OPEN

PRS GLOBAL OPEN

ORIGINAL ARTICLE

Cosmetic

The Surgical Anatomy and the Deep Plane Thread Lift of the Buccal Fat Pad

Yun-Ta Tsai, MD*
Yajie Zhang, MD, PhD†
Yumeng Wu, MD‡
Hung-Hsu Yang, MD§
Lili Chen, MD¶
Patrick Po-Han Huang, MD||
Chao-Huei Wang, MD**

Background: Management of facial rejuvenation by the thread lift procedure has evolved over the past few years. The role of deep plane thread lift for buccal fat pad reposition was advocated. However, there are concerns about the risks and the feasibility of the deep plane thread lift. This study was designed to determine whether the deep plane thread lift could achieve effective aesthetic results and to investigate the possible risks of critical tissue injury through cadaveric studies.

Methods: Twelve fresh frozen cephalic specimens of 8 male and 4 female Asian body donors (mean age, 63.3 ± 8.0 years) were investigated. The deep plane thread lifts for reposition of the buccal fat pads were performed for all the left hemifaces. Cadaveric dissections were performed to investigate the moving distance of the buccal fat pad and to examine the surrounding tissue of the passage of the deep plane thread lift.

Results: The average moving distance of the buccal fat pads after the deep plane thread lift was 3.73 cm. The difference in moving distance of buccal fat pads between bilateral sides was statistically significant ($P < 0.001$). No injuries of the critical vessels or nerves were found after cadaveric dissection. The passage of the deep plane thread lift was evaluated.

Conclusion: The deep plane thread lift for reposition of the buccal fat pad is a safe, effective, and practical method. *(Plast Reconstr Surg Glob Open 2020;8:e2839; doi: 10.1097/GOX.0000000000002839; Published online 23 June 2020.)*

INTRODUCTION

The buccal fat pad was first described by Heister approximately 300 years ago.[1] Bichat[2] is credited with recognizing the anatomy of the buccal fat pad. There is substantial literature on anatomic studies, physiological functions, and the relationship of the buccal fat pad with the masticatory space.[3–7]

The buccal fat pad is a versatile structure used in many reconstructive procedures.[8–14] Used as a pedicle flap, it could be an effective tool for repair of congenital cleft palate or for the closure of oroantral fistula.

In recent decades, anatomical studies of soft tissue spaces and retaining ligaments have been well investigated.[15–17] Space expansion, secondary to boundary weakness, could be found in an aging face. With volumetric change in the masticator space, the buccal fat pad descends and contributes to the labiomandibular fold and jowl. To regain an inverted triangle facial shape, removal of buccal fat pads may enhance the zygomatic prominence and facial aesthetic contouring and highlight the angularity of the facial skeletal features.[3,4,18–20]

In the thread-looping method advocated by Wang et al,[21] the concept of buccal fat pad repositioning through the deep plane thread lift was proposed. However, the risks of nerve or vessel injuries were questioned. Whether reposition of the buccal fat pad is achieved through the deep plane thread lift was also challenged. The goal of this study was to determine whether buccal fat pad repositioning is possible through the deep plane thread lift and to conduct safe passage according to anatomic studies.

*From the *Dr. Shine Clinic, Kaohsiung, Taiwan; †Department of Plastic and Reconstructive Surgery, The 8th Medical Center of the General Hospital of the People's Liberation Army (PLAGH), Beijing, China; ‡Daiyi Clinic, Beijing, China; §101 Aesthetic Clinic, Taipei, Taiwan; ¶Beijing Fengtai Youanmen Hospital, Beijing, China; ||Huang PH Dermatology and Aesthetics, Kaohsiung, Taiwan; and **Dr. Shine Clinic, New Taipei City, Taiwan.*

Received for publication February 17, 2020; accepted March 20, 2020.

Presented at the International Master Course on Aging Science (IMCAS Asia 2019, July 5-7, 2019), Bali, and the International Master Course on Aging Science (IMCAS 2020, January 30-February 1, 2020), Paris.

DOI: 10.1097/GOX.0000000000002839

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

Related Digital Media are available in the full-text version of the article on www.PRSGlobalOpen.com.

MATERIALS AND METHODS

Sample

This study included 12 full-head fresh frozen specimens from 8 male and 4 female Asian body donors with a mean age of 63.3 ± 8.0 years. All the included donors had no history of previous facial surgery, filler injections, or disease that causes changes in facial anatomy. The carotids of all specimens were injected with red glue, and the jugulars were injected with blue glue.

Deep Plane Thread Lift Procedure

In this study, the deep plane thread lift, which is deeper than the zygomatic arch, was used for repositioning of the left buccal fat pad. (**See Video [online]**, which displays the deep plane thread technique). Tissue suspension was done by 2-0 STRATAFIX Symmetric (Ethicon, Somerville, NJ). No thread lift was performed at the right hemiface. The inlet of the thread was open 1.5 cm above the zygomatic arch just along the sideburn. The cannula was positioned 0.5 cm lateral to the modiolus. Once the cannula passed deeper than the zygomatic arch, the other hand was used to compress against the buccal mucosa to feel the cannula moving right next to the buccinator muscle. To prevent the cannula from going too deep and cause severe tragedy, it is important to feel the tip of the cannula gliding right under the zygomatic arch. With this, the cannula can pass through the buccal fat pad without causing vessel or nerve injuries. When the cannula passed the horizontal level of the labial commissure, the thread was inserted. After performing the deep plane thread lift, step-by-step dissection from the superficial layer to the profound layer was performed.

Cadaveric Dissections and Measurement of Left Hemifaces

When dissecting the left hemifaces, all branches of the facial nerve were preserved. The distance between the labial commissure and the lower end of left buccal fat pad was measured for all hemifaces (Figs. 1A, 2A). Splitting the zygomatic arch exposed the passage of the deep plane thread lift. All tissues surrounding the passage of the deep plane thread lift were well-investigated to evaluate the feasibility.

Cadaveric Dissections and Measurement of Right Hemifaces

When dissecting the right hemifaces, the space and the surrounding anatomic structures of the buccal fat pads were recorded. The distance between the labial

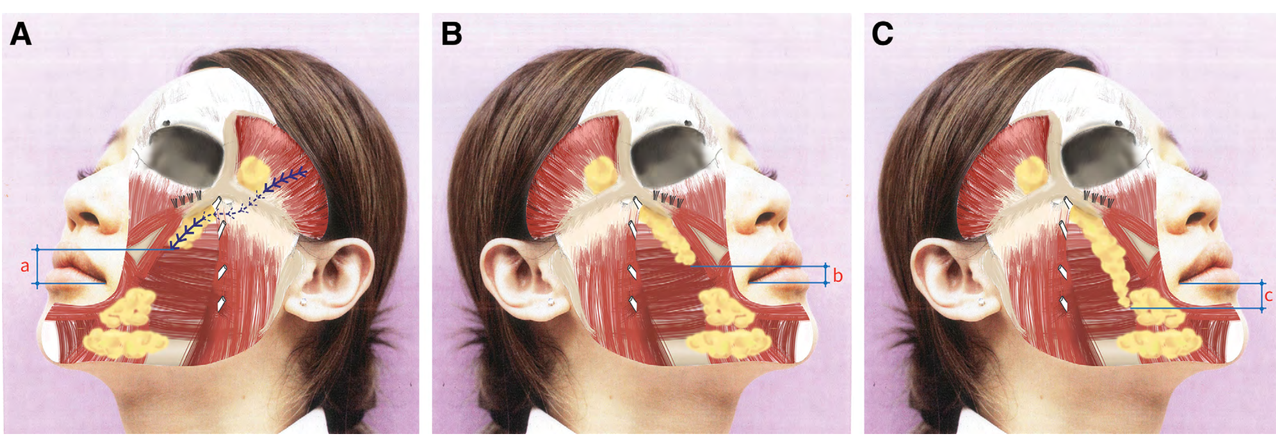

Fig. 1. Measurement of the distance between the labial commissure and the lower end of the buccal fat pad. A, The deep plane thread lift was performed at all left hemifaces. B and C, No thread lift was performed at the right hemifaces. The lower end of right buccal fat pad might be (B) higher or (C) lower than the labial commissure.

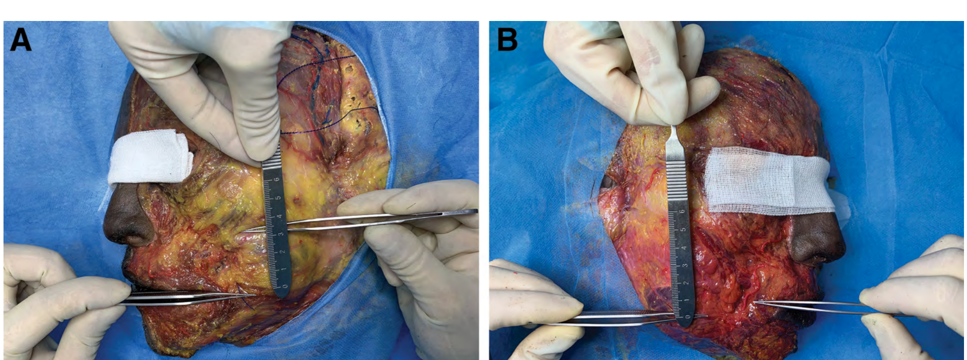

Fig. 2. Comparison of different positions of the buccal fat pad from bilateral hemifaces. A, Cadaveric dissection of the left face to measure the position of the buccal fat pad after the deep plane thread lift. B, Cadaveric dissection of the right face, in which no thread lift was performed, to measure the position of the buccal fat pad.

commissure and the lower end of the right buccal fat pad was measured. If the lower end of the right buccal fat pad was higher than the labial commissure, the distance was counted as a positive number (Figs. 1B, 2B); if it was lower than the labial commissure, it was counted as a negative number (Fig. 1C). The longitudinal distance between the lower ends of the bilateral buccal fat pads was collected. All distances were measured with specimens in upright position to simulate the effects of gravity. Wilcoxon rank-sum tests were used to determine the difference in the location of the bilateral buccal fat pads. Results were considered statistically significant at a probability level of $P \leq 0.05$.

RESULTS

Twelve cadaveric specimens with only left hemifaces who underwent the deep plane thread lift were included (Table 1). Among all 24 hemifaces, the mean distance between the buccal fat pads and labial commissures of the left side was 3.6 cm, and the mean distance of the control side was −0.09 cm (Table 2). The movement of the buccal fat pads treated with the deep plane thread lift was defined as the longitudinal distance between the lower ends of the bilateral buccal fat pads. The average moving distance of the buccal fat pads is 3.73 cm. The difference in their moving distance between bilateral sides was statistically significant ($P < 0.001$).

Cadaveric Dissections

The buccal space is the compartment where the buccal fat pad is located. Its boundaries comprise the buccinator muscle medially, the deep cervical fascia and muscles of facial expression anterolaterally, and the masticator space and parotid gland posteriorly. The buccal fat pad, parotid duct, facial artery and vein, buccal vessels, and branches of the facial nerves lie in the buccal space.

The buccal fat pad is a trilobed adipose tissue that occupies the space of the temporal fossa and buccal area. It is an encapsulated mass with 3 extensions. The temporal extension lies behind the frontal process of the zygoma and zygomatic arch. The pterygoid extension lies posteriorly involving the lingual nerve and mandibular neurovascular bundle. The buccal extension lies mainly in the buccal space and predominantly exhibits pseudoherniation. The buccal fat pad cushions, protects, and separates the muscles of the cheek. In infants, it provides supportive function to prevent cheek depression during sucking. However, with the development of the surrounding tissue, the buccal fat pad no longer provides an important role. Moreover, with volumetric change of the space, buccal fat pad prolapse could lead to irregularity of the perioral area and puffy cheek mass.

According to previous literature review,[22] the mean volume of the buccal fat pad was 10.2 ml (7.8–11.2) in men and 8.9 ml (7.2–10.8) in women. In our study, the average volume of the buccal fat pad was 9.6 ml. Zhang et al[23] described 6 ligaments that anchor the various parts of the buccal fat pad. In all left hemifaces receiving the deep thread lift, there were no obvious ligaments left around the buccal fat pads.

Table 1. Distance from the Lower End of the Buccal Fat

Cadaver	Age of Death, y	Distance from the Lower End of Left Buccal Fat Pad to the Labial Commissure, cm	Distance from the Lower End of Right Buccal Fat Pad to the Labial Commissure, cm	Distance Difference between Bilateral Buccal Fat Pads, cm
1	74	3.6	−0.8	4.4
2	56	3.5	0.5	3.0
3	48	3.7	0.6	3.5
4	66	3.6	−0.2	3.8
5	63	3.7	0	3.7
6	69	3.6	−0.7	4.3
7	72	3.6	−0.7	4.3
8	59	3.8	0.5	3.3
9	69	3.4	−0.5	3.9
10	53	3.5	0.5	3.0
11	68	3.6	−0.4	4.0
12	63	3.6	0.1	3.5

Table 2. Descriptive Statistics for the Lower End of the Left and Right Buccal Fat Pad to Labial Commissure

	Mean, cm	Minimum, cm	Maximum, cm	SD	95% CI	P
Left	3.6	3.4	3.8	0.105	3.54 to 3.66	<0.001
Right	−0.09	−0.8	0.6	0.530	−0.39 to 0.21	

Relation between the Passage of the Deep Plane Thread Lift and the Facial Nerve

In our study, the thread inlet was open 1.5 cm above the zygomatic arch just along the sideburn. The inlet scar can be hidden easily to meet the patient's expectation. Once it passed through soft tissue, it went deeper than the zygomatic arch. The temporal branches of the facial nerve travel superficially to the periosteum of the zygomatic arch. Injury of the facial nerve's temporal branches can be avoided completely. The facial nerve's zygomatic branches run across the zygomatic bone to supply the orbicularis oculi. It goes superficially after emerging from the parotid gland. The passage of the deep plane thread lift at this point goes through the buccal space connecting the temporal area to the buccal area. It is deeper than the zygomatic bone and far from the facial nerve's zygomatic branches. The buccal branches of the facial nerve pass horizontally forward to innervate facial expression muscles. At the point where the thread goes deep through the buccal fat pad, all buccal branches go superficially to the innervated muscles. Because the cannula was stopped once it went over the horizontal level of the labial commissure, the tip of the thread is difficult to reach the distal end of the marginal mandibular nerve. Through layer-by-layer dissection, different layers of facial nerve and the thread can be found. The passage of the deep plane thread lift was safe, and no facial nerves were injured (Fig. 3).

Relation between the Passage of the Deep Plane Thread Lift and the Major Vessels

With the passage of the deep plane thread lift, there are concerns of injuries to some major vessels, including the middle temporal vein, transverse facial artery, maxillary artery, and facial artery.

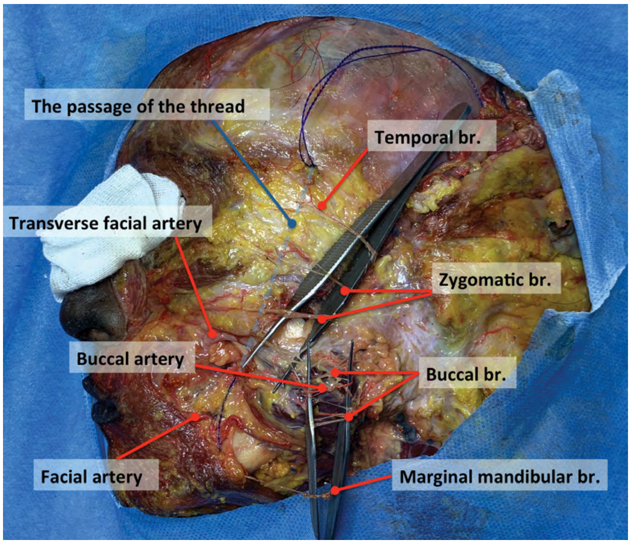

Fig. 3. After the deep plane thread lift, cadaveric dissection of the left face exposing the critical vessels and the branches of the facial nerve. The passage of the thread could avoid injury to transverse facial artery, buccal artery, facial artery, and all branches of the facial nerve.

The middle temporal vein comes from venules at the lateral orbital rim, passing backward, downward, and outward at the temporal area. The course of the middle temporal vein at the temporal area is around 1.5 cm above the zygomatic arch and paralleling to it. In our design, the thread inlet is open 1.5 cm above the zygomatic arch just along the sideburn. As the thread passes deeper and downward, it can avoid passing the course of the middle temporal vein (Fig. 4A).

The transverse facial artery is given off from the superficial temporal artery. It passes transversely across the side of the face and superficially to the buccal fat pad. Because the deep plane thread lift passes through the deeper part of the buccal fat pad, the thread does not injure the transverse facial artery with the cushion of the buccal fat pad and the masseter muscle (Figs. 3 and 4B).

As for the facial artery, it passes over the body of the mandible. It goes superficially after passing over the modiolus. In our design, the thread passing through the buccal fat pad can keep the level at the deeper part, which differs from the depth of the facial artery (Fig. 3). Facial vein runs obliquely downward and backward from the superficial infraorbital area and descends along the anterior border and then on the superficial surface of the masseter. It is also the boundary between the masticator space and buccal space. So if the thread penetrates the buccal fat to its superficial surface, there is a chance to injure the facial vein. Therefore, it is always important to keep the passage deep and near the buccal mucosa.

The maxillary artery, also known as the internal maxillary artery, arises from the external carotid artery. It passes horizontally forward behind the neck of the mandible and runs obliquely forward and upward under the ramus of the mandible. The passage of the deep plane thread lift, even deeper than the zygomatic arch, is still superficial to the mandible. Although the passage of the deep plane thread lift seems to injure the maxillary artery by 2-dimensional anatomy atlas, it goes at a completely different facial tissue layer.

Relation between the Passage of the Deep Plane Thread Lift and Stensen's Duct

Stensen's duct emerges from the parotid gland, runs forward along the lateral side of the masseter muscle, and takes a sharp turn before opening into the vestibule of the mouth. Stensen's duct might run superficially across the buccal fat pad or pass through its lobes. Stensen's duct turns sharply anterior to the body of the buccal fat pad. In our design, the route of the deep plane thread lift was positioned 0.5 cm lateral to the modiolus and was kept posteriorly to the opening of the parotid duct. This design can prevent cross-injury of the sharp turn of Stensen's duct (Fig. 4C).

Evaluation of the Passage

To evaluate the passage of the deep plane thread lift at the retro-zygomatic arch area, the zygomatic arch was cut through a zygomaticotemporal suture. Although the passage of the thread into the masticator space does not cause vessel or nerve damage, it still passes through the origin of the deep part of the masseter muscle (Fig. 5A).

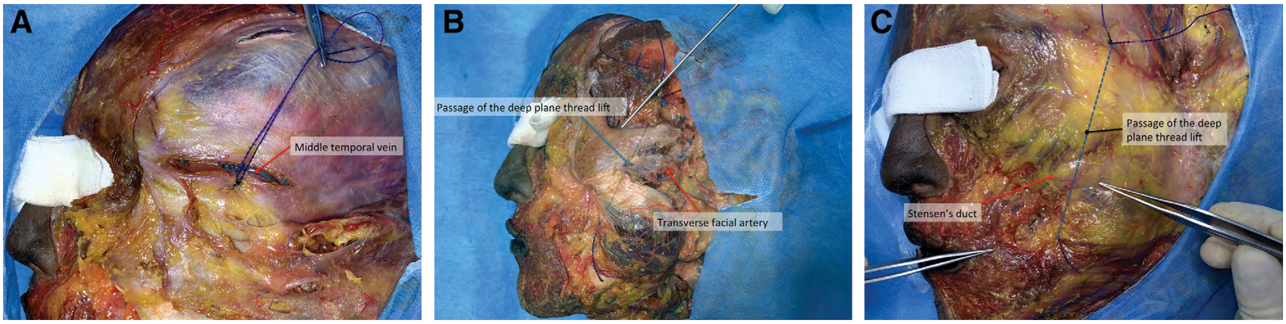

Fig. 4. After performing the deep plane thread lift, cadaveric dissection of the left face exposing the critical structures around the passage. A, The design of the inlet of the deep plane thread lift could avoid penetration of the middle temporal vein. B, The course of the transverse facial artery passes transversely across the side of the face. The thread does not injure the transverse facial artery with the cushion of the buccal fat pad and the masseter muscle. C, Stensen's duct turns sharply anterior to the body of the buccal fat pad. The route of the deep plane thread lift was positioned 0.5 cm lateral to the modiolus and was kept posteriorly to the opening of the parotid duct.

Fig. 5. Cadaveric dissection by splitting left zygomatic arch to evaluate the passage. A, In our original design, although there is no vessel or nerve damage, it still passes through the origin of the deep part of the masseter muscle. B and C, In simulating the safer passage, note that there would be (B) a smooth, bloodless area at the posterior surface of the zygoma body. By changing the direction of the cannula downward, the blunt cannula could (C) slide across the posterior surface of the zygoma going into the masticator space automatically.

Thereafter, the thread enters into the buccal space involving the buccal fat pad.

DISCUSSION

With increasing studies on the facial anatomy, the role fat compartments play on an aging face is becoming a concern.[24] Aging changes include the skin, subcutaneous tissue, muscle, and bone. Because of volumetric changes, the relation between the facial space and surrounding tissue is not the same as that in a youthful face.[15] Schenck et al[25] described inferior displacement of the superficial fat compartments after filler injection, in their anatomic study. However, there are no inferior displacements of the deep facial fat compartments with increasing age or after filler injection.[26] These findings emphasize the importance of the deep fat compartments for overlying structure support.

Buccal fat pad displacement (so-called pseudoherniation) could result in a puffy cheek mass. Pseudoherniation of the buccal fat pad can be easily reduced with upward displacement into the buccal space. It should be distinguished from other perioral masses, such as modiolus thickening or superficial jowl fat hypertrophy, and confirmation can be achieved by asking the patient to look up, with the chin and the forehead at the same horizontal level. If the cheek mass disappears, pseudoherniation of the buccal fat pad is diagnosed.

Excision of the buccal fat pad to enhance facial aesthetic contour was advocated by Matarasso.[4,19–20] According to our clinical experience, however, excision of the buccal fat pad alone does not always achieve better aesthetic result. These cases might present haggard appearance rather than smooth facial contour after removal of the buccal fat pads. It might result from the nature of the deep fat pad that provides support for the overlying structure. As a result, "reposition" of the buccal fat pad rather than excision would be another choice.

In the thread-looping method advocated by Wang et al,[21] the passage of the deep plane thread lift provides a minimal invasive way to reposition the buccal fat pad. However, there are doubts concerning the risks of facial structure injuries. Performing the deep plane thread lift method safely is still challenging for most physicians. In this study, we depict the passage of the deep plane thread lift for repositioning of the buccal fat pad. In our method, it is important to let the thread pass through the masticator space at the retro-zygomatic arch area. Within the space, the guiding cannula can pass through smoothly and the thread would hook up the buccal fat pad easily. The key to make sure that the cannula is at the right location is to insert the other hand into the mouth. If the fingers can feel the passage of guiding cannula right under the buccinator muscle, it means the guiding cannula can pass through the buccal fat pad. In our study design, we try to use a cadaveric study to demonstrate the safety of the deep plane thread lift. After meticulous dissection of 24 hemifaces of 12 full-head specimens, no branches of the facial nerves, major vessels, or Stensen's duct were injured by the thread. Therefore, with sufficient understanding of facial anatomy and proper manipulation, the deep plane thread lift can be done smoothly without damage of any critical structure.

According to previous literature review,[23] there are 6 ligaments anchoring various parts of the buccal fat pad. However, there were no obvious ligaments left around the buccal fat pad in all left hemifaces after the deep plant thread lift. In our opinion, the term "ligament" might not be suitable for describing the anchoring tissue around the buccal fat pad. The better term for naming this tissue might be "thickening of the capsule."

Measurement of the lower end of the bilateral buccal fat pads was done in our cadaveric study. The average movement of the buccal fat pads after the deep plane thread lift was 3.73 cm. Repositioning of the buccal fat pad after the deep plane thread lift is effective and feasible.

According to our study, the normal location of the lower end of the buccal fat pad is around the horizontal level of the labial commissure. However, there are still some variations. In our study, the groups with the lower end of the buccal fat pad higher than the labial commissure are the individuals aged 48 to 63 years. For the groups with the buccal fat pad lower than the labial commissure are individuals aged 66 to 74 years. The results suggest that volumetric change during aging may provide more room for pseudoherniation of the buccal fat pad.

When evaluating the passage of the deep plane thread lift, it would pass through the origin of the deep part of the masseter muscle (Fig. 5A). This might be the reason that some of the cases receiving the deep plane thread lift might experience sustained facial swelling. To simulate the safer passage without passing through the masseter muscle, a blunt cannula right next to the zygomaticotemporal suture was used. By pushing the blunt cannula to the posterior surface of the zygoma body, there would be a smooth, bloodless area (Fig. 5B). When the tip of the blunt cannula arrives in this area, changing the direction of the cannula downward will make the blunt cannula slide across the posterior surface of the zygoma going into the masticator space automatically (Fig. 5C). Therefore, the buccal fat pad can be easily involved through this safer passage. However, this is only a cadaveric study. For patients seeking an aesthetic appearance, the scar of the inlet hole right next to the zygomaticotemporal suture would be difficult to hide. This simulating passage might be safer and easier, but the outcome of the obvious wound at the face is another concern.

During our cadaveric dissection, the temporal extension of the buccal fat provided a nonfibrotic tract between the anterolateral cheek and temporal fossa. This finding could also explain the "falling" of fillers to the anterolateral cheek after filler injection for temporal hollowing.

Based on our findings, pseudoherniation of the buccal fat pad might cause perioral swelling, resulting in an unattractive lower face. To improve aesthetic outcome, repositioning of the buccal fat pad would be an option. However, this method is not beneficial to patients with non-herniated buccal fat pad. For plastic surgeons who prefer excision of the buccal fat pad, the supportive function of the deep fat pad should be kept in mind. Therefore, the goal is to reduce the volume of the lower part rather than the whole part of the buccal fat pad. Moreover, simultaneous fat transfer at the temporal area or thread lifting should be considered to deal with volume change of the contents in the buccal space. With a combing therapy, a saggy lower face after excision of the buccal fat pads can be prevented.

There are some limitations in this study. First, unilateral pseudoherniation of the buccal fat pad might occur, thus invalidating the results of our study. Second, there might be a different extent of pseudoherniation of the bilateral buccal fat pads. In our study, repositioning of the buccal fat pad through the deep plane thread lift was effective. However, whether the thread lift can create a long-lasting effect is another practical issue worth considering.

CONCLUSIONS

The results of this cadaveric study suggest that, with a comprehensive understanding of facial anatomy, the deep plane thread lift is a safe, practical, and easy way to reposition the buccal fat pads. Our findings confirm that there are no injuries of the crucial structures after the deep plane thread lift method is used in our study. Repositioning of the buccal fat pad to enhance the aesthetic contour of the lower face might be a viable option for patients with pseudoherniation of the buccal fat pads.

Chao-Huei Wang, MD
Dr. Shine Clinic
6F, No. 3, Sec 1, Zhongshan Rd
Banqiao Dist
New Taipei City 22063, Taiwan
E-mail: tuderek@gmail.com

REFERENCES

1. Heister L. *Compendium Anatomicum.* Wentworth Press, Norimbergae; 1732.
2. Bichat F. *Anatomie Generale, Appliquee A La Physiologie Et A La Medicine.* Paris: Grosson, Gabon, and Cie; 1802.
3. Stuzin JM, Wagstrom L, Kawamoto HK, et al. The anatomy and clinical applications of the buccal fat pad. *Plast Reconstr Surg.* 1990;85:29–37.
4. Matarasso A. Buccal fat pad excision: aesthetic improvement of the midface. *Ann Plast Surg.* 1991;26:413–418.
5. Hasse FM, Lemperle G. Resection and augmentation of Bichat's fat pad in facial contouring. *Eur J Plast Surg.* 1994;17:239–242
6. Yousif NJ, Gosain A, Matloub HS, et al. The nasolabial fold: an anatomic and histologic reappraisal. *Plast Reconstr Surg.* 1994;93:60–69
7. Stuzin JM, Wagstrom L, Kawamoto HK, et al. Anatomy of the frontal branch of the facial nerve: the significance of the temporal fat pad. *Plast Reconstr Surg.* 1989;83:265–271.
8. Singh J, Prasad K, Lalitha RM, et al. Buccal pad of fat and its applications in oral and maxillofacial surgery: a review of published literature (February) 2004 to (July) 2009. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2010;110:698–705.
9. Hanazawa Y, Itoh K, Mabashi T, et al. Closure of oroantral communications using a pedicled buccal fat pad graft. *J Oral Maxillofac Surg.* 1995;53:771–775; discussion 775.
10. Jackson IT, Moreira-Gonzalez AA, Rogers A, et al. The buccal flap—a useful technique in cleft palate repair? *Cleft Palate Craniofac J.* 2004;41:144–151.
11. Levi B, Kasten SJ, Buchman SR. Utilization of the buccal fat pad flap for congenital cleft palate repair. *Plast Reconstr Surg.* 2009;123:1018–1021.
12. Rohrich RJ, Gosman AA. An update on the timing of hard palate closure: a critical long-term analysis. *Plast Reconstr Surg.* 2004;113:350–352.
13. Gröbe A, Eichhorn W, Hanken H, et al. The use of buccal fat pad (BFP) as a pedicled graft in cleft palate surgery. *Int J Oral Maxillofac Surg.* 2011;40:685–689.
14. Losee JE, Smith DM, Afifi AM, et al. A successful algorithm for limiting postoperative fistulae following palatal procedures in the patient with orofacial clefting. *Plast Reconstr Surg.* 2008;122:544–554.
15. Mendelson BC, Jacobson SR. Surgical anatomy of the midcheek: facial layers, spaces, and the midcheek segments. *Clin Plast Surg.* 2008;35:395–404; discussion 393.
16. Mendelson BC. Facelift anatomy, SMAS retaining ligaments and facial spaces. In: Aston SJ, Steinbrech DS, Walden JL, eds. *Aesthetic Plastic Surgery.* Saunders Elsevier; 2009:3–21.
17. Mendelson BC, Freeman ME, Wu W, et al. Surgical anatomy of the lower face: the premasseter space, the jowl, and the labiomandibular fold. *Aesthetic Plast Surg.* 2008;32:185–195.
18. Matarasso A. Pseudoherniation of the buccal fat pad: a new clinical syndrome. *Plast Reconstr Surg.* 1997;100:723–730; discussion 731.
19. Matarasso A. Pseudoherniation of the buccal fat pad: a new clinical syndrome. *Plast Reconstr Surg.* 2003;112:1716–1718; discussion 1719.
20. Jackson IT. Anatomy of the buccal fat pad and its clinical significance. *Plast Reconstr Surg.* 1999;103:2059–2060; discussion 2061.
21. Wang CH, Liu HJ, Tsai YT, et al. An innovative thread-looping method for facial rejuvenation: minimal access multiple plane suspension. *Plast Reconstr Surg Glob Open.* 2019;7:e2045.
22. Loukas M, Kapos T, Louis RG Jr, et al. Gross anatomical, CT and MRI analyses of the buccal fat pad with special emphasis on volumetric variations. *Surg Radiol Anat.* 2006;28:254–260.

23. Zhang HM, Yan YP, Qi KM, et al. Anatomical structure of the buccal fat pad and its clinical adaptations. *Plast Reconstr Surg*. 2002;109:2509–2518; discussion 2519.
24. Rohrich RJ, Pessa JE. The fat compartments of the face: anatomy and clinical implications for cosmetic surgery. *Plast Reconstr Surg*. 2007;119:2219–2227; discussion 2228.
25. Schenck TL, Koban KC, Schlattau A, et al. The functional anatomy of the superficial fat compartments of the face: a detailed imaging study. *Plast Reconstr Surg*. 2018;141:1351–1359.
26. Cotofana S, Gotkin RH, Frank K, et al. The functional anatomy of the deep facial fat compartments: a detailed imaging-based investigation. *Plast Reconstr Surg*. 2019;143:53–63.