Samuel Söderqvist

Upper Blepharoplasty for Dermatochalasis With or Without Resection of the Preaponeurotic and Nasal Fat Pads: A Comparative Study

Syventävien opintojen kirjallinen työ

Syyslukukausi 2019

Samuel Söderqvist

Upper Blepharoplasty for Dermatochalasis With or Without Resection of the Preaponeurotic and Nasal Fat Pads: A Comparative Study

Plastiikka- ja Yleiskirurgian Klinikka, Turun Yliopistollinen Keskussairaala, Turun Yliopisto, Turku.

Syyslukukausi 2019

Vastuuhenkilö: Dosentti Salvatore Giordano

Turun yliopisto

Lääketieteellinen tiedekunta

Upper Blepharoplasty for Dermatochalasis With or Without Resection of the Preaponeurotic and Nasal Fat Pads: A Comparative Study

Samuel Söderqvist, LK

Lääketieteen lisensiaatin tutkinnon kirjallinen työ

Plastiikka- ja Yleiskirurgian Klinikka, Turun Yliopistollinen Keskussairaala, Turun Yliopisto, Turku.

Lippaluomi on tila, jossa ylimääräinen iho yläluomella aiheuttaa näkökenttäpuutoksen tai tulehduksen yläluomen iholle. Lippaluomi voidaan korjata leikkauksella, jota kutsutaan blefaroplastiaksi. Se voidaan toteuttaa poistamalla joko pelkästään ylimääräistä ihoa tai poistamalla sen lisäksi myös osa silmäluomen sulkijalihaksesta ja yläluomen rasvakudoksesta. Tutkimuksen tarkoituksena on vertailla näitä leikkausmenetelmiä keskenään. Tutkimuksessa vertaillaan eri leikkaustapoja komplikaatioiden, uusintaleikkausten ja potilaiden tyytyväisyyden osalta keskenään.

Tutkimus on retrospektiivinen vertaileva tutkimus. Yhteensä 386 lippaluomipotilasta jaettiin leikkausmenetelmän perusteella tutkimus- ja kontrolliryhmään. Tutkimusryhmä muodostui 51 potilaasta, joilta ylimääräisen ihon lisäksi poistettiin yläluomen rasvaa ja osa silmän sulkijalihasta. Kontrolliryhmän 335 potilaalta poistettiin ainoastaan ylimääräistä ihoa yläluomelta. Potilaiden ominaisuuksia, komplikaatioita ja uusintaleikkausten tarvetta vertailtiin ryhmien välillä.

Tutkimusryhmän potilaiden leikkaus kesti merkitsevästi kauemmin ja he olivat pidempään sairaslomalla. He olivat nuorempia, sairastivat enemmän masennusta ja tupakoivat enemmän. Komplikaatioiden lukumäärässä ei ollut merkitsevää eroa ryhmien välillä. Kuitenkin hankalia verenpurkaumia oli tutkimusryhmän potilailla merkitsevästi enemmän. Uusintaleikkausia tehtiin molempien ryhmien potilaille yhtä paljon. Tulosten perusteella silmäluomen seudun rasvan poistolla ei ole vaikutusta leikkauksen turvallisuuteen. Vaikka lippaluomileikkaus, jossa poistetaan rasvaa kestää kauemmin, niin potilaat ovat sen lopputulokseen tyytyväisempiä kuin pelkän ihon poistoon.

Upper Blepharoplasty for Dermatochalasis With or Without Resection of the Preaponeurotic and Nasal Fat Pads: A Comparative Study

Samuel C. Söderqvist, MS[1], Salvatore Giordano, MD, PhD, FACS[1].

[1]*Department of Plastic and General Surgery, Turku University Hospital and The University of Turku, Turku, Finland.*

Short title: Upper Blepharoplasty with preaponeurotic and nasal fat pad resection results in – better patient and surgeon satisfaction without increased surgical complication risk.

Presented at the National Conference of the Finnish Surgical Society on November 14th – 16th, 2018, Helsinki, Finland.

Declaration of conflicting interests

The authors declared no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

Funding statement

The authors received no funding from any source.

Each author certifies that his or her institution waived approval for the reporting of this investigation and that all investigations were conducted in conformity with ethical principles of research.

This study was conducted at the Department of Plastic and General Surgery, Turku University Hospital and at The University of Turku, Turku, Finland.

Précis Blepharoplasty with preaponeurotic and nasal fat pad resection is a safe procedure.

Abstract

Purpose: Dermatochalasis is a skin excess in the upper eyelid and upper blepharoplasty corrects it. Blepharoplasty can be performed by removing only the excess of the skin or concomitant orbicularis oculi, preaponeural or nasal fat pads removal. The aim of this study was to investigate the efficacy of one technique over the other in order to improve safety and aesthetic results.

Methods: A comparative retrospective study was conducted in 386 consecutive patients with dermatochalasis of the upper eyelid, who underwent primary upper eyelid blepharoplasty from January 1st, 2015 to June 30th, 2017 at Turku University Hospital. Patients were divided according to the resection of preaponeurotic and nasal fat pads (study group, 51 patients) versus skin only (control group, 335 patients). Outcomes, patients' and surgeons' satisfaction were compared at follow-up.

Results: Operative time and return to work were significantly shorter in the control group. No significant differences in the total amount of complications were detected (7.8% vs 2.4%, p=0.075). Ecchymosis requiring further observation was significantly more frequent in the experimental group (3.9% vs 0.29%, p=0.046). Re-operation rates at follow-up were similar between the two groups. Subjective patients' satisfaction was significantly higher when preaponeurotic and nasal fat pads were resected (from 0-10, mean 8.3 vs 7.0, p=0.034).

Conclusions: Concomitant preaponeurotic and nasal fat pad resection appear to have higher patients' satisfaction without increased complications in upper lid blepharoplasty for dermatochalasis.

Key words: dermatochalasis, blepharoplasty, nasal fat pad, preaponeurotic fat pad, orbicularis oculi muscle, complications.

1. Introduction

Dermatochalasis is a condition where the excess loose skin of the upper eyelid starts to hang over the lashes and the eye, thus limiting the visual field. Lacrimal gland prolapse or fat herniation can exacerbate the symptoms. With the visual field limitation, dermatochalasis can cause chronic tension-type headache[1–3]. Dry eye symptoms have also been described concomitant to this condition[4]. Objective ways to measure the visual field loss caused by dermatochalasis are perimeter tests, the measurement of the distance between lower border of the skin fold in the upper eyelid and visual axis that is called margin reflex distance[5].

Blepharoplasty is the golden standard to treat dermatochalasis and it is one of the most common plastic surgeries in the USA with over 200,000 operations annually[6]. Blepharoplasty alleviates visual field limit both subjectively and objectively[5]. It might also alleviate chronic headache and the dry eye symptoms improving self-esteem and quality of life[1,2,4,7]. Patients might even be viewed in a more positive manner after the blepharoplasty than before the operation[8].

Blepharoplasty is a procedure where different amounts and types of tissue are removed from the upper eyelid. The two most common approaches are to remove only the skin, or concomitant orbitalis oculi muscle and periorbital fat altogether. However, complications can lead to poor functional and aesthetic outcomes. These include periorbital hematoma, surgical site infections, suture granulomas, lagophthalmos and post-operative ptosis[9]. Visual loss caused by ischemia or intraorbital hemorrhage is a more serious but rare complication which requires immediate treatment[10]. However, it is uncertain which approach is the safest, with the least complications and re-operations at long-term follow-up[11].

In Finland blepharoplasty is indicated in public health care settings when dermatochalasis causes functional deficits.

The aim of our study is to compare skin-only excision versus concomitant orbicularis oculi muscle and preaponeural fat removal blepharoplasty. Our hypothesis is that concomitant removal of orbicularis oculi muscle and preaponeuronal fat is equally safe compared to skin-only blepharoplasty.

2. Methods

2.1 Study design

This is a retrospective cohort study and the approval was claimed from the Turku University Hospital District and it was conducted by the tenets of the Declaration of Helsinki. Due the retrospective nature of the study no approval of the ethical committee was needed. The study population was acquired through electronic charts.

2.2 Study population

The inclusion criteria in the study were a diagnosis of dermatochalasis and the operation of bilateral blepharoplasty skin-only or with orbicularis muscle and fat removal. Patients with a history of unilateral blepharoplasty or with earlier facial surgery were excluded. The diagnosis of dermatochalasis required at least one of the following criteria: the excess skin of the upper eyelid in direct contact or caused the eyelashes to contact the eyeball, margin reflex distance was below 2 mm or the folding of the excess of skin causing inflammation and wounds in the eyelid area.

We included patients operated in the years 2015-2017 at Turku University Hospital. A total of 404 consecutive patients were found and 386 met the inclusion criteria. A total of 18 patients

were excluded due to unilateral blepharoplasty or earlier periorbital surgery. The patients were divided into study and control group. The study group consist of 51 patients with dermatochalasis where blepharoplasty with skin and nasal fat removal was accomplished. The control group consist of 335 patients with dermatochalasis where a skin-only blepharoplasty was performed.

2.3 Data collection

The medical records of these patients were read manually, and the following information was collected: general information about the patient, preoperative conditions of the orbital region, medication increasing the risk of bleeding and comorbidities. Similarly, information about the surgical technique, equipment and local anesthesia were extracted. Post-operative complications, re-operations, follow-up time and time of sick leave were also analyzed (Table 1). Satisfaction of post-operative results of the patient and the surgeon was evaluated on a visual analogue scale (VAS) from 0 (not satisfied) to 10 (satisfied).

Table 1. Data collected about the patients from the medical records.

General information	**Preoperative conditions of the orbital region**	**Medication increasing the risk of bleeding**	**Comorbidities**
Age	Ptosis	Aspirin	Any
Height	Brow ptosis	Warfarin	HTA
Weight	Asymmetry	Novel oral anticoagulants	Lung disease
	Trichiasis	Clopidogrel	Lipid disease
		Ticagrelor	Diabetes
			Depression
Information about the surgeon	**Surgical technique**	**Equipment used**	**Local anesthesia**
Surgeon name	Concomitant eyebrow lift	Knife	Lidocaine

Resident or specialist	Concomitant other procedure	RadioSurg	Naropin
Ophtalmologist or plastic surgeon	Type of tissue resected	Diathermia	Hyaluronidase
		PlasmaPeak	
Information about the operation	**Infections**	**Time of follow-up**	
Operative time	Wound coulture	By the surgeon	
Loss of blood	Eye coulture	By any doctor in TYKS	
Suture material	Blood coulture	Time of sick leave	
Suture removal days	Microorganism isolated		
	Any infection requiring antibiotics		
Complications	**Complications**	**Re-Operation**	
Hematoma requiring treatment	Postoperative asymmetry	Condition needing treatment	
Ecchymosis	Postoperative ptosis	Type of re-operation	
Poor scar requiring revision	Asymmetric ptosis		

2.4 Definitions

A hematoma requiring revision is a large periorbital hematoma that causes symptoms and pain to the patient. A retrobulbar hematoma is a condition where the hematoma compresses the neurovascular structures of the eye and requires immediate evacuation of the hematoma and ophthalmological treatment. Ecchymosis was defined as excessive blood in the subcutaneous tissue not requiring intervention, but uncomfortable for the patient.

Surgical site complications were limited to the operation area, including granuloma formation, suture abscesses, eye dryness and lagophthalmos.

Surgical site infections included conjunctivitis, keratitis, wound infection, orbital preseptal cellulitis or intraorbital cellulitis.

Systemic complications or infections included sepsis, organ failure and other major conditions that require treatment in a hospital.

Re-operations included re-blepharoplasties, removal of granulomas and suture abscesses, brow lifts after blepharoplasty to enhance its results, or any operation that requires local anesthesia after the initial operation.

2.5 Surgical Technique

The operations were performed by 34 different surgeons and 22 of them were ophthalmologists and 12 were plastic surgeons. The area intended to be operated was marked and local anesthesia was injected. The marked skin was removed and depending on the technique also a strip of orbicularis oculi muscle and preaponeuronal fat were excised. The indication for each type of technique was at the surgeon's preferences. Similarly, either absorbable or non-absorbable thread were used for wound closure.

2.6 Statistical analysis

The results of parametric and nonparametric data were expressed as mean ± standard deviation (SD). SPSS statistical software (SPSS 23.0, Chicago, Illinois 60606, U.S.A) was used for all statistical analyses. Comparisons between both groups were determined using the chi-square test or Fisher's exact test when appropriate. Continuous variables were compared using the analysis of variance test. Confidence intervals were set at 95%. A two-sided *P* value of = 0.05 was considered as statistically significant.

3. Results

The patients in the study group were significantly younger than the patients in the control group (62.8 ± 9.3 years vs. 67.7 ± 10.1 years, p=0.001) with higher smoking prevalence (14 (27.5%) vs. 45 (13.4%), p=0.010). Study group patients had a significantly higher depression prevalence than in the control group (10 (19.6%) vs. 33 (9.8%), p=0.038). There were no other significant differences between the groups with respect of demographics. There were no significant differences between preoperative ptosis and orbital asymmetry (Table 2).

Table 2. Demographics of patients at time of study.

	Fat/Orbicularis Resection Group (n = 51)	*Control Group (n = 335)*	*p-value*
Age (mean ± SD)	62.8 ± 9.3	67.7 ± 10.1	***0.001***
BMI	27.3 ± 4.3	27.6 ± 6.6	0.703
Any comorbidity	33 (64.7%)	205 (62.1%)	0.723
HTA	27 (52.9%)	185 (55.1%)	0.777
Diabetes	9 (17.6%)	50 (14.9%)	0.615
Hypercholesterolemia	14 (27.5%)	127 (37.8%)	0.153
Lung disease	7 (13.7%)	48 (14.3%)	0.915
Depression	10 (19.6%)	33 (9.8%)	***0.038***
Smokers	14 (27.5%)	45 (13.4%)	***0.010***
Warfarin	2 (3.9%)	26 (7.8%)	0.325
Aspirin	7 (13.7%)	59 (17.6%)	0.498
Omega-3	3 (6.1%)	21 (6.3 %)	0.952
Ptosis	2 (3.9%)	16 (4.8%)	0.787
Asymmetry	17 (33.3%)	98 (29.3%)	0.553

Operative time was significantly longer in the study group (72.2 ± 22.8 minutes vs. 60.2 ± 11.7 minutes, p<0.001) and the sock leave was significantly longer in the study group than the control (11.3 ± 4.2 days vs. 8.0 ± 3.1 days, p<0.001, Table 3).

Table 3. Comparison of perioperative parameters in the two groups of patients.

	Fat/Orbicularis Resection Group (n = 51)	*Control Group (n = 335)*	*p-value*
Operative time (min, mean ± SD)	72.2 ± 22.8	60.2 ± 11.7	***<0.001***
Return to work (days, mean ± SD)*	11.3 ± 4.2	8.0 ± 3.1	***<0.001***
Follow-up (months, mean ± SD)	12.0 ± 10.3	15.6 ± 20.6	0.234

*For patients not retired (21 vs 73 patients).

The incidence of ecchymosis was significantly higher in the study group (3.9% vs. 0.29%, p=0-046). There were no significant differences among other complications between the groups. Re-operation rate was high in the study group (11.8%) but not significant. The study group patients were significantly more satisfied with the post-operative results than the control group (VAS 8.3 ± 2.7 vs. 7.0 ± 2.3, p = 0.034). There were no significant differences between surgeons' satisfaction (Table 4).

Table 4. Postoperative complications and satisfaction.

	Fat/Orbicularis Resection Group (n = 51)	*Control Group (n =335)*	*P-value**
Complications	3 (7.8%)	5 (2.4%)	0.075
Any infection	1 (0.3%)	3 (0.8%)	0.432
Ecchymosis (requiring any observation)	2 (3.9%)	1 (0.29%)	***0.046***
Postoperative ptosis	0 (0.0%)	1 (0.3%)	1.000
Levator damage	0 (0.0%)	0 (0.0%)	1.000
Re-operation	6 (11.8%)	26 (7.7%)	0.327
Patients' satisfaction (0-10, mean ± SD)	8.3 ± 2.7	7.0 ± 2.3	***0.034***
Surgeon's satisfaction (0-10, mean ± SD)	8.5 ± 2.4	7.4 ± 2.3	0.085

4. Discussion

Our study demonstrated that concomitant preaponeurotic and nasal fat pad resection result into higher patients' satisfaction without increased complications in upper lid blepharoplasty for dermatochalasis. In the study group patients smoked more frequently and they were younger. Smoking is a well-known cause of aging-related changes and, therefore, might increase the dermatochalasis incidence[12]. On the other hand, surgeons might also have chosen a less invasive technique to correct dermatochalasis for elderly patients in order to avoid unnecessary risks. Advanced age and related diseases might pose the patient at an increased risk of bleeding, surgical site complications and other conditions of orbital region.

Not surprisingly, operation time in skin-only blepharoplasty was significantly shorter. In contrast, study group patients needed a significantly longer sick leave, probably because of a

more invasive procedure. However, a previous study on this topic showed that the patients return to work in similar time lapse, independently on the type of surgical technique and tissue resected. Almost 60% of the patients had returned to work after one week and 90% after two weeks. [11] The results of our study indicate that there is no reason to prescribe longer sick leaves for patients with a more invasive blepharoplasty technique, with a median length under two weeks for both groups if the patient was an active worker.

The optimal type and amount of tissue to be removed in blepharoplasty is still debated, but most of studies mainly focus either on the aesthetic or the functional outcomes[13]. Some authors claim that saving the orbital fat and orbitals oculi muscle preserves a youthful look. Other studies have shown that the initial results might be worse after the removal of part of orbicularis, but the final aesthetic results are similar [11,14–16]. We found that patients who underwent blepharoplasty with fat removal were more satisfied with the results than the skin-only patients at follow-up. However, the satisfaction might be influenced not only by the aesthetic appearance but also by the functional improvement.

As expected, most postoperative complications were minor and treated in a conservative matter. Surprisingly, the amount of re-operations was relatively high in both groups without statistical differences. Most of the reoperations were due to dermatochalasis recurrence and removal of suture granulomas or abscesses. The study group had significantly more ecchymosis, which could be expected from a more invasive surgery. Interestingly, the only post-operative ptosis happened after skin-only blepharoplasty, which is considered to be a less invasive method[15]. Other authors found that the amount of complications depended only on the patients' primary diseases and not on the blepharoplasty technique itself [11]. Small studies have detected that minor complications such as itching, pain, dry-eye symptoms, edema, hematoma and even lagophthalmos were worse when a part of orbicularis was removed particularly during the first postoperative weeks, but these differences were not persistent and

resolved during the follow-up[15,16]. In our study, we could not assess such minor complications due to lack of data.

It has been shown that a part of orbicularis oculi muscle, which is typically removed in blepharoplasty, acts as a tear pump.[12] Therefore, blepharoplasty can even exacerbate the dry eye symptoms if part of the orbicularis oculi muscle is removed without a careful assessment[4,17]. On the other hand, weakening the upper part of the orbicularis might result in a mild upper brow lift, improving both functional and aesthetic outcomes.

Both blepharoplasty techniques seem to be safe and patients might be more satisfied with blepharoplasty with fat removal. However, it seems that removing the excess fat or muscle does not significantly prevent the need for reoperation. Though, there are subgroups such as patients with lacrimal gland prolapse or fat herniation that might benefit from a more invasive surgery.

To our best knowledge this is one of the largest studies evaluating post-operative complications in patients with dermatochalasis after blepharoplasty. However, the low number of patients in the study group could explain the higher amount of complications and re-operations did not reach statistical significance. Further studies with larger study populations are warranted to clarify the indications for one procedure over the other.

Due to the retrospective nature of this study, we were vulnerable to selection bias. We had to rely on the patient records which might contain not accurate information consistently. The assessment of patients' and surgeons' satisfaction were subjective.

There might be a subgroup of patients that would especially benefit from the removal of excess fat or muscle. Recognizing these patients before the operation might improve the outcomes and decrease the need of reoperations.

5. Conclusion

Both upper blepharoplasty techniques are safe with similar outcomes. The skin-only blepharoplasty might cause less symptoms initially after the surgery, but there is no evidence for long-term differences between the above mentioned techniques. The skin-only blepharoplasty is faster compared to a more invasive procedure. However, the patients seem to be more satisfied when orbicularis, preorbital and nasal fat pads are resected.

References

1. Bahceci Simsek, I. Association of Upper Eyelid Ptosis Repair and Blepharoplasty With Headache-Related Quality of Life. *JAMA Facial Plast. Surg.* **19**, 293 (2017).

2. Mokhtarzadeh, A., McClelland, C., Lee, M. S., Smith, S. & Harrison, A. R. The Bleph and the Brain: The Effect of Upper Eyelid Surgery on Chronic Headaches. *Ophthal. Plast. Reconstr. Surg.* **33**, 178–181 (2017).

3. Kim, D. *et al.* Does upper blepharoplasty affect frontalis tonicity? *J. Plast. Reconstr. Aesthet. Surg.* **68**, 638–644 (2015).

4. Vold, S. D., Carroll, R. P. & Nelson, J. D. Dermatochalasis and Dry Eye. *Am. J. Ophthalmol.* **115**, 216–220 (1993).

5. Jacobsen, A. G., Brost, B., Vorum, H. & Hargitai, J. Functional benefits and patient satisfaction with upper blepharoplasty - evaluated by objective and subjective outcome measures. *Acta Ophthalmol. (Copenh.)* **95**, 820–825 (2017).

6. 2017 Plastic Surgery Statistics Report. *Plast. Surg.* 25 (2017).

7. Herruer, J., Prins, J., van Heerbeek, N., Verhage-Damen, G. & Ingels, K. Patient-reported outcome measurement in upper blepharoplasty: How to measure what the patient sees. *J. Plast. Reconstr. Aesthet. Surg.* **71**, 1346–1351 (2018).

8. Bullock, J. D., Warwar, R. E., Bienenfeld, D. G., Marciniszyn, S. L. & Markert, R. J. PSYCHOSOCIAL IMPLICATIONS OF BLEPHAROPTOSIS AND DERMATOCHALASIS. 8.

9. Pacella, S. J. & Codner, M. A. Minor Complications after Blepharoplasty: Dry Eyes, Chemosis, Granulomas, Ptosis, and Scleral Show: *Plast. Reconstr. Surg.* **125**, 709–718 (2010).

10. Teng, C. C., Reddy, S., Wong, J. J. & Lisman, R. D. Retrobulbar Hemorrhage Nine Days after Cosmetic Blepharoplasty Resulting in Permanent Visual Loss: *Ophthal. Plast. Reconstr. Surg.* **22**, 388–389 (2006).

11. Saalabian, A. A., Liebmann, P. & Deutinger, M. Which Tissue Should Be Removed in Upper Blepharoplasty? Analysis and Evaluation of Satisfaction. 8 (2017).

12. Deliaert, A. E. K., van den Elzen, M. E. P., van den Kerckhove, E., Fieuws, S. & van der Hulst, R. R. W. J. Smoking in Relation to Age in Aesthetic Facial Surgery. *Aesthetic Plast. Surg.* **36**, 853–856 (2012).

13. Hoorntje, L. E., Lei, B. van der, Stollenwerck, G. A. & Kon, M. Resecting orbicularis oculi muscle in upper eyelid blepharoplasty – A review of the literature. *J. Plast. Reconstr. Aesthet. Surg.* **63**, 787–792 (2010).

14. LoPiccolo, M. C., Mahmoud, B. H., Liu, A., Sage, R. J. & Kouba, D. J. Evaluation of Orbicularis Oculi Muscle Stripping on the Cosmetic Outcome of Upper Lid Blepharoplasty: A Randomized, Controlled Study: *Dermatol. Surg.* **39**, 739–743 (2013).

15. Damasceno, R. W., Cariello, A. J., Cardoso, E. B., Viana, G. A. & Osaki, M. H. Upper Blepharoplasty With or Without Resection of the Orbicularis Oculi Muscle: A Randomized Double-Blind Left-Right Study: *Ophthal. Plast. Reconstr. Surg.* 1 (2011) doi:10.1097/IOP.0b013e318201d659.

16. Kiang, L., Deptula, P., Mazhar, M., Murariu, D. & Parsa, F. D. Muscle-Sparing Blepharoplasty: A Prospective Left-Right Comparative Study. *Arch. Plast. Surg.* **41**, 576 (2014).

17. Saadat, D. & Dresner, S. C. Safety of Blepharoplasty in Patients With Preoperative Dry Eyes. *Arch. Facial Plast. Surg.* **6**, 101–104 (2004).