

BUCCAL FAT PAD TRANSFER AS A PEDICLED FLAP FOR FACIAL AUGMENTATION

Sang-Chul Chung Heui-Yong Ann Hong-Sik Choi

In-Woong Um* Chang-Soo Kim

Dept. of Oral & Maxillofacial Surgery, Chungnam National University Hospital,

Tae-Jun, Korea

* Dept. of Oral & Maxillofacial surgery, College of Dentistry WonKwang University

The use of the autogenous free fat is a well-known procedure to fill in superficial depressions resulting from the traumatic or congenital defects. The major donor site for this procedure was the abdominal subcutaneous fat or buttocks. In 1977, Egyedi was the first to report the use of the buccal fat pad as a pedicled graft.

The buccal fat pad is a structure usually considered to be a nuisance when encountered in intraoral procedures such as facial bone osteotomies, elevation of buccal flap, or procedures on Stensen's duct. In these operations, appearance of the buccal fat pad complicates surgical exposure.

The buccal fat pad is a lobulated convex mass of fatty tissue covered by a very delicate membrane, and is described as having a body from which four processes extend. These projection serve as a filling material between the various muscular structures in the area.

Recently malar depression was augmented with the pedicled buccal fat pad in 3 cases, and it was used for the reconstruction of the nasolabial fold in one case.

I. INTRODUCTION

The use of the autogenous free fat is a well-known procedure to fill in superficial depressions resulting from the traumatic or congenital defects. The major donor site for this procedures was the abdominal subcutaneous fat or the buttocks. This mass of fatty tissue was first mentioned in 1731 by Heister, who believed it the glandular in character and termed it the "glandular molares". Fat transplantation has been known since 1892. Lexer was the first to use free fat grafts extensively in hemifacial atrophy. The most comprehensive study on fatty tissue transplantation was presented by Peer¹⁾ in 1977. Neder²⁾ mentioned the use of the buccal fat pad as a free graft to reconstruct the defects created following the relief of scar tissue within the oral cavity in 1983. Egyedi³⁾ was the first to report the use of buccal fat pad as a pedicled graft for closure of oro-antral and

oronasal communications.

The buccal fat pad is a structure usually considered to be a nuisance when encountered in intraoral procedures such as facial bone osteotomies, elevation of buccal flap, or procedures on Stensen's duct. In these operations, appearance of the buccal fat pad complicates surgical exposure, especially when the suction tip snags the fat hernia and pulls it into the field.

A few cases of traumatic herniation of the buccal fat pad into the oral cavity have been reported.^{4,5)}

Elective removal of the buccal fat pad for esthetic reasons has been performed for patients displaying excessively full cheeks or "baby faces". The opposite situation, atrophy of the buccal fat pad, is a well-known component of hemifacial atrophy.

Thus now, the buccal fat pad has been used as a pedicled flap, both with and without a skin graft, to close fistulas and other defects in the oral cavity.

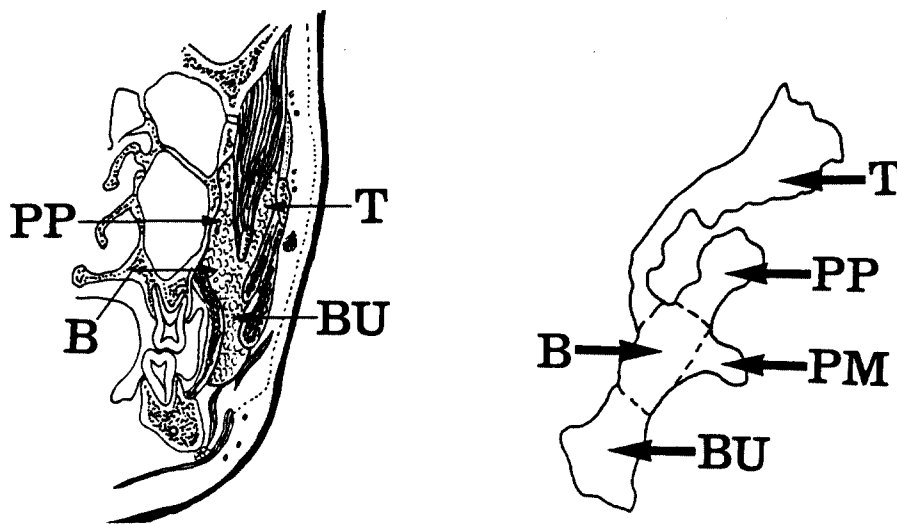


Fig. 1. Surgical anatomy of buccal fat pad.

- A. Coronal section of head showing body(B), buccal process(BU), temporal process(T), and pterygopalatine processgPP).
- B. Diagram of free specimen showing body(B), buccal process(BU), temporal process(T), pterygopalatine process(PP), and pterygomandibular process(PM).

Recently malar depression was augmented with buccal fat pad as a pedicled flap in 3 cases, and it was used for the construction of the nasolabial fold in one case.

II. SURGICAL ANATOMY

The buccal fat pad (corpus adiposum buccae, buccal fat pad of Bishat) is a lobulated convex mass of fatty tissue covered by a very delicate membrane, and is described as having a body from which four processes extend^{6,10} (Fig 1). These projections serve as a filling material between the various muscular structures in the area. The volume of the fat pad is about 10cm³. The whole mass is very supple and reshaperable and easily separated from its surroundings except on temporal extension.

In the adult, the body of the buccal fat pad rests on the periosteum that covers the posterior aspect of the maxilla, and is bounded by the pterygopalatine fossa and the buccinator and masseter muscles.

The buccal extension of the fat pad rests on the buccopharyngeal fascia, which lines the external surface of the buccinator muscle.

The superomedial, pterygopalatine, extension of fat pad courses through the pterygomaxillary fissure into the pterygopalatine fossa, where it envelops the neurovascular structures contained within the fossa. This thin extension finally courses along the maxillary division of the trigeminal nerve to enter the cranial vault through the foramen rotundum.

The largest, or temporal, extension passes superiorly under zygomatic arch to the temporal plane. It consists of two portions: the larger, superficial portion passing upward and backward between the temporal fascia and the surface of the temporal muscle, and the deep portion is a narrow tongue that passes superiorly between the superficial and deep fibers of the temporal muscle, to rest the greater wing of the sphenoid bone.

Pterygomandibular extension of the fat pad reaches backward into a space bounded laterally by the medial

surface of the mandibular ramus, medially by medial pterygoid muscle, and superiorly by the lateral pterygoid muscle. This process surrounds the lingual and inferior alveolar nerves and the inferior alveolar blood vessels, and reaches backward to the anterior surface of the deep portion of the parotid gland.

Through the cadaver dissections of 15 patients, Jose⁷ classified buccal fat pad into three group : A, B and C. In Group A of thin cadavers, the buccal fat pad was reduced in its temporal and body portions. the body of the fat pad was lobulated in front of the ascending ramus of the mandible and had no relation to the subcutaneous fat. In Group B with having moderately bulky cheeks, in addition to the body, the temporal, buccal and superomedial extensions, the buccal fat pad also presented with an extension that partially covered the superficial portion of the masster muscle. This extension was separate and independent from the subcutaneous fat. In Group C with chubby cheeks, there was an outward prolongation of the buccal fat pad, which covers, in its major part, the superficial portion of the masster muscle. It also prolongates downward toward the mandibular border and is separated from the subcutaneous fat with a ligament of connective tissue.

The theory of a pedicled graft is that the viability of the graft is maintained by the original arterial supply while the transposed tissue is becoming revascularized from the host bed. Scammon⁸ suggested that the blood supply to the buccal fat pad can be best studied during fetal life, when the fat lobules are still separated by broad connective tissue septa. Although he described in some detail the course of the entering arterioles and their subsequent termination in capillary plexuses among the fat cells, he did not discuss or name the parent artery or arteries. Tideman⁹ suggested that the blood supply to the buccal fat pad was derived specifically from the buccal branch of the superficial temporal artery, and from small branches of the facial artery.

III. REPORT OF CASES

Case 1

A 32-year-old man was admitted with the diagnosis

of pan-facial bone fracture(Fig 2). Under general anesthesia, open reduction was performed on the both subcondyle of mandible, and maxilla, and zygoma tripod areas. Right orbital floor was absent on the medial half, and anterior antral wall was nearly absent. Orbital floor was reconstructed with the fractured bone fragments, and malar depression was augmented with the buccal fat pad as a pedicled flap. Postoperative malar appearance was nearly symmetric(Fig 3).

Case 2

A 20-year-old man was performed open reduction with miniplate on the right zygoma area 8 months ago. Second operation was planned to remove the miniplate and to relieve the scar contracture, which might be contribute to mild ectropion(Fig 4). Upper vestibular incision was done, and miniplates were removed.



Fig. 2. Preoperative CT showing defect of right maxillary antral wall.

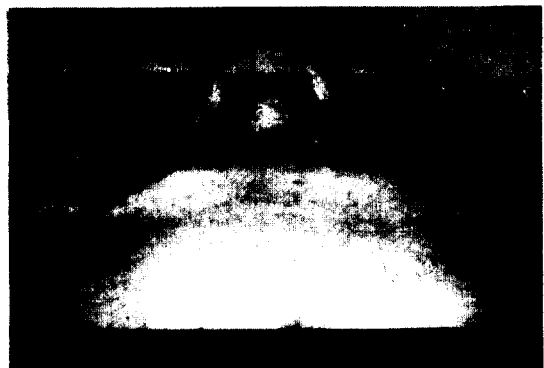


Fig. 3. Postoperative, symmetric malar appearance.



Fig. 4. Preoperative photograph showing depression of right malar area.



Fig. 5. Photograph of postoperative 2 months, showing corrected appearance of right infraorbital area.



Fig. 6. Postoperative complication showing the formation of hematoma or serous bulla.

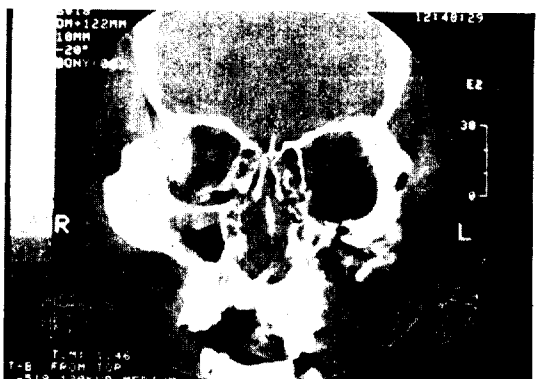


Fig. 7. Preoperative CT showing pan-facial bone fracture with defect of left antral wall.

During the blunt dissection, the scar tissue was severely rigid, and fused with the absent antral wall. After the release of the scar tissue, buccal fat pad was transposed on the right infraorbital area as a pedicled flap.

Postoperatively malar elevation was excellent, the patient was satisfied with the result (Fig 5). On the third day after the operation, however, he complained the painful swelling on the right midface. Intraoral examination revealed that hematoma and serous bulla were found (Fig 6). Drainage was needed, and swelling was subsided on the third day after the day.

Case 3

A 29-year-old man was injured on the multiple facial bones due to traffic accident. Through the routine examination, we found that there were skull base fracture,

comminuted mandibular body fracture, maxillary midpalatal fracture, comminuted zygomatic arch fracture, and nasal bone fracture (Fig 7). Laboratory tests revealed that he had chronic liver disease, so advanced tests were needed. After careful study, he was performed the open reduction under special permission of the anesthesia. Through the coronal and intraoral approaches, comminuted zygoma body and arch were reduced and fixed with miniplate. Comminuted mandible was treated as a same method. Nasal bone was elevated and fixed with silastic splint and nasal packing. Facial contour was satisfactory, but the right antral wall was absent. So we grafted the right buccal fat pad as a pedicle on the right malar area (Fig 8). The result was more admitted.



Fig. 8. Operative view showing the pedicled buccal fat pad on the left infraorbital area.



Fig. 9. Preoperative photograph showing the depressed right cheek area, and relative loss of nasolabial fold.



Fig. 10. Postoperative, symmetric malar appearance.

Case 4

A 23-year-old man was needed the second operation with the chief complaint of the post-traumatic telecanthus. He had been performed the open reduction of the zygomatico-maxillary complex. His right cheek was depressed, so the right nasolabial fold could not be seen (Fig 9). Operation was proceeded buccal fat pad graft as a pedicle after the canthoplasty. Proper amount and length of the buccal fat pad was gained from the intraoral approach behind the maxillary tuberosity area. Nasolabial fold was reconstructed (Fig 10).

IV. DISCUSSION

The buccal fat pad is a structure usually considered to be a nuisance when encountered in intraoral procedures such as facial bone osteotomies, elevation of buccal

flaps, or procedures on Stensen's duct. In these operation, appearance of the buccal fat pad complicates surgical exposure, especially when the suction tip snags the fat hernia and pulls it into the field.

The buccal fat pad is a lobulated convex mass of the fatty tissue covered by a very delicate membrane, and is described as having a body from which four processes extend: buccal, superomedial, temporal, and pterygomandibular extensions.^{6,10)}

These extensions serve as a filling material between the various muscular structures in the area. The volume of the buccal fat pad is about 10cm³. The whole mass is very supple and reshapeable and easily separated from its surroundings except on temporal extension. The blood supply to the buccal fat pad is derived specifically from the buccal and deep temporal branches of the maxillary artery, the transverse facial branch of the superficial temporal artery, and from small branches of the facial artery.⁹⁾

The buccal fat pad can be exposed via the horizontal buccal incision in the region of the maxillary third molar, or the vertical incision of 1.5cm in length and 1cm lateral to the coronoid process of the mandible when the mouth is held in an open position by a prop.

Defects up to about 3×5cm can be closed without compromising blood supply.⁹⁾

However, the volume of transposable fat has varied considerably from patient to patient and does not seem

to be directly proportional to the amount of fat elsewhere on the patient. Thus, defects in the maxilla can usually be closed with grafts from the buccal fat pad alone, whereas larger mandibular defects usually require local flaps in addition to the buccal fat.

Fat transplantation has been known since 1892. Lexer was the first to use free fat grafts extensively in hemifacial atrophy. Fat transplantation is still a controversial subject. Some believe that histiocytes replaced all the fatty transplanted tissue after taking on the lipid from broken fatty cells; others believe in the cell survival theory.¹⁾ In 1977, Peer¹⁾ mentioned the most comprehensive study on fatty tissue transplantation including the type of graft, fate, and behavior. In 1983, Neder²⁾ presented the two cases: in first case of central giant cell granuloma, an adequate part of the buccal fat pad was excised and inserted in the supraperiosteal pouch around the inferior border of the mandible. In second case of neurofibroma attached to the mental nerve, mental nerve was freed from surrounding scar tissue and released a distance of about 1cm from the mental foramen. In 1986, report of 3 cases was given by Tideman.⁹⁾ In case of mucoepidermoid carcinoma on the soft palate, the buccal fat pad was then tunnelled supraperiosteally from behind the maxillary tuberosity into the area of the defect. In second case of adenocarcinoma of maxilla, the buccal fat pad was advanced into the defect and supported during healing with an acrylic splint. In third case, after resection of the cancer mass of mandibular alveolus, the buccal fat pad was directly transposed from its bed, and that was sutured over the defect intraorally.

Fat tissue is generally considered to be poorly vascularized and usually incapable of induction into bone forming cells.³⁾ However, the buccal fat pad has a satisfactory vascular supply as split skin grafts applied to its surface have been successful. Adaptation of the remaining mucosa to the fat pad seems to enable the regeneration of the respiratory epithelium and a return of its function.

As with all grafts, postoperative complications are usually related to graft failure resulting from necrosis or infection. To minimize the incidence of postoperative complications, it is suggested that the fat pad graft ade-

quately cover the surgical defect and that it not be sutured under tension. It is also advisable that the patient receive a liquid or soft, nonchewy diet until soft tissue healing has taken place.

V. SUMMARY

Buccal fat pad is probably the troublesome structure which often complicates operation field exposure. However, this can be used as graft as a pedicled flap.

1. This procedure is technically easy.
2. There is no visible scar in the donor site.
3. There is an anatomic proximity of the donor site to the recipient site.
4. It is capable of reconstruction of various contour.
5. In most cases, it is capable of grafting as a pedicle.
6. It has viability.

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국문초록

외상성 안면 함몰부에 협지방대 유경 피판을 사용한 재건술

충남대학교 병원 안악면·구강외과학 교실
정상철·안희용·최홍식·엄인웅·김창수

외상성, 혹은 선천적 결손으로 인한 함몰부에 사용한 자가 유리지방 이식은 잘 알려진 방법이다. 이를 위해 사용되는 주된 공여부는 복부나 둔부의 피하지방이었다. 그러나, 1977년 Egyedi는 협지방대를 유경피판으로 처음 사용하였다.

협지방대는 안면골 절단술시, 협측 피판을 들어올릴 때, 혹은 이하선관 수술 같은 구강내 수술시 항상 귀찮은 구조물로써, 수술 시야를 방해한다.

협지방대는 매우 세밀한 막으로 둘러싸인 소엽형태의 불룩한 물질로, body와 네 개의 process들로 구성된다. 이 돌기들은 여러 근육층 사이의 충전물로 작용하며, 유아에서는 sucking시 보조작용으로, 성인에서는 윤활재로 사용되기도 한다.

본 교실에서는 협지방대를 사용하여 세 증례의 협골 함몰부에, 그리고 한 증례의 비순구 재건을 위해 사용한 바, 양호한 결과를 얻었기에 문헌고찰과 함께 증례보고를 하는 바이다.