

## **Surgery of blepharoptosis with concomitant periorbital changes in the elderly population**

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**Blepharoptosis is an abnormally low-located upper eyelid that can cover the visual axis and cause narrowing of the visual field and in extreme cases, also impacts negatively the visual acuity. Quite frequently it goes hand by hand with dermatochalasis which is defined as extra skin on the upper eyelid that also has a similar impact on visual function. Age is considered to be a risk factor for both of these entities and in an increasingly aging population, the number of patients is calculated to be on the rise. We evaluated the patients who suffered from one or both of these conditions. To determine the frequency and optimal surgical treatment of acquired blepharoptosis in patients with age-related periorbital changes (dermatochalasis) in the elderly group of patients, 31 patients aged 56 to 86 years (mean  $68\pm 8$  years), men 5 (16 %), and women 26 (84%) were examined. One-stage minimally invasive surgical correction of blepharoptosis, supplemented by upper blepharoplasty to eliminate dermatochalasis should be based on the individual characteristics of the patient, his pathology. It is advisable to consider the simultaneous correction of blepharoptosis and dermatochalasis as the most optimal, since it provides both functional improvement and cosmetic satisfaction for the patient, restoration of the quality of life.**

**Keywords:** *Blepharoptosis, dermatochalasis, levator resection, upper blepharoplasty, ageing population, quality of life*

### **INTRODUCTION**

The demographic trends of the planet indicate increasing life expectancy, the older population will almost double from 2005 to 2050, and in 2025 the population over 60 years old will be 1.2 billion. Ensuring a decent quality of life for older people is one of the main missions of a developed social society (United Nations WPP, 2012). Acquired blepharoptosis is one of the reasons for visual function deprivation in an aging population (Anderson, 1985). Eyelid surgeries hold the 4th position in the list of the most frequent plastic surgeries, indicating the high frequency and demand for adnexal surgery of the eye (American Society of Plastic Surgery, 2018).

Diabetes is one of the growing pathologies among adults and it is also considered to be a risk factor for droopiness of the eyelid (Moon, 2015).

Another factor predisposing patients to develop BP (blepharoptosis) is various types of ophthalmic surgeries, which is on the rise due to the increased availability of ophthalmic care in nations (Koh, 2017).

The main complaint of patients attending the ophthalmologist is droopiness of the eyelid that leads to a decreased visual field, chin-up position, and headaches due to constant overreaction of frontal muscle. The goal of BP surgery is to lift a drooping eyelid, eliminate discomfort, and improve quality of life, which is a logical criterion for evaluating the outcome of treatment (Clauser et al., 2006).

Surgical correction of senile BP is widely discussed, both by ophthalmologists and plastic surgeons, where the evaluation criterion undoubtedly remains the functional and cosmetic satisfaction of the patient. Two indications for the

surgery are functional and cosmetic. Purely functional indications are based on the elimination of droopiness of the eyelid with the main goal to ameliorate decreased visual field and open up the visual axis, which is performed by different surgical approaches (internal and external techniques) with their advantages, disadvantages, complications, and numerous modifications of known methods (Putterman et al., 1975).

The second trend in the research includes surgical correction of BP in combination with aesthetic blepharoplasty which addresses not just functional, but also cosmetical issues. The most frequent pathology that goes hand in hand with ptosis is dermatochalasis (abundant skin of the upper eyelid) which is addressed by additional upper blepharoplasty (Bhattacharjee et al., 2017).

What are the arguments for an ophthalmologist in favor of expanding the scope of surgery for the correction of senile BP with a one-step correction of concomitant changes in the periorbital region? It is well documented that dermatochalasis is one of the most frequent pathologies in patients above 45 years of age and is as frequent as 16% in this age group (Damasceno RW et al., 2015). Simultaneous correction of BP and dermatochalasis of the upper eyelid can significantly improve vision, ameliorating functional disturbances, and as a result improving the quality of life.

Senile BP is associated with stretching and weakening of the attachments of the aponeurosis of the levator palpebrae muscle from the upper eyelid tarsus. Age-related topographic and anatomical changes include a progressive decrease in elasticity and firmness of the skin, weakening of connection with the underlying tissues, in particular, with the hypotonic (atonic) orbicular oculi muscle of the eyelid. Muscle fibers become thin, fragmented, transverse striation also becomes altered. The skin of the periorbital region undergoes involutional changes as well and in conjunction with other structures of the upper eyelid, it plays a major role in the development of dermatochalasis. Changes include the mechanisms of compensation of the eyelids and eyebrows, the volume depletion of the fat pads of the upper eyelid, orbit and eyebrows along with bone resorption are contributing factors to aging (Koh et al., 2005). It is worthwhile to mention that

all these changes accompanied by BP play a role in visual field constriction leading to a decrease in the quality of vision and cause additional functional and cosmetic difficulties for the patient (Bellinvia et al., 2014).

Despite the huge number of publications on the surgical treatment of BP and dermatochalasis (upper blepharoplasty), it is not well described the adequate tactic with simultaneous intervention to improve condition simultaneously in these both pathologies.

Taking into account an increased number of visits of older patients, the problem of blepharoplasty for ophthalmologists remains relevant. From the point of view of the choice of surgical tactics, optimal approaches for correcting BP and periorbital region changes to achieve a functionally as well as cosmetically acceptable result remains a significant issue for both patient and treating physician.

The aim of this study was to determine the optimal surgical treatment of acquired blepharoptosis in patients with age-related periorbital changes (dermatochalasis) in the elderly group of patients.

## **MATERIALS AND METHODS**

In total 31 patients aged 56 to 86 years (mean age  $68 \pm 8$  years), complaining of the drooping upper eyelid (eyelids) were included in the study, among them 5 men (16%) and 26 women (84%). All cases of ptosis of the upper eyelid were acquired. Examination of patients included a thorough collection of anamnestic data in order to determine the nature of ptosis, somatic factors that can provoke its development.

After general ophthalmological examination, additional measurements of the eyelids were undertaken and consisted of the levator function of the upper eyelid; the distance from the ciliary edge of the upper eyelid to the central corneal reflex (MRD 1) and the distance from the palpebral fold to the central corneal reflex (CCRD).

The degree of ptosis was assessed according to Finsterer (Finsterer, 2003).

Among the studies, evaluating the "Bell phenomenon", the presence of lagophthalmos is to

prevent postoperative complications. Tests for myasthenia gravis were determined: a fatigue test and a cold test. Changes in the upper eyelid are suggestive of dermatochalasis.

Methods of surgical correction of BP and upper blepharoplasty were used.

Blepharoplasty of the upper eyelid in dermatochalasis was performed before correction of the BP. The operation included marking excess skin followed by infiltration with 2% lidocaine anesthetic, surgical excision with subsequent correction of the BP, which was performed by the traditional method of resection of the aponeurosis according to Anderson (Anderson, 1979) and the method of conjunctival-mullerectomy according to A.Putterman and M.J.Urist (using a Karl Ilg & Co., St. Charles clamp) (Putterman et al., 1975). In the first variant, to determine the symmetry and adequate vertical position of the eyelid, the assessment of intraoperative correction was carried out in a sitting position under local anesthesia. In the second variant, a 4 mm resection nomogram was used for each millimeter of ptosis.

Photographing patients before and after the operation was a necessary step for assessing changes, obtaining the patient's consent for surgery. Informed consent was obtained from all patients. Examinations of patients and the study itself were carried out according to the principles set out in the Guidelines for the requirements (provisions) of the Declaration of Helsinki (and its amendments).

**RESULTS AND DISCUSSION**

As shown by the preoperative examination, senile BP was unilateral only in 4 (12.1%) cases, and bilateral (87.9%) in 27 cases. For establishing the surgical approach patient complaints, degree of BP, and changes in the periorbital region were of decisive importance.

When examining the upper eyelids, attention was focused on dermatochalasis (with or without excess medial fat pad).

In total, BP was observed without dermatochalasis in 10 patients (32%); combined BP and dermatochalasis in 12 patients (39%).

The choice of surgery was based on if

patients had just ptosis or dermatochalasis as well, in the first group it was enough to correct the BP, in the second group BP surgery was performed simultaneously with blepharoplasty of the upper eyelids. In the first group for BP repair posterior approach was utilized (Putterman). Taking into account that upper blepharoplasty and levator resection surgery share the same surgical approach (transcutaneous), BP repair in the second group was achieved by levator aponeurosis resection. The surgeries performed have been demonstrated in Table 1.

**Table 1.** Surgery types performed

Aging changes	Surgery	BP bilateral/unilateral	Patients
BP	CM	7/3	10(32%)
BP+DCh	LR	20/1	21(68%)

Complications during the surgical treatment were not observed.

A rate of under-correction was observed in 8 (26%) cases, out of which in 5 (16%) cases there was insufficient correction of the BP (resection of the aponeurosis), in 2 (6%) cases there was excess skin of the upper eyelid in the second group. As it is known, levator resection surgery does not always have a predictable outcome, and the success rate varies from 70% to 95% (Putterman and Urist, 1975).

After the surgical treatment, all patients were under dynamic observation. Postoperative studies in the period 6 months to a year showed improvement in all parameters (Table 2).

**Table 2.** Measured data before and after the procedures

Groups	MRD1 before/after	CCRD before/after
Group 1	0.98 (±0.97)	7.05 (±1.94)
	2.51 (±0.70)	5.53 (±1.63)
	<i>p</i> -value < 0.05	<i>p</i> -value < 0.05
Group 2	1.12 (±0.42)	5.16 (±1.59)
	2.89(±0.37)	7.30 (±0.71)
	<i>p</i> -value < 0.05	<i>p</i> -value < 0.05

MRD1 - margin reflex distance

CCRD - crease corneal reflex distance

The results of the study confirmed that the method of conjunctivo-mullerectomy for the isolated correction of BP is preferable due to the greater predictability of the results compared to

anterior levator resection (Frueh BR et al., 2004). The important factor in choosing a treatment is a clear understanding of the result that the patient expects. The result expected by the patient does not always coincide with the required volume of intervention planned by the surgeon. Thus, out of 31 patients who were involved in the study due to complaints of drooping eyelids, only in 10 (32%) patients, isolated correction of the BP could provide the patient with the desired result. Worthwhile mentioning that in 21 (78%) patients the BP surgery alone was not enough to achieve patient satisfaction since contributing factor was not just BP, but dermatochalasis as well, which is almost twice as much as in BP only group.

While choosing surgery to be performed one should agree that in the elderly group of patients, the degree of ptosis is not the only factor to be considered (Ben Simon et al., 2005). Simultaneous surgical interventions have been previously presented in the literature and discussed in terms of their advantages. Among them, emphasis was placed on reducing the operation time (compared to if the operations were performed separately), the financial burden (which is related both to the cost of the operation and which may fall either on the patient or the national budget) as well as the number visits to the clinic that almost double up in case if surgeries performed on separate visits. The latter is even more complicated if the patient lives far from the hospital. The benefits of single-stage interventions have been discussed and also presented in terms of greater efficiency especially in the field of periorbital surgery (Askeroglu et al., 2019). Simultaneous correction of BP and dermatochalasis of the upper eyelid provides even greater elimination of functional complaints that are bothersome for the patient. Bilateral surgery has a positive impact on the improvement of vision, peripheral visual field, especially on an attempt to gaze up and also improves the quality of life (An SH. et al., 2016). In blepharoplasty, optimal removal of excess eyelid skin after measuring it at rest and after stretching provides the desired result in most cases (Kashkouli et al., 2017). In our study among the additional arguments in favor of combined surgery, there were patients in whom only the BP was removed without the removal of the excess skin from the

upper eyelid (group 1). When lifting the eyelid, the crease of the upper eyelid falls lower than preoperatively due to a shortening of the distance between a lash line and an eyebrow (Karlin et al., 2020). This fact was reflected in the 1-st group of patients where the ciliary margin was raised from 0.98 mm to 2.51 mm, the fold was lowered from 7.05 to 5.53 mm. The drooping of the fold, in turn, leads to an even greater overhang, thereby affecting the deterioration of the visual field and a less attractive cosmetic result (Ho et al., 2011).

It should be agreed that the adoption of surgical decisions includes, in general, taking into account individual age-related changes, the optimal tactics for their elimination with the choice of less traumatic surgical approaches. During the surgical correction of the BP, preference is given to the classic technique of the muscle that lifts the upper eyelid (levator) or its aponeurosis, as more physiological (Martin et al., 2015). Thus, the optimal tactics for planning BP surgery in older people involve a proper examination algorithm, a cumulative assessment of all existing age-related changes in the eyelids which determines the choice of the surgical technique, more often techniques that can provide a cosmetic and functional effect. Predicting a patient-satisfying result is often not limited only to the correction of the BP, but includes the simultaneous elimination of age-related changes that affect the outcome, especially in women.

## CONCLUSION

The optimal surgical technique should be based on the individual characteristics of the patient and his pathology and should be minimally invasive. It is reasonable to consider simultaneous surgery for the correction of BP and dermatochalasis in older people since it provides both functional improvement and cosmetic satisfaction for the patient in order to restore the patient's quality of life.

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