


Complications associated with the bichectomy surgery

Complicações associadas às cirurgias de bichectomia

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ABSTRACT

This research study aimed at reviewing, in the literature, the aspects related to the buccal fat pad structure, named the Bichat Ball, evaluating the anatomy of the area, the buccal fat pad clinical applications and the possible complications of its surgical removal, as well as reporting a series of cases that presented such complications. The most important anatomical structures surrounding the buccal fat pad and that are frequently involved in surgical complications are the parotid gland duct, the facial nerve branches, the blood vessels and the muscular tissues. In Dentistry, the buccal fat pad clinical application has an aesthetic purpose and it can be removed or repositioned. The removal occurs to avoid intra-oral trauma, "nibbling", and the pedicle repositioning occurs for protection or to be used as a graft. The complications of the surgical removal of the buccal fat pad are not frequent, however, hematoma, infection, facial nerve and facial vessel injuries may occur. Therapies involved in it include drug therapy, drainage, laser therapy and compresses.

Indexing terms: Adipose tissue. Dentistry. Face. General surgery. Surgery.

RESUMO

Este trabalho teve por objetivo levantar na literatura aspectos referentes ao corpo adiposo bucal denominado de Bola de Bichat quanto à anatomia da área, as aplicações clínicas da referida gordura e as possíveis complicações cirúrgicas da remoção da mesma, e relatar uma série de casos de remoção estética do corpo adiposo bucal que tiveram complicações. As estruturas anatômicas mais importantes que circundam o corpo adiposo bucal e estão muitas vezes envolvidas nas complicações da cirurgia de remoção são os ductos da glândula parótida, ramos do nervo facial, vasos sanguíneos e tecidos musculares. As aplicações clínicas do corpo adiposo bucal na área da odontologia são para fins estéticos removendo ou reposicionando-o, remoção para evitar trauma intra-oral, "mordiscamento", devido ao seu volume e reposicionamento pediculado para proteger ou usar como enxertia. Complicações do procedimento cirúrgico de remoção do corpo adiposo bucal não são frequentes, no entanto, hematoma, infecção, lesão do nervo facial, lesão dos vasos faciais podem vir a ocorrer. E as terapêuticas envolvidas nesta eventualidade compreendem terapêutica medicamentosa, drenagem, laser terapia e compressas.

Termos de indexação: Tecido adiposo. Odontologia. Face. Cirurgia geral.

INTRODUCTION

The buccal fat pad is located in an area of the face surrounded by several important anatomical structures. With the increasing number of surgical interventions involving this structure, a precise anatomical knowledge of this region is necessary to avoid iatrogenesis, that may cause temporary and permanent sequelae [1]. Heister

(1732) was the first author to describe the buccal fat pad as a glandular structure. However, it was only in 1802, that Marie-Francois Xavier Bichat described this anatomical structure as an adipose tissue, named the Bichat Ball, and its clinical application occurs in the medical and dental areas [1-3].

This anatomical structure fills the masticatory space, separating the masticatory muscles from each other

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and, also, from the mandibular and zygomatic branches, and it can also be used for aesthetic purposes in surgeries [3,4]. It has a mechanical function, facilitating the muscle movements, as chewing and sucking [5-7]. Furthermore, the buccal fat pad total volume is, approximately, 9.6ml, and its removal should be limited to 2/3 of this volume. Additionally, the fat component forming this structure remains relatively stable in volume throughout life because, histologically, the buccal fat pad is composed by the same fat type as the other parts of the body. However, it is not consumed by weight loss, a process that occurs to fat from the other parts of the body [2,5-8]. It is covered by a thin fibrous capsule, isolating it from the direct contact with the surrounding tissues, and its development is, primarily, related to the sucking movements of newborns and, subsequently, to chewing. Therefore, the buccal fat pad can be considered a sliding structure that assists in the chewing movements and in speech. In addition, it is also a structure with an aesthetic function, responsible for the facial contour. With the partial removal of the buccal fat pad, it is possible to achieve softer and symmetrical facial lines, in which a square facial contour can become ovoid, and, consequently, more delicate and harmonious [1,3-5,7,9].

This research study aimed at reviewing the literature, analyzing the buccal fat pad structures, evaluating its anatomy, the clinical applications of the fat, and the possible surgical and postsurgical complications of its removal, as well as reporting a series of cases in which the aesthetic removal of the adipose body presented complications.

CASE REPORT

Case 1

A 35-year-old female subject, seen by a bucomaxillofacial surgeon, reporting as a major complaint swollen face, on the left side. When the patient came to the office, she informed that, seven days ago, she had undergone surgery to remove the buccal fat pad. The patient also reported that, after surgery, she was medicated with amoxicillin and nonsteroidal anti-inflammatory, developing severe edema on the left side of the face (which, occasionally, presented size oscillation during eating) along with pain (figure 1,2).

The intraoral examination showed edema, on the left side of the face, and a clear line of traumatic nibbling (figure

3). The bucomaxillofacial surgeon diagnosed parotid duct injury and salivary fluid retention. As a clinical management, the patient received local infiltrative anesthesia and an intraoral horizontal buccal incision was made using a N°15 scalpel blade (figure 4), 1.5cm below the occlusal plane, at the height of the first upper molar (approximately 1.5cm of distal length), where a 1cm silicone cannula was inserted. The cannula was sutured in the incision area and allowed the salivary exudate extravasation (figure 5), remaining in place for 15 days. Also, as a treatment management, the patient was medicated with amoxicillin combined with clavulanic acid. Fifteen days after the drain was removed, the patient was stable, considering both the intraoral aspect and the facial contour of the face (figure 6).



Figure 1. Frontal View – patient with left hemiface edema after the buccal fat pad removal from the cheek.

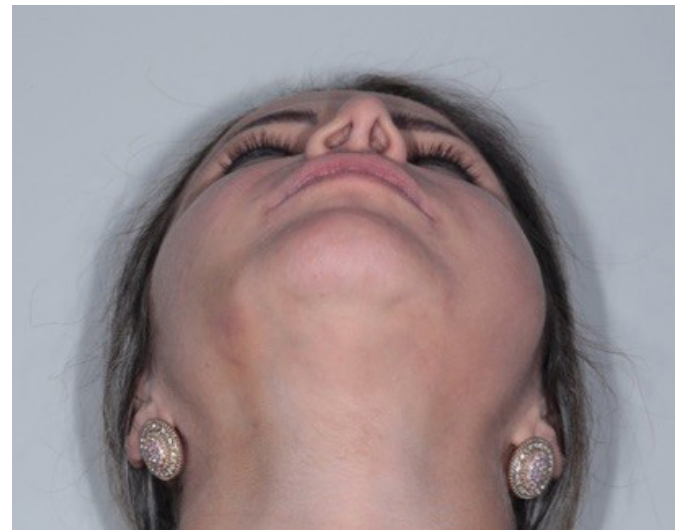


Figure 2. Patient with left hemiface edema after the buccal fat pad removal from the cheek.

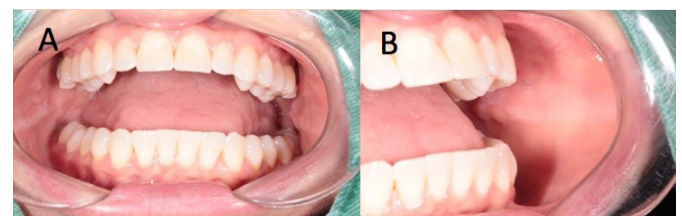


Figure 3. Intraoral View - patient with left edema after the buccal fat pad removal.

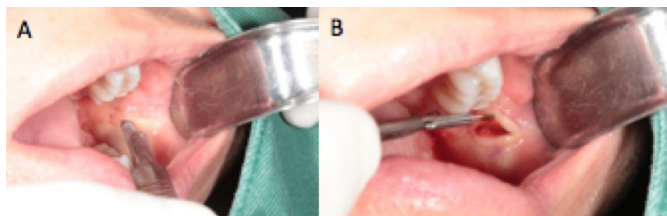


Figure 4. Intraoral View. A. Incision region for exudate drainage. B. Incision with col scalpel.

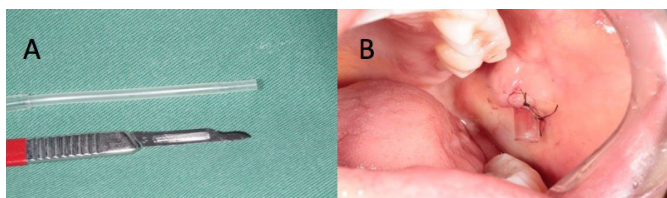


Figure 5. A. Material used for intraoral drainage, N°15 scalpel blade and sucker; B. Intraoral View - Sutured drain.

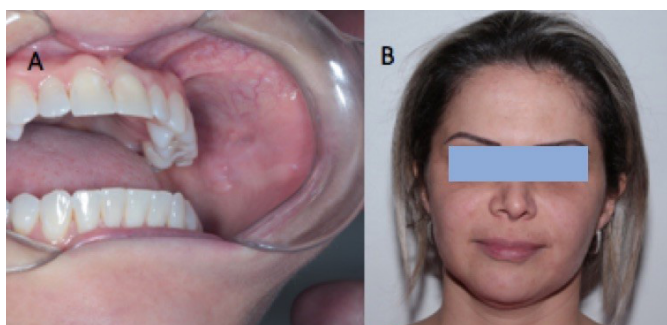


Figure 6. A. Intraoral post-healing appearance; B. Extraoral after 15 days of drainage removal.

Case 2

A 49-year-old male subject underwent unilateral bichectomy surgery, on the right side of the face, with the purpose of correcting the facial asymmetry. The surgical removal was performed by a plastic surgeon in a surgical environment. The patient received anesthesia and was fully unconscious. The incision was performed with laser in an ectopic site, making it difficult to localize the buccal fat pad, therefore a new incision was made just below the parotid duct. The buccal fat pad was not found; them, it was not removed. For more than 60 days, there was dermal lesion, abscess, necrosis, sequelae and persistent suppuration. And, for 60 days, there was seroma and edema (figure 7, 8).

The physician neither participated in the postoperative stage nor provided a report. The patient reported no vessels or parotid duct injury. There was tissue necrosis, just below the epithelium, caused by the laser cutting that, possibly, carbonized one of the dermal layers or contaminated the site. The patient was a dental surgeon, therefore, he worked on the dressing changes, cleaning the fistula (figure 8) and conducting the antibiotic medication.

Lymphatic drainage was performed in 10 sessions by a physiotherapist. And, in 60 days, the patient's clinical condition was stabilized (figure 9).



Figure 7. A. Patient with banding and severe facial edema one day after surgery; B. Patient two weeks after surgery, still presenting large local edema.



Figure 8. Patient presenting external drainage fistula.



Figure 9. A. Dressing in fistula and improvement of edema within 30 days. B. After 60 days, the clinical condition was stabilized.

Case 3

A female subject underwent bilateral bichectomy, presenting alterations in the perioral muscle function (figure 10A and B) and paralysis, caused by a possible injury of the buccal branch of the facial nerve, which is responsible for the motor function of the perioral muscles. At rest, there was no aesthetic impairment and paresthesia (figure 11).

The therapeutic approach comprised laser and drug therapy with ETNA (every 8 hours) cytidine disodium phosphate-based medicine, uridine trisodium triphosphate and hydroxocobalamin acetate (intended to treat peripheral nerve injuries caused by trauma or compression). The case was treated by a dentist and the patient authorized the use of images.

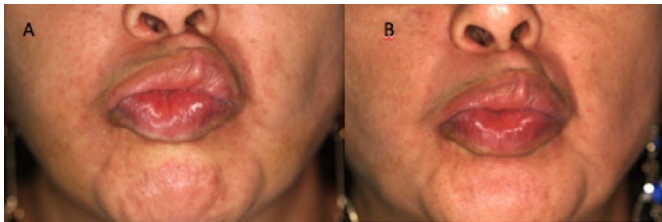


Figure 10. A. Patient with instable perioral muscle function after undergoing the bichectomy surgery; B. Muscle function after 1 week.

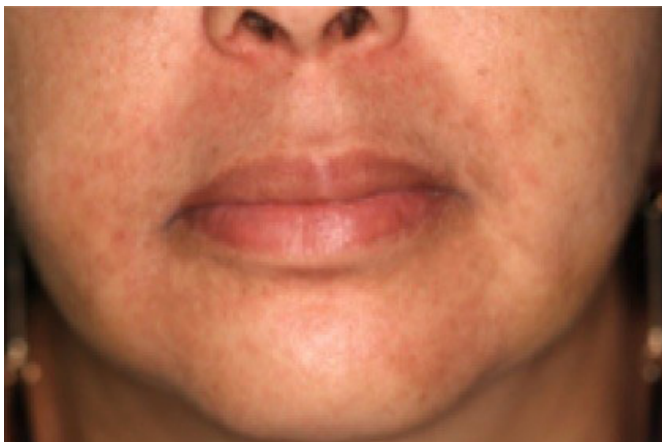


Figure 11. Patient at rest, with a slight alteration of the labial shape by lowering the angle of the buccal commissure, right side, after undergoing the bichectomy surgery.

DISCUSSION

In 1802, Marie-Francois Xavier Bichat, a French anatomist very respected at the time, described the fatty aspect of the buccal fat pad [1,2]. Based on his autopsy studies, several structures were introduced and were named after him, such as the pterygopalatine fossa, initially called the Bichat fossa and the Bichat protuberance, popularly known as the Bichat's ball, which refers to the

buccal fat pad [2]. It is located in the so-called masticatory space [1,7,10-12] presenting an average weight of 9.3 grams and average volume of 9.6 ml, with little variation between the right and left sides (around 1.5 grams) [7], and, usually, 4 - 6 grams is removed on both sides [10]. For Kahn et al. [13] in adults, the buccal fat pad is a white pure fat, with few fibrous trabeculae, differing from the subcutaneous fat, which is more fibrous. Therefore, it was firstly described as a gland by Heister in 1732 [1,7].

The buccal fat pad is composed by the main body and four extensions, which are the buccal, the pterygoid, the superficial and the deep temporal extensions. [7] Considering encapsulation, ligaments and arteries nutrition, the buccal fat pad can be divided into three lobes, which are the anterior, the intermediate and the posterior lobes. The buccal, pterygoid, pterygopalatine and temporal extensions derive from the buccal fat pad posterior lobe [1,14].

Each lobe of the buccal fat pad is surrounded by a fibrous membrane, or capsule, attached by some ligaments and nourished by different sources of arteries, and vascular plexus exists below the lobe capsule [1,7,12,14]. This capsule separates the adipose lobe groups from each other, making, them, independent compartments [12-15] thus, creating a natural space between the lobules [1]. According to Stuzin [7] and Matarasso [10], this capsule should be gently broken, with the aid of scissors or tweezers, during the buccal fat pad surgical intervention.

The buccal extension of the posterior lobe of the buccal fat pad is what provides facial contour and fullness to the cheek [7,16]. It corresponds to the lower part of the posterior lobe, just below the parotid duct, therefore, its volume can affect the facial appearance throughout the individual's life [1]. The deep temporal extension and the pterygoid extension are accessible above the zygomatic arch and seem to have little influence on the facial contour [1].

Therefore, the buccal fat pad portion that is manipulated in surgical interventions, whether for removal or not, is the buccal extension of the posterior lobe of the buccal fat pad, therefore, there should be further discussion considering this extension.

Considering the buccal extension anatomy of the buccal fat pad, it is important to review the masticatory muscles [1,7,12,14]. The buccal extension is the most superficial segment of the buccal fat pad, located on the cheek, just below the parotid duct, extending along the

anterior border of the masseter muscle, as it descends to the mandibular retromolar region. It covers the main part of the buccinator muscle as it crosses the cheek [7]. In the reports presented in this study, the buccinator muscle was separated to intraorally access the buccal extension of the adipose body of the cheek.

The facial artery, the transverse facial vein and the maxillary internal artery and its anastomoses are the vessels that nourish the buccal fat pad [1,7]. The anterior limit of the buccal fat pad buccal extension is marked by the passage of the facial artery and vein, which are in the same plane as the buccal extension of the buccal fat pad [7]. The buccal extension branch of the middle facial artery extends forward from space, between the parotid and the masseter muscle, and enters the buccal extension [1]. The inferior artery of the buccinator, branch of the facial artery, divides into anterior and posterior branches on the surface of the buccinator muscle. The anterior branch nourishes the intermediate lobe of the buccal adipose body, while the posterior branch of the buccinator artery nourishes the posterior lobe of the buccal adipose body [1]. During interventions to intraorally access the buccal fat pad, bruising may be related to trauma in the lower buccinator branch of the facial artery. In case 2, reported in this work, bruises are possibly related to trauma in that branch of the facial artery.

The parotid duct passes through the entire lateral surface of the buccal fat pad or penetrates it [1,7,8]. The buccal extension is the lower part of the posterior lobe, below the parotid duct [1]. The parotid duct is located superficially in the buccal fat pad, penetrating it and the buccinator muscle, then, it opens into the oral cavity, mesial to the second upper molar [7]. In case 1, reported in this research study, it was observed injury to the parotid duct, with edema due to the accumulation of salivary exudate, requiring drainage.

Directly below the parotid duct, there are several small branches of the facial nerve and the large buccal branch [7]. The buccal branches of the facial nerve present two locations in the buccal fat pad: firstly, intersecting superficially with the buccal fat, and, secondly, passing through its full extension [8]. In case 3, reported in this research study, the paralysis was possibly associated with lesions of the buccal branches of the facial nerve.

As described above, failure to observe the anatomical structures surrounding the buccal extension of the cheek body during the surgical technique can cause structural damage and severe complications.

Thus, in 1991, Matarasso [10] proposed a safe removal technique, which is the identification of the papilla of the parotid duct, located above and, approximately, 1cm lateral to the operative field. Thus, an incision of 2.5 cm, 1cm below and lateral to the papilla of the parotid duct is performed. The fibers of the buccinator muscle will be exposed separated by a non-cutting edge instrument, the fat will be exposed and the membrane that covers it will penetrate in it. A maneuver will be established, exerting external pressure on the face, below the zygomatic arch, to force the buccal adipose body towards the intraoral direction. In 1990, Stuzin et al. [6] reported that the preferred incision was the intraoral one, at the bottom of the vestibule, starting above the second molar and extending, posteriorly, 2cm, exposing the fibers of the buccinator muscle. Therefore, in agreement with Matarasso [10], fat is involved by a fascia and should be broken gently with tweezers or scissors. In the three cases reported, the incision was intraorally made, following the technique proposed by Matarasso [10]. However, in case 2, due to failure to localize the buccal fat body, the clinician chose the technique recommended by Stuzin et al. [6], however, with no success. Stuzin et al. [6] reported that the complications of buccal fat pad removal are minimal ones and, considering the aspects of the intraoral technique, there was no report describing facial nerve injury, hematoma, or infection. However, postoperative edema is common and is solved in 2-4 months. However, in the cases presented in this study, the following complications were observed: lesion of the oral branches of the facial nerve, hematomas and edemas, infection with external suppuration to the cheek and obstruction of the parotid duct.

Despite the buccal fat pad surgical intervention occurs to harmonize the facial contour, as this anatomical structure provides fullness to the cheek and is responsible for the facial contour [7,17], in Dentistry, many other clinical applications for the buccal fat pad use are listed in the literature such as: harmonizing the facial contour in cases of masseter hypertrophy; repairing defects caused by tumor resections, maxillary cysts and oro-antral communication [18-26]; post-traumatic defect correction [19-21]; reconstruction of the soft palate and the hard palate defects [27]; use as an aesthetic filler to provide lip, premaxilla and paranasal volume [28]; in the malar region [29,30] use as a filler in cases of maxillary sinus membrane perforation [31]. In cases 1 and 3 reported in this research study, the purpose of the surgical intervention was to

change the facial contour of the patients, making it softer and more pleasant. In case 2, the patient had as main complaint the facial asymmetry, therefore, the buccal adipose body was unilaterally removed to establish the facial symmetry.

CONCLUSION

The anatomical structures related to the surgical procedure of the buccal extension of the buccal fat pad are the following ones: parotid gland duct, facial nerve and its buccal branches, facial artery and its branches, facial vein and masseter, buccinator and zygomatic major muscles. The possible complications resulting from the

surgical intervention of the buccal fat pad are: lesion of the facial nerve buccal branches, bruises and edema, infection, traumatic lesion of the parotid duct and lesion of the facial vessels.

Collaborators

L KLÜPPEL, conception of the article, final review of the manuscript. RB MARCOS, collaborator in literature review and final review of the manuscript. IA SHIMIZU, final review of the manuscript. MAD SILVA, collaborator in drafting the paper, final review of the manuscript. RD SILVA, conception of the article, drafting the paper, final review of the manuscript.

REFERENCES

- Zhang HM, Yan YP, Qi KM, Wang JQ, Liu ZF. Anatomical structure of the buccal fat pad its clinical adaptations. *Plast Reconstr Surg*. 2001;109(7):2509-18.
- Shoja MM1, Tubbs RS, Loukas M, Shokouhi G, Ardalan MR. Marie-François Xavier Bichat (1771-1802) and his contributions to the foundations of pathological anatomy and modern medicine. *Ann Anat* 2008;20 190(5):413-20. doi: 10.1016/j.aanat.2008.07.004
- Bichat F. Anatomie genetale appliquee a la physiologie et a la medecine. Paris, France, Grosson. Gabon et Cie. 1802 [cited 2017 Jun 9]. Available from: <<http://gallica.bnf.fr/ark:/12148/bpt6k98766m/f4.image>>.
- Dubin B, Jackson IT, Halim A, Triplett WW, Ferreira M. Anatomy of the buccal fat pad and its clinical significance. *Plast Reconstr Surg*. 1989;83(2):257-262.
- Stuzin JM, Wagstrom L, Kawamoto HK. Anatomy of the frontal branch of the facial nerve: the significance of the temporal fat pad. *Plast Reconstr Surg*. 1989;83(2):265-71.
- Stuzin JM, Wagstrom L, Kawamoto HK, Baker TJ, Wolfe SA. The anatomy and clinical application of the buccal fat pad. *Plast Reconstr Surg*. 1990;85(1):29-37.
- Kennedy, S. Suction assisted lipectomy of the face and neck. *J Oral Maxillofac Surg*. 1988;46(7):546-58. doi: 10.1016/0278-2391(88)90144-9
- Epker, BN, Stella JP. Application of buccal lipectomy in cosmetic maxillofacial surgery. *Oral Maxillofac Surg Clin N Am*. 1990;2:387.
- Madeira MC. Anatomia da face: bases anátomo-funcionais para a prática odontológica. 3ª ed. São Paulo: Sarvier; 2001. p. 84-85.
- Matarasso A. Buccal fat pad excision: aesthetic improvement of the midface. *Ann Plast Surg*. 1991;26(5):413-8. doi: 10.1097/0000637-199205000-00022
- Baumann A, Ewers R. Application of the buccal fat pad in oral reconstruction. *J Oral Maxillofac Surg*. 2000; 58(4):389-92. doi: 10.1016/S0278-2391(00)90919-4
- Tideman H, Bosanquet A, Scott J. Use of the buccal fat pad as a pedicled graft. *J Oral Maxillofac Surg*. 1986;44(6):435-440. doi: 10.1016/S0278-2391(86)80007-6
- Kahn JL, Wolfram-Gabel R, Bourjat P. Anatomy and imaging of the deep fat of the face. *Clin Anat*. 2000;13(5):373-382. doi: 10.1002/1098-2353(2000)13:5<373::AID-CA7>3.0.CO;2-W
- Zhang HM, Yan YP, Qi KM, Wang JQ, Liu ZF. Anatomical structure of the buccal fat pad and its clinical adaptations. *Plast Reconstr Surg*. 2002 Jun;109(7):2509-18
- Gierloff M, Stöhring C, Buder T, Gassling V, Açil Y, Wiltfang J. Aging changes of the midfacial fat compartments: a computed tomographic study. *Plast Reconstr Surg*. 2012;129(1):263-273. doi: 10.1097/PRS.0b013e3182362b96
- Cho KH, Lee HS, Katori Y, Rodríguez-Vázquez JF, Murakami G, Abe S. Deep fat of the face revisited. *Clin Anat*. 2013;26(3):347-356. doi: 10.1002/ca.22206
- Hwang K1, Cho HJ, Battuvshin D, Chung IH, Hwang SH. Interrelated buccal fat pad with facial buccal branches and parotid duct. *J Craniofac Surg*. 2005;16(4):658-660. doi: 10.1097/01.SCS.0000157019.35407.55
- Pessa JE, Rohrich RJ. Discussion: aging changes of the midfacial fat compartments: a computed tomographic study. *Plast Reconstr Surg*. 2012; 129(1):274-275. doi: 10.1097/PRS.0b013e3182362be2
- Carbonell A, Salavert A, Planas J. Resection of the Buccal Fat Pad in the Treatment of Hypertrophy of the Masseter Muscle. *Aesthetic Plast Surg*. 1991;15(3):219-222.
- Martin-Granizo R, Naval G, Costas Um, Goizueta C, Rodriguez F, Monje F, et al. Use of buccal fat pad to repair intraoral defects: review of 30 cases. *Br J Oral Maxillofac Surg*. 1997;35(2):81-4.
- Bither S, Halli R, Kini Y. Buccal fat pad in intraoral defect reconstruction. *J Maxillofac Oral Surg*. 2013;12(4):451-5. doi: 10.1007/s12663-010-0166-9

22. Meyer E, Liebenberg SJ, Fagan JJ. Buccal fat pad: a simple underutilised flap. *S Afr J Surg.* 2012; 50(2):47-49.
23. Candamourty R, Jain MK, Sankar K, Babu MR. Double-layered closure of oroantral fistula using buccal fat pad and buccal advancement flap. *J Nat Sci Biol Med.* 2012;3(2):203-5. doi: 10.4103/0976-9668.101930
24. Toshihiro Y, Nariai Y, Takamura Y, Yoshimura H, Tobita T, Yoshino A, et al. Applicability of buccal fat pad grafting for oral reconstruction. *Int. J. Oral Maxillofac Surg.* 2013; 42(5):604-10. doi: 10.1016/j.ijom.2012.07.009
25. Jinghong Xu, Yijia Yu. A Modified surgical method of lower-face recontouring. *Aesth Plast Surg.* 2013;37(2):216-221. doi: 10.1007/s00266-013-0080-x
26. Rubio-Bueno P1, Ardanza B, Piñas L, Murillo N. Pedicled buccal fat pad flap for upper lip augmentation in orthognathic surgery patients. *J Oral Maxillofac Surg.* 2013; 71(4):e178-84. doi: 10.1016/j.joms.2012.11.012
27. Khiabani K, Keyhan SO, Varedi P, Hemmat S, Razmdideh R, Hoseini E. Buccal fat pad lifting: an alternative open technique for malar augmentation. *J Oral Maxillofac Surg.* 2014;72(2):403. doi: 10.1016/j.joms.2013.10.002
28. Hernández-Alfaro F, Valls-Ontañón A, Blasco-Palacio JC, Guijarro-Martínez R. Malar augmentation with pedicled buccal fat pad in orthognathic surgery. *Plast Reconstr Surg.* 2015;136(5): 1063-1067. doi: 10.1097/PRS.0000000000001702
29. Markey J, Benet A, H. El-Sayed I. The endonasal endoscopic harvest and anatomy of the buccal fat pad flap for closure of skull base defects. *Laryngoscope.* 2015;125 (10):2247-2252. doi: 10.1002/lary.25209
30. Deliberador TM, Trevisani CT, Storrer CLM, Santos FR, Zielak JC, Souza Filho CB. non-pedicled buccal fat pad grafts to treatment for class i and ii gingival recessions: a clinical trial. *Braz Dent J.* 2015;26(6):572-79. doi: 10.1590/0103-6440201300432
31. Habib AM, Medra A. The feasibility of buccal fat pad flap in oral reconstruction based on clinical experience in a governmental hospital, Alexandria, Egypt. *Cleft Palate Craniofac J.* 2016;53(6):657-663. doi: 10.1597/15-106
32. Berrone M, Florindi FU, Carbone V, Aldiano C, Pentenero M. Stage 3 medication-related osteonecrosis of the posterior maxilla: surgical treatment using a pedicled buccal fat pad flap: case reports. *J Oral Maxillofac Surg.* 2015; 73(11): 2082-2086. doi: 10.1016/j.joms.2015.06.165
33. Falh M, Srouji S. Use of buccal fat pad for closure of perforation and graft material in a maxillary sinus elevation procedure: a preliminary study. *Int J Oral Maxillofac Implants.* 2016;31(4):842-8. doi: 10.11607/jomi.4406

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