

## SUBORBITAL FAT PROTRUSION OF THE LOWER EYELIDS

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**Abstract:** *Background:* Protrusion of the lower eyelid is an aesthetic condition that is influenced by many anatomical features. *Aim* is to identify and categorize fat pad protrusion under the lower eyelids, and to evaluate the scoring system for determining the anatomical characteristics that will yield optimal surgical results.

*Material and Methods:* During a six year period (2000–2005) we operated 42 patients with suborbital protrusion of lower eyelids. In our assessment of the fat pad protrusion we employed analysis of: prominence of the orbicular muscle, prolapse of the suborbital fatty tissue, eyelid fluid, stretching of the lower eyelid, triangular prominence in the malar region, loss of skin elasticity (tear through).

*Results:* Our study showed that the cause for baggy lower eyelids appearance is a group of complex anatomical changes. The cumulative contribution score used in this study allows for determination of the principal cause for the appearance of the sagging baggy lower eyelids. With this knowledge, the surgeon has the opportunity of choose the most appropriate Blepharoplasty technique in obtaining the optimum aesthetic effect.

*Conclusion:* The cumulative contribution score for each anatomic variable show us that prolapsed orbital fat received high score in man as compared to women. The knowledge of the origin of baggy eye lids can aid surgeons in their selection of the correct facial sculpting technique in order to achieve the optimal aesthetic effect.

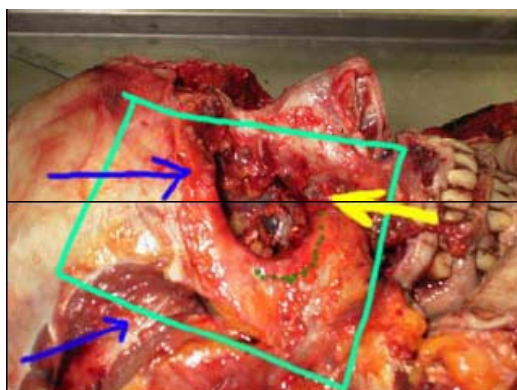
**Key words:** Blepharoplasty, fatty tissue, lower eyelids, score.

### *Historical background*

Cosmetic eyelid surgery has been described for over a century. Aulus Cornelius Celsus discussed skin excision in the upper eyelid in his *De re Medica*, published in 1478. In 1818, von Graefe used the term blepharoplasty (from the Greek *blepharon*, meaning eyelid, and *plastos*, meaning formed) to describe a case of eyelid reconstruction. In 1817, Beers wrote and described the first illustration of eyelid deformity caused by fat herniation and a mechanical ptosis due to excess skin. [1] Some authors called this finding ptosis adiposa, and introduced the term blepharochalasis as a way of describing the apparent excess of eyelid skin associated with aging changes

### *Etiology*

Blepharoplasty is currently defined as excision of excessive eyelid skin, with or without orbital fat removal, for either functional or cosmetic indications. Aging changes in the eyelid are caused by combination of degenerative and pathological processes that alter the skin and periorbital structures. These changes may convey an inappropriate message of tiredness, sadness, and absence of vigor, which may diminish the aesthetic appearance of the face. With age, the orbital septum (which is a distensible anatomical layer of the eyelid) weakens thus leading to loss of elasticity of the orbicularis muscle and the supporting ligaments of the eyelid. The resultant loss of elasticity in the skin creates broadened surface areas of epidermis necessary to cover the protruding fat resulting in redundant tissues of the eyelid (Figure 1).



*Figure 1 – Anatomical properties of the eye and periorbital region of cadaver*  
*Слика 1 – Анатомски одлики на око то и периорбиталниот регион (кај 1e1)*

The eyes and periorbital area are commonly the focal point during human conversation and communication. Cosmetic lower eyelid blepharoplasty

is an elective procedure performed to improve the aesthetic appearance of the eyes. The variety and complexity of periorbital surgical procedure continue to increase, and the aesthetic surgeon has to decide on the proper technique which will give the best aesthetic results. Blepharoplasty with or without fat pad removal (Figure 2) may be performed as an isolated procedure or in combination with rejuvenation of the upper third of the face. [2] Patients often seek this procedure in order to remove baggy lower eyelids, dark circles around their eyes, wrinkles around the eye area or sagging appearance of the face.

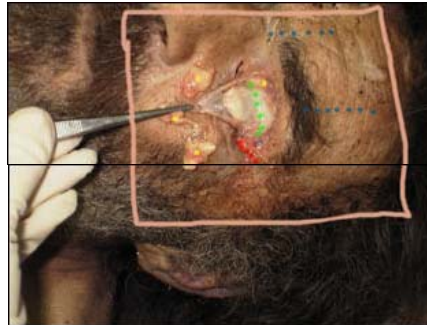


Figure 2 – Removal of fatty pads from cadaver  
Слика 2 – Отстранување на масни перничичиња (од леу)

#### *Anatomical Consideration*

The cephalometric dimensions of the periorbital region are different in men and women. In the female, eyelid crease are higher and more arched, while the eyelid fold is less prominent. In men, the brow protrudes more anterior, with the eyelid crease closer to the eyelid margin. In women the crease is usually 8 mm above the lid margin, and in men it is usually 6 mm above the eyelid margin. Surgeon must evaluate these periorbital relationships before performing aesthetic surgery. Additionally, a basic ophthalmology examination, including testing for visual acuity and testing for dry eyes, should be performed.

#### *Surgical landmarks of the periorbital region*

Evaluation of surgical landmarks and planned skin excision was carried out prior to each operation. We used the pinch technique to assess the amount of skin to be excised in combination with a gently pressure on the globe that presented the amount of fat pad protrusion in the lower eye lid. Other surgical landmarks are:

- *Prominence of the orbicular muscle:* Can be characteristic for younger age. In the process of aging it can be the main reason for wrinkle appearance. Many patients complain of seeing vertical and horizontal lines which are more visible while laughing (Figure 3, 4, 5).

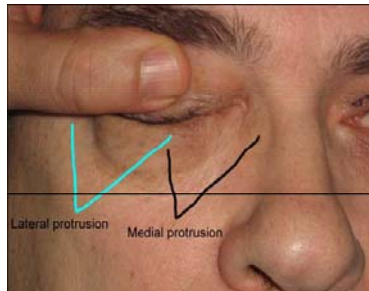


Figure 3 – Prominence of the orbicular muscle

Слика 3 – Истракнување на очниот мускул



Figure 4, 5 – Prominence of the orbicular muscle

Слика 4, 5 – Истракнување на очниот мускул

- *Prolapse of the suborbital fatty tissue*: Recognized by the characteristic form of the fatty orbital compartments. The central fatty tissue usually has a cigarette like shape (Figure 6). The orbital fatty tissue is made of individual compartments which are easily to visualize through the skin. The lateral and the central fatty tissues between are divided with oblique inferior muscle, while the central and medial fatty tissues are divided by oblique muscle. All of the fatty tissues can be seen and analyzed while the patient looks upward. The prominence of the orbital fatty tissue is in relation with the process of aging. Reason for protrusion of the orbital fatty tissue is weakening of the septum.



Figure 6 – a. Pre-operative prolapse of the suborbital fatty tissue;  
b. 3 months post-operative

Слика 6 – а. Пред-оперативно пролапс на суборбитално масно ткиво;  
б. Пост-оперативно 3 месеци

- **Eyelid fluid:** Has specific diagnostic characteristics (Figure 7). The swelling is greater in the morning and after eating salty food. It is pinkish in color and doesn't make a prominence while looking upward. The fluid in the eyelids is not well defined in relation to the lateral, medial and central compartments. When pinched, the fluid fluctuates, but the contour of the fluid does not change while looking upward or downward.



Figure 7 – a. Pre-operative – Patient with eyelid fluid; b. Post-operative.  
Слика 7 – а. Пред-оперативно – Пациентка со течност во очните капаци;  
б. Пост-оперативно

- **Stretching of the lower eyelid:** One of the major characteristics in the process of aging. This is characterized by loss of subcutaneous fatty tissue followed by thinning of the skin, loss of the ligament elasticity and sagging of the face. (Figure 8) Stretching of the lower eyelid is often associated with underlying bone configuration and very often is seen in patients with congenital hypoplastic cheeks and maxilla.
- **Triangular prominence in the malar region:** Becomes visible with collection of fluid. This condition can be hereditary. Anatomically the triangular prominence in the malar region is found in the zygomatic region (Figure 9).

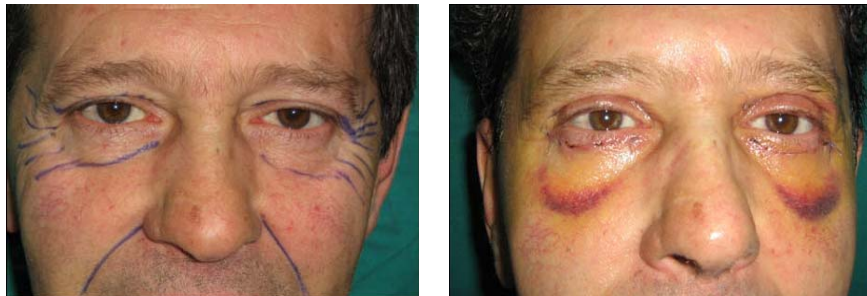


Figure 8 – a. Pre-operative stretching of the lower eyelid; b. 3<sup>rd</sup> day post-operative.  
Слика 8 – а. Пред-оперативно растегнување на долниот очен карак;

*б. Трет пост-оперативен ден*



*Figure 9 – a. Pre-operative triangular prominence in the malar region;  
b. 2 months post-operative*

*Слика 9 – а. Пред-оперативно троаголно исракнување во маларниот предел;  
б. Пост-оперативно*

- *Loss of skin elasticity (tear through)*: This is a characteristic point in the process of aging of the eyelids and comes with color change and the quality of the skin. The thin skin shows the irregularities of the tissue that are underneath that skin (Figure 10).



*Figure 10 – a. Pre-operative loss of skin elasticity with xanthelasma;  
b. 1 year post-operative*

*Слика 10 – а. Пред-оперативен губиток на еластичитетот на кожата со присутни ксантелиази; б. Пост-оперативно*

### *Material and Methods*

During a six year period, 2000–2005, lower eyelid Blepharoplasty was carried out in 42 patients (13 male and 29 female) at the Clinic for Plastic and Reconstructive Surgery in the University Clinical Center, Skopje, Republic of Macedonia. Informed consent was obtained preoperatively. In order to be considered for Blepharoplasty, patients underwent a complete preoperative medical evaluation. All concurrent medical conditions were documented, and use of Aspirin

and anticoagulation medicine, was taken into account. Patients with a history of keloid scar formation and abnormal coagulation were not included in the study.

Documenting pre-operative state and post-operative changes was performed by photographing patients. Digitalized photographic pictures were taken in traditional views (close up of the eyes, upward and downward gaze). Additional views taken may include lateral (profile) and oblique (right and left) view. Globe position was documented in relation to the inferior orbital rim.

Surgeon's evaluation score of the anatomical contribution from six surgical landmarks of the periorbital region to the eyelid bag changes are graded with a five point system [3] (0–4):

- 0 = no involvement;
- 1 = mild involvement;
- 2 = moderate involvement,
- 3 = marked involvement,
- 4 = severe involvement.

All pictures from the 42 patients were examined and scored by three independent aesthetic surgeons. Score from the six surgical landmarks of the periorbital region is tallied into a contribution score for each anatomic variable. Score is computed when the given points are added and averaged. For example: if a patient was graded 4 (severe involvement) for prominence of the orbicular muscle, 3 (marked involvement) for prolapse of the suborbital fatty tissue, 2 (moderate involvement) for presence of eyelid fluid, 1 (mild involvement) for stretching of the lower eyelid, 0 (no involvement) for triangular prominence in the malar region, and 0 (no involvement) for loss of skin elasticity, the score is  $4 + 3 + 2 + 1 + 0 + 0 = 10$ . The anatomical contribution to the periorbital baggy lower eyelid is the average of the individual scores.

$$\text{anatomical contribution} = \frac{4+3+2+1+0+0}{6} = 1.67$$

Patient's satisfaction from the aesthetic outcome was measured with a questionnaire assessing satisfaction from the operation. In order to obtain unbiased responses, patients with previous surgical intervention were excluded from evaluation in this study. The score is graded as:

- 0 – Bad;
- 1 – Satisfactory;
- 2 – Good;
- 3 – Excellent.

Aim of our study is to analyze the anatomical characteristics that contribute to changes of the lower eyelids in patients undergoing aesthetic correction of the lower eyelid, and to evaluate the patient's satisfactory response in relation to the outcome of the operation to correct the baggy lower eyelids [4].

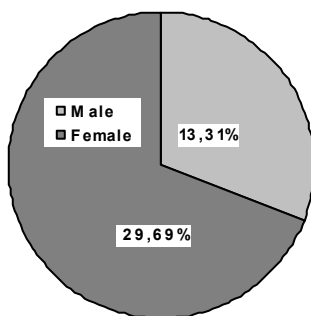
Statistic analysis was made by using commercially available statistical package.

#### *Intraoperative details*

Local anesthesia (commercially available 2% Lidocaine with 0.5% Adrenaline) with systemic sedation is applied at the start of the operation [5]. Intraocular anesthesia with 0.3 mg (5 mg/ml) Marcaine (0.5% Alcaine, Couvreur, Belgium) is added in order to avoid patient's uncontrolled eyelid movement. Orbital septum was identified after incision of the skin and orbicular muscle. Control of bleeding during fat removal is imperative to obtaining optimum result. Eyelid crease formation is performed with absorbable 5-0 Vicryl sutures, and 6-0 non-absorbable nylon sutures for skin closure [6]. Postoperative recovery usually lasts up to 24 hours. Patients are not bandaged, and the wounds are covered with topical antibiotic ointment. Normal activities can be resumed after 7 days [7].

#### *Results*

During a six year period (2000–2005) forty two patients were evaluated and operated (13 man [31%] and 29 women [69%] at a mean age of  $45.9 \pm 9.0$  years, range 26 to 73 years) (Figure 11). The majority of patients (30, 71.4%) had a university degree and the rest (12, 28.6%) were with a high school diploma.



*Figure 11 – Proportion of Male and Female patients*

*Слика 11 – Поделба на пациенти по пол*

The average length of stay in the hospital was 1.1 days with only 5 (11.9%) patients staying two or more days, while all other 37 (88.1%) were hospitalized for only one day. Routine administration of post-operative prophylactic antibiotic measures resulted in appearance of infection in only one patient (2.4%). On the average, surgical procedures lasted  $63 \pm 14.7$  minutes (range 45 to 90 minutes).

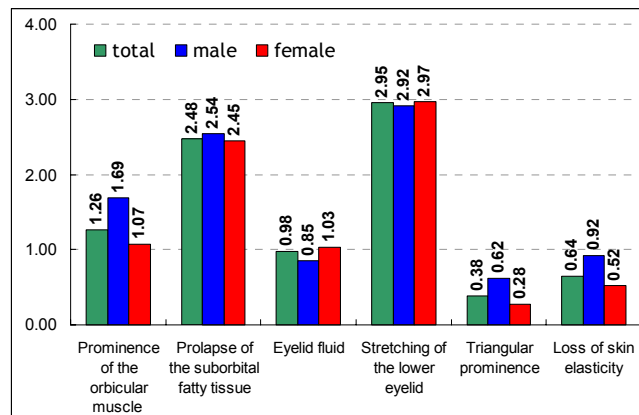


Evaluation of patient's pictures, by the three surgeons, showed that stretching of the lower eyelid and prolapsed suborbital fatty tissue received the highest score, indicating that they were the two most important anatomical problems that caused the aesthetic problem (Table 1). We noticed that in males the prominence of the orbicular muscle and triangular prominence caused greater anatomical changes in men than in women (Figure 12). In the other anatomical changes there was no significant difference among men and women.

Table 1 – Табела 1

*Cumulative contributive score 42 patient*  
*Резултат од кумулативен придонес кај 42 пациенти*

Category	Total score	male	female
Prominence of the orbicular muscle	1.26 (31.5%)	1.69	1.07
Prolapse of the suborbital fatty tissue	2.48 (62.0%)	2.54	2.45
Eyelid fluid	0.98 (24.5%)	0.85	1.03
Stretching of the lower eyelid	2.95 (73.7%)	2.92	2.97
Triangular prominence	0.38 (9.5%)	0.62	0.28
Loss of skin elasticity	0.64 (16.0%)	0.92	0.52
Cumulative contribution score	8.69 / 6 = 1.45	9.54 / 6 = 1.59	8.32 / 6 = 1.39



*Figure 12 – Anatomical changes*  
*Слика 12 – Анатомски промени*

When patients expressed their satisfaction from the outcome of the operation, the results indicated that a greater proportion of women were more

satisfied from the outcome immediately after the operation than were men (Table 2 & Figure 13).

After the 6 months follow-up period all women felt that the aesthetic changes were excellent (Figure 14a), while 84.6% of men felt so (Figure 14b).

Table 2 – Tabela 2

*Patient satisfaction score*  
*Скала за са тисфакција на пациенти*

	Men		Woman		All patients	
	mean	SD	mean	SD	mean	SD
0 months post-op	3.3	± 1.0	3.6	± 0.6	3.5	± 0.8
2 months post-op	3.5	± 0.9	3.9	± 0.3	3.8	± 0.6
6 months post-op	3.8	± 0.6	4.0	± 0.0	3.9	± 0.3

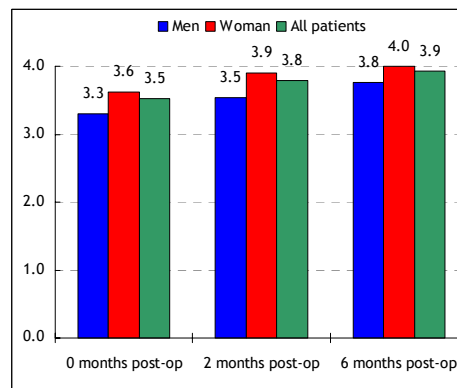


Figure 13 – Graphic presentation of the patient satisfaction score  
Слика 13 – Графички приказ на скала за са тисфакција на пациенти

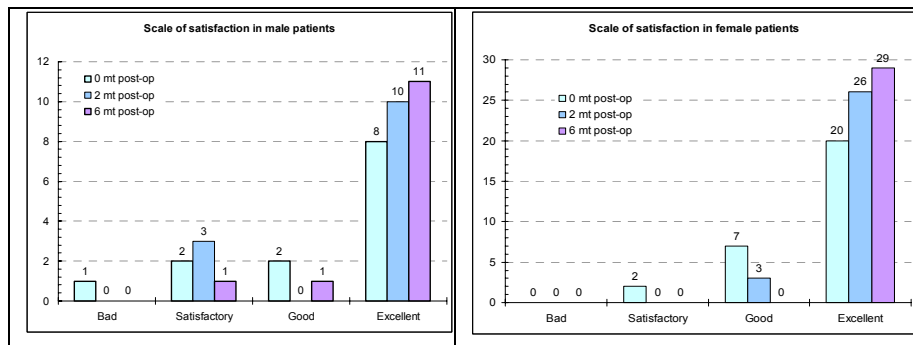


Figure 14 – a. b. Scale of satisfaction in male (a) and female patients (b) immediately, 2 months and 6 months post operatively  
Слика 14 – Скала на са̀тисфакцѝја ка̀ј ма̀и (а) и `ени (б) ведна̀, 2 месеци и 6 месеци по о̀перативниот зафа̀т

### Discussion

The results from this study give us a degree of confidence so we can say that the suborbital protrusion of the eyelids is a complex problem. The most common anatomical problems that are in showing the suborbital protrusion of the eyelids are stretching of the lower eyelid, prolapsed of the suborbital fatty tissue, losing of skin elasticity, eyelid fluid, orbicular hyperactivity, triangular cheek prominence are closely related to the process of aging. The scoring system which was used in our study gave us the results that are already shown, for which we think that are from great value for the aesthetic surgeon. The scored system is novel and easy to use, and can be improve communication between physicians and patients as well as during the dissemination of knowledge during medical communication. Scored system is based on objective criteria and on a model of healthy lower eyelid skin. The cumulative contribution score for each anatomic variable show us that prolapsed orbital fat received high score in men as compared to women. We used them in the preoperative evaluation of the patient, and also help the surgeon to find the right operative method, and also get to know the patients expectations.

No one specific technique is appropriate for every patient. A simple approach to the lower eyelid, with fat removing technique will give a consistent result. The lower eyelids and the cheeks are focused point on the face and because of changes in this region patients come for a consultation with an aesthetic surgeon.

The changes that occur in this region are mostly hereditary as well as the changes connected with the process of aging. Adopting this score will direct help to achieve the best possible surgical technique and to obtain excellent cosmetic effects. The eyes and periorbital area are commonly the focal point during human conversation and communication [8]. Lower eyelid Blepharoplasty is an elective procedure performed to improve the aesthetic appearance of the eyes.

### Conclusion

The characterization of a person as “beautiful”, whether on an individual basis or by community consensus, is often based on some combination of *inner beauty*, which includes psychological factors such as personality, intelli-

gence, grace, charm and elegance, and *outer beauty*, which includes physical factors, such as health, youthfulness, symmetry, averageness, and complexion

Concerns are noted in a number of the articles regarding invasion of the fat pad protrusion, laxity of orbicularis muscle and orbital septum. There is growing trend toward preserving at this junction and in doing so preventing scarring, which can lead to retraction, after operation. Our study showed that the origin of manifestation of baggy lower eye lids lies in a group of complex anatomical alterations. Interestingly, volumetric changes [9] that have been noted in the periorcular area after use of the blefaroplasty with fat repositioning technique. With the use of the algorithm presented in this study, we can detect the principal cause responsible for the manifestation of baggy lower eye lids. With the understanding of the origin of baggy eye lids, the surgeon can make the correct choice of aesthetic surgical intervention to correct this in order to achieve the optimal aesthetic effect. We concur that fat correction with lower lid blepharoplasty is extremely important for any patient with lower lid laxity. Eyelid fat can be easily identified, and in our group of 42 operated patients we recognize that the scoring system can aid us.

#### R E F E R E N C E S

1. Vikram D Durairaj, Blepharoplasty: Upper Eyelid, URL <http://www.emedicine.com/ent/topic198.htm>.
2. Williams, E. F., III, Vargas, H., Dahiya, R., Hove, C. R., Rodgers, B. J., and Lam, S. M. (2003): Midfacial rejuvenation via a minimal-incision brow-lift approach: Critical evaluation of a 5-year experience. *Arch. Facial Plast. Surg*; 5: 470,
3. Goldberg, A. Robert, McCann, D. John, Fiaschetti, Danica, Simon, J. Ben Guy (2005): What causes eyelid bags? Analysis of 114 consecutive patients: *Plast. Reconstr. Surg*; April 15; 115:1395.
4. Booth, A.J., Murray, A., Tyers, A.G. (2004): The direct brow lift: efficacy, complications, and patient satisfaction: *B J of Ophthalmology*; 88(5): 688-691. May.
5. Anwar M., Smith D.E., Kaye A.D. (1997): Anesthesia for cutaneous surgery. *Int J Aesth Restorative Surg*; 5: 108-115.
6. Camirand A (1999): The surgical correction of aging eyelids. *Plast Reconstr Surg*; Apr 103(4): 1325-6.
7. R. J. Edler, B.D.S., F.D.S., M.ORTH.R.C.S, Background Considerations to Facial Aesthetics, *Journal of Orthodontics*, June 2001; Vol. 28 (No. 2): 159-168.
8. Meyer D.R. (1997): Functional eyelid surgery. *Ophthal Plast Reconstr Surg*; Jun; 13(2): 77-80.
9. Powell N. (1984): Humphreys B, proportions of aesthetic face. Thieme-Stratton: New York.

## R e z i m e

SUBORBITALNA PROTРУЗИЈА НА МАСНОТИТЕ  
НА ДОЛНИОТ ОЧЕН КАПАК

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*Вовед:* Протрузија на долниот очен капак е естетска состојба која е под влијание на многу анатомски одлики. Цел на трудот е да се идентификуваат и категоризираат протрузиите на масните перничии на долниот очен капак, и да се процени системот за бодирање на анатомските карактеристики со што би се добил оптимален хируршки пристап.

*Материјал и метода:* Во текот на 4-годишниот период (2002–2005) оперирани се 42 пациенти со суборбитална протрузија на долниот очен капак. Во проценка на протрузија на очниот капак употребена е анализа на следните параметри: испакнатост на орбиталниот мускул, пролапс на суборбиталното масно ткиво, течност во очниот капак, растегнување на долниот очен капак, триаголна испакнатост во маларниот регион и губиток на еластицитетот на кожата.

*Резултати:* Нашата студија укажува дека причина за појава на торбички на долните очни капаци е резултат од комплексни анатомски промени. Формула за проценка на кумулативниот придонес применета во оваа студија, овозможува да се одреди главната причина за појава на виснатите очни капаци. Со оваа информација хирургот има можност да ја одбере правилната оперативна техника за блефаропластика со цел да го постигне оптималниот естетски ефект.

*Заклучок:* Формула за проценка на кумулативниот придонес на секоја анатомска варијабла ни покажува дека кај мажи е добиена поголема вредност во споредба со жени. Познавањето за потеклото на виснатите очни капаци може да му помогне на хирургот во изборот на правилната оперативна техника за скулптура, со цел да се постигне оптималниот естетски ефект.

**Клучни зборови:** блефаропластика, масно ткиво, долен очен капак, формула.

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