrophy. An additional fat transfer is needed for absorption, and lipoaspiration helps with hypertrophy but it can also injure the facial nerve or its branches, along with other localized nerves [19].

CONCLUSION

Superiorly-based Sternocleidomastoid muscle flap improves facial deformity following either superficial or total parotidectomy by lowering the occurence of Frey's syndrome objectively as well as subjectively compared to risks of postoperative complications at the donor site associated with free abdominal fat reconstruction, which has a high incidence of of partially fat absorption or liquefaction.

Financial support and sponsorship: Nil.
Conflict of interest: Nil.

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