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Factors influencing the length of the recovery period after blepharoplasty: a review of the latest data

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Abstract

Introduction and purpose

Blepharoplasty is a surgical procedure aimed at restoring the functionality and/or aesthetics of the eyelids. The aim of the study is to draw attention to the factors influencing the recovery period at successive stages of therapeutic procedures.

A brief description of the state of knowledge:

Preoperative consultation is important in selecting patients, planning surgical procedures, identifying potential complications and meeting patients' expectations. In patients with hypertension, diabetes, smoking, and anticoagulant treatment, a worse scar assessment, longer

recovery period and more complications have been observed. Patients who have undergone refractive surgery within the last 6 months are not suitable candidates for blepharoplasty. Nutrition status has a significant impact on wound healing and tissue repair after aesthetic medicine procedures. The use of continuous sutures compared to tissue glue results in similar wound healing time and postoperative discomfort level. Postoperative wound care is essential for the healing process. Electrostimulation of the wound does not accelerate edema reduction. We have focused on many complications, such as swelling, bleeding, infections, eyelid malposition, dry eye syndrome, wound dehiscence, ways to cope with these problems, and the role of lasers.

Summary (conclusions):

Important is the proper preparation of the patient for the procedure. A detailed interview and examination influence therapeutic decisions, allowing the doctor to choose the most optimal treatment methods that will shorten the recovery time. Blepharoplasty is one of the most commonly performed aesthetic procedures, so we propose the development of publicly accessible standards that should be included in the initial interview.

Keywords: blepharoplasty; wound healing; convalescence;

Introduction and purpose

Facial plastic surgery leads to a significant and permanent reduction in the perceived age of the face. This effect is more pronounced when the number of surgical procedures modifying different parts of the face increases.¹ One of these procedures is blepharoplasty. The eyes and the area around the eyes are not only visible points during contact with people, but also reflect the aging of the face. With age, the skin loses elasticity, becomes saggy, and folds of skin form on the edges of the eyelids. These changes in the appearance of the eyelids create an illusion of sadness, fatigue, and loss of vitality, as well as reduce the aesthetics of the human face. Furthermore, in severe cases, excessive skin sagging impairs vision by limiting the field of view.² Blepharoplasty (eyelid correction) is a cosmetic surgical procedure aimed at functional and/or cosmetic reconstruction of the eyelids by removing excess skin and fatty tissue from the upper and lower eyelids. It is both a functional and an aesthetic procedure. Blepharoplasty is indicated not only for people suffering from aging, but also for people in their 20s and 30s who are concerned about excess skin on their eyelids, as well as for people genetically predisposed to under-eye shadows.^{2,3} Eyelid plastic surgery is safe and effective,

with a low rate of complications and a significant improvement in self-esteem after 6 months from the procedure.⁴ However, there is a lack of evidence on the long-term effects of eyelid plastic surgery. It is estimated that the effect of the procedure typically lasts 10-15 years.¹ This is due to the inevitable fact that the areas undergoing the procedure also undergo the same aging process as the rest of the body.² Blepharoplasty is currently one of the most commonly performed procedures in the world.⁵

According to the American Society of Plastic Surgeons, over 200,000 eyelid procedures were performed in 2016. The popularity of this procedure stems from its ability to provide a natural, younger-looking appearance with limited operating time and a low risk profile.² Upper eyelid surgery aims to achieve a more youthful appearance of the eyes by treating skin sagging and correcting typical age-related changes. Different types of surgeries have different effects, which can be positive or negative. Some results are associated with cosmetic effects and patient satisfaction with the final appearance, while other studies have shown an impact on the cornea, visual acuity, intraocular pressure, and dry eye syndrome.² It is therefore important to properly prepare the patient in order to minimize the risk of failure.

Factors affecting the recovery period occur at different stages of therapeutic proceedings. The preoperative assessment, proper qualification, type of procedure performed, wound dressing applied, and postoperative care method are important. The aim of this study is to pay special attention to factors affecting the length of the recovery period after blepharoplasty, as every patient wants to enjoy the desired effect as soon as possible. We will focus on various aspects that occur during the preoperative period, during the procedure, and during the healing period.

Description of the state of knowledge

Pre-anaesthesia evaluation

Preoperative assessment is crucial for selecting suitable patients, planning surgical procedures, identifying potential complications, meeting patient expectations, and taking photographs for documentation purposes.⁶ Furthermore, patients undergoing cosmetic blepharoplasty may have different expectations than those undergoing functional blepharoplasty. Therefore, it is important to discuss the expected outcome with the patient well before the surgery to ensure the best possible end result.² However, Paixao et al.⁷ concluded that the level of satisfaction with the surgery was significantly associated with the absence of adverse effects such as excessive scarring, minor changes in vision, swelling, itching, milia, and a feeling of pressure. Preoperative evaluation before blepharoplasty should include a detailed general and

ophthalmic history, a thorough physical examination, and an exhaustive interview with the patient.

Anamnesis and medical examination

This interview should include chronic conditions such as hypertension, diabetes, heart disease, bleeding disorders, hematological disorders, and thyroid abnormalities. It is also important to determine the medications currently being taken and prior surgical procedures, as they can affect wound healing. The eyelids are highly vascular structures. To minimize the risk of bleeding, the patient's anticoagulant status should be checked before the surgery, and if it is safe for the patient's health, appropriate medications should be discontinued 7-10 days before the procedure. If necessary, consultation with the patient's primary care physician is recommended.⁵ An ophthalmic history is very important in the preoperative assessment. The interview should include information about visual acuity, previous eye injuries, and eye conditions (e.g., glaucoma, allergic reactions, dry eye). Many surgeons may require a detailed preoperative ophthalmic examination to assess visual fields, visual acuity, tear film quality, extraocular muscle function, and glaucoma and macular disease. A detailed physical examination of the periorbital area is recommended. It includes an examination of periorbital structures and an assessment for the presence of upper and lower eyelid laxity, lateral canthal droop, lateral canthal angle divergence, and lower eyelid laxity.^{2,8} Healing of wounds is also affected by smoking, alcohol consumption, the use of illegal drugs, and over-the-counter herbal supplements.² Excessive alcohol consumption leads to increased generation of free radicals in human skin.⁹ A study by researchers found that smokers were twice as likely to experience wound dehiscence after blepharoplasty as non-smokers.⁶

Personal predispositions to keloids

Before the surgery, it should be determined whether the patient has a history of keloid scars. Ideally, a monofilament suture such as nylon or polypropylene, which minimally reacts with tissues, should be used. Avoid using inflammatory sutures such as silk or polyglactin 910 (Vicryl) to close the skin, as they can cause suture granulomas.⁶ These hypertrophic scar changes are caused by a chronic inflammatory state of the reticular dermis and are associated with excessive angiogenesis and abundant collagen accumulation. Some diets (such as those rich in hot and spicy foods) can exacerbate the inflammatory state caused by surgery.¹⁰ In the early remodeling of scar tissue, zinc is an essential trace element; therefore, a healthy, balanced diet is recommended preoperatively.¹¹ Postoperative use of a steroid ointment can

also help reduce scar formation. However, it should be noted that steroid ointment should not be continued for longer than a month after the procedure due to the risk of ocular complications, including increased intraocular pressure and cataract development. Some patients may inquire about using arnica gel to facilitate wound healing. The authors do not recommend this routinely due to a lack of evidence of its effectiveness. If it appears that scar hypertrophy is developing, consider injecting a steroid or 5-fluorouracil (5-FU) along the incision, starting approximately 4 to 6 weeks after the surgery. In the case of 5-FU, a total of 3 or 4 injections at least a week apart may be necessary. In milder cases of suture granulomas, observation is usually sufficient, as many of them disappear over time. If a granuloma persists for longer than 3 months, surgical excision should be considered.⁶

Patient's nutritional status

Nutritional status can significantly impact wound healing and tissue repair after surgical procedures, as well as the results of aesthetic and cosmetic procedures. Therefore, specialists working in this field must take into account the nutritional aspects of their patients in order to achieve the best results. Nutrition plays a fundamental role in surgery, as well as in modern medicine, as optimal nutritional status is now considered an important determinant of surgical outcomes. Good nutritional status also optimizes healing and can lead to better results in all types of surgeries.¹² Due to mineral and vitamin deficiencies, inadequate nutrition can actually affect the three basic phases related to wound healing processes: the inflammatory phase, remodeling, and the proliferative phase of wound healing.¹³ Furthermore, nutritional deficits can also lead to decreased immunity and an inability to tolerate and overcome stress factors such as infections.^{14,15} The state of nutrition can significantly impact wound healing and tissue repair after surgical procedures.¹⁶ It has been shown that up to 25% of outpatient plastic surgery patients are at risk of malnutrition.^{16,17} Therefore, nutrition can also affect the occurrence of granulomas. Malnutrition alters immune response by reducing T cell response,¹⁸ impairs phagocytic function, and alters cytokine and antibody production. Malnutrition is associated with granuloma development in patients with inflammatory bowel disease.¹⁹⁻²¹ Low intake of fruits and vegetables leads to deficiencies in certain skin-beneficial microelements, including vitamins and other molecules with antioxidant properties. Certain conditions, such as advanced age, hypertension, high BMI, and low preoperative protein and albumin levels, predispose patients to hematoma formation.²² Malnutrition is characterized by low albumin levels,²³ which exposes patients to skin complications. Consuming proteins is essential in order to obtain the necessary amino acids.

The consequences of protein loss in wound healing include fibroblast proliferation and reduced angiogenesis,²⁴ leading to decreased collagen synthesis and remodeling. Proteins are essential for wound healing after surgery to maintain skin integrity, fluid and electrolyte balance, and immune response activation. It has been shown that certain amino acids, such as arginine and glutamine, accelerate wound healing. For these reasons, arginine is one of the most recommended amino acids that promote wound healing.²⁵ Glutamine also plays a role in enzymatic, metabolic, antioxidant, and immune responses.²⁶ Glycine also plays an important role in promoting protein synthesis and wound healing, preventing tissue damage, and improving immunity.²⁷ Protein deficiency leads to poor wound healing due to delayed transition from the inflammatory phase to the proliferative phase.²⁸ The demand for protein in chronic wounds increases up to 250% due to the loss of a large number of proteins.²⁹ Omega-3 fatty acids act as precursors to prostaglandins and factors facilitating inflammation and metabolism. Some studies have shown that polyunsaturated omega-3 fatty acids (PUFA ω -3) promote wound healing.^{30,31} PUFA ω -3 consists of eicosapentaenoic acid (EPA), docosahexaenoic acid (DHA), and alpha-linolenic acid (ALA). The human body can only obtain DHA and EPA from fish that eat phytoplankton and marine algae, which naturally produce them.³⁰ It is possible that PUFA ω -3 modulates local inflammatory response in wound areas, speeding up the healing process.³² One study showed that diets enriched with PUFA ω -3 reduced the production of inflammatory mediators.^{31,32} PUFA ω -3 have a positive impact on both depression and inflammation, confirming their potential significance in surgical patients. Several studies have examined the potential value of specific trace elements in wound healing regulation. The beneficial impact of adequate microelement intake on surgical outcomes also applies to minor plastic surgery procedures. Therefore, proper intake of microelements is important. Vitamin A increases collagen synthesis and cross-linking, inflammatory response in wounds, and the number of immune cells in the wound environment, facilitating skin healing and differentiation.³³ Retinoids, such as retinol, improve skin elasticity, help remove damaged elastin fibers, and promote angiogenesis. Vitamin D and its receptor are expressed throughout the body and have a range of effects on wound healing.³⁴ It is also necessary for infection prevention and consequent inflammatory reactions. Vitamin C plays a crucial role as a necessary coenzyme in multiple enzymatic reactions and possesses significant antioxidant characteristics. Preclinical studies have shown that vitamin C supplementation results in higher expression of wound healing mediators and decreased expression of pro-inflammatory mediators, allowing for early tissue remodeling and resolution of inflammation.^{35,36} Due to its strong antioxidant properties, vitamin E is

considered one of the main molecules that protect the body from oxidative stress.^{33,37} Vitamins B1 and B2 are essential for proper collagen production.³⁸ Blood clotting relies on the significance of vitamin K. Production of prothrombin and factors II, VII, IX, and X is decreased if the level of vitamin K is low, and the initial phase of wound healing depends on blood clotting.³⁹ Deficiency of vitamins B6 and B12 as well as folic acid can lead to delayed wound healing after surgical procedures.⁴⁰ There is a significant risk of iron deficiency in the population undergoing plastic surgery and aesthetic procedures. Therefore, these individuals should be screened for iron deficiency. Iron can hinder wound healing by contributing to the formation of toxic free radicals.²⁴ Increased levels of free iron and reactive oxygen species released by neutrophils are important pathological stages responsible for increased destruction of connective tissue, sustained inflammation, and lipid peroxidation, which contribute to the development of a pro-oxidative environment in chronic wounds.⁴¹ Copper and magnesium are important trace elements worth mentioning. Copper helps stimulate angiogenesis by promoting the endothelial growth factor.⁴² It has been suggested that magnesium may improve the mechanical properties of scars⁴³. The Mediterranean diet (MD) and the Dietary Approaches to Stop Hypertension (DASH) are two healthy eating patterns that have been shown to improve overall health. However, patients with malnutrition or obesity are at increased risk of complications from surgical procedures. It is important for aesthetic medicine specialists and plastic surgeons to work with dieticians to ensure that patients are following a healthy diet before undergoing surgery.⁸

Ophthalmic procedures in the past

It is particularly important to inquire about any previous eye surgeries, such as refractive corrective surgery. Patients who have undergone refractive surgery within the last 6 months are not suitable candidates for blepharoplasty⁴⁴⁻⁴⁶ This patient population is at risk of developing dry eye syndrome and corneal ectasia due to changes in corneal sensation, tear fluid secretion, and tear film formation. Griffin et al. found that blepharoplasty can be performed after LASIK (laser-assisted in situ keratomileusis) if enough time has passed.⁸ The authors state that patients with a history of LASIK are at high risk of developing exposure keratopathy and a thorough preoperative assessment should be conducted to minimize complications.⁴⁷ Eyelid laxity is usually temporary and lubrication and eyelid massage are recommended during the intermediate postoperative period.⁴⁸ Causes of eyelid ptosis include excessive skin excision, damage to the orbicularis muscle or peripheral seventh cranial nerve, suturing or steri-strips, and postoperative pain leading to bandaging or incomplete closure.⁸

Factors occurring during the procedure.

Many factors influencing the recovery period also occur during the procedure. It has been shown that preparation with a cold blade causes less trauma, prevents histological changes in tissue, and is associated with a lower risk of thermal injury to the conjunctiva. For pinpoint bleeding, bipolar forceps should be used for coagulation. These forceps effectively reduce the risk of unwanted injury and swelling of the surrounding tissue, facilitating and accelerating the healing process.⁴⁹ Multiple studies have shown that electrocautery offers benefits such as rapid hemostasis, quicker incision and reduced blood loss, without affecting wound healing time, infection frequency, and postoperative complications.⁵⁰⁻⁵⁵ General and histological variable frequency distributions associated with wound healing have been calculated. It was found that incision with a scalpel was less necrotic compared to radio surgery and laser surgery.² During the procedure, local anesthesia should be injected slowly to avoid hematoma formation. If sedatives are used, the injection should be delayed until the patient is sufficiently sedated. A mixture of local anesthetic and adrenaline in a ratio of 1:100,000 or 1:200,000 can help constrict blood vessels. After local injection, the eyelid should be compressed for 30 seconds to minimize hematoma formation. The appropriate diathermy should be used during the procedure.⁶

Non-surgical procedures are an important alternative to surgery for rejuvenating the periorbital area. When the problem can be solved by "filling" and "removing" a smaller amount, fillers can be useful.⁶ Injections of botulinum toxin A and HA filler also have complications. Complications of botulinum toxin injections include bruising from injection, unintended ptosis of the eyelid or brow, lower lid ectropion, diplopia, dry eye, and incomplete eye closure.⁵⁶⁻⁵⁸

Literature on complications after HA filler injections continues to grow. Complications after HA filler injections include transient erythema, swelling, and bruising at the injection site; contour irregularities; fluid accumulation; and bluish discoloration secondary to light scattering. If the complications are severe, enzymatic dissolution may be necessary using hyaluronidase. Rare but serious complications can also occur, including cutaneous hypersensitivity reactions, vascular occlusion, including occlusion of the retinal branch artery and vision loss, and infections, including biofilm-type processes.^{46,59}

Greene et al. evaluated the effectiveness of octyl-2-cyanoacrylate tissue adhesive in eyelid surgery compared to traditional continuous suture closure.²⁶ Twenty patients after upper eyelid surgery were examined. One incision was closed with tissue adhesive, while the

opposite incision was closed with continuous sutures. Five blinded observers found no statistically significant difference in wound quality using a visual analog scale and a modified Hollander scale. There was no significant difference in healing time, inflammation, and wound complications. The authors concluded that octyl-2-cyanoacrylate adhesive is an excellent alternative to suturing. Tissue adhesive did not cause inflammatory complications and withstood closing forces.⁶⁰ Scaccia et al. conducted a prospective study involving 30 patients to compare subcutaneous closure with 5-0 polypropylene sutures and rapidly absorbable 6-0 gut sutures in approximating the eyelids after surgery. Both materials resulted in comparable morbidity and postoperative discomfort level.² In a randomized, prospective, single-blinded, split-eyelid trial conducted by Kouba DJ (2011) et al. on upper eyelid surgery, three subgroups were examined (ECA compared to rapidly absorbable sutures, ECA compared to polypropylene, and rapid absorbable gut suture compared to polypropylene). Although suture closure and tissue adhesive closure are highly effective in upper eyelid surgery, physicians and participants believed that cosmetics with ECA were superior to those with rapidly absorbable gut sutures.^{2,61} No differences were found in terms of scars, recovery period, or frequency of complications. However, in patients with more risk factors (such as hypertension, smoking, and anticoagulant or antiplatelet therapy), worse scar assessment, longer recovery periods, and more complications were found. Scar aspects were also evaluated by Kouba et al.,^{2,61} who concluded that tissue adhesive seems to provide better aesthetics than absorbable suture material.

The postoperative period

Wound care

Postoperative wound care plays an important role in wound healing and requires patient compliance and proper observation. Patients should also be advised on proper wound hygiene, such as daily cleansing with mild soap and water, followed by gentle drying of the wound. Avoiding prolonged soaking of the wound and using bandages or dressings according to the physician's recommendations may also be necessary.⁶ Although the entire recovery process takes months, the effect is often visible after about 2-3 weeks after surgery.⁶² Patients should expect swelling, bruising, mild eyelid drooping, and a pulling sensation when looking upward.⁴⁹

Postoperative swelling

Postoperative swelling can be reduced by applying cold compresses to the surgical area for up to twenty minutes at a time, with breaks, during the first 36 hours after surgery. Patients are advised to use cold packs and take pain relievers. Additional guidelines recommend rest and sleeping in a semi-reclined position. Avoiding exposure to direct sunlight is necessary, and wearing sunglasses when going outside is required. It is best to refrain from engaging in demanding physical activity. The head should be elevated above the level of the heart to reduce swelling.⁶²

Electrostimulation

A new medical device approved by the FDA for treating postoperative swelling is available. The device emits a low-level, pulsating electromagnetic energy field that modulates the resting membrane potential, allowing for a return to the physiological resting membrane potential. Fifty-seven people participated in this randomized double-blind trial. All patients underwent upper eyelid blepharoplasty. During the postoperative visit, patients assessed pain, swelling, and bruising, while the physician assessed swelling, bruising, and redness.

Using pulsating electromagnetic energy had no effect on postoperative pain, swelling, or bruising according to patient and physician assessments. A statistically significant reduction in redness, as assessed by the physician, was found when using active eye pads under the eyes compared to placebo. Although this study did not demonstrate any beneficial effects of the patch beyond reducing redness, the results and questions raised require further research. There is sufficient laboratory and clinical evidence suggesting that pulsating electromagnetic energy speeds up healing. Replicating the study with endpoints at different postoperative periods would be beneficial for comparing and uncovering whether an "early" device effect was observed.⁶³

Rubbing the eyes, body movement, and lifting heavy objects should also be avoided for two weeks after surgery. This helps prevent microclot migration and minimizes the risk of postoperative bleeding.⁴⁴

Chemosis, or infiltrative conjunctival edema, can occur as a complication. Its frequency of occurrence is 26.3%. Inflammatory fluid accumulates around the cornea, and lymphatic flow is reduced, causing localized swelling and inability to close the eye. Healing can be accelerated by using eye drops and steroids, which constrict blood vessels.⁶⁴

Postoperative bleeding

If postoperative bleeding occurs, it can result in subconjunctival hemorrhage, putting the patient at risk of compressive optic neuropathy and vision loss.⁴⁴ Subconjunctival hemorrhage should be immediately managed through lateral canthotomy and cantholysis, and if there is still no improvement, urgent hematoma evacuation should be performed.

Symptoms of subconjunctival hemorrhage include painful, tense eye sockets with significantly limited vision, reduced extraocular movements, increased intraocular pressure, and signs of optic neuropathy, including afferent pupillary defect and decreased color vision. In cases where bleeding is limited to the preseptal plane, these symptoms may not occur. It is advised for the patient to apply ice and compress the eyelid and sit with their head elevated. In most cases, bleeding subsides and only observation and reassurance is required. However, in sporadic cases where bleeding persists despite conservative treatment, re-opening the incision and repeating active cauterization of bleeding vessels may be necessary. At this stage, consideration should be given to discontinuing anticoagulant medications if not yet done. In refractory cases requiring multiple cautery attempts, silver nitrate application may be necessary.⁴⁴

The most alarming complication during the early postoperative period (first week) is permanent vision loss. Complete vessel occlusion lasting 60-120 minutes can result in permanent vision loss. In case of threat, immediate referral to an ophthalmologist and pharmacological and/or surgical treatment should be initiated. Treatment may include drugs that lower intraocular pressure, such as mannitol, acetazolamide, steroids, and beta-blocker eye drops. Surgical treatment may involve wound exploration, hemostasis, and hematoma evacuation. In an experimental study conducted by Zoumalan et al., ten orbits from human cadavers were injected to simulate subconjunctival hemorrhage.⁶⁵ The effectiveness of various surgical techniques, such as canthotomy, cantholysis, and septolysis, were examined. The use of these techniques resulted in reduced orbital pressure and intraocular pressure. However, the effect was short-lived in the case of continuous simulated bleeding. Early postoperative pain and swelling should not be ignored, as they may be early signs of infection. Immediate treatment with intravenous antibiotics, irrigation, drainage, and potentially hyperbaric oxygen therapy is recommended.^{2,66}

Infection of the operated area

Another complication that may occur in the first week of surgery is infection. It has been found that both obesity and underweight increase the risk of infection in adults. Therefore, a

healthy body mass is associated with the lowest risk of infection in most patients. Skin infections are also a manifestation of eating disorders (anorexia nervosa). Preventing malnutrition and promoting a healthy diet can be considered as the fundamental nutritional goals of surgery. These goals can be achieved before surgery through screening and nutritional assessment to diagnose, treat, and prevent malnutrition. The correlation between health status and adherence to a proper diet is well-established. Early coordinated efforts from surgical and dietetic departments can ensure optimal nutritional care for preoperative patients. The same applies to minimally invasive procedures and aesthetic techniques. Preoperative screening and nutritional assessments should be conducted to diagnose, treat, and prevent all types of malnutrition.¹⁶ Although infections are rare due to extensive vascularization in the area, they do occur and require early appropriate antibiotic treatment. The incidence rate is suggested to be 0.2%, and laser resurfacing can further increase the risk by 0.2%. These infections can be easy to cure, but they can also lead to more serious complications. Therefore, it is important to adhere to proper hygiene procedures and monitor potential infections after eyelid surgery. Lid contamination has the potential for critical complications such as cavernous sinus thrombosis or permanent vision loss.^{62,67} Connective tissue preseptal cellulitis is characterized by erythema, hardening, and edema of the eyelids, but without disturbance or loss of vision. Connective tissue preseptal cellulitis can be effectively treated with third-generation cephalosporins or fluoroquinolones and can be controlled on an outpatient basis. If empirical antibiotic treatment is not administered within 48 hours, hospitalization and intravenous antibiotics may be necessary. On the other hand, orbital cellulitis is characterized by excessive pain, proptosis, chemosis, ophthalmoplegia, leading to visual loss and reduced visual acuity. Orbital cellulitis is best controlled in a hospital setting due to possible consequences. Intravenous antibiotic therapy should be initiated immediately, in combination with computed tomography, which allows for a better assessment of the extent of infection, exclusion of cavernous sinus thrombosis, and detection of any abscesses. An enlarging abscess within the closed space of the orbit can also mimic retrobulbar hemorrhage, as the growing abscess compresses the central retinal artery and optic nerve, ultimately leading to permanent vision loss. As adjunctive pharmacological agents to reduce intraocular pressure, mannitol, dexamethasone, or timolol can be used. An ophthalmologist should be consulted after a surgical consultation to manage orbital abscesses.⁶² Case reports of postoperative infections with Group A beta-hemolytic *Streptococcus* have been described. Sunera et al. presented a case of necrotizing fasciitis after bilateral upper eyelid plastic surgery in a diabetic patient.⁶⁸ Jordania et al. described a similar case of necrotizing fasciitis

after eyelid surgery. In this case, the patient's son was found to have impetigo before the surgery.⁶⁹ Goldberg and Li described a comparable case of a healthy patient who presented to the hospital within 30 hours after surgery, demonstrating that necrotizing fasciitis is initially indistinguishable from cellulitis.⁷⁰ Although orbital abscesses are rare, diagnosis based on physical symptoms is not sufficient; a case of orbital abscess diagnosed by ultrasound has been described, and the authors recommend the use of ultrasound as an aid in diagnosis.⁷¹ Juthani et al. reported a case of postoperative orbital cellulitis caused by methicillin-resistant *Staphylococcus aureus*, which was promptly identified and treated with intravenous antibiotics. Although the Centers for Disease Control and Prevention recommend early antimicrobial prophylaxis and routine MRSA monitoring, the authors suggest considering antimicrobial prophylaxis in hosts with reduced methicillin-resistant immunity or patients colonized by *S. aureus*.⁷² In summary, early postoperative pain and swelling should not be ignored, as they may be early signs of infection. Immediate treatment with intravenous antibiotics, cleansing, drainage, and possibly hyperbaric oxygen therapy is recommended.²

As part of prevention, regular use of moisturizing eye drops and ointments is advised to prevent corneal abrasions. Corneal erosion is generally a reversible cause of vision changes and occurs as a result of unintentional damage to the superficial layer of the corneal epithelium. Diagnosis is made based on symptoms such as pain, foreign body sensation, light sensitivity, and is usually visible immediately after the procedure. Diagnosis is confirmed by evaluating the cornea under cobalt blue light after fluorescein instillation. Corneal abrasions are treated with ophthalmic antibiotic ointment four times a day and should resolve within 24 hours. Persistent subjective and objective symptoms should prompt an ophthalmic evaluation. Ointments can aid in wound healing, but depending on the ingredients of the ointment (e.g. antibiotics), contact dermatitis may occur.²

Postoperatively, lubricating drops, Lacri-Lube, and antibiotic eye ointment may be prescribed to reduce the incidence of corneal and conjunctival inflammation and subjective and objective symptoms of dry eye syndrome. A shower is possible the next day, and antibiotic ointment should be applied as needed during wound care. The same is recommended for individuals wearing contact lenses and limiting the use of corrective eyewear. When canthopexy is not performed, half-inch Steri-Strips are applied, serving as a "cast" (with benzoin or Mastisol for safety). This method reduces the tendency for lid eversion. Alternatively, a temporary Frost suture placed inside the lower eyelid margin and attached to the forehead supports the eyelid during early healing. It is worth noting that the current trend in eyelid surgery is minimalism -

preservation or even increase of volume loss. Aggressive procedures may yield excellent results; however, more complications may arise.^{2,73}

Blepharoptosis and lagophthalmia

During the period of 1 to 6 weeks after surgery, many complications can occur, including abnormal positioning of the upper eyelid and lower eyelid.² Complications of abnormal positioning of the upper eyelid include eyelid ptosis and eyelid not closing properly. The frequency of eyelid ptosis is unknown, but it is believed to be caused by swelling or bruising after surgery, which can subside with conservative treatment such as cold compresses. Lagophthalmos, which is the inability to fully close the eyelids, is usually a transient postoperative complication. Causes of eyelid not closing properly include excessive skin removal, damage to the orbicularis muscle or peripheral seventh cranial nerve, sutures or Steri-Strips. Lagophthalmos is usually temporary, and lubrication and eyelid massage are recommended during the intermediate postoperative period.²

Dry eye syndrome

Dry eye syndrome is a common condition of tear insufficiency with symptoms such as dryness, burning, foreign body sensation, blurry vision, light sensitivity, itching, redness, increased tear flow, and mucus discharge. Since blepharoplasty can mechanically alter eyelid closure and disrupt lubrication mechanisms, the presence of subclinical dry eye syndrome should be considered in patients considering blepharoplasty, especially those with pre-existing eye conditions.²

Late abnormal positioning of the lower eyelid is associated with additional complications compared to the intermediate postoperative period. The treatment depends on the location of the problem, which can involve deficiency or adhesions of the anterior, middle, or posterior lamella. Surgical repair of anterior lamellar deficiency involves skin grafting. Surgical repair of middle lamellar deficiency involves lysis of adhesions if conservative stretching fails. Shoreta et al. described a procedure called "Madame Butterfly" which refers to a triad involving scar lysis of the middle lamella, reconstruction of the lateral canthus, and cheek lift as an effective method for treating cicatricial lower eyelid retraction.^{2,74}

Malar festoons

Malar festoons occur in patients with a predisposition to fluid accumulation, such as those with thyroid diseases, renal insufficiency, sinusitis, and allergies. According to Lisman's

review article, the best method of preventing this complication is early preoperative diagnosis and intraoperative administration of intravenous steroids or postoperative oral steroids in high-risk individuals.⁷⁵ Other treatment methods include diuretic medications such as furosemide or hydrochlorothiazide. Even though it is possible to surgically remove malar festoons that are persistent, the chances of success are not high. If the underlying disease is systemic, eyelid surgery may not be able to locally correct the problem.²

Another way to manage excess skin after lower eyelid surgery is ablative laser treatment, which uses intense laser light to remove excess skin. This is a very precise method that minimizes the risk of damaging surrounding structures. Ablative laser treatment can also improve the appearance of scars after surgery.

Chemical peels are another option, which involves applying a special chemical preparation to the skin to remove the upper layers of skin. This allows for the removal of excess skin and improvement in its elasticity. Chemical peels may be performed individually or alongside other treatments.

In cases where the excess skin is particularly large, dermabrasion may be necessary. This is a more invasive procedure that uses special tools to mechanically scrape away excess skin. Dermabrasion can be an effective way to remove a large amount of skin, but it is a more advanced procedure and may require a longer recovery time. It is important to consult with an experienced plastic surgeon before deciding to remove excess skin after eyelid surgery. The surgeon will be able to assess the individual case and recommend the appropriate procedure that minimizes risks and provides the best results for the patient.^{2,76,77} In the case of mild excess skin (<2 mm) and blackheads after lower eyelid surgery, ablative skin resurfacing techniques such as ablative laser or chemical peels can be applied. These procedures should generally be reserved for patients with skin type III or lower according to Fitzpatrick. Due to the risk of pigmentation changes in patients with skin type IV or higher, caution should be exercised when considering these procedures. Preliminary treatment with topical retinoic acid (0.05% or 0.10%), hydroquinone (4-8%), and alpha-hydroxy acids (4%-10%) for 4-6 weeks is recommended, applied daily at night, starting one week before treatment.⁷⁸ In a retrospective evaluation conducted by Herbig et al., a combination of Jessner's chemical peel and 35% trichloroacetic acid was used on 115 patients. The author concluded that this method is an effective and safe tool for resurfacing superficial and moderate scars.⁷⁹ As Roy summarized, laser ablative facial resurfacing can also correct excess skin and other issues in a review article; commonly used lasers are carbon dioxide (CO₂) and neodymium-doped yttrium aluminum garnet (Nd:YAG) lasers. Although these platforms are effective, they can also

increase the risk of prolonged healing time, redness, swelling, and hypopigmentation.⁸⁰ Therefore, fractional laser has become a more preferred method than traditional full-field lasers because it provides faster epithelial regeneration and shortens healing time.⁸¹ In the case of laser resurfacing, the patient should be educated about long-lasting redness and wound care. Most importantly, patients should be informed that the final results of the surgery may not be fully visible for 3 months due to postoperative swelling.² Other studies have shown that laser resurfacing is an effective and safe method for treating various skin problems such as acne scars, wrinkles, hyperpigmentation, and sun damage. Patients may experience some discomfort during and for a few days after the procedure, but pain can be alleviated with local anesthesia or painkillers. It is also important for patients to be aware that laser treatment may require multiple sessions to achieve optimal results. Each session may be separated by a several-week recovery period to allow the skin time to heal. Additionally, patients should be advised to follow certain skincare guidelines after the procedure, such as avoiding sun exposure, using sunscreen creams, and avoiding harsh scrubbing of the skin. It is worth mentioning that laser resurfacing may carry some risk of complications such as infection, hyperpigmentation, scarring, discomfort, or swelling. However, a relatively low percentage of patients experience these complications, and most of them can be effectively treated. Therefore, after a thorough assessment of potential benefits and risks, laser resurfacing can be an appropriate solution for the patient.²

Laser treatment and microsurgical techniques

Laser treatment and microsurgical techniques can be effective solutions for problems related to excess or lack of skin elasticity. However, it should be noted that ablative lasers require longer recovery time and may carry higher risks.⁵ Studies have shown that both CO₂ and Er:YAG lasers have a similar degree of skin tightening, but Er:YAG lasers may lead to more scarring and have less coagulation abilities compared to CO₂ lasers. On the other hand, fractionated CO₂ laser resurfacing was comparable to traditional ablative resurfacing, but had lower risk of complications and shorter recovery time.^{82,83} A study by Kim et al.⁸⁴ with fractional ablative CO₂ laser resurfacing revealed low risk of infections, mainly viral. The most common complication was inflammatory hyperpigmentation, which occurred in about 10% of patients but could be easily treated locally. Visible scars occurred in less than 1% of cases and required corticosteroid injections. The study showed that about 97% of patients were "very satisfied" or higher with the overall treatment effect. Laser treatment, especially fractional ablative CO₂ laser resurfacing, can be an effective way to deal with issues related

to skin elasticity and excess. However, the risk of complications such as infections or hyperpigmentation exists, although it is low.⁵

Wound dehiscence

There is a high risk of wound dehiscence within the first 2 weeks after surgery. Intraoperative techniques aiming to reduce the risk of later wound dehiscence include avoiding excessive cautery of wound edges, closing the circular muscle to reduce tension on the skin wound, undermining the skin wound edges before suturing to avoid epithelial layer overlap, and securely tying suture knots. The use of rapidly absorbable sutures may be associated with an increased risk of wound dehiscence.⁶ Therefore, if absorbable sutures are used, choose one that will dissolve in at least 7 days, or use non-absorbable sutures and remove them after 1 week. The patient should be advised to avoid bending, lifting heavy objects, and sleeping face down for 2 weeks after surgery. If wound dehiscence occurs, the management depends on the extent of skin separation and whether secondary healing has begun. In cases of complete separation of the wound along a significant portion of the incision, the wound edges require a deep resuturing with a scalpel or Westcott scissors, followed by closure. In cases of minor wound separation, observation may be the best approach, allowing for secondary wound healing.⁶

Summary

Preparing a patient for surgery is extremely important and cannot be overlooked. We understand that a detailed interview and examination are crucial for making therapeutic decisions. With them, the doctor can choose the most optimal treatment methods that will accelerate the recovery process. Amongst numerous aesthetic procedures, blepharoplasty is one of the most commonly performed surgeries. Therefore, we propose the development of widely accessible standards that should be considered during the initial interview with the patient. During the interview, the focus should be on the aesthetic concerns reported by the patient and any associated discomfort. Knowledge about these issues will help the doctor assess the patient's needs more accurately and tailor the procedure to their individual expectations. Examining the patient before the surgery is extremely important as it allows for an assessment of the condition of the skin, tissue positioning, and other factors that influence the proper choice of surgical technique. Additionally, it can provide information about any possible limitations or contraindications for the surgery, which is crucial for avoiding potential complications. Therefore, we propose that the pre-blepharoplasty interview includes

questions regarding the patient's medical history, previous surgeries, current health status, medications taken, and any allergies. Additionally, detailed skin examinations will be conducted, analyzing the elasticity and tension of the tissues, as well as evaluating any irregularities or unevenness. We believe that the development and implementation of standardized protocols, which will be widely accessible before aesthetic surgeries such as blepharoplasty, are crucial for ensuring the most satisfying results for every patient.

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