Versatility of the buccal fat pad flap

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<td>Bichat's fat pad</td>
<td>The buccal fat pad (BFP) flap is an important reconstructive option in oral and maxillofacial surgery. Its abundant vascularization, coming largely from the depth of the pterigomaxillary region, allows to transpose it with high reliability to fill posterior and lateral defects of the upper jaw. The aim of this work is therefore to describe this surgical technique.</td>
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<td>Buccal fat pad flap</td>
<td>Technique description: The popularity and diffusion of sinus lifting involves frequent tearing of the sinus membrane (7% to 35% of cases). Defects larger than 10 mm can easily be repaired by transposing the adaptable adipose tissue of the BFP, while allowing to contemporarily graft bone plus hydroxyapatite. Oro-antral communications can also be reliably solved using a BFP flap, which may eventually be utilized as a vascular support for an overlying mucosal flap. Finally, maxillary and palatal gap smaller than 2.5 cm of diameter and consequent to oncological surgical removal may also be repaired by this easy technique.</td>
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<td>The success of the BFP flap lies in its ease of harvesting, eventually under local anesthesia, the immediate proximity to the loss of substance to be repaired and its very low morbidity.</td>
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Introduction
The buccal fat pad (or Bichat's fat pad) (BFP) is a versatile and reliable source of adipose tissue near the maxillary tuberosity. Its rich blood supply makes it extremely reliable for use in the form of a pedicled flap, assuring a good healing capacity and defence against infections. Its considerable volume allows the blocking of large losses of substance, while its distinctive composition means that areas of irregular shape or otherwise difficult to suture can be easily sealed with less adaptable tissues such as the periosteum and the attached gingiva.

The most frequent uses in oral and maxillofacial surgery are in sealing extensive sinus membrane perforations resulting from sinus lift operations, repairing oroantral fistulas and repairing minor substance losses in tumour surgery. A further use is for covering maxillary bone grafts.

Its success is certainly due to the ease of its preparation even under local anaesthesia, its vascular reliability, the absence of evident scars and the very low donor-site morbidity.

Anatomy
Bichat's fat pad (Figure 1) is named after the French anatomist, pathologist and histologist Marie François Xavier Bichat who described it in 1801, but is more commonly known as the BFP. Its function is to facilitate a gliding movement between the various muscles, bones, tendons and blood vessels-nerves buried deep in the face and oral cavity.

The BFP consists of a main body, located deep in the buccinator muscle and in front of the masseter muscle, and 4 extensions: the buccal/inferior, masseteric/superficial, pterygoid/posterior, temporal/deep and cranial. The pad is held in position by fibrous septa that, partly weakening with age, can result in downward ptosis.

The abundant blood supply derives from the deep buccal and temporal branches of the internal maxillary artery, the transverse facial artery, a branch of the superficial temporal artery and several branches of the facial artery including the inferior buccal artery.

Some of the central-face branches of the facial nerve run in close relationship with the upper margin of the body and masseteric process of the BFP, providing motor innervation to the orbicularis oris muscle, the caninus muscle and the transverse part of the nasalis and, further back, the zygomaticus muscles.

The parotid duct can come into contact with the masseteric lobe of the pad, while its superior part is much higher in the vestibular sulcus than the incisions usually made when harvesting a BFP flap.

Surgical technique
Once an incision has been made in the posterior vestibular sulcus, the periosteum is detached from the bone surface of the tuberosity and the lower
portion of the zygomatic pillar. The body of the BFP is immediately revealed beneath the vestibular periosteum after it has been incised and lacerated by opening the ends of a pair of scissors or Klemmer pliers (Figure 2). At this point, the adipose tissue spontaneously emerges from its natural seat with its typical tendency to fill the spaces.

The masseteric and buccal extensions are cut to allow the pad to go towards the receiving site. Given the rich vascularization of the adipose tissue, it is essential to coagulate with bipolar forceps before cutting the tissues in order to prevent the fat from retracting, thus making it difficult to find the bleeding vessels.

The flap prepared in this way is assured a blood supply by vessels coming from the pterygoid and temporal lobes.

The isolated tissue is particularly fragile. Preparing the flap and its forward traction to cover the bone defect or soft tissues must be done gently to avoid tearing
the adipose tissue and thus not be able to completely cover the donor site. For the forward traction of the flap after its separation from the masseteric and buccal processes, it is delicately moved with vascular pincers to find the fibrous bands still retaining it. These are coagulated and cut in order to be able to position the fat very gently and cover the defect. The displaced tissue is usually abundant and will spontaneously cover large defects, up to about 2.5 cm in diameter. Personally, I attach the flap with resorbable sutures of multifilament 2-0 or 3-0, calibres sufficient to reduce the possibility of tearing the delicate adipose tissue. The removal of sutures remaining on view must be done no earlier than 20 days after surgery to provide the maximum guarantee against a recurrence of the fistula.

In the case of oroantral fistula (Figure 3-11), if a large loss of bone accompanies the defect in the soft tissues, a double lining closure could be employed, using the adipose mass as a base for a mucosal flap.
to position on the surface. To allow the mucosal flap to easily slide towards the palatine mucosa to obtain a tensionless suture, the vestibular periosteum that holds it in place must first be cut, being careful to perform an accurate haemostasis.

The branches of the facial nerve for mid-face muscles lay adjacent to the BFP and the masseteric process. They vary in size between 0.5 mm and 1.5 mm, are opalescent white in color and have an elastic consistency. This means that they can be easily seen by spreading the tissues along their horizontal axis using the tips of scissors. It is crucial that these important nerve branches are kept intact and manipulated as little as possible in order to preserve their function and avoid facial paralysis or paresis.

Besides repairing oroantral fistulas, further applications are in maxillary bone grafts and tumour surgery (Figure 12-25).
It is reported that the sinus membrane is perforated during sinus lift surgery in a percentage varying between 7% and 35%. If this occurs, the surgeon can stop the sinus lift procedure and wait a few months for the membrane to repair before repeating the operation. However, if the perforation only amounts to a few millimeters, it is often not necessary to repair it because the detaching and lifting of the Schneiderian membrane folds it in on itself and spontaneously closes the tear. If the perforation exceeds 5 mm it is advisable to correct it, in order to be able to simultaneously perform a particulate graft that can be guaranteed as much as possible to stay in place, ensure reasonably low infection rates and avoid sinusitis developing from the entry of a foreign body. The reparative surgical techniques available include direct suturing of the membrane (generally hard to do because of the very limited space), or using fibrin glue, resorbable...
membranes or cancellous bone laminae. Using the BFP, possibly also in combination with a graft of bone lamina, is the most appropriate approach for larger defects of over 10 mm. The transposition of the BFP body as a graft is certainly easily done, but it does not provide the same guarantee of quick recovery and protection from infections as are given by preparing it as described in this article as a pedicled flap which is therefore richly vascularised. The author therefore prefers the pedicled form which is more complicated to prepare but provides better defence against any infections.

The volume of the BFP varies depending on the patient’s nutritional condition and on individual variables. Nonetheless, for repairing a tear in the sinus membrane it is always sufficient, as it has always been (in personal experience) for repairing oroantral fistulas. But its size is generally insufficient for repairing defects resulting from removing a tumor of over 2.5 cm.

In the case of oroantral fistulas of just a few millimeters and with good surrounding bone borders, the tissues can spontaneously heal and close in a few days/weeks. Alternatively, especially in cases where the fistula persists, it can be closed by very carefully cutting the periosteum that holds the vestibular mucosa in order to allow it to slide; this is followed by careful sutures with “U” stitches between the palatal and vestibular mucosa. However, if the fistula is a natural discharge outlet from a purulent sinusitis process above, closing it can cause problems, even to the extent of triggering a sinus abscess and it is therefore advisable for the sinus to receive endoscopic treatment concurrently with closing the fistula.

In the case of large fistulas (over 7-8 mm) and particularly when there is a lack of bone support due to iatrogenic reasons or chronic infection, the BFP flap can easily block the loss of substance. To provide more mechanical sealing security, the closure can be reinforced using a second mucous lining to lay over the BFP adipose tissue. In this case, the BFP flap will have a twofold function of closing the fistula and being a vascular base supporting the mucous flap. However, this cannot be used for most tumor defects when a large quantity of mucous membrane has already been removed: the BFP flap in this circumstance acts as the only diaphragm between the oral cavity and the maxillary sinus.

When the flap is transposed, the time for epithelialization of its surface is about 2-4 weeks; after this time, its aesthetic appearance is indistinguishable from the surrounding mucosa.

For mechanical resistance to acquire the high consistency of scars takes about 3-4 months.

Cutting the branches of the facial nerve adjacent to the body of the BFP leads to paralysis of some mimetic muscles which can partly be compensated by neighbouring branches. It is obvious that scrupulous attention must be paid when preparing the flap to avoid this serious complication.

Cutting the parotid duct seems much more unlikely since its position is more cranial than the BFP. In any case, the size of the duct is very large and it is therefore easily seen. If this complication ever occurs, it would be necessary to cannulate it with a small-calibre silicone tube to leave in place for several weeks. The incorrect preparing of the flap by excessively reducing its vascular supply can lead to atrophy, bacterial superinfection and its re-absorption. In this case it will be necessary to consider alternative surgical methods to resolve the problem later on: vestibular mucosa flaps, the buccinator myomucosal flap, the temporal muscle flap and others can be prepared.

Lastly, it is to be remembered that the BFP has also been “discovered” by cosmetic surgery where it can be partially removed to give better definition to the facial profile and make the cheeks leaner, while its transposition in the form of a flap can increase the volume and profile of the upper lip and zygomatic arches.
Conclusion

The BFP flap, richly vascularised and with a natural tendency to close spaces, is a valid and reliable option for repairing large sinus mucosa defects occurring during sinus lift operations, for oroantral fistulas and losses of posterior maxillary substance less than 2.5cm in diameter.

References