

## Original Research Article

# Clinical significance of the buccal fat pad: how to determine the correct surgical indications based on preoperative analysis

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## ABSTRACT

**Background:** Despite the multitude of clinical and aesthetic uses, the correct surgical indications for buccal fat pad (BFP) removal have yet to be fully elucidated. Although the procedure is widely performed and promoted for aesthetic purpose, literature lacks of studies accounting for a proper evaluation of patients undergoing BFP removal.

**Methods:** Between 2012 and 2016 patients seeking an improvement of the malar contour by reduction of the submalar prominence have been visited at the Department of Plastic Surgery of the Institution. A preoperative MRI was requested in order to correctly identify the volume of the BFP and the presence of a masseter muscle (MM) hypertrophy.

**Results:** According to clinical examination and the results of the preoperative imaging, patients were offered different treatment options: patients with BFP hypertrophy underwent BFP removal through an intraoral approach; patients with MM hypertrophy received injection of 50 UI of botulinum toxin (BTX). No complications were observed in the postoperative period and all patients were satisfied with the results.

**Conclusions:** According to the experience, midface contouring procedures should take account of both surgeons' experience, patients' expectations and anatomical evaluation. As such, there is no given approach suitable for all cases. Suggested visual criteria, clinical examination and imaging analysis are useful in establishing patient's condition and determining the appropriate methods of treatment to enhance the facial profile.

**Keywords:** Buccal fat pad, Bichat fat pad, Buccal fat pad removal, Masseter muscle, Masseter muscle hypertrophy

## INTRODUCTION

Since its first description in 1802 by Bichat the buccal fat pad (BFP) has gained growing interest among plastic surgeons.<sup>1,2</sup> It has been used for reconstructive purposes as early as 1977 and it has been removed with increasing frequency in aesthetic procedures.<sup>3,4</sup>

Despite the multitude of clinical and aesthetic uses, the correct surgical indications for BFP removal have yet to

be fully elucidated.<sup>5</sup> Indeed, the BFP involutes with age and its removal may lead to an excessive thinning of the face that may fail to provide a more youthful appearance, especially considering that the use of fat grafting is currently one of the most common procedures for facial rejuvenation. On the contrary, in a chubby face the thinning that can be obtained might be minimal and the presence of masseter muscle (MM) hypertrophy should be ruled out.

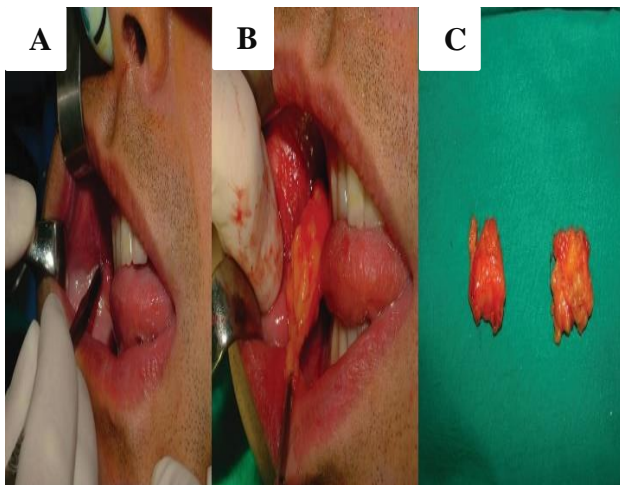
Furthermore, although the procedure is widely performed and promoted for aesthetic purpose, few reports have been released and so far, literature lacks of studies accounting for imaging evaluation of patients undergoing BFP removal.

The aim of present study is to provide an examination of the BFP with special emphasis on its preoperative evaluation in order to identify the correct indication for its removal and better match patients' expectations.

## METHODS

Between 2012 and 2016 patients seeking an improvement of the malar contour by reduction of the submalar prominence have been visited at the Department of Plastic Surgery of the Institution.

Patients' demographic data were recorded. None of the patients had previous history of facial trauma, surgery, fractures or congenital facial deformities. Patients' weight was reported as stable over the previous 12 months. A preoperative MRI was requested in order to correctly identify the volume of the BFP and the presence of a MM hypertrophy. According to clinical examination and the results of the preoperative imaging, patients were offered different treatment options. All procedures were performed by the same clinician.



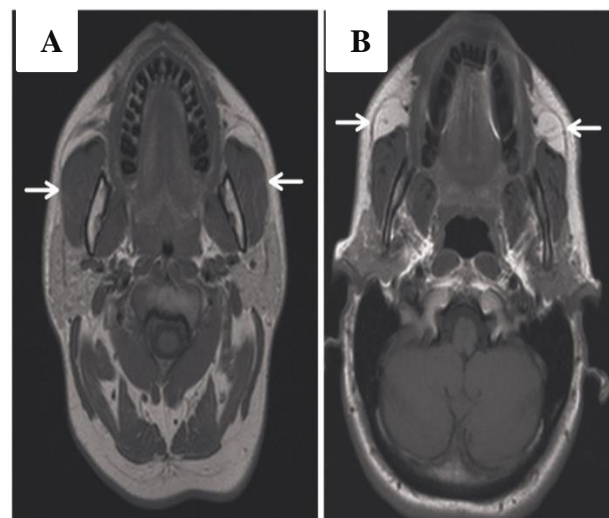
**Figure 1: Intraoperative pictures of BFP removal through an intraoral approach; (A) A 2cm incision was made just approximately 1 cm laterally to Stensen's duct; (B) After blunt dissection, a moderate pressure was applied externally, and the fat herniated through the incision; (C) Picture of bilateral BFP removed.**

Patients with BFP hypertrophy underwent BFP removal through an itraoral approach. All the surgeries were performed under local anaesthesia by the same operators. Briefly, a solution of lidocainc and epinephrine was injected between the first and second molar sulcus, retracting the cheek. A 2cm incision was made just

approximately 1cm laterally to Stensen's duct (Figure 1A). The buccinator was exposed and blunt dissection was performed to spread muscle fibers. As the fat herniated through the incision, its overlying sheath was penetrated, and a moderate pressure was applied externally, below the zygomatic arch (Figure 1B). The BFP was the clamped, electrocoagulated and excised. The opposite side was symmetrically operated, and the wound closed in layers (Figure 1C). Conversely, patients with MM hypertrophy received injection of 50 UI of botulinum toxin (BTX).<sup>6,7</sup>

## RESULTS

Between 2012 and 2016, 8 patients (5 men and 3 women) requested malar contour remodelling for submalar hypertrophy. The patients' ages ranged from 28 to 42 years old (average age, 35). Patients' body mass index (BMI) ranged from 19.7 to 27.5 years old (average, 23.6). The malar area was preoperatively analyzed with MRI scans in all patients. A BFP hypertrophy was identified in 5 patients (4 men and 1 woman) (Figure 2B). The mean volume of the BFP in male patients was 11.2ml with a range of 10.3-11.9ml, while in the female patient the volume was 10.8 ml. Variations between the right and left sides were not significantly different. These five patients underwent the removal of the BFP with an intraoral approach (Figure 1). No complications have been observed in the postoperative period. The patients received broad-spectrum antibiotic therapy and oral rinse with diluted hydrogen peroxide. The remaining three patients had a MM hypertrophy (Figure 2A), for which they were offered BTX injections<sup>8</sup>. All patients were satisfied with the results.



**Figure 2: (A) Magnetic Resonance imaging T<sub>1</sub>-weighted turbo spin echo sequence showing bilateral masseter muscle hypertrophy (white arrows); (B) Magnetic resonance imaging T<sub>1</sub>-weighted Turbo Spin Echo sequence showing bilateral buccal fat pad (BFP) hypertrophy (white arrows).**

## DISCUSSION

In the early stages, surgery for fleshy midface definition was exclusively based on camouflaging techniques, third-molar removal and malar augmentation with implant.<sup>5,8-9</sup> With the advent and growing spread of either direct or suction-assisted lipectomy, correction of corpulent face has been extensively addressed. In a selected small population of patients, direct intraoral BFP removal, alone or both with facial liposculpture and soft tissue lifting, is a useful tool for treating midface fullness.<sup>8-10</sup> Defining these cases could be somewhat challenging as a deep analysis of anatomical structure is fundamental. A clinical evaluation of the patient, based on an aesthetical accepted set of standards for midface contour, does not always allow a proper diagnosis and a consequent adequate treatment. Indeed, midface profile is determined by facial skeleton, BFP and MM mass. A full cheek face could underlie a hypertrophy of the BFP or a fibrous BFP not involuted with age, or an hypertrophy of the MM, or a contribution of both.<sup>5</sup> In this condition, clinical evaluation may not be sufficient and imaging technique are needed for an accurate diagnosis. MRI is a reliable and consistent method for soft tissue evaluation. In the series, in case of a doubtful clinical examination, in order to better investigate the anatomical structures of the patients' face, a preoperative MRI was performed, clearly visualizing BFP due to its pure adipose nature. Author were able to differentiate the anatomic border of the BFP in greater detail using T1 sequences in contrast to T2, along with the MM fibers, distinguishing BFP from MM hypertrophy. Anatomical studies have demonstrated that the BFP usually involutes with age, therefore the appropriateness of its removal should be carefully evaluated in each patient, in order to avoid developing of a bony cheek later in life.<sup>2</sup>

In the series, in case of hypertrophic BFP or resistant to aging involution, an intraoral lipectomy was performed with high patients' comfort and outcomes. Instead, in case of MM hypertrophy, the midface definition was performed with the injection of BTX, with similar results. According to the experience, midface contouring procedures should take account of both surgeons' experience, patients' expectations and anatomical evaluation. As such, there is no given approach suitable for all cases. Suggested visual criteria, clinical examination and imaging analysis are useful in establishing patient's condition and determining the appropriate methods of treatment to enhance the facial profile.

## CONCLUSION

In conclusion, the results obtained from BFP removal gives a slight improvement in face lift results. It is, however, important to understand that removal should be

performed only in patients who wish to have a cheek area more highlighted. The technique should be used with caution in aesthetic patients, because thinning of the face is not always desirable, especially in patients with masseter hypertrophy and a robust BFP. On the contrary, given the fuller appearance of the young face, it has recently been suggested that lipofilling is performed to enhance BFP fullness during face lifting procedures.<sup>11</sup> As such, the appropriateness of BFP procedures should be determined on a case-by-case basis, depending on the particular age-associated changes observed in a given patient.

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