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Single Stitch Orbicularis Suspension (SOS technique) in Combined Upper and Lower Blepharoplasty

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Abstract:

Background and objectives: Lateral lower eyelid support has been employed for a long-time during blepharoplasty to avoid postoperative complication. The aim is to evaluate this new technique's effectiveness in providing enough support & preventing lower lid retraction.

Methods: This is a single armed interventional study performed in Sulaymaniyah Burn, Reconstructive & Plastic Surgery Hospital in Sulaymaniah city/Kurdistan Region-Iraq between Nov 1st 2020 to Mar 25th 2022. The study included 20 patients of both genders who had mild to moderate lower lid laxity, they underwent combined upper and lower blepharoplasty with lateral lower eyelid suspension using a single stitch. Postoperatively lower eyelid was examined for retraction and patients' feedback was recorded for their satisfaction.

Result: This study included 20 patients with eyelid laxity (13 mild and 7 moderate) who underwent upper and lower blepharoplasty with a mean age of 50.7± 8.0 years (1 male and 19 female). With an average follow-up of 17.1±3.9 months, no patient showed clinically significant lower eyelid retraction or laxity postoperatively. The average Blepharoplasty Outcome Evaluation score before surgery was 22.0±13.1%, which increased significantly to 92.1±11.8% postoperatively based on Wilcoxon Signed Ranks Test.

Conclusion: This technique is effective and practical for prevention of post blepharoplasty lower lid retraction.

Key words: Blepharoplasty, Orbicularis oculi, Retraction, Suspension

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Introduction

Our eyes take center stage when it comes to showing our age, this is why it's no wonder a vast number of patients seek periorbital rejuvenation. In the lower eyelid the effect of aging can be found clinically in all the layers, manifested in wrinkles, fat prolapse, alterations of the canthal support.[1] The tarsoligamentous laxity can also ameliorate the tone of Orbicularis Oculi Muscle(OOM) with subsequent interference with the eye closure mechanism.[2-4] For the lower lid to be functionally and aesthetically acceptable it should have a tight apposition to the globe with a gentle curve that touches the inferior limbus. This balance is kept by several factors including canthal position, lid laxity, eyelid muscular homeostasis and the relation of the globe to the maxilla.[5] The attempt to reverse the changes caused by aging is the goal of lower blepharoplasty that can be riddled with complications most of which are temporary, but some are permanent.[6,7] The most common of which are ectropion and lid retraction.[8] The etiology of which may be explained by excessive skin excision, the lid lacks support due to weak muscle tone especially during the postoperative period because of swelling or when conditions like; negative vector and volume deficiency are not factored in.[9] The resultant lower lid retraction will be a trouble for the patient and the surgeon to solve.[10] On the other hand, when a conservative amount of skin is removed wrinkles and sagging recur, resulting in patient dissatisfaction, further surgery and as a result exposure to infections and complications. This provoked plastic surgeons to look for solutions that allow excising enough skin without causing retraction by combining lateral canthal support with lower blepharoplasty either through canthoplasty, canthopexy or OOM suspension.[11] While canthopexy is suspension of the lateral retinaculum by a stitch without cantholysis employed for minimal laxity, canthoplasty means performing cantholysis and reforming the canthus applied in more severe forms of lid laxity.[1] Several techniques have been mentioned in the literature. We would like to present our experience undertaken in Sulaymaniyah city/ Kurdistan region-Iraq. The aim of the study is to assess the effectiveness of SOS-technique for lateral OOM suspension in prevention of postoperative lower lid retraction in patients with mild and moderate lid laxity.

Patients and methods

In this single armed interventional study (20) patients were operated on in Sulaymaniyah Burn, Reconstructive & Plastic Surgery Hospital in Sulaymaniah city/Kurdistan Region-Iraq on; one male and (19) females, aged (33-64 yr) with a mean age of (48.5) yr. They underwent combined upper and lower blepharoplasty with SOS-technique between Nov 2020-Mar 2022. In fact, the total number of the operated cases that were to be included was 63 cases, but the rest of them couldn't come back for the postoperative photography session. That's why they were excluded from the study despite their positive feedback on the phone. All patients' first visit consisted of history taking; concentrating on comorbidities and chronic drug use. Patient expectations were discussed in length. Examination consisted of the pinch test for skin excess, laxity with snapback and distraction test and the vector of the globe.[12] The inclusion criteria for this study was combined upper and lower blepharoplasty cases with mild to moderate lower lid laxity meaning a distraction test of <6mm and a snap-back test of less than 4sec.[13] Figure (1).

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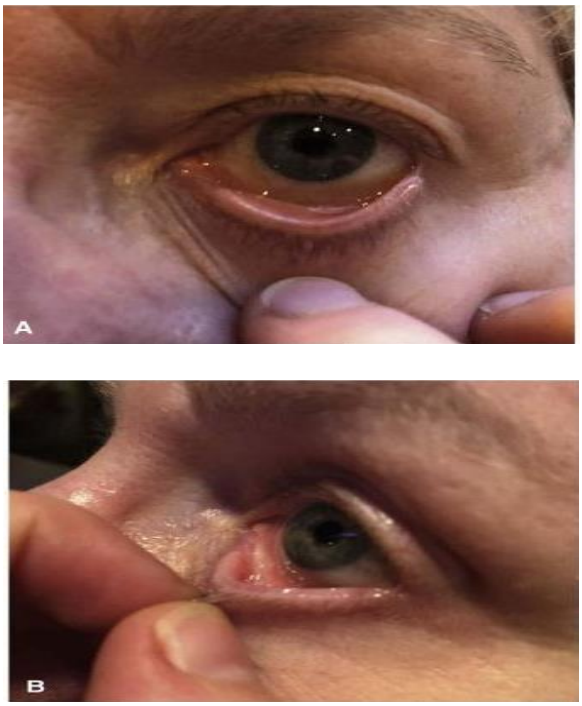

Figure (1): A. Snapback test. B. Distraction test.

While patients with severe lid laxity who needed canthal anchoring procedures were excluded. Patients were reassessed on the operative day, and they were photographed in straight forward and lateral gaze. Postoperatively they were seen in 3 days for dressing change then after a week from the operation to remove the stitches. The next follow-up visit was after 2 months for checkup and lastly after 1 year to assess the results. This study's results were interpreted using both subjective and objective parameters; for patient satisfaction we used the Blepharoplasty Outcome Evaluation (BOE) to assess our patients' subjective feedback.[14] The BOE questionnaire contains six questions with five choices each. Zero points indicate least satisfaction and 4 points most satisfaction. The total score is calculated by dividing the total points by 24 and multiplying by 100, figure (2). Then pre and postoperative lower lid position were objectively analyzed in forward gaze photographs taken by the same surgeon in the same settings comparing Margin Reflex Distance 2 which is the vertical distance between the lower lid margin and the pupillary light reflex, lower lid retraction is defined as MRD2 of more than 6mm.[15-17] With clinical assessment for lower lid laxity as well. The operation starts with skin marking in supine for precision, the upper lid is marked for laterally extended blepharoplasty then the lower lid is marked as shown in figure (3-a). Each eye was injected with 5ml of local anesthesia consisting of 2% Lidocaine and 1:80000 Adrenaline. During the operation more anesthesia was used as needed. The dissection started with upper blepharoplasty, leaving the wound open only approximating the edges with two simple 5-0 Vicryl stitches then lower blepharoplasty started with a 1 cm incision in the lateral end and proceeding with scissors separating the skin from the muscle then cutting the skin until just passing the medial limbus. Dissection is continued with Colorado needle electrocautery superficial to the pretarsal muscle till 5 mm from the lashes then diving deep to the preseptal OOM directing the tip of the electrocautery inferiorly to expose the orbital septum till the orbital rim and separate the orbicularis retaining ligament.

Blepharoplasty Outcomes Evaluation (BOE)

This questionnaire is designed to assist your surgeon in determining the best patient outcomes following blepharoplasty surgery. Your comments are confidential and may be used to refine surgical procedures for future patients. Please circle the number that best characterizes your current opinion regarding the following questions:

1. How well do you like the appearance of your eyes?

Not at all	Somewhat	Moderately	Very much	Completely
0	1	2	3	4

2. Do you feel like the appearance of your eyes makes you look tired?

Completely	Very much	Moderately	Somewhat	Not at all
0	1	2	3	4

3. How much do you feel your friends and loved ones like the appearance of your eyes?

Not at all	Somewhat	Moderately	Very much	Completely
0	1	2	3	4

4. Do you feel the current appearance of your eyes limits your social or professional activities?

Always	Usually	Sometimes	Rarely	Never
0	1	2	3	4

5. How confident are you that the appearance of your eyes is the best that it can be?

Not at all	Somewhat	Moderately	Very much	Completely
0	1	2	3	4

6. Would you like to surgically alter the appearance of your eyes?

Definitely	Most likely	Possibly	Probably not	No
0	1	2	3	4

Figure (2): Blepharoplasty Outcome Evaluation (BOE)

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Then using gauze to bluntly dissect into the prezygomatic space for recruitment of midface soft tissue. Most of the dissection is done inferolaterally to preserve buccal branches of the facial nerve medially. After good hemostasis the septum is plicated with few vertical 5-0 Vicryl stitches if needed after addressing any periorbital fat excess through excision or transposition. The skin muscle flap is re-draped and excess skin cut with scissors starting in an oblique manner laterally to make the edge beveled, cutting more skin and less muscle until just passing the lateral canthus flipping the scissors from there onward in the reverse oblique direction cutting more muscle and less skin medially not reaching near the punctum to avoid visible scar. Usually, the excised skin & muscle is a bit more than 1 cm at its widest lateral part, figure (3-b). Next SOS-technique starts, first; in the lower lateral part of the incision dissecting the muscle from the overlying skin using needle electrocautery to get a flap of nearly 1cm width. Second, the inferior end of the tunnel is prepared by gauze dissection and electrocautery making room for the flap to fit in.

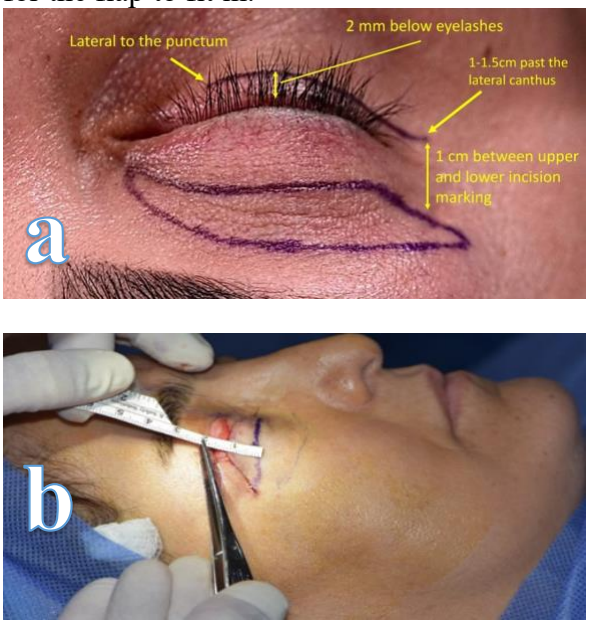

Figure (3): a. the skin marking, **b.** the excess skin and muscle marked to be excised.

Third; the muscle and soft tissue in the lateral end of the upper blepharoplasty incision is separated with electrocautery and gauze till the periosteum, figure (4-a). Fourth, a submuscular tunnel is created between the upper and lower blepharoplasty incisions with scissors big enough for the flap to pass through smoothly, figure (4-b). Lastly, the flap is suspended with a single lamellated mattress 4-0 PDO stitch to the exposed lateral orbital rim periosteum about 1 cm above the level of lateral canthus, taking the muscle flap throw 4 points; 2 proximal and 2 distal points to avoid flipping or cheese wiring, figure (4-c).

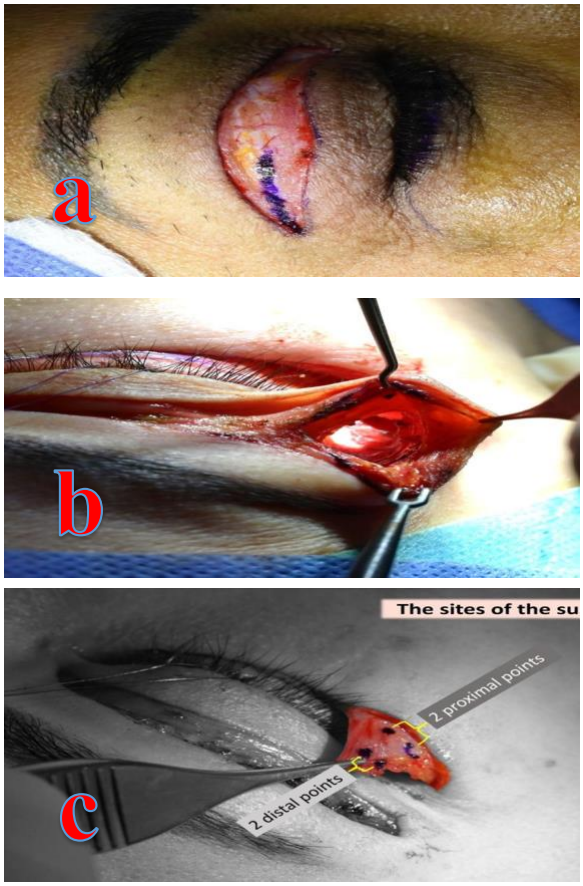

Figure (4): a. the site of dissection through the upper blepharoplasty incision to expose lateral orbital rim. **b.** superior view of the submuscular tunnel. **c.** the muscle flap to be suspended through 4 points.

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The re-draped skin muscle flap is examined again for any dimpling or extra skin excess to be addressed. Incisions are closed with subcuticular running 6-0 Prolene suture after placing few 5-0 Vicryl stitches as needed then steri-strips applied to the upper and lower lids. N-Betamethasone eye drops (Neomycin & Betamethasone) as prophylaxis for conjunctivitis and chemosis, painkillers and chloramphenicol eye ointment at night were prescribed.[18,19] Patients sent home on the same day after a brief resting period postoperatively. The study protocol was approved by the Medical Ethical Committee of KHCMS. The data were analyzed using SPSS version 27 statistical software, considering the significance level of 0.05.

https://www.youtube.com/watch?v=NiaAUA-jAZE

Results

A total of 20 patients (1 male and 19 female) undergoing upper and lower blepharoplasty with mean age of 50.7±8.0 years were included in this study; 13 patients (65%) with mild laxity and 7 patients (35%) with moderate laxity Table (1).

Table (1). Patient biography & degree of lower lid laxity.

patient	gender	age	Previous Periorbital procedures	Degree of lower lid laxity	Follow up period
1	Female	33yr	None	Mild	20 months
2	Female	39yr	None	Mild	23 months
3	Female	42yr	None	Mild	16 months
4	Female	44yr	None	Mild	16 months
5	Female	47yr	None	Moderate	14 months
6	Female	47yr	None	Mild	13 months
7	Female	48yr	None	Moderate	16 months
8	Female	48yr	None	Moderate	23 months
9	Female	50yr	None	Mild	12 months
10	Female	50yr	None	Mild	21 months
11	Female	50yr	None	Moderate	16 months
12	Female	50yr	None	Moderate	17 months
13	Female	50yr	None	Mild	15 months
14	Male	53yr	None	Mild	15 months
15	Female	58yr	Filler injection	Mild	14 months
16	Female	58yr	None	Mild	20 months
17	Female	59yr	None	Moderate	15 months
18	Female	61yr	None	Moderate	27 months
19	Female	63yr	None	Mild	15 months
20	Female	64yr	Filler injection	Mild	14 months

During the follow up period, that ranged between 12-27 months with a mean of 17.1±3.9 months, clinical examination and standard front-view photography assessment revealed that there were no patients with lower lid retraction or clinically significant laxity postoperatively. None of them showed any significant change in the lower eyelid margin distance from the pupillary light reflex (MRD2). Figures (5) (6) (7).

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Figure (5): Case No.1: A 48y Lady with moderate lower lid laxity showing no retraction 16 months post SOS technique, showing no change in MRD2.

Figure (6): Case No.2: a 50y old lady with moderate lower lid laxity showing no retraction 16 months post SOS technique, showing no change in MRD2.

Figure (7): Case No.3: a 50y old lady with moderate lower lid laxity showing no retraction 2 years post SOS technique, showing no change in MRD2.

They were all satisfied with their results as shown in table (2) the average BOE score before surgery was 22.0±13.1%, which increased to 92.1±11.8% postoperatively. The results of the Wilcoxon Signed Ranks Test showed a significant increase in the BOE score after surgery (p-value<0.001) Table (3). The complications were ecchymosis and periorbital edema that resolved in 2 weeks.

Table (2). Clinical assessment and BOE score results of the patients.

Patient	Preoperative BOE	Postoperative BOE	Postoperative lower lid retraction
1	8.3%	95.8%	No
2	16.6%	100%	No
3	20.8%	95.8%	No
4	45.8%	100%	No
5	29.1%	54.1%	No
6	25%	95.8%	No
7	20.8%	83.3%	No
8	0%	91.6%	No

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9	8.3%	95.8%	No
10	29.1%	100%	No
11	33.3%	95.8%	No
12	8.3%	100%	No
13	25%	100%	No
14	33.3%	95.8%	No
15	25%	75%	No
16	8.3%	91.6%	No
17	0%	100%	No
18	41.6%	75%	No
19	29.1%	95.8%	No
20	33.3%	100%	No

Table (3). Mean patient satisfaction score.

Time point	Satisfaction BOE score				p-value$^{\alpha}$
	Mean	Standard Deviation	Minimum	Maximum	
Preoperative	22.0%	13.1%	0.0%	45.8%	<0.001
Postoperative	92.1%	11.8%	54.1%	100%	

α Wilcoxon Signed Ranks Test

Discussion

Long ago de-epithelialized skin flaps were used to support the lower lid during blepharoplasty operations, but development of epidermal cysts led to abandonment of this procedure.[20] Later this practice was replaced by using a flap of OOM & the idea was supported by the notion that aging of the lower lid was not by the anterior lamella only, but also aging of OOM.[21,22] Several techniques have been employed in the last few decades for this muscle suspension. Adamson et al used 2 stitches of 4-0 clear Nylon to fix the mid portion of a triangular OOM flap, that was made by separating the muscle from the skin which was discarded in the excess part of the lower lid, to the periosteum of the lateral orbital rim through a submuscular tunnel.[20] In this study Adamson's technique was modified; SOS muscle flap is not made from the excess portion of the lower lid which is to be discarded as Adamson et al did, instead the flap is fabricated by dissecting the remaining skin from the preseptal OOM after discarding the excess skin and muscle to give better support and gain more lift in the mid face. Neither the malar fat was included in the suspension stitch as Liapakis et al did using a single 5-0 Monocryl.[23] Other surgeons have employed transposition flaps of OOM and suspended it.[21] Christopher I. Zoumalan et al suspended the flap with 1 stitch of clear 5-0 nylon suture.[16] Our stitch choice was based on strength and camouflage; 4-0 PDO is used to hold the flap in place until adhesions occur between the muscle flap and the bed. This adhesion was enhanced by the wide dissection at the lower end of the tunnel. Long lasting absorbable suture material was chosen so that no foreign material be left behind. Lateral sling is recommended in the literature as a mode of preventing lid retraction and ectropion, mentioning few other complications beside skin buckling at the site of the flap, that can be camouflaged by dissecting the muscle flap from the overlying skin for 1cm making it freer to move. This suspension alone can prevent lower lid retraction without adding lateral canthal anchoring for cases of mild and moderate lower lid laxity which spares the patient from the canthopexy complications like changing the shape of the palpebral fissure.[24] As an extra advantage with SOS-technique, release of the orbicularis retaining ligament gave a smoother lid check transition with smiling as mentioned by Mandelson et al as well.[25] For future, including cases whose been operated on by other surgeon's using this technique would assess its reproducibility and a longer follow up period would evaluate its long-lasting effect.

Conclusion

Single stitch Orbicularis Muscle Suspension abbreviation is inspired from the Morse code (SOS), because it can save the surgeon as well as the patient from post blepharoplasty lower lid retraction, with a shallow learning

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curve and no need to anchor the lateral canthus in cases with mild and moderate laxity.

Conflict of interest

None of the authors has any financial or personal relationship that could inappropriately influence this article.

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