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RESEARCH ARTICLE

BLEPHAROPLASTY : INDICATIONS AND SURGICAL TECHNIQUES

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Abstract

Blepharoplasty consists of surgically removing eyelid skin excess or fat protrusion along the eyelid crease mostly for improved cosmesis or for therapeutic purposes .Attaining successful outcomes relies on a solid understanding of facial topography,indications, patient and technique selection. Our study, made in the department ofPlastic , Reconstructive and Aesthetic Surgery , Center of burned patients of the University Hospital of Tangier-Tetouan-Alhouceima 01/03/2021 to 20/05/2022 ; is about 21 cases of upper blepharoplasty , mostly in middle aged women , in response to a dermatochalasis and only one in a male patient presenting ptosis. In this work , we discuss the noted results from the study with a wide range of background literature in the eye-face rejuvenation surgery.

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Introduction:-

Blepharoplasty has become one of the more common aesthetic surgical procedures performed today with a vital role in facial harmony and rejuvination . It consists of the removal of folds of loose skin and bulges of protruding fat from the eyelids , either the upper or the lower lid , secondary to the loss of tissue elasticity due to aging ,genetics and sun exposure . Blepharoplasty is majorly indicated in dermatochalasis ,blepharochalasis or lipoptosis . It can be performed by many operative approaches and combined with other facial and skin rejuvenation procedures such as brow lift , laser or chemical skin resurfacing .

Surgical anatomy /Physiological variants:

It is primordial to have a very thorough understanding of the eyelid anatomy and thephysiologicalspecificities.One should view the upper and lower lids as analogous or similar, with a few specialized differences.

A fundamental concept in viewing the eyelid is that it is composed of three distinct anatomic layers. These include an external coverage or skin, a middle support layer, and an internal lining . The eyelids could be considered as a trilamellae squeegee-like structures covering the orbital rim and anchored medialy and lateraly by respectivily , the medial and lateral canthal tendons which can be used as an anchor in the lateral canthopexy. The three lamellae include an outside coverage of skin that is the thinnest of the whole body ,with minimal to no subcutaneous fat. (1,5)The orbicularis muscles,are the main protractors of the eyelids forming the middle or supportive layer , presenting three portions, the pretarsal one lying in front of the tarsal plate , the preseptalone lying

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anterior to the orbital septum and the orbital one .It is responsible of the closure both voluntarily and involuntarily of the eyelids and should be preserved in both upper and lower blepharoplasties by making the access incisions through the muscle at the junction of the pretarsal and preseptalorbicularis .The retractors muscles for the upper lid are the levatoraponeurosis anteriorly and the superior tarsal muscle (Muller's muscle) posteriorly . For the lower lid , they are thecapsulopalpebral fascia(CPF) and the inferior tarsal muscle . (3)

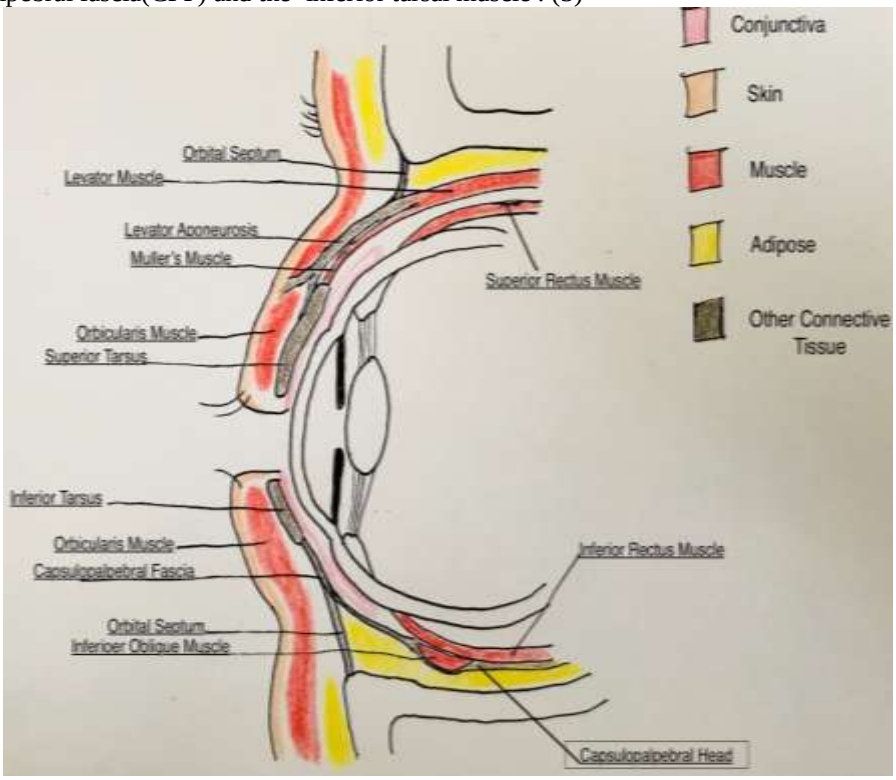

Figure1:- Eyelid Anatomy. Contributed and Illustrated by Megan L. Cochran.

The orbital septum separates anterior eyelid structures from the intra-orbital structures . In the upper lid , it connects connects the periosteum of the superior orbital rim to the levatoraponeurosis above the superior tarsal border (though this has racial variance). In the lower lid , it connects the periosteum of the inferior orbital rim to the CPF just below the inferior tarsal border.The orbital septum in Caucasians fuses with the levatoraponeurosis closer to the superior border of the tarsal plate; whereas,the orbital septum in Asian eyelids fuses with the levatoraponeurosis closer to the eyelid margin .

Orbital fat is located immediately posterior to the orbital septum and anterior to the levatoraponeurosis in the upper lid made of two pads : medial and central ; and anterior to the capsulopalpebral fascia of the lower lid and made of three fat pads : nasal , central and temporal ... The inferior oblique muscle runs in between the medial and central fat pad in the lower eyelid and is an important anatomical landmark during eyelid and orbital surgery.During the manipulation of the nasal fat pad , it is necessary to be extra careful not to injure two neighboring vascular infrastructures : the medial palpebral artery located medially and a branch of the superior ophthalmic vein located deep in the pad . (3,5)

The tarsal plate is a rigid cartilaginous-like structure that measures vertically in the center of the eyelid 4 to 6 mm in the lower one and 8 to 10 mm in the upper one and measures horizontally approximately 29 mm on both . It is especially important for vertical support and rigidity of the eyelid. This vertical supportive task is important and fundamental in maintaining the lower eyelid position 1 or 2 mm above the corneoscleral junction or limbus. A normal upper eyelid lies midway between the upper aspect of the pupillary aperture and the upper limbus. The tarsal plate is a little wider on the upper lid than on the lower, and both upper and lower lids enjoy a mucous membrane lining , conjunctiva , that is applied to the visceral and parietal surfaces, namely, the eyeball and posterior eyelids .This structural layer is pierced by glands that drain or open posterior to the eyelashes or cilia line.(1,3)

The upper lid drains its blood supply from the internal carotid artery through its ophtalmic collateral forming the superior marginal arcade .The lower lid is drained by the external carotid artery through its facial collateral that gives the angular artery thus forming the inferior marginal arcade . The upper and lower eyelids have rich vascular supply and have many anastomoses between the upper and lower lid circulations.
The V cranial nerve and its branches provide the sensitive innervation to the eyelids , namely the ophthalmic branch to the upper lid and the maxillary branch to the lower lid . (2)

Materials And Methods:-

A retrospective review of the 6 cases of blepharoplasty in the Department of Plastic , Reconstructive and Aesthetic Surgery , Center of burned patients of the University Hospital of Tangier-Tetouan-Alhouceimafrom 01/03/2021 to 20/05/2022 .

The patients case notes were reviewed and all the needed information , about age , sex , indications, techniques and post-operative complications , were extracted .

The results are put together in different forms and discussed later on the basis of scientific literature.

Results:-

Under the period of the study , 21patients were presented to our consultation complaning of droopy eyes , with little to no impairement of the eye's function for most cases but especially for the aesthetic prejudice.

Twenty patients amongst our series , are consulting for a dermatochalasis of the upper eyelid which is the most commun indication of blepharoplasty and are female , from 45 to 75 with a median age of 56.All patients note a very important sun exposure during multiple years .

(a)

(b)

Figure2: -(a) The excess of skin and fat, (b) 5th post-operative day photographs with a hidden scar and a more light and youthful look.

One male patient , of 44 years old , presented a bilateral congenital ptosis of the upper lid with important impairment of the peripheral vision . He beneficiated from a bilateral tightening of the levator aponeurosis muscle , combined with a blepharoplasty from optimal results .

(a)

(b)

Figure3:-(a) Initial Picture of the patient with bilateral ptosis .
(b) Final result after a bilateral ptosis surgery combined with an upper blepharoplasty .

The pre-operative evaluation includes a thorough medical history concerning dry eyes, recurrent herpes zoster or simplex infections, and thyroid or myasthenia disease and other systemic diseases such as diabetes andhigh blood pressure. And notes of the complaints as described by the patients in front of a mirror and taking different plans photographs.

A complete physical examination is mandatory, especially a fine examination of the lid margin for chronic blepharitis, evidence for lid retraction or laxity.

All the cases in our study, were preferably performed under local anesthesia. The local anesthetic used in our case is Xylocaine 2%, associated to Adrenaline at a ratio 20ml:0.25ml; permitting local vasoconstriction and thus hemostasis and injected superficially using an intradermic needle.

The preoperative marking is made on a sitting patient in neutral gaze with no face mimicry. The lower limit of incision is usually situated in the natural crease of the eyelid , the lateral limit is limited by a line joining the lateral canthus and lateral end of the brow .The superior limit is determined by how much skin excision we want to make , respecting enough vertical lid height to preserve a normal eye closure .
A fat excision is usually combined, interesting the medial and central fat pads of the upper eyelid.The closing is

made by stitches (Prolene 0/6) hidden in the crease of the eyelid thus minimizing the scare appearance , which are removed after 5-7 days .

(a)

(b)

(c)

(d)

Figure 4:-(a, b) Preoperative marking of the skin to be excised (c,d) Immediat postoperative result and the excess of skin and fat pads : medial and centralFurthermore , in our series of cases no secondary complications have occurred.

Discussion:-

Blepharoplasty refers to the aesthetic or functional surgical manipulation of the upper or lower eyelids . Upper or lower lid blepharoplasty both have their own set of indications and may be undertaken during the same procedure or at different times . This intervention interests generally more women than men , as noted in our study . Dermatochalasis refers to the excess of the skin of the lower or upper eyelids and is the most common indication of blepharoplasty , as it is the case in our study . Many patients will seek blepharoplasty for cosmetic concerns related to the amount of dermatochalasis of either the upper or lower lids. However, significantdermatochalasis of the upper lids may contribute to lateral hooding and visual obstruction, while that of the lower lid may contribute to ectropion. Dermatochalasis results from the loss of elasticity and support in the skin , accentuated by age(starting 4^{th} decade) and important sun exposure , concurring to the results of our study . Steatoblepharon, another frequent indication, refers to the fat protrusion in the upper and more often lower eyelids, which may also cause a cosmetic concern to patients. It could be a result to fat herniation caused by aging of tissues or at a younger age with familiar predisposition, usually due to a negative vector (lack of anterior cheek projection).(3-5-6)

A pathologic concern specific to the upper eyelid is ptosis. Patients affected by this pathology will show the variable overlap of the upper lid over the pupil. The most reliable way to describe the degree of ptosis , is to measure the distance from the mid pupil to the lid margin , called the margin reflex distance 1 (MRD1) which normally measures 4 mm . Patients with significant ptosis, often described as an MRD1 of 1 to 2 mm, are often considered candidates for levator advancement procedures.This specific indication is noted once in our study , in a male patient .

An indication applicable to the lower eyelid is lower lid ectropion or turning out of the lid exposing the conjunctiva, indicating a decrease in the elasticity and increase in the laxity of the lower lid. This feature can be assessed using the lower lid snap-back test, in which the lower lid is pulled away from the sclera and allowed to retract. The lower lid may be slow to retract or will not retract at all, indicating that a lateral canthopexy or canthoplasty may be necessary.

Cosmetically, the goal for the upper lid is resection of skin and fat to allow a mild hollow and shadow related to the superior orbital rim and eliminate lateral hooding. The goal remains the same for the lower eyelid, though lower lid procedures also focus on alleviating the sagging of the lower lid and treating the lid-cheek junction. (4-6)

Preoperative patient evaluation for blepharoplasty should document medical and ophthalmologic history such as chronic systemic diseases and medications. Ophthalmologic history should be obtained, including vision, corrective lenses, trauma, glaucoma, allergic reactions, excess tearing, and dry eyes. No cosmetic surgery of the periorbital region should be performed for a minimum of six months following corneal refractory surgery. Schirmer's test should be considered if there is history of dry eye.

The patient’s specific cosmetic complaints should be verified while looking in the mirror. Evaluation then proceeds with careful analysis of periorbital topography and signs of aging. Standardized preoperative photographs are taken in 6 views that include a front, lateral, three quarters, and a close-up view of the eyes. In addition, photographs of the eyes closed in repose and of the eyes open with the globe in upward gaze, help in evaluation of the amount of

excess skin in the upper lid and excess orbital fat in the lower lid, respectively.The surgical plan should be determined after discussing the patient's goals and desired outcome and it should be customized depending on the presenting features. (1-5-6)

Blepharoplasty may be performed under either local or general anesthesia depending upon the surgical plan, patient and surgeon preference, and need for concomitant operations. A simple upper or lower eyelid blepharoplasty where only skin or fat is excised can be performed under local anesthesia. Other more invasive procedures, such as lower blepharoplasty combined with fat repositioning may need intravenous sedation, or general anesthesia. (4)

Upper Blepharoplasty:

The upper eyelid is divided into two distinct spaces, the upper eyelid fold, which is the space between the brow and upper lid crease, and the pretarsal space, defined as the space between the crease and the lash line. The ratio between both spaces (fold:pretarsal ratio) and the difference in volume is what determines upper eyelid aesthetics. This ratio differs from medial to lateral and between males and females. Studies of the upper eyelid topographical proportions in attractive Caucasian female models, presented at the American Society for Aesthetic Plastic Surgery Annual Meeting in New York, found that an ideal fold:pretarsal ratio averages 1.87 medially and widens laterally to an average of 2.98, peaking at the lateral limbus. These findings reflect the importance of the presence of some degree of pretarsal show in females. In males, on the other hand, pretarsal show is not as critical and upper lid fold height is more even across the width of the palpebral fissure.(7-8)

On another aspect , a normal upper eyelid lies midway between the upper aspect of the pupillary aperture and the upper corneal scleral junction or limbus. The apex of this arch lies just medial to the pupil, and this is an important landmark in any ptosis correction using a surgical manipulation of the levatoraponeurosis(very powerful tool for altering upper lid height). This can be achieved by plication, advancement, or recession.

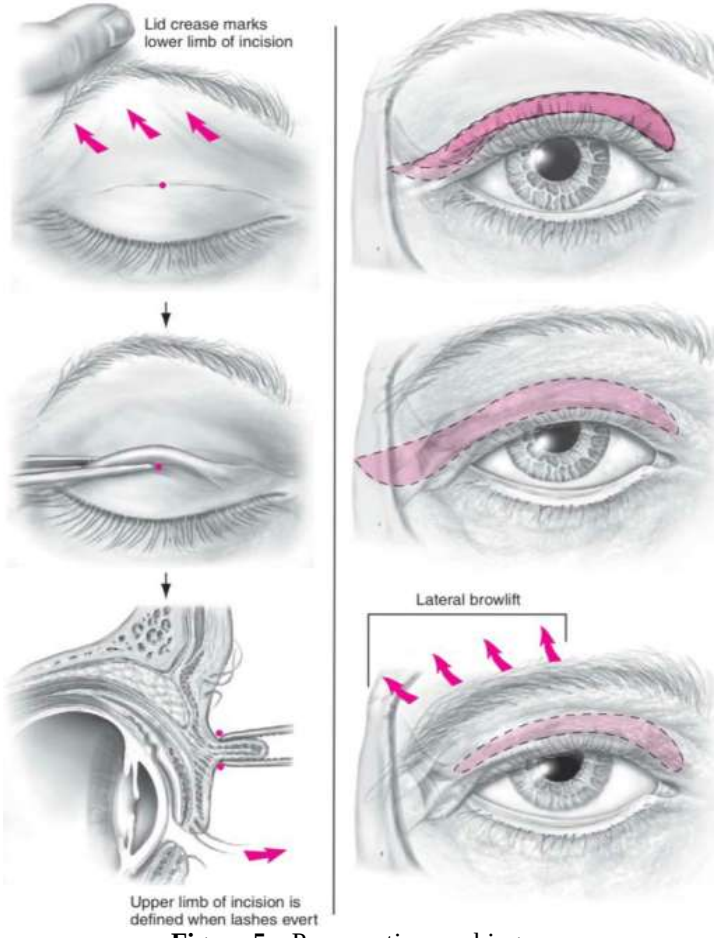

Figure 5:- Preoperative markings.

Preoperative markings should be made with the patient sitting upright in neutral gaze with the brow properly positioned. The eyelid crease is situated above the ciliary margin approximately 8 to 9 mm in women and 7 to 8 mm in men. The lower limit of excision should be along the eyelid crease, and the lateral extent of the marking should be limited by an imaginary line joining the lateral end of the brow to the lateral canthus . The extent of excision should be at least 10 mm from the inferior border of the brow, making a pattern of skin excision as shown in the Figure. Skin pinch test using forceps can confirm the preoperative markings. A minimum of 20mm of vertical lid height should be preserved for normal eye closure. The location of fat should be determined and marked preoperatively. (1-8)

In practice the upper lid blepharoplasty can be efficiently performed using a few technical manioulations consistent with the anatomy . Digital traction and light pressure allow smooth quick skin incisions , exerting slightly more pressure on the scalpel (blade N° 15) laterally as the skin thickens around and lateral to the orbital rim . Then , skin and orbicularis muscle resection is made using an instrument on the skin-muscle section, preferably a needle tipped insulated cautery , and pulling this superonasally while providing digital traction laterally .(1-6)The orbital septum is widely opened ,exposing the preaponeurotic space .The underlying levatoraponeurosis is protected by opening the septum as cephalad as possible , because the levator and septum diverge as one moves superiorly . The medial fat pad may require digital pressure to expose and grasp ; however , care should be taken not to overly resect fat when using digital pressure techniques , to prevent deep orbital hemorrhageand should be conservative to avoid a hollowed-out appearance. . When the orbicualris oculi muscle is left untouched, plicating the muscle by incorporating it in skin closure helps define the upper lid crease and enhance the upper lid fold convexity.(1-9-10)Closure may then be performed , preferably by 6-0 nylon interrupted sutures laterally and 5-0 nylon intracuticular sutures medially . (1)
The trans-conjunctival blepharoplasty is rarely used on the upper eyelid .

Lower Blepharoplasty :
Lower lid blepharoplasty is one of the most variable procedures in plastic surgery , and generally involves skin resection , postseptal fat resection , blunting of the lid-cheek junction and tightening of the lower lid tarsoligamentous complex . There are two popular approaches to surgical rejuvenation of the lower eyelid: the transconjunctival and skin-muscle flap blepharoplasties. The main distinguishing feature between the two is that the transconjunctival approach does not violate the orbicularis oculi muscle and the orbital septum can also be left intact. The skin muscle flap technique on the other hand relies on mobilization and tightening of the orbicularis oculi muscle through suspension, which resembles a SMAS facelift.(6-11)

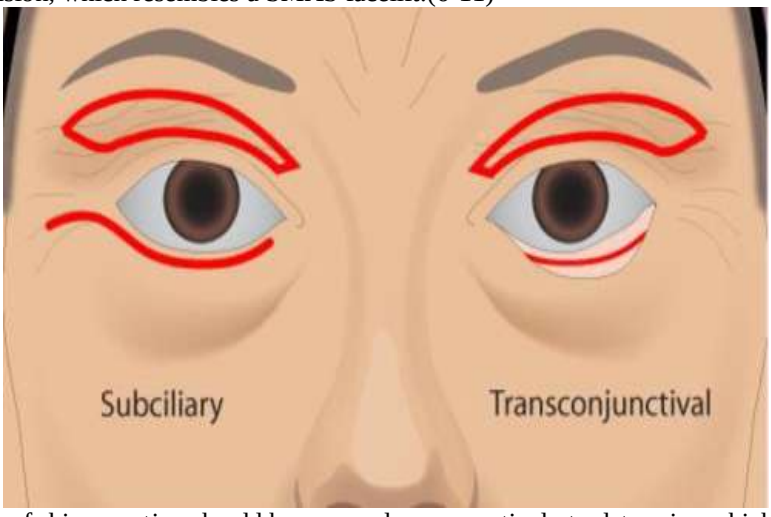

Figure6:-The amount of skin resection should be assessed pre-operatively to determine which incision will be used to access the lower lid. Patients requiring skin resection will need an external incision on the lid, most often from a subciliary approach(LEFT). Patients not requiring skin resection may have postseptal fat resected from the transconjunctivalapproach(RIGHT).

The skin-muscle flap technique provides access to the orbital fat through an anterior approach. A stair-step incision is made in the skin immediately inferior to the lash line and is extended a few millimeters laterally beyond the lateral canthus. The lateral extension is marked in an upright sitting position in a natural crow's feet line .Then , dissection

is deepened through the orbicularis oculi muscle until the lateral orbital rim periosteum is identified. After the skin is separated from the orbicularis oculi, the muscle incision is extended preserving 4 millimeters of pretarsal orbicularis. Dissection proceeds in a preseptal plane until the inferior orbital rim is reached. In this plane, the tear trough ligament and the orbicularis retaining ligaments are identified and are released in continuity with the lateral orbital adhesion, which frees the muscle and allows mobilization of the orbital portion of the orbicularis along with its overlying subcutaneous fat compartment .33 This maneuver is what defines the skin-muscle flap technique, as it redrapes and lifts the orbicularis taking the soft tissue redundancy laterally where the majority of trimming occurs (11-12-13)Fat excision or redraping is performed through a septal incision or partial excision. After the orbicularis is redraped, a triangular skin and muscle excision is performed laterally and inset is performed after lateral canthal tightening. Proper inset of the skin-muscle flap is probably one of the most challenging steps of this technique for several reasons; there is a substantial dog ear that has to be chased while maintaining a relatively short incision, sewing the orbicularis back together can create a step off that has to be leveled, and finally imprecise inset of the skin near the lateral canthus can result in postoperative webbing. Given the nature of the stair-step incision, careful trimming of the preseptal orbicularis is necessary to avoid overlap and unintentional augmentation of the pretarsal orbicularis. (8-13)

A transconjuctival incision provides access to the orbital fat through a posterior approach and leaves the orbicularis muscle and septum undisturbed. An incision is made in the conjunctiva 5 to 6 mm inferior to the tarsus to avoid the zone of fusion between the capsulopalpebral fascia and the orbital septum. This allows direct posterior access to the orbital fat while staying in a postseptal plane. The incision in the capsulopalpebral fascia can be made horizontally along the same line with conjunctiva, or separately as a vertical split to preserve the retracting function of the muscle.(14-15) A subperiosteal dissection is performed with a periosteal elevator taking care not to injure the infraorbital neurovascular bundle, which is clearly visualized.8,11,36 A preseptal dissection is preferred in other cases as it provides better access to release the palpebral part of the orbicularis oculi, tear trough ligament, orbital part of the orbicularis oculi, and the orbicularis retaining ligament. After the fat is redraped, lateral canthal tightening can be performed when indicated and the conjunctival incision is closed or left to heal by secondary intention. (14-16)

Postoperatively, patients should be advised to use ice packs on the surgical site for three days to minimize postoperative swelling, and topical ciprofloxacin ophthalmic ointment on the incision sites for two weeks. Non-absorbable sutures can be removed after one week. (3-4) Complications after blepharoplasty, aren't very common on literature and include hematoma, asymmetry, lagophthalmos, lower lid malposition, scleral show, dry eyes, frank lower lid ectropion, lateral canthal webbing, and chemosis. The most devastating complication after blepharoplasty is blindness that can occur as a result of globe injury, retrobulbar hematoma, and/or fat grafting. Postblepharoplasty lower eyelid retraction (PBLER) is one of the most feared complications after lower blepharoplasty. Risk factors that predispose to PBLER include excessive skin or muscle resection, scarring of the middle lamella, and failure to recognize and address lower eyelid laxity.(5-6)

Conclusion:-

Upper and lower blepharoplasties are effective and safe cosmetic surgical procedures that require knowledge of periorbital anatomy and carful preoperative planning. The choice of approach should be tailored to the patient's needs and topographical indications . Volume preservation and enhancement rather than excessive tissue removal define modern blepharoplasty. It can be associated to other procedures such as brow lift , mid-face lift , canthopexy or canthoplasty to ameliorate the aesthetic prejudice even more .

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