



Blepharoplasty – a practical approach to the selection of surgical techniques and wound dressing

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Abstract

Blepharoplasty is a procedure aimed at correcting the eyelids and restoring the proper tension to the skin of the eyelids. Indications for the procedure can be divided into cosmetic, which result in visual rejuvenation of the patient, and functional, which are aimed at improving functioning. The procedure is commonly performed with Vicryl, polypropylene, nylon, fast-absorbing sutures or cyanoacrylate tissue adhesives. The most commonly used surgical suturing techniques include interrupted cutaneous, running cutaneous and subcutaneous continuous. The procedure can cause side effects, the most serious of which is intraorbital hemorrhage, which can lead to loss of vision. For the course of the procedure, achieving a satisfactory effect and minimizing the risk of

complications, it is very important to use sutures made of the appropriate material, use the appropriate surgical suturing technique and determine the correct postoperative procedure. With the increasing number of blepharoplasty procedures performed, the risk of complications increases. Inadequate wound dressing significantly increases the incidence of complications, therefore proper wound dressing, hygiene and strict adherence to post-treatment recommendations are of fundamental importance in achieving the intended effect. Incorrect wound care can have a decisive impact on the course of the entire procedure.

Key words: blepharoplasty, sutures, wound care, postoperative care, post-surgery instructions.

Introduction

Blepharoplasty is a procedure aimed at correcting the eyelids. This treatment involves removing excess skin on the eyelids, as well as fat and muscles, and restoring their proper tension [1]. The word “blepharon” means eyelids and “plastikos” means to form, hence the name blepharoplasty is understandable [2].

Aging is inevitable and causes changes to the body. The eye area of the face is its central region and focal point. The eyes are responsible for showing emotions and expression, which is why many patients do not accept their natural age-related changes. In such a situation, a blepharoplasty procedure performed for esthetic reasons may be proposed to visually rejuvenate the patient [3].

Nowadays, esthetic medicine is an integral part of the doctors work. The first book about esthetic surgery was written in 1907, and in the post-war times the development of this branch of medicine significantly accelerated. Today, these types of treatments

are performed daily. Operations performed on eyelids have been described since the Middle Ages. The first text about eyelidsurgery dates from the 15th century. However, it should not be forgotten that there are also other health indications for this procedure, e.g. limiting the field of view. Upper eyelid surgery is usually performed for esthetic and functional reasons, while lower eyelid surgery is usually performed for esthetic reasons.

It is a relatively popular and common procedure, but complications can always occur. The eyelids are very important for human functioning, which is why it is so important to perform a thorough interview with the patient and conduct an examination before the procedure. The purpose of this procedure is to achieve the best esthetic result with minimal complications and discomfort, so it is important to listen to patients' precise expectations for the result. The effect of the treatment makes people look younger and more rested, and their self-confidence increases.

It is important to choose the right sutures and wound closure technique to minimize the risk of postoperative complications. Establishing and maintaining recommendations for proper wound hygiene is essential to ensure an optimal result. Blepharoplasty is performed by both surgeons and ophthalmologists. Choosing a suitably qualified operator will increase the likelihood of achieving the expected effect.

To fully understand this procedure, it is worth paying attention to the anatomy of the eyelids. The skin of the eyelids is the thinnest in our body, approximately 1 mm thick and it does not contain a subcutaneous fat layer. Due to its thinness and constant movement, it gradually loses its elasticity with age [2]. The upper eyelid is divided into the tarsal and orbital parts, which join at the junction of the levator palpebrae superioris muscle and the orbital septum. The orbital septum is a delicate layer of connective tissue located under the orbicularis muscle of the eye. This septum begins at the bony rim of the orbit as an extension of the periosteum, and then descends to the surface of the eyelid, joining the appropriate shield (upper or lower). On the eyelid, it lies under the levator muscle of the upper eyelid [2, 4]. Its main task is to separate the fat body and protect the elements behind it [4].

Indications and contraindications for upper eyelid surgery

Functional and/or cosmetic indications are the basis for blepharoplasty. Functional indications include the following: excessive flaccidity of the eyelids (dermatochalasis), congenital horizontal skin fold of the lower eyelid (epiblepharon) with rotation of the eyelashes towards the eyeball, drooping eyelids (ptosis), inflammation, and trauma [2].

Functional indications

Dermatochalasis

Dermatochalasis is a disease of civilization with the extension of the average life expectancy, and it is caused by physiological involutionary changes taking place in the periorbital soft tissues [2]. With age, elastic fibers in the skin are lost along with the weakening of the connective tissue and the relaxation of the structures of the lateral part of the forehead. This results in lowering the tail of the eyebrows and the appearance of skin folds in the lateral corner of the upper eyelid, limiting the upper and supratemporal vision. In clinical practice, it manifests as the necessity to constantly raise the eyebrow or chin to obtain a useful visual field. The limitations reported

by the patient are usually related to driving difficulties, including vision and proper judgment of traffic lights. Prolonged, frequent use of the frontal muscle to improve the quality of vision can result in a frontal headache [2, 5]. The condition usually occurs bilaterally in older people. It affects 16% of the population over 45 years of age, and is more common in men [2]. Pathological excess skin of the upper eyelid may lead to lateral limitation of the visual field, and in the case of the lower eyelid – entropion [6]. Unnecessary tissue may cause internal rotation of the eyelashes, which will lead to irritation of the bulbar conjunctiva and cornea, causing epithelial loss and discomfort. Chronic inflammation associated with the presence of the wound requires constant ophthalmological monitoring and local antibiotic therapy [2, 5]. In addition, the excess and protruding skin of the upper eyelid restricts the amount of light reaching the eye, causing diffraction and reduced sensitivity to image contrast and brightness. In a study by Meyer *et al.* in 14 patients who underwent bilateral blepharoplasty, a statistically significant increase in contrast sensitivity was demonstrated. This resulted in a brighter image and improved functional quality of vision [2]. Excessive skin folds are sometimes accompanied by adipose tissue falling through the orbital septum. By causing a change in pressure and affecting the shape of the cornea, they can cause astigmatic changes. Based on research by Brown *et al.* it has been proven that the improvement of corneal topography after blepharoplasty significantly affects the correction of astigmatism. This is confirmed by an average change in astigmatism of 0.55 diopters after surgery of the upper 18 eyelids [2].

There was also a reduction in ocular aberrations, particularly higher order aberrations (HOA) clinically manifested by halos, glare and distortion in the field of view. In a study by Kim *et al.* on 22 eyelids of 16 patients with excessive eyelid laxity, it was found that blepharoplasty significantly increased contrast and improved the quality of vision in patients with HOA [2].

Epiblepharon

Coexisting with epiblepharon, eyelash drooping promotes damage to the surface epithelium of the eye and the formation of micro-injuries. Chronic inflammation and initiation of the cascade of inflammatory mediators contribute to the instability of the tear film and increase the hyperosmolality of the ocular surface. This can result in dry eye syndrome [2].

Blepharochalasis

In contrast to dermatochalasis, which is more common among older patients, blepharochalasis is the dominant disease in younger patients. It comprises inflammation of the eyelids characterized by swelling, which often leads to stretching of the skin. The onset of the disease usually begins in adolescence and is characterized by recurrent acute inflammation combined with angioedema in the tissues of the upper eyelid. This leads to a gradual loss of elastic fibers and may affect one or both upper eyelids [2, 7].

Inflammations

One of the indications for blepharoplasty is ophthalmopathy occurring in Graves' disease [2].

Injuries

Both eyelid and orbital cavity can be reasons for upper eyelid surgery [2]. The cause of drooping eyelids may also be an injury that leads to damage to the upper eyelid levator muscle, its aponeurosis or the nerves that control eyelid movements. It may also result from complications of eye surgery.

Other

Other functional indications include limiting the mobility of the upper eyelid, large xanthelasma, tumor mass or developmental anomaly [2].

Cosmetic indications

Many patients who decide to undergo blepharoplasty expect the result to be a more visible marking of the palpebral sulcus and exposure of the pretarsal part of the upper eyelid. This is especially true for patients in the younger age group, especially among Asians and Northeast Indians, who are racially characterized by the presence of wrinkling and a greater crease of the skin of the upper eyelid. The goal is a significant visual rejuvenation of the facial appearance. This has its direct esthetic reference to the appearance and symmetry of the eyebrows and cheeks. Depending on the clinical situation, blepharoplasty with eyebrow elevation is performed at the same time [2, 5].

Contraindications

All patients scheduled for blepharoplasty should undergo a complete ophthalmological examination and an examination for visual acuity, dry eye symptoms and visual disturbances. In addition, a history should be taken including questions about the presence of concomitant systemic disease with ophthalmic symptoms, in particular thyroid diseases, diabetes

mellitus, hypertension and inflammatory diseases treated with steroids. It should also be determined whether the patient has coagulation disorders and possible pharmacotherapy [5, 6].

A relative contraindication is the presence of thyroid disease, proptosis and coagulation disorders. Coagulation disorders should be treated individually and, if possible, the clinical situation should be consulted with the attending physician [5, 6].

Current research indicates that blepharoplasty has no effect on the tear film, which means that dry eye syndrome is not a contraindication to the procedure [8, 9].

Before qualifying, patients who have undergone at least one blepharoplasty in the past should be examined for the current condition of the upper eyelid skin and orbital muscle, as well as possible eyelid re-gurgitation. In patients complaining of photophobia, blepharoplasty should be abandoned, and treatment of the underlying disease should be the focus [5, 6].

Course of blepharoplasty, description of methods and materials used

The pre-treatment procedure includes a medical consultation and laboratory blood tests. During the consultation, the doctor collects a detailed medical history, including an ophthalmological one, and conducts a physical examination [2, 10, 11]. Visual acuity should be assessed, the height and shape of the palpebral fissure, the position of the upper eyelid, the distance between the crease and the eyelid fold, the position of the eyebrows, and the condition of the tear film. The operator should pay attention to the patient's medical history, eye injuries and ophthalmological procedures [2]. The patient's racial, ethnic and genetic characteristics should be ascertained. Old photographs can be used to assess the youthful folds of the patient's upper eyelid [1]. The patient is provided with information on the course of the operation, results and foreseeable complications [8]. For the 7 days before the procedure, it is forbidden to take drugs affecting blood coagulability [2, 10, 11]. Prior to surgery, based on the individual examination of the patient, incision lines should be marked. The cutout takes on an ellipsoidal shape. The skin pinch technique is the method most often chosen by surgeons to determine the operating drawing on the skin [2]. To take into account the influence of gravity on the location of the eyelid and eyebrow, the patient should be in a sitting position during the pre-treatment consultation. Blepharoplasty is usually performed under local anesthesia, using 2–3 ml of

lignocaine with 1 : 100,000 epinephrine, administered subcutaneously [2]. It is important to wait 15 minutes to achieve vasoconstriction [12]. After making skin incisions, one edge of the wound is lifted and the skin is removed by cauterization. A strip of the orbicularis muscle is then excised and incisions are made above the orbital septum, providing direct access to the orbital fat, which is removed [2]. Currently, it is not recommended that a fragment of the orbicularis oculi muscle be removed [13]. The orbicularis oculi layer is usually preserved unless overdeveloped [11]. In older patients, plastic surgery of the upper eyelid is often accompanied by the procedure of raising drooping eyebrows (brow lifting). Although upper eyelid surgery has a high patient satisfaction rate, there are subtle differences in wound closure methods that can make a significant difference to the result. Surgical sutures commonly used in the correction of the upper eyelids are Vicryl, polypropylene, nylon, fast-absorbing gut, and ethyl cyanoacrylate adhesives. The most commonly used surgical suturing techniques include subcutaneous continuous, interrupted cutaneous, and running cutaneous.

A clinical study published in February 2022 by Aydemir *et al.* [3] compared suture techniques using polypropylene and Vicryl sutures. Two techniques using the same material were used in each patient, with an interrupted cutaneous suture in one eye and a running cutaneous suture in the other. Postoperatively, patients were applied cooling packs, and in each case the sutures were removed after 7 days. The results of the procedure were evaluated in terms of edema, ecchymosis and postoperative scar. Regardless of the material used, a better result and the advantage of interrupted cutaneous suture over running cutaneous suture were demonstrated. It has been proven that both the functional and cosmetic effects are better with interrupted cutaneous suture [3]. Pool *et al.* [14] evaluated the effect of the subcutaneous continuous suture placement technique in upper eyelid blepharoplasty on the development of suture abscesses and focal inflammation at the wound site. The wound on one eyelid was closed using an internal intradermal suturing, where the suture begins and ends directly at the wound margin, while on the other eyelid, external intradermal suturing was used, beginning and ending the suture outside the incision, in the adjacent intact skin. Significantly less abscess, erythema and edema were observed at the medial side of the wound closed with an internal intradermal suturing compared to the wound of the other eye closed with an external intradermal suturing [14].

Scaccia *et al.* [15] made a comparison of an upper eyelid blepharoplasty procedure using a subcuticular closure with a fast-absorbing catgut suture to that of a subcuticular closure with a polypropylene suture. Taking esthetic considerations into account, in the authors' opinion, slightly better results were obtained with the use of the catgut suture.

Due to the natural mobility of the upper eyelids thanks to the strong muscles of the orbicularis oculi and the levator palpebrae, Steri-Strips are not routinely used. When the size of the wound exceeds 5 mm, the use of only strips will not be enough to protect it, there is a risk of the wound opening and difficult healing. However, if the wound is small-up to 5 mm or if the suture is damaged after the procedure, Steri-Strips can be used to secure the proper healing of the wound without the need to install a new suture.

Postoperative care

Postoperative care is necessary for the performed procedure to obtain a good effect. It consists of many elements to which the patient must pay attention in the postoperative period. By strictly following the appropriate recommendations, the risk of complications is reduced and the chance of achieving a satisfactory result of the procedure is increased [16].

To minimize the risk of complications, the procedure should be carefully planned. First of all, attention must be paid to the amount of excess skin, fat and the location of the tear glands. Many factors influence the details of the procedure performed. These include racial, ethnic and genetic differences of patients. Changing the appearance of the eyelid too radically is a common mistake that can be avoided at the stage of planning the surgery [1].

During the second and third day after the procedure, it is recommended that cold compresses be applied to the eyelids 3 or 4 times a day. Patients can use gel masks or ice packs, which can be reused after being stored in a refrigerator. It should be remembered that the duration of one-time cooling should not exceed 10 minutes, due to the risk of frostbite. For 3 days after surgery, patients should sleep with the head raised by using more pillows, a reclining chair or an armchair. For 2 weeks after the procedure, the wearing of contact lenses, staying in the sun and using make-up should be avoided. Physical activity is not recommended for the next 3–4 weeks in the case of upper eyelid surgery. Activities that require heavy lifting or bending should especially be avoided. Patients should avoid physical activity for 48 hours after the procedure, and intensive exercise

is not recommended for 2 weeks in the case of lower eyelid surgery. From 3 days after the intervention, patients can use warm compresses, which allows a gentle cleansing of the surgical wound without damaging the operated area. During the first week after surgery, it is recommended that an antibiotic ointment be applied 3 to 4 times a day on the postoperative wound. Some patients have some degree of dry eye due to swelling and ecchymosis of the eyelids. In these cases, the eye should be lubricated with artificial tears, a lubricating gel at night and antibiotic ointment along the incision up to 4 times a day after peroxide cleansing. Removal of sutures is recommended on the 7th day after surgery, if reabsorbable material has not been used in the case of upper eyelid surgery and the period is from 5 to 7 days in the case of lower eyelid surgery. Then the application of corticosteroid ointment allows the wound to heal better. The ointment should be used 3 times a day during the initial period. Patients should be advised to avoid rubbing the eyelid because it may cause wound dehiscence [16].

Risk factors for postoperative wound dehiscence include infections, minor trauma, and the patient's uncoordinated movements during sleep. It is necessary to choose the right type of sutures to reduce the risk of wound dehiscence. Prolene 6-0 skin sutures are preferred for upper eyelid surgery. Silk and absorbable sutures give less satisfactory results in the plastic surgery of the upper eyelids. Prolene is useful for precise wound closure. The use of Prolene sutures and their complete removal at the appropriate time reduces the risk of granulomas. Minor wound dehiscence can be treated with topical and oral antibiotics. The postoperative area must be carefully monitored because complete wound dehiscence requires rapid debridement and repair. This avoids lower eyelid retraction and scarring. It should be remembered that medications such as aspirin, ibuprofen, and naproxen can increase bleeding, and may have a negative influence on wound healing [1].

If the incision line is red and thick after 4 weeks, a cream containing vitamin E, massage, or topical steroids can be used. Occasionally, epithelial inclusion cysts appear instead of scar hypertrophy. It is important to pay attention to this, because the epithelial inclusion cyst must be removed. Pyogenic granulomas occasionally develop in the incision area, treatment of which consists of applying topical steroids or excision of the pathological lesion [1, 16].

The frequency of complications is largely influenced by the technique of the procedure. Authors

in the literature more often choose CO₂ laser blepharoplasty. More procedures for the lower eyelids are performed via a transconjunctival approach than an external approach [1].

It has been shown that the use of silicone ointments after blepharoplasty improves the appearance of postoperative scars. This method is safe and effective, but it requires the patient to be systematic in its use [17].

The wound healing process after blepharoplasty lasts from 6 to 8 weeks, but the period of postoperative scar reduction can take up to 12 months. It is extremely important that post-treatment scars are located in the natural folds of the skin, which makes them less visible and has a significant impact on the final effect of the procedure. In the case of lower eyelid surgery, the best location for the incisions is just below the lash line. Thanks to its rich vascularization, the skin of the eyelids heals extremely quickly.

Complications

Every surgical intervention carries a potential risk of complications. Complications after blepharoplasty are quite rare and if they do occur, they are usually mild rapidly treatable. It should be noted that with the increasing number of blepharoplasty procedures performed, the risk of complications increases. The surgeon performing the procedure should inform the patient about the potential risks associated with the operation and ask what their expectations are in relation to the postoperative effect. It is important that the patient is aware of their decision and knows that blepharoplasty, although a simple procedure, may be associated with later complications [1, 18].

The most common side effects after blepharoplasty are superficial petechiae and hematomas. They may arise during the preparation of the patient for surgery, e.g. when administering local anesthesia; intraoperatively when there is bleeding into the orbicularis oculi muscle or postoperatively due to weakening of the structure of the blood vessels [2]. To minimize the formation of superficial petechiae and hematomas, patients are advised to avoid the use of anticoagulants, blood pressure should be controlled in hypertensive patients, excessive physical exertion should be avoided, and the surgical site should be protected from trauma [1]. Superficial petechiae and hematomas usually resolve shortly after surgery and do not require re-surgical intervention [1, 6].

Another complication that occurs after blepharoplasty is dehiscence of the postoperative wound. Factors contributing to this include: postoperative

injuries, infections and patients who sleep restlessly and damage the surgical site while sleeping. It is important to properly select and apply sutures supplying the wound after the procedure. The patient should avoid pressure on the operated eyelid (e.g. during sleep) and injuries in this place. In the event of a minor wound dehiscence, topical or oral antibiotic treatment is possible, and at the time of significant dehiscence, it is necessary to clean and suture the wound again [1].

Wound infections after blepharoplasty are quite rare. This is due to the good vascularization of this area of the face and the recommended use of antibiotic ointments. The most common pathogens causing postoperative wound infections are bacteria living on the skin of patients but also *Streptococcus* and *Mycobacterium*. One of the most serious infections that can be a complication of blepharoplasty is orbital cellulitis. It manifests as by severe pain, swelling, movement disorders of the eye muscles and may lead to loss of vision. Intravenous broad-spectrum antibiotic therapy is implemented to treat infections. When it does not bring therapeutic effects and the patient's symptoms worsen, surgical treatment should be initiated as soon as possible [6].

In the initial phase of recovery after blepharoplasty, patients often suffer from symptoms of dry eye syndrome, such as foreign body sensation, burning or photophobia. According to research, this problem is faced by 8% to even 21% of operated patients [2, 6]. To eliminate the adverse symptoms of dry eye syndrome, patients are advised to use artificial tear preparations or corneal moistening drops. Before performing blepharoplasty, the surgeon should assess the patient for lacrimation disorders and perform the Schirmer test. This will determine whether the patient is predisposed to adverse symptoms. Symptoms associated with dry eye syndrome after blepharoplasty surgery may persist for approximately 3 months in patients [6, 19].

Complications after blepharoplasty are also oculomotor disorders, lymphatic edema, eyelid ptosis (blepharoptosis), and ectropion – eyelid retraction and lagophthalmos, i.e. the inability to completely close the eyelids. These are changes caused by incorrect healing of the postoperative wound, its scarring, abnormalities of the eyelid folds, incorrect resection of the skin during the procedure [18]. Patients may also report esthetic complications such as eyelid asymmetry, medial membrane formation, and eyelid skin pigmentation anomalies [2].

The most serious complication after blepharoplasty is intraorbital hemorrhage and, consequently, ischemic optic neuropathy, which in extreme cases leads to partial or complete loss of vision. According to studies, the incidence of orbital hemorrhage with vision loss is 1 in 2,000 to 1 in 25,000 operated patients [1]. This complication most often occurs in the immediate postoperative period [2]. The symptoms that should prompt the physician to prompt diagnosis and treatment include reduced eyeball mobility, exophthalmos, dilated pupil, sudden and severe pain, and deterioration of vision. In this case, the patient should be immediately qualified for surgical treatment (lateral canthotomy) to evacuate the hematoma and decrease the intraocular pressure. It is also recommended that an osmotic diuretic and steroid therapy be used [1, 2, 19].

In current medical practice, the preferred technique in most cases is the transconjunctival approach, which is accompanied by fewer complications compared to the percutaneous approach. In addition to the advantage of avoiding scarring, this method is said to be simpler and much faster than the conventional percutaneous approach. We avoid cutting through the orbicularis muscle, which preserves its innervation, reduces postoperative swelling and retraction, and avoids the formation of a scar. This method also reduces the risk of postoperative lower eyelid retraction. In the percutaneous approach, swelling of the orbicularis oculi muscle caused by bleeding may affect visual acuity; in the case of the transconjunctival approach, we avoid this complication, as well as the occurrence of lagophthalmos and ectropion and eyelid asymmetry, which are common side effects of the classic percutaneous approach [20].

What to do to avoid complications?

As with any procedure, a very important element of wound healing is the patient's comorbidities and their proper control. Before the procedure, the patient's diseases should be compensated and treated appropriately. Especially in diabetic patients, there is a greater risk of infection and postoperative wound healing, so special attention should be paid to regular and appropriate glycemic control. In patients with weakened immunity and carriers of bacteria, including: carious teeth, and skin and nail diseases, these diseases should be treated before the procedure is performed to reduce the risk of infection. To reduce the risk of complications, the doses of anticoagulants should be adjusted before the procedure in consultation with the doctor (if the patient takes them

chronically) to avoid bleeding. After the procedure, patients should carefully follow doctors' recommendations and attend follow-up visits. A very important aspect is wound hygiene and appropriate dressing changes to prevent infection. After blepharoplasty, patients should sleep on their back with their head raised on a pillow, which will prevent pressure on the eyelids and possible damage to the stitches. It is also important to protect this area from the sun to prevent sunlight damage, which could cause a wound to form in the tissue weakened by the cut and suture. This protection includes both creams with a UV filter and sunglasses. Also give up stimulants that weaken the regenerative abilities of the body should be stopped. These actions will help us reduce the risk of complications and increase the likelihood of the procedure being effective.

Summary

Due to the increasing frequency of blepharoplasty among different age groups, it is important to ensure high quality of the procedure. The choice of both wound opening and closure techniques has a significant impact on healing, and thus leads to a satisfactory result. It is crucial to use sutures made of appropriate material, determine the proper postoperative procedure and instruct the patient on proper postoperative wound hygiene. This will reduce the risk of postoperative complications. Despite the small area occupied by the eyeball and eyelids in the body, they perform extremely important functions, both functional and aesthetic. They provide essential visual functions and determine one's external appearance. Inadequate wound care can lead to serious complications and even blindness. Therefore, proper hygiene of a seemingly small wound is of fundamental importance for the quality of functioning of each patient.

Disclosure

The authors declare no conflict of interest.

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