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A new proposed surgical technique for dimpleplasty

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Aim: This study aims to evaluate a newly proposed surgical technique for facial dimpleplasty, focusing on patient satisfaction and early recovery symptoms and complications.
Materials and methods: A randomized clinical trial was conducted on 20 patients aged 20-27 years who requested dimpleplasty. Patients were randomly assigned to either the control group, which received dimpleplasty utilizing a conventional technique, or the test group, which underwent a new surgical technique proposed by the authors. Patient-reported outcomes included satisfaction with the decision, outcome, overall facial appearance, and complications.
Results: Patients expressed excellent overall satisfaction with aesthetic outcomes, the decision to undergo the procedure, and facial appearance. Statistical analysis revealed no significant differences between the groups ($P > 0.05$). However, significant differences were observed in early recovery symptoms ($P < 0.05$). Swelling, discomfort, and bruising were more frequent in the test group, while facial tightness was more common in the control group.
Conclusion: Our conservative dimpleplasty technique demonstrated high patient satisfaction and effective outcomes with minimal risk. The procedure's simplicity and reliability make it a viable option for achieving aesthetically pleasing facial dimples.

Keywords: dimple, facial, cosmetic surgery, dimpleplasty

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Introduction

Facial dimples are dynamic skin indentations that predominantly appear on the cheeks. Many cultures associate cheek dimples with beauty and youth.[1, 2] In recent years, the demand for dimpleplasty has increased significantly, with many individuals worldwide opting for this procedure.[3] Natural dimples enhance facial expressions and draw attention during social interactions by deepening during facial animation and nearly disappearing at rest. [4] The ideal artificial facial dimple should mimic this dynamic nature, being visible during facial animation and invisible at rest. [5] The anatomical foundation of this feature is thought to stem from a bifurcated zygomaticus major muscle. This muscle's split cutaneous insertions exert varying traction forces around a central dermal segment, which is anchored to the underlying buccinator muscle. The cheek wall comprises various anatomical components, such as the epidermis, dermis, subcutaneous tissue, myofascial structures (including the buccinator), and the oral mucosa. The primary goal of a cheek dimpleplasty is to form an adhesion between the dermis and the underlying myofascial structures, particularly the buccinator muscle. [3]

In 1962, Boo-Chai reported the first recorded surgical intervention aimed at creating artificial cheek dimples. He developed a simple surgical procedure for dimpleplasty that sought to replicate the dynamic characteristics of natural dimples. Additionally, he described a method to easily establish the ideal location for surgically created dimples.[2] Over the years, various procedures have been developed to create artificial dimples, each with slight variations. The primary objective of these techniques is to produce natural-looking facial dimples with minimal trauma to the patient and long-lasting results. Researchers have categorized these procedures into three main types: nonexcisional dimpleplasty (further divided into transepidermal and transdermal dimpleplasty), excisional dimpleplasty, and incisional dimpleplasty.[3]

Each type of dimpleplasty procedure has its own set of advantages and disadvantages. Nonexcisional dimpleplasty offers benefits such as a decreased risk of injury to surrounding structures, reduced postoperative edema, faster recovery, and less bleeding. However, the outcomes of nonexcisional dimpleplasty are not long-lasting. Excisional dimpleplasty provides better adhesion of the dermis to the buccinator muscle and a low risk of epidermal cysts, but it also poses risks such as skin infection and increased injury to surrounding structures. Incisional dimpleplasty, while decreasing the risk of injury to surrounding structures, has drawbacks including increased bleeding and pain.[3]

Therefore, our study aims to evaluate a newly proposed surgical technique for facial dimpleplasty, focusing on patient satisfaction, early recovery symptoms, and complications.

Materials and Methods

Study design and sample size calculation

Our study aimed to evaluate patient satisfaction and early recovery symptoms using a new dimpleplasty surgical technique. A randomized clinical trial (RCT) was conducted on 20 patients, aged 20 to 27 years, who requested dimpleplasty procedures. Patients were randomly allocated into one of two groups: the control group, which received dimpleplasty following the technique described by Bao et al. (2007), and the test group, which underwent dimpleplasty using a new surgical technique proposed by the authors. The study was conducted at the Department of Oral and Maxillofacial Surgery, Faculty of Dental Medicine, Damascus University, Damascus, Syria, in

accordance with the ethical guidelines of the Helsinki Declaration as revised in 2000. All eligible patients were thoroughly informed about the procedure, its purpose, and any potential complications. Written consent was obtained from all participants. The study protocol was ethically approved by the Ethics Committee of Damascus University (UDDS-28066023/SRC-2577). The reporting of this study adhered to the checklist items proposed in the CONSORT statement. The study was registered in the ISRCTN registry under the ID (ISRCTN96988513). The overall study duration was six months.

G*Power software (version 3.1.9.4) was used to calculate the sample size. Based on the results of a pilot study conducted on six patients who underwent dimpleplasty using the same two surgical techniques as in the current study, the mean dimple depth after six months was 2.90 ± 0.74 mm for the first group and 4.08 ± 0.95 mm for the second group. With an effect size of 1.385, a study power of 80%, and an alpha level of 0.05, a sample size of 16 patients was deemed appropriate for this study. Considering a 20% patient dropout rate, the final sample size was set at 20 patients (10 per group).

Inclusion and exclusion criteria

The study sample consisted of patients who met the following inclusion criteria: Aged between 18 and 30 years; Capable of understanding the study procedures and committed to follow-up; Maintaining good oral hygiene.

The exclusion criteria for the study were: Presence of any facial deformities; Previous dimpleplasty procedures; Suffering from systemic diseases; Undergoing radiation therapy in the head and neck region within the last six months; Smoking.

Surgical procedure

The following description applies to both groups, as it is part of the methodology for both surgical procedures. Later, the two surgical techniques will be detailed separately. All surgical procedures for both groups were performed under local anesthesia. The ideal location of the facial dimple was determined using the method reported by Boo-Chai [2]. According to this method, the dimple is located at the intersection of two lines: a vertical line passing through the lateral canthus and a horizontal line extending from the oral commissure to the lobule of the ear. The location of the dimple placement was marked on the cheek skin. Two percent lidocaine with 1:100,000 epinephrine (Kwang Myung Pharm, Sindaebang 1-dong Dongjak-gu, Seoul, Korea) was infiltrated into the surgical site. The facial skin was prepped with Hibiclens 4% solution to disinfect the skin, as reported by Chen et al. (2019).[4] The Stensen duct papilla was identified and marked on the inner wall of the cheeks.

For the patients in the control group, we followed the technique reported by Bao et al. (2007).[1] The patients were asked to sit in the supine position. The buccal mucosa was incised using a no.15 blade, with the incision measuring 2 to 3 mm in length and positioned below the papilla of Stensen's duct. A syringe needle was then punctured through the cheek from the marked skin and pulled through the buccal mucosa incision. A 3-0 monofilament nylon suture was threaded into the pinhole of the syringe needle and drawn through using a vacuum extractor. Once the suture was pulled through, the needle was gradually withdrawn to the dermis. The needle's direction was then adjusted, puncturing through the dermis and muscle, and pulled through the buccal mucosa incision again. The suture was drawn through the pinhole of the syringe needle, which was then removed from the skin. This process sutured the active facial muscles and dermis together. The knot was tied, forming the dimple. The buccal mucosa was closed with a 3-0 silk suture (Figure 1).

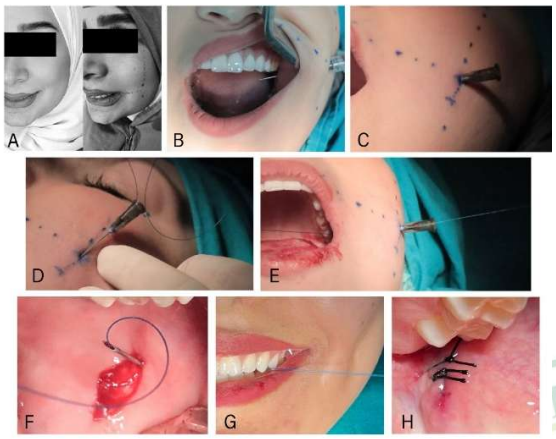

Figure 1: Dimpleplasty procedure in the control group(A) identifying the preferred location of the dimple, and marking it on the cheek; (B and C) A syringe needle is punctured through the cheek from the marked skin and pulled through the buccal mucosa incision; (D, E, and F) A nylon suture is threaded into the pinhole of the syringe needle; (G) The knot is tied, forming the dimple; (H) The buccal mucosa is closed with a 3-0 silk suture.

No dressing was required, and antibiotics were administered for 3 days. The 5-0 suture was removed after 7 days.

For the patients in the test group, we performed a modified version of the previous surgical technique. A syringe needle was punctured through the cheek from the marked skin and pulled through the buccal mucosa incision. The buccal mucosa was incised using a no.15 blade, with the incision measuring 4 to 6 mm in length. Dissection of the mucosa was performed to reveal the underlying buccinator muscle. A rectangular portion of the muscle (6 × 4 mm) was excised using fine tissue scissors. The remaining muscle parts and the dermis were then connected using an absorbable 3-0 Vicryl thread. A knot was made between the muscle and the dermis at the upper part of the incision, and another knot was made at the lower part of the incision (Figure 2). The buccal mucosa was closed with a 5-0 monofilament nylon suture. No dressing was required, and antibiotics were administered for 3 days. The 5-0 suture was removed after 7 days.

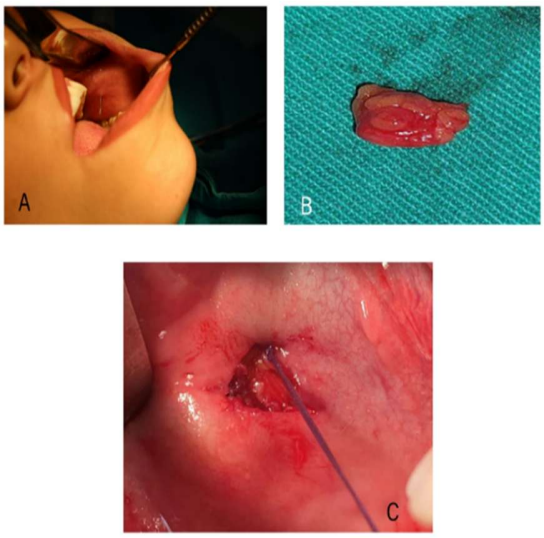

Figure 2: The modification to Boa, S. dimpleplasty technique (A) A syringe needle was punctured through the cheek from the marked skin and pulled through the buccal mucosa incision; (B) A rectangular portion of the muscle (6 × 4 mm) was excised using fine tissue scissors; (C) A knot was made between the muscle and the dermis at the upper part of the incision, and another knot was made at the lower part of the incision.

Outcome measurements

Patient-reported outcomes

We utilized the FACE-Q© (Facial Aesthetic Quality of Life Questionnaire) to measure patient-reported outcomes. The FACE-Q© includes over 40 independently functioning scales and checklists designed to measure concepts and symptoms relevant to facial aesthetic patients across different facial areas. These scales can be used for any facial aesthetic patient, whether they have undergone surgical or nonsurgical procedures, to assess their perceptions of appearance, quality of life, adverse effects, and the care process. Each scale generates a standalone score ranging from 0 to 100, with higher scores reflecting better outcomes.[8] According to Klassen et al.,[9] who first reported the development of the FACE-Q©

scale in 2014, only the FACE-Q© scales and/or checklists relevant to a particular patient or procedure(s) need to be completed, depending on the surgical or nonsurgical procedure. As such, we implemented the FACE-Q© scales and/or checklists that are relevant to the procedure of dimpleplasty. All the scales had a possible range between 1 and 4 (Very Satisfied, Somewhat Satisfied, Somewhat Dissatisfied, Very Dissatisfied). Patient satisfaction with the decision was evaluated one week after the procedure. Patient satisfaction with the outcome was evaluated four weeks after the procedure. On the other hand, patient satisfaction with overall facial appearance was evaluated at baseline and two weeks after. Permission to use the FACE-Q© instrument was obtained from McMaster University and The Hospital for Sick Children.

Evaluation of Post-operative Complications

Postoperative complications were evaluated one week after the procedure using a four-point scale questionnaire. Patients were asked to report on the following complications, rating each on a scale from 1 to 4 (Not at all, A Little, Moderate, Extreme): swelling, tenderness, discomfort, bruising, tightness of the face, numbness, itching, and fever.

Statistical analysis

The data were analyzed using SPSS software (version 26.0, IBM, USA). Descriptive statistics were performed to summarize the demographic data for 20 patients, including age, gender, and the side of dimpleplasty. To assess whether the data followed a normal distribution, the Kolmogorov-Smirnov test was used. The level of significance was set at 0.05. The Mann-Whitney U test was used to compare the mean values of postoperative complications, and patient satisfaction with the decision, outcomes, and overall facial appearance between the two groups. Additionally, the Wilcoxon test was performed to compare intergroup differences according to the studied period.

Patients' satisfaction with outcomes, decision, and facial appearance overall

Results

Demographic characteristics

A total of 26 patients were eligible for this study. However, six patients were excluded: four due to smoking and two who refused to participate. Subsequently, ten patients were allocated to each group, resulting in 20 patients undergoing dimpleplasty in the cheek region. The flow diagram of participant enrollment is shown in Figure 3.

Table 1 presents the demographic characteristics of the participants. All patients were women. The mean age in the control group was 23.1 ± 3.8 years, while in the test group, it was 23.4 ± 3.3 years. These ages were similar to the overall mean age of 23.3 ± 3.5 years. The statistical differences were not significant (P = 0.081). Regarding the side of the procedure, the majority of patients underwent dimpleplasty on the right side.

Table 1: The demographic characteristics of the participants

Characteristic:	Mean (SD) or *N* (%)
Age (years):	
Control group (n = 10)	23.1 (3.8)
Test group (n = 10)	23.4 (3.3)
Gender:	
Male	0 (0%)
Female	20 (100%)
Side of the procedure:	
Right side in the control group	7 (70%)
Left side in the control group	3 (30%)
Right side in the test group	8 (80%)
Left side in the test group	2 (20%)

The FACE-Q© questionnaire was used in this study to evaluate patient satisfaction with outcomes, decision, and

overall facial appearance. Responses were categorized as follows: 1 (Very Satisfied - VS), 2 (Somewhat Satisfied - SS), 3 (Somewhat Dissatisfied - SD), and 4 (Very Dissatisfied - VD). Patient satisfaction percentages and rank means in both groups are summarized in Table 2. The Mann-Whitney U test showed that the rank mean of patient satisfaction (across all categories) in the control group was similar to that in the test group, with no statistically significant difference, as shown in Table 3.

Post-operative complications

The FACE-Q© questionnaire was also used to assess postoperative complications (early recovery symptoms). This evaluation included postoperative complications such as swelling, tenderness, discomfort, bruising, numbness, itching, feverishness, and facial tightness. Each complication was evaluated on a four-point scale: 1 (Not at all), 2 (A little), 3 (Moderate), and 4 (Extreme).

During the follow-up period, no tenderness, itching, or feverishness were observed in either group. Additionally, no numbness occurred in the control group, while one case was reported in the test group. There were no statistically significant differences between the two groups ($P > 0.05$). However, significant differences were observed in terms of swelling, discomfort, and bruising. The rate and severity of these complications were significantly higher in the test group compared to the control group ($P < 0.001$). In contrast, facial tightness was observed more frequently in the control group than in the test group, indicating statistically significant differences between the two groups ($P < 0.001$), as noted in Table 4.

Discussion

The concept of surgically creating facial dimples, known as dimpleplasty, was first introduced by Boo-Chai in 1962 during an anatomical study in Singapore. This study found that approximately 1 in 18 individuals had facial dimples.[2] These dimples can appear bilaterally or unilaterally and follow an autosomal dominant inheritance pattern, with no gender preference.[10, 11] Boo-Chai's 1962 study identified the most common and aesthetically pleasing location for facial dimples as the intersection of a vertical line through the lateral canthus of the eye and a horizontal line through the oral commissure. However, some researchers have suggested that the ideal placement is slightly above this point.[12] In our study, we have consistently applied these anatomical guidelines.

Boo-Chai's original dimpleplasty technique involved passing a transcutaneous suture through a buccal mucosal incision and attaching it to the buccinator muscle. Since then, the procedure has undergone numerous modifications. In 1971, Argamaso introduced a variation involving the removal of all subdermal tissue layers instead of simply plicating the dermis to the buccinator.[10] More recently, several authors have suggested a transcutaneous needle technique for placing anchor sutures, which eliminates the need for tissue removal and external incisions.[1] Other approaches have included subcutaneous dissection and the use of bolsters to promote tissue layer apposition.[13]

Our findings indicate that patient satisfaction with the outcomes, decision, and overall facial appearance was high, with no significant difference between the control and test groups. However, the test group experienced higher rates of swelling, discomfort, and bruising, while the control group reported more frequent facial tightness. These results suggest that while our technique is effective, attention to postoperative care is crucial to minimize complications.

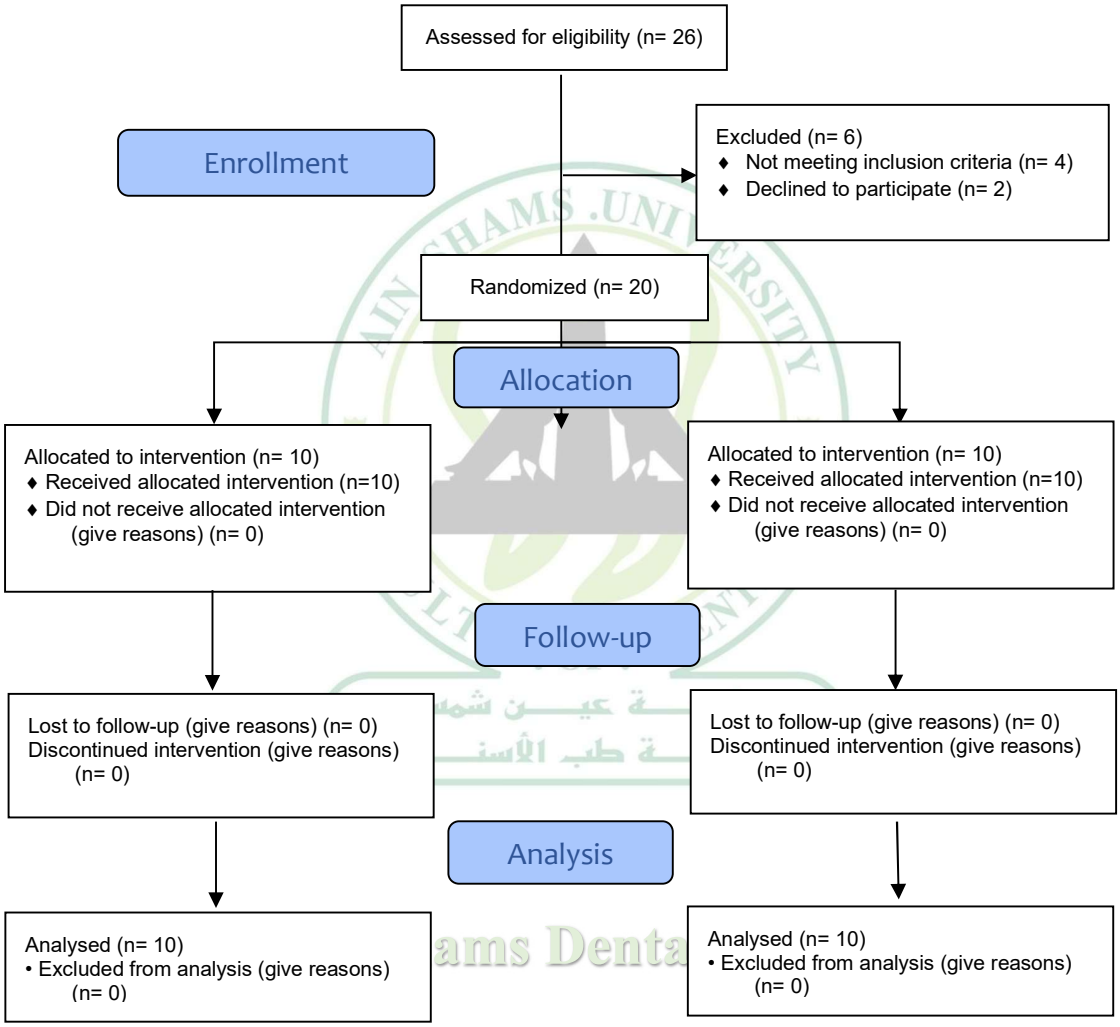

Figure 3: The flow diagram of participant enrollment

Table 2: Percentage, rank mean and the results of Mann-Whitney U test of patient's satisfaction with outcomes and decision

	Studied variables	Studied periods	Groups	VS (%)	SS (%)	SD (%)	VD (%)	Rank Mean	U Value	P Value
Patient satisfaction with	Result Miraculous	After the 1st month	Control	0	100	0	0	9.00	35.0	0.06
			Test	30	70	0	0	12.0		
	Result Fantastic		Control	0	100	0	0	9.00	35.0	0.06
			Test	30	70	0	0	12.0		
	Result Great		Control	100	0	0	0	10.5	50.0	1.00
			Test	100	0	0	0	10.5		
	Result Expected		Control	100	0	0	0	10.5	50.0	1.00
			Test	100	0	0	0	10.5		
	Pleased Results		Control	100	0	0	0	10.5	50.0	1.00
			Test	100	0	0	0	10.5		
	Look Good Mirror		Control	100	0	0	0	10.5	50.0	1.00
			Test	100	0	0	0	10.5		
Patients satisfaction with	Worth Time and Effort	After the 1st week	Control	100	0	0	0	10.5	50.0	1.00
			Test	100	0	0	0	10.5		
	Just What Wanted		Control	100	0	0	0	10.5	50.0	1.00
			Test	100	0	0	0	10.5		
	Just What Needed		Control	50%	50%	0	0	10.5	50.0	1.00
			Test	50%	50%	0	0	10.5		
	Look How I Want To		Control	50%	50%	0	0	10.5	50.0	1.00
			Test	50%	50%	0	0	10.5		
	Life Better		Control	100	0	0	0	10.5	50.0	1.00
			Test	100	0	0	0	10.5		

SD, somewhat dissatisfied; SS, somewhat satisfied; VD, very dissatisfied, VS, very satisfied. (statistical tests: Wilcoxon and Mann Whitney U, P>0.05)

Table 3: Percentage, rank mean and the results of Mann-Whitney U test of patient's satisfaction with facial appearance overall

	Studied variables	Studied periods	Groups	VS (%)	SS (%)	SD (%)	VD (%)	Rank Mean	U Value	P Value
Patients satisfaction with facial appearance overall	Symmetric	Before	Control	0	100	0	0	10.5	50.0	1.00
			Test	0	100	0	0	10.5		
		After 2th week	Control	100	0	0	0	10.5	50.0	1.00
			Test	100	0	0	0	10.5		
	Balanced	Before	Control	0	100	0	0	10.5	50.0	1.00
			Test	0	100	0	0	10.5		
		After 2th week	Control	100	0	0	0	10.5	50.0	1.00
			Test	100	0	0	0	10.5		
	Well-Proportioned	Before	Control	0	100	0	0	10.5	50.0	1.00
			Test	0	100	0	0	10.5		
		After 2 weeks	Control	100	0	0	0	10.5	50.0	1.00
			Test	100	0	0	0	10.5		
	End of your Day	Before	Control	0	0	100	0	10.5	50.0	1.00
			Test	0	0	100	0	10.5		
		After 2th week	Control	0	100	0	0	10.5	50.0	1.00
			Test	0	100	0	0	10.5		
	Fresh	Before	Control	0	0	100	0	10.5	50.0	1.00
			Test	0	0	100	0	10.5		
		After 2th week	Control	100	0	0	0	10.5	50.0	1.00
			Test	100	0	0	0	10.5		
	Rested	Before	Control	0	0	100	0	10.5	50.0	1.00
			Test	0	0	100	0	10.5		
		After 2th week	Control	0	100	0	0	10.5	50.0	1.00
			Test	0	100	0	0	10.5		
	Photos	Before	Control	0	0	100	0	10.5	50.0	1.00
			Test	0	0	100	0	10.5		
		After 2th week	Control	100	0	0	0	10.5	50.0	1.00
			Test	100	0	0	0	10.5		
	Wake Up	Before	Control	0	0	100	0	10.5	50.0	1.00
			Test	0	0	100	0	10.5		
		After 2th week	Control	100	0	0	0	10.5	50.0	1.00
			Test	100	0	0	0	10.5		
			Test	0	100	0	0	10.5		

SD, somewhat dissatisfied; SS, somewhat satisfied; VD, very dissatisfied, VS, very satisfied. (statistical tests: Wilcoxon and Mann Whitney U, P>0.05)

Table 4: Percentage, rank mean and the results of Mann-Whitney U test of early recovery symptoms

Studied variables	Groups	Not at all (%)	Little (%)	Moderate (%)	Extreme (%)	Rank Mean	U Value	P Value
Swelling	Control	20	80	0	0	6.70	12.0	0.001*
	Test	0	30	70	0	14.30		
Tenderness	Control	100	0	0	0	10.50	50.0	1.000
	Test	100	0	0	0	10.50		
Discomfort	Control	40	60	0	0	6.40	9.0	0.001*
	Test	0	30	70	0	14.60		
Bruised	Control	20	80	0	0	6.70	12.0	0.001*
	Test	0	30	70	0	14.30		
Numbness	Control	100	0	0	0	10.50	45.0	0.317
	Test	90	10	0	0	10.50		
Itching	Control	100	0	0	0	10.50	50.0	1.000
	Test	100	0	0	0	10.50		
Feverish	Control	100	0	0	0	10.50	50.0	1.000
	Test	100	0	0	0	10.50		
Face is Tight	Control	0	30	70	0	14.30	12.0	0.001*
	Test	20	80	0	0	6.70		

Conclusion

This study demonstrates the effectiveness of a conservative dimpleplasty technique involving the excision of a small portion of the buccinator muscle. The procedure is minimally invasive, performed under local anesthesia, and allows for a quick return to normal activities. Patient satisfaction was high, with no significant differences between the control and test groups. However, the test group experienced higher rates of swelling, discomfort, and bruising, while the control group reported more frequent facial tightness. These findings highlight the importance of careful postoperative care. Future research should focus on further reducing complications and enhancing long-term satisfaction.

Funding

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Data availability

Anonymized data will be available upon reasonable request from the co-author of this article.

Ethics approval and consent to participate

This study was approved by the ethics committee of Damascus University (UDDS-28066023/SRC-2577). All participants gave their informed consent before starting the study.

Competing interests

The authors declare that there are no competing of interests.

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