

Success Rate of Buccal Fat Pad Removal in Cases of Previous Injection Lipolysis of the Cheeks: A Comparative Analysis

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Background: Although buccal fat pad removal for facial slimming has a high success rate, fibrosis in patients with a history of cheek injection lipolysis may pose challenges. Therefore, we evaluated the success rate and procedure-related complications of buccal fat pad removal in patients with a history of cheek injection lipolysis.

Methods: Patients who underwent buccal fat pad removal between September 2016 and February 2020 were categorized according to a history of lipolysis (injection lipolysis group versus control group). The primary and secondary outcomes were the success rate of buccal fat pad removal and the incidence of procedure-related complications, respectively.

Results: The study sample comprised 100 patients (14 men; 86 women; mean age, 27.49 ± 6.26 years; mean follow-up duration, 7.41 months), with 61 patients (nine men; 52 women) in the injection lipolysis group and 39 patients (five men; 34 women) in the control group. The mean buccal fat pad weight did not differ significantly between the two groups. However, the success rate was 91.8% (56/61 patients) and 100% (39/39 patients) in the injection lipolysis and control groups, respectively. Complications were exclusively observed in the injection lipolysis group [8/122 cheeks (6.6%); control group, 0/78 cheeks (0%)].

Conclusions: Buccal fat pad removal effectively enhances the aesthetic appearance of the lower face. However, in patients with a history of cheek injection lipolysis, the success rate of buccal fat pad removal is lower, and the incidence of complications is significantly higher. Consequently, caution should be exercised when performing this procedure in specific patient populations. (*Plast Reconstr Surg Glob Open* 2023; 11:e5410; doi: 10.1097/GOX.0000000000005410; Published online 16 November 2023.)

INTRODUCTION

In recent years, there has been a substantial surge in the popularity of aesthetic surgery and rejuvenation medicine, particularly among urban populations. This growing

interest can be attributed to various factors, including the demands of professional life and aspirations to improve one's social appearance. Consequently, individuals increasingly seek methods to enhance their self-confidence and refine their overall demeanor. Moreover, the ubiquitous influence of multimedia, television, and the internet has fostered a globalized perception of beauty that disregards ethnic variations in ideals of attractiveness. This prevailing notion has instigated a preference for leaner facial aesthetics, particularly among younger demographics.¹

When addressing cheek fullness, a thorough understanding of the underlying cause is crucial. If the excess fullness is attributed to the masseter muscle, which primarily functions in mastication, a potential solution involves the administration of botulinum toxin type A injections to reduce muscle thickness.² On the other hand, if the fullness is a consequence of an excessive buccal fat pad, removing this pad can effectively mitigate cheek fullness and contribute to a more slender appearance of the cheeks and chin.³

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Buccal fat pad removal can generally be performed using the intraoral approach and percutaneous approach, the latter of which may involve face-lifting surgery.⁴ However, an intraoral approach is typically preferred when the primary objective is to remove the buccal fat pad.^{5,6} Beyond this approach, various techniques exist for buccal fat pad removal, including liposuction^{7,8} and injection lipolysis.⁹ However, liposuction is not commonly used for buccal fat pad removal due to the perception that surgical excision is simpler and less complicated.¹⁰ Injection lipolysis involves the use of a fat-dissolving agent, often deoxycholic acid, which induces fat dissociation¹¹ and triggers an inflammatory response leading to fibrosis.¹² Presently, deoxycholic acid is approved by the Food and Drug Administration in the United States for submental fat reduction.¹³ However, practitioners in some countries use this substance off-label for buccal fat pad dissolution. It is important to note that injecting deoxycholic acid into the deep layer of the cheeks can result in fibrosis of the buccal fat pad,¹² thereby rendering surgical removal challenging.

The buccal fat pad contains two important structures: the buccal branch of the facial nerve and the parotid duct. Damage to the facial nerve can lead to facial palsy, whereas injury to the parotid duct may result in tearing and swelling caused by saliva leakage.^{14,15} Consequently, performing buccal fat removal surgery in patients with fibrosis resulting from injection lipolysis poses significant challenges. Preoperative assessment of the body or cheeks cannot reliably predict the feasibility of buccal fat removal surgery; instead, clinicians must evaluate the buccal fat pad and fibrosis via computed tomography, magnetic resonance imaging, or actual surgery.

After a thorough review of the buccal fat pad removal procedure, our research team observed a remarkable trend. We noticed that a specific group of patients, composed of those who previously underwent cheek injection lipolysis, faced substantial challenges, with complications, when complete or partial removal of their buccal fat pads was attempted; the presence of fibrotic tissue was primarily responsible for these difficulties. In contrast, buccal fat pad removal was smoothly performed in patients without a history of cheek injection lipolysis. This observation motivated the present study.

The primary objective of this study was to examine the success rate of buccal fat pad removal in patients with a history of cheek injection lipolysis for buccal fat reduction. Additionally, we aimed to assess the incidence of procedure-related complications.

METHODS

This retrospective cohort study was approved by the Ethics Committee of the Faculty of Medicine at Vajira Hospital, Navamindradhiraj University, Bangkok, Thailand, and was registered with the Thai Clinical Trials Registry (TCTR number: TCTR20230612003). Written informed consent was obtained from all patients.

Participants

Individuals who underwent percutaneous injection lipolysis for buccal fat pad reduction at other clinics or

Takeaways

Question: What is the impact of a history of cheek injection lipolysis on the success rate and complications associated with buccal fat pad removal?

Findings: This retrospective cohort study found that patients with a history of cheek injection lipolysis have a lower success rate for buccal fat pad removal and more complications than those without such history (success rate: 91.8% versus 100%; complication incidence: 6.6% versus 0%).

Meaning: Surgeons should exercise caution and be prepared for potential challenges when performing buccal fat pad removal surgery in patients with a history of cheek injection lipolysis.

hospitals may still express dissatisfaction with their cheek appearance if they have not achieved the desired reduction in size. Such patients sought consultation with our research team regarding the possibility of buccal fat pad removal surgery. The study sample comprised patients, with or without previous injection lipolysis, who underwent buccal fat pad removal at our private clinic between September 2016 and February 2020. The participants included Thai and foreign patients seeking medical services in Bangkok, Thailand. We excluded individuals presenting with facial asymmetry; midface distortion resulting from facial aging; prior facial surgery, such as facelift; previous injections of other substances, such as fillers or liquid silicone; pregnant or breastfeeding status; and compromised immune system. Further, patients with a history of cheek injection lipolysis were required to have a minimum waiting period of 3 months from their last dose before undergoing the surgical procedure.

Patients were categorized into two groups: the injection lipolysis group, serving as the experimental group, which consisted of patients with a history of cheek injection lipolysis, and the control group, consisting of patients without a history of cheek injection lipolysis.

Surgical Technique

The surgical technique used a step-by-step approach based on the methodology proposed by Rohrich et al.¹⁶ First, anesthesia was administered and hemostasis was achieved via a 3-mL injection of 1% lidocaine with epinephrine. Subsequently, a 2-cm incision was made approximately 1 cm below the opening of the Stensen duct using a sharp instrument. Electrocautery was used to control the bleeding. Dissection was performed using arterial clamps and smooth forceps. The buccal fat pad was identified and carefully grasped using forceps to guide its extraction from the incision site. Throughout the dissection, great care was taken to avoid excessive forces that could disrupt the fibrous septa separating the lobes. It is of utmost importance to prevent excessive traction or aggressive dissection to avoid overremoval of the buccal extension of the buccal fat pad, which can lead to an excessively hollowed appearance, premature aging, and potential injury to the parotid and buccal branches of the facial nerve. The incision was closed

using 4-0 chromic sutures. After the procedure, patients were advised to adhere to a soft diet and use a 0.12% chlorhexidine oral rinse for 1 week. All procedures were performed by a single surgeon (P.S.).

Evaluation

After the bilateral removal of the buccal fat pads, their weights were quantified using a digital scale. In cases where complete removal of the buccal fat pad from either side was not feasible, or the weights of the two buccal fat pads differed by more than 50%, the surgical intervention was considered to be unsuccessful. To monitor the patient’s clinical progress, identify potential complications, and remove sutures, a follow-up appointment was scheduled after 1 week. Subsequent follow-up visits were arranged at 1 month, 3 months, 6 months, and 1-year postoperatively. Follow-up assessments were conducted either at the clinic or via telephone communication.

Statistical Analyses

Data are summarized as the mean and SD for continuous variables and frequencies and percentages for categorical variables. Group comparisons were conducted using the Student *t* test, chi-square test, or Fisher exact test, as appropriate. Statistical significance was set at a *P* value less than 0.05. All statistical analyses were performed using STATA, version 17.0 (StataCorp, College Station, Tex.).

RESULTS

Of the 103 patients eligible to participate in this study, three were excluded because of previous injections of fillers or liquid silicone. Consequently, the final sample size for analysis was 100 patients (14 men; 86 women; mean age, 27.49 ± 6.26 years; Table 1). The average follow-up was 7.41 months (1–12 months). The injection lipolysis group comprised 61 patients (9 men; 52 women), and the control group comprised 39 patients (five men; 34 women; Table 2). The success rate of buccal fat pad removal was 91.8% in the injection lipolysis group and 100% in the control group (*P* = 0.153). Within the injection lipolysis group, buccal fat pad removal was considered unsuccessful in five patients. Specifically, the buccal fat pad could

Table 1. Demographic Data

Characteristic	Value (%)
No. patients	100 (100)
Age, y	
Mean	27.49
Range	20–44
Sex	
Male	14 (14)
Female	86 (86)
BMI, kg/m ²	
Mean	20.86
Range	16.16–29.33
Injection lipolysis of the cheeks	
Yes	61 (61)
No	39 (39)
No. cheek injection lipolysis sessions	
1–5	52 (85.3)
6–10	1 (1.6)
>10	8 (13.1)
Follow-up, mo	
Mean	7.41
Range	1–12
Underlying diseases	
Allergic rhinitis	4 (4)
Asthma	2 (2)
Atopic dermatitis	1 (1)
Chronic sinusitis	1 (1)
Depressive disorder	1 (1)
Gastritis	1 (1)
Migraine headache	1 (1)
Nontoxic thyroid goiter	1 (1)
Thalassemia	2 (2)

BMI, body mass index.

not be removed on one side in two patients, and in three patients, it was only partially removed (the weight of one buccal fat pad was less than 50% that of the other buccal fat pad; Fig. 1).

The mean weight of the buccal fat pad did not significantly differ between the two groups. The buccal fat pad weighed 2.63 ± 1.01 g on average in the injection lipolysis group and 2.67 ± 0.81 g in the control group. In the injection lipolysis group, the right-sided buccal fat pad weighed 2.57 ± 0.88 g on average, and the left-sided pad weighed 2.69 ± 1.12 g. In the control group,

Table 2. Patient Characteristics, Success Rate, and Buccal Fat Pad Weight according to a History of Cheek Injection Lipolysis

Characteristic	Injection Lipolysis (Patients)		<i>P</i>
	Yes (N = 61)	No (N = 39)	
Age, y (mean ± SD)	26.82 ± 6.0	28.54 ± 6.49	0.184*
Sex, male (%)	9 (14.8)	5 (12.8)	0.074†
BMI, kg/m ² (mean ± SD)	20.58 ± 3.03	21.18 ± 3.18	0.523*
The success rate of buccal fat pad removal (%)	56/61 (91.8)	39/39 (100)	0.153‡
Weight of buccal fat pad, g (mean ± SD)	2.63 ± 1.01	2.67 ± 0.81	0.761*
Weight of right buccal fat pad, g (mean ± SD)	2.57 ± 0.88	2.74 ± 0.87	0.341*
Weight of left buccal fat pad, g (mean ± SD)	2.69 ± 1.12	2.60 ± 0.74	0.618*

*Student *t* test.

†Chi-square test.

‡Fisher exact test.

BMI, body mass index.

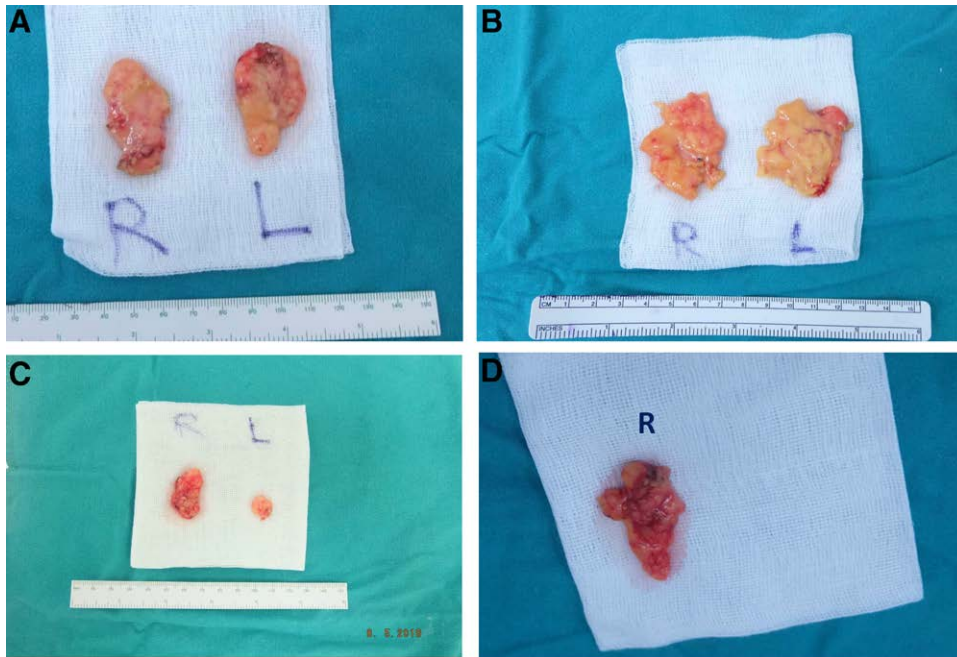


Fig. 1. Buccal fat pads from the right and left sides are shown. A, Buccal fat pad from a patient who did not undergo cheek injection lipolysis; the weight of the right-hand side is 3.5 g, and the weight of the left-hand side is 3.4 g. B, Buccal fat pad from a patient who underwent cheek injection lipolysis in more than 10 sessions; the weight of the right-hand side is 3.9 g, and the weight of the left-hand side is 3.7 g. C, Buccal fat pad from a patient who received cheek injection lipolysis twice; the weight of the right side is 1.0 g, and the weight of the left side is 0.1 g. D, Buccal fat pad from a patient who underwent cheek injection lipolysis more than 10 times; the weight of the right side is 1.7 g, but the removal of the left side was not feasible due to fibrosis. (R: right side, L: left side).

the right-sided buccal fat pad weighed 2.74 ± 0.87 g on average, and the left-sided pad weighed 2.60 ± 0.74 g (Table 2). The average weight of partially removed buccal fat pads in three patients was 0.63 ± 0.56 g (with a range of 0.1–1.4 g).

Complications, such as hematoma, prolonged cheek swelling, sagging of cheeks, and wound dehiscence, occurred in eight (6.6%) of the 122 cheeks in the injection lipolysis group, but did not occur in the 78 cheeks in the control group ($P = 0.007$; Table 3).

DISCUSSION

Buccal fat pad removal is a surgical procedure aimed at enhancing the aesthetics of the lower face by improving facial definition and angularity while avoiding midface

distortion. Proponents of this procedure argue that it can effectively achieve the desired cosmetic improvements.^{5,6} However, few studies have investigated the relationship between a history of cheek injection lipolysis and buccal fat pad removal. This lack of research is primarily due to restrictions on drug use in such studies. Currently, injection lipolysis using deoxycholic acid has been approved for reducing submental fat deposits.¹³ However, it is noteworthy that in certain countries, some practitioners perform injection lipolysis not only for body treatments, but also for reducing cheek fat pads.^{17,18} In the present study, the number of patients with a history of cheek injection lipolysis was larger than that of the control group. This may be explained by the fact that most patients initially attempt to achieve a slimmer face through medical intervention. Subsequently, if patients are dissatisfied with the outcomes with cheek injection lipolysis, buccal fat pad removal surgery is performed as an alternative approach.

According to the existing literature, buccal fat pad removal surgery has a success rate of nearly 100%.^{5,6,10} Consistent with this, the control group in the present study exhibited a success rate of 100%. However, the success rate was slightly lower (91.8%) in patients with a history of cheek injection lipolysis. We experienced difficulties in effectively removing the buccal fat pad in five of the 61 patients in this group. Specifically, we were unable to remove the buccal fat pad from one cheek in two patients, whereas the remaining three patients underwent

Table 3. Complications according to a History of Cheek Injection Lipolysis

Complications	Injection Lipolysis (Cheeks)		P
	Yes (N = 122)	No (N = 78)	
Hematoma	1	0	0.007*
Prolonged cheek swelling	2	0	
Sagging of cheek	4	0	
Wound dehiscence	1	0	

*Fisher exact test.

partial removal, with a buccal fat pad weight of less than 50% that of the other side. The challenges encountered in removing the buccal fat pad in these cases were attributed to fibrosis resulting from prior injection lipolysis of the cheek. It is important to note that the existing literature suggests that injection lipolysis triggers a specific inflammatory response in adipose tissue, leading to cellular death, necrosis of fat tissue, and subsequent tissue fibrosis.¹⁹⁻²¹ Further, the presence of fibrosis resulting from prior cheek injection lipolysis complicates the removal of the buccal fat pad, posing significant risks to the integrity of the buccal branch of the facial nerve and parotid duct.

Buccal fat pad removal is particularly advantageous for individuals with round and chubby faces, as a substantial volume of fat should be excised to achieve an aesthetically pleasing result.¹⁶ It is pertinent to acknowledge that buccal fat pad volumes are not symmetrical.²² Approaching buccal fat pad removal with caution is of utmost importance to prevent excessive aggressiveness, which can result in midface distortion and accelerate signs of facial aging.²³ A cadaver study conducted in 1990 by Stuzin et al²⁴ reported an average weight of 9.3g for the total buccal fat pad. In 1991, Matarasso⁵ reported that, typically, 4–6g of the buccal fat pad should be removed on each side. However, Stuzin et al²⁴ suggested that 1–2g of fat should be removed to achieve the desired aesthetic outcome, although individuals with fuller cheeks may require the removal of 4–5g of fat from each side. Another study by Kubo²⁵ on 30 patients seeking facial slimming through buccal fat pad removal reported that the buccal fat pad weight was 1.74 ± 0.72 g on the right side and 1.59 ± 0.71 g on the left side. In comparison, in the present study, the weight of the buccal fat pad averaged 2.63 ± 1.01 g, with 2.57 ± 0.88 g on the right side and 2.69 ± 1.12 g on the left side, in the injection lipolysis group, and averaged 2.67 ± 0.81 g, with 2.74 ± 0.87 g on the right side and 2.60 ± 0.74 g on the left side, in the control group. Careful consideration of the individual's facial structure and desired outcome is necessary to ensure a successful procedure.

Complications can arise as a result of buccal fat pad removal surgery, with severity ranging from minor to major. Procedure-related complications include hematoma, trismus, infection, facial impairment, parotid duct injury, overresection, induration, and asymmetry.²⁶ In the present study, all complications were exclusively observed in patients with a history of cheek injection lipolysis. Fortunately, most of these complications were minor. Specifically, we encountered one case of hematoma in the cheek at 1 week postoperatively, which was successfully alleviated by opening and drainage. This particular case had received more than 10 sessions of injection lipolysis of the cheek. Additionally, there was one case of wound dehiscence in the cheek at 1 week postoperatively, which was promptly repaired through resuturing. This specific case had received only a single session of injection lipolysis of the cheek. Prolonged cheek swelling was noted in two cheeks at 1 month postoperatively; these cases were managed by providing information and counseling to reassure the patients that the swelling would gradually subside over time. These cases had received more than 10 sessions of cheek injection lipolysis. Lastly, four cheeks

exhibited sagging at 12 months postoperatively, and the patients were dissatisfied with the results. Among these, two patients each had received two and five sessions of cheek injection lipolysis, respectively.

When encountering difficulty in locating the buccal fat pad due to its deep, variable location, and fibrosis, it is important to maintain composure and patience. Begin by identifying the buccal fat pad and use blunt instruments to gently shift the buccinator muscle, aiding access to the fat pad. Applying external pressure to the skin over the area of the buccal fat pad can lead to its exposure, and piercing the fascia with an arterial clamp allows access. During this step, the buccal fat pad might naturally emerge from its pocket, so avoid forceful pulling. If it does not emerge, gently explore the vicinity while avoiding forceful grasping to prevent potential bleeding and injury to vital structures. Finally, if the surgeon struggles to locate the buccal fat pad, seeking guidance from experienced professionals is advisable. Additionally, consider counseling patients before the surgery if they present a risk for challenging buccal fat pad identification.

This study had several strengths that enhanced its validity. First, its design enabled the direct evaluation of the success rate and incidence of complications among patients with a history of cheek injection lipolysis in comparison with that in a control group. Additionally, surgical procedures were performed by a single surgeon (P. S.) to ensure uniformity in technique and proficiency. However, it is important to acknowledge the limitations of this study. First, its retrospective design was inherently susceptible to bias and constraints in data collection. Additionally, interpreting the study results is challenging, as only one nonblinded surgeon conducted the procedures. Second, sometimes buccal fat pad removal can be tricky and require persistence in finding the fat pad and entering its capsule. If the surgeon is aware that the patient previously underwent lipolytic injections, it might lead them to give up more quickly or to assume that a seemingly challenging case is difficult due to the prior lipolytic injection, potentially resulting in a quicker decision to abandon the removal attempt. Third, this study was conducted at a single private clinic, which potentially limits the generalizability of the findings to other health-care settings. Fourth, the follow-up period was relatively short, ranging from 1 to 12 months, which might not adequately capture long-term outcomes and complications. Future studies that use prospective designs, involve larger sample sizes, include multiple surgeons, or implement blinding techniques to conceal the patients' history are necessary. Such studies are warranted to further explore the success rate and incidence of complications of buccal fat pad removal in patients with a history of cheek injection lipolysis.

CONCLUSIONS

The aesthetic advantages associated with buccal fat pad removal from the lower face are widely acknowledged. Nevertheless, it is imperative to acknowledge that the success rate of buccal fat pad removal is diminished, and the likelihood of complications is elevated, among patients with a history of injection lipolysis of the cheeks

compared with patients without this history. Hence, a cautious approach is indispensable when performing this procedure on such individuals.

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DISCLOSURES

The authors have no financial interest to declare in relation to the content of this article.

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