

Current Techniques in Aesthetic Oculoplastic Surgery.

AK Grover, Shilpa Taneja, Shaloo Bageja

Department of Ophthalmology, Sir Ganga Ram Hospital, Rajinder Nagar, New Delhi, India

Abstract: Aesthetic surgery has become an increasingly important part of oculoplastic surgery. Appropriate preoperative evaluation of the patient is necessary to tailor the procedure according to the needs of each individual. The Facial augmentation and rejuvenation in the periocular region includes medical and surgical management. Medical measures include dermal fillers, dermabrasion, chemical peeling, laser resurfacing including fractional lasers and Botulinum toxin injections. Hyaluronic acid injections are increasingly being used for tissue augmentation. Surgical procedures which are commonly practiced are brow plasty, blepharoplasty and mid face lift. Newer approaches for blepharoplasty and for browlift or midface lift have been outlined in the text. The role of endoscopic and trans bleph endotine techniques for browlift, fat repositioning in lower lid blepharoplasty and SOOF lift for midface have been discussed.

Keywords: aesthetic oculoplastic, fillers, botulinum toxin, blepharoplasty, browplasty, laser resurfacing, Botox, midface lift.

INTRODUCTION

Aesthetic surgery has become an increasingly important part of oculoplastic surgery during the past couple of decades. Increased life expectancy, improved economic standards and greater cosmetic consciousness in the population have contributed to the increased demand for aesthetic oculoplastic surgery. The oculoplastic surgeon does not any longer confine himself to the region around eye, but also performs aesthetic surgery on forehead and lower face and carries out a mid-face lift. On the other hand, the aesthetic oculoplastic surgery is not confined to oculoplastic surgeons alone. Dermatologist, oral maxillofacial surgeons, comprehensive plastic surgeons as well as comprehensive ophthalmologists are also active in conducting the craft. Aesthetic surgery is no longer in the domain of only the women, as was traditionally the case. Men today account for about 25% of the population seeking aesthetic procedures^{1,2,3}. The cosmetic surgery, is also special and presents greatest challenge to the surgeon in view of the high and often unrealistic patient expectations.

A patient who approaches for cosmetic improvement has an entirely different psychological profile than a patient who requires reconstructive surgery. It is important for the surgeon to understand the patient's motivation for consultation. A detailed analysis of the patient helps guide the surgeon to tailor an optimal procedure for an individual.

PATHOGENESIS OF THE AGING FACE

Both **intrinsic** (chronological programmed aging) and **extrinsic** factors (smoke, UV radiation, gravity, and wind) lead to involuntional facial changes⁴. As the face ages, the soft tissue component moves inferiorly and the bone component loses mass, leaving the soft tissue to hang from its attachments to the bone.

The aging process complicated by actinic skin changes, fat redistribution and loss of elasticity affects structural integrity of the eyelid complex, eyebrows, cheek, and jawline.

Around the eyes, the lateral brow typically descends more than the medial brow, leading to **temporal hooding** (fig.1). Drooping of the forehead skin with accompanying dermatochalasis leads to chronic use of frontalis muscle to elevate the eyebrows. Such chronic contracture of the frontalis muscle leads to prominent transverse **forehead rhytids**. (fig.2)

The lower eyelid skin, orbicularis muscle, postseptal fat, suborbicularis orbital fat (SOOF) and malar fat pad sag down and form **festoons**. Hollowing of the nasojugal groove area appears as



Fig.1: Descent of the lateral brow creating a **temporal hood**



Fig.2: Brow ptosis in a 65-year-old lady with marked frontalis overaction resulting in prominent forehead rhytids.

tear trough deformity under the eyes. This hollow is commonly also known as **dark circles**.

BASIC PRINCIPLES OF AESTHETIC OCULOPLASTIC SURGERY

An adequate evaluation including anatomical assessment, psychological profiling and a discussion with the patient to explain what is achievable is extremely vital.

Traditionally, cosmetic ocular surgery in the young patient primarily involves excisional fat sculpting without skin removal from a heavy lower eyelid. The upper eyelids generally require modest skin, muscle, and fat sculpting, with preservation of the lid crease. Conversely, blepharoplasty in the mature face often requires restoration of underlying structural integrity of the upper face, including the eyebrows and eyelids.

This technique of 'shaping-up' of the eyelids is usually predictable and technically straightforward. However, it does not address the volume loss as a result of the aging process. **Adding volume is less predictable and more difficult technically but affords the replacement of tissue that is lost while we age.** Functional and aesthetic eyelid problems are best addressed by adding volume, not removing tissue⁵.

The soft tissue loss occurs at sites where bony ligaments attach to



Fig.3: A 45-year-old male with Periorbital hollows: septal confluence hollow (yellow); orbital rim hollow (blue); zygomatic hollow (green)

the skin. This occurs mainly in three places viz the **orbital rim ligament** (orbitomalar), the **zygomatic ligament**, and the **septal confluence**⁶ (fig.3). These areas of loss can be filled with various materials such as fat injection, fat transfer/preservation, implants, and synthetic fillers.

Oculoplastics traditionally referred to the eyelids, orbit & the lacrimal system. The cosmetic or the aesthetic part of oculoplastics is primary bupharoplasties, brow lifts, ptosis & injectables like botox & fillers.

SURGICAL AESTHETIC PROCEDURES

Browplasty

Many patients who present requesting blepharoplasty to address heavy upper eyelids actually have significant eyebrow ptosis. The patient may compensate by keeping the eyebrows above the orbital rim, elevating the frontalis muscle. When skin is taken from the eyelid, however, the eyelid margin ptosis may only be slightly improved because the eyebrow falls to a new resting level. It is important to recognize eyebrow problems preoperatively and to discuss with the patient the advisability of eyebrow surgery. The nature of the limitations of surgical results imposed by eyebrow descent if the patient elects to proceed without addressing eyebrow ptosis (fig.4a, 4b) also needs to be explained.



Fig. 4a: Brow descent due to aging.



Fig.4b: manual correction of the brow to its normal position i.e. above the supraorbital rim.

Eye brow position alteration

The eyebrow position and contours may be manipulated medically and surgically.

Identification of the ptotic brow may demonstrate a patient who may benefit from the “**medical brow lift**” by using botulinum toxin to paralyze the brow depressors, including the lateral orbicularis muscle^{7,8}. Hyaluronic acid gel fillers may also be injected into the brow fat pad to reinflate and lift the eyebrow⁹.

Some patients may be candidates for **browpexy** i.e. eyebrow suspension sutures during blepharoplasty.

Brow lift

Brow lift options for brow ptosis include an open (traditional) brow lift¹⁰ with incisions just above the eyebrows (**suprabrow excision**), in the mid forehead region (**temporal brow lift**), in the hairline (**frontal hairline brow lift**)¹¹ or coronal area (**coronal brow lift**)¹². Furthermore, the approaches can be **subperiosteal, subgaleal, or subcutaneous**. Generally, the most common brow lift technique is a **subgaleal approach** through a hairline or coronal incision¹².

For browplasty the most important step is assessment and marking of the skin. The brow is lifted to the desired position and a ruler is placed next to inferior brow hair. The eyebrow is allowed to drop. The distance is measured and multiplied by factor of 1-1.5 to give height of final incision. Ellipse is drawn above the eyebrow (fig .5). Skin and muscle are excised in one layer (fig.6). Supra orbital nerve medially and frontal nerve laterally should be preserved. Wound closure is done in 2 layers with 4-0 vicryl and 6-0 non absorbable interrupted sutures.



Fig.5: Marking the incision for brow plasty.



Fig.6: Excision of skin and muscle in one layer.

Recently, **endoscopic** techniques for brow lifts have gained popularity¹². While these methods are effective in reducing corrugator activity, frontalis activity is difficult to alter reliably using this technique. Brow elevation can be achieved to a predictable degree, but fixation remains a concern with the endoscopic lift¹³. Multiple techniques have been proposed for endoscopic brow fixation, with several alternatives proving successful. This includes suture suspension, screw fixation (absorbable or removable screws), and K wire fixation. Endoscopic techniques limit the incisions, proving desirable to many patients as a “minimally invasive procedure.” However, the endoscopic lift does not allow for modification of the hairline in patients with a high forehead¹⁴.

Brow fixation through an internal browpexy approach has included various techniques and methods of fixation. Latest being the **TransBleph Endotine fixation system**^{15,16,17,18} which is inserted through a conventional blepharoplasty incision. (fig.7)



Fig.7: TransBleph Endotine fixation system

The bioabsorbable Endotine implant allows subperiosteal multipoint soft tissue fixation via a three-tined (3.0 mm or 3.5 mm) design. The implant, composed of a polymer mixture of lactic acid and glycolic acid, provides mechanical fixation during the postoperative healing phase. This technique allows an alternative brow lift procedure for patients with **mild to moderate** brow ptosis.

A short learning curve is associated with the drilling of the fixation hole and placement of the device in the **subperiosteal** plane. Short-term complications included postoperative neuralgias, which are self-limited.¹⁸ Tucking the frontal periosteum above the device, rather than draping it over the tines, may reduce the occurrence of brow ptosis. Overall, the TransBleph Endotine fixation system enables satisfactory brow elevation via a minimally invasive technique. It provides distributed tension^{16,17} with repeatable and predictable brow fixation during endoscopic and open brow plasty.

Blepharoplasty

Upper lid blepharoplasty

Upper lid blepharoplasty is done for both functional and cosmetic purpose. If the patient is to have an upper eyelid blepharoplasty, significant eyebrow ptosis must be repaired or it will only be made worse by removing tissue between the eyebrow and the eyelid margin^{19,20}.

The most important step in upper lid blepharoplasty is marking appropriate and symmetric amount of skin and muscle to be excised^{21,22}. It is best to mark the incisions in the sitting position before anesthesia with tissues in their normal gravitational relationship (fig.8). First the skin crease incision is marked which is **precisely at the crease in younger patients** and **1 mm caudal to existing crease for older patients**. It has been observed that the lower arm of the incision should be 7 to 10mm above the lash line centrally in a female and **5 to 8 mm in a male**^{23,24}. Excess skin is pinched with fine forceps and amount of skin to be removed is assessed²⁵(fig 9).

The vertical excision of the skin should be conservative with at least 2 cm left between the eyebrow and eyelashes for proper eyelid closure.



Fig.8: Marking for upper lid blepharoplasty in sitting position



Fig.9: Pinch method for assessing the skin to be removed in blepharoplasty.

Upper limit of incision is then marked. Incision should extend in the line above the punctum medially and above the lateral canthus laterally (fig. 10). In adults, the lateral incision can be extended laterally and upward to include the redundant skin. Excision of skin and muscle is done in one layer (fig 11). Septum is identified and opened along the entire length of the wound.

Pre aponeurotic fat is seen at this point and is dissected off the levator towards the superior orbit rim. Most of the fullness of the upper



Fig. 10: Superficial skin incision completed for upperlid blepharoplasty



Fig.11: Excision of skin and muscle done in one layer

eyelid is usually contributed by the prolapse of the central pad of fat. The valley of the superior oblique tendon separates the central pad of fat from the nasal fat pad and is usually a hollow area. Nasal pad of fat is excised medially²³. Crease forming sutures may be passed from skin edge to the aponeurosis (Fig.14) at the level of the crease with 6-0 silk. Rest of the skin wound is closed with additional 6-0 silk interrupted sutures. Alternately, 6'0 vicryl (or polygalactin) or sub cuticular sutures with 6-0 nylon or prolene may be used.

In cases where excess loose skin is present a **'lazy-S' incision** may be given. This type of incision extends medially to take care of extra tissue and prevents post-operative webbing. Excess skin in the lower lid or upper lid can also be taken care of by a **double prong incision** as shown in fig.15a and 15b.



Fig.13: Tissue excision completed.



Fig.14: Bilateral closure done with 6'0 silk.

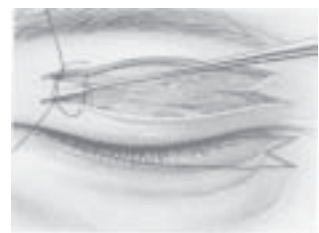


Fig.15a and 15b: Double prong incisions for excess skin removal in upper and lower lid blepharoplasty.

Upper Lid blepharoplasty in Oriental eyelids

In patients with **oriental eyelid**, the lid crease is formed in a similar fashion. However, the lower arm of the incision is drawn 5-7mm above the lash line centrally (fig. 16 and 17). Either suture technique^{26,27,28} or external incision technique can be used. We prefer the latter i.e. the external incision approach. This approach is technically more difficult and is more time consuming but yields superior results. The crease is more likely to be permanent, and excess upper lid skin and herniated orbital fat can be debulked if desired.(fig. 18b and 18c) This approach produces a more **physiologic or dynamic** lid crease which is more visible when the eyes are open and tends to disappear during lid closure^{29,30}.



Fig.16: Oriental eyelid



Fig.17: Marking the position of new lid crease.



Fig.18a: Excess skin assessed by pinching technique.



Fig.18b: Excision of marked skin excess.



Fig.18c: Prolapsing pad of fat cauterizing and excised.



Fig.18d: Placement of sutures through skin and levator aponeurosis for creation of lid fold.



Fig.18e: Skin suturing completed.



Fig.18f: Bilateral appearance at the end of the surgery.

Lower lid blepharoplasty

Lower eyelid blepharoplasty can be carried out from the skin or the conjunctival side. The trans-conjunctival approach is now the preferred one except when a simultaneous skin muscle excision is desired for blepharoplasty.

TRANSCONJUNCTIVAL BLEPHAROPLASTY^{31,32}

The approach is preferred in patients without any excess skin and muscle. Traction sutures are applied through the lower lid margins and an incision is made along the inferior edge of the tarsus. (fig.19a - fig.19i) Protection of cornea should be ensured. Dissection is done and orbicularis is lifted off the orbital septum. Septum is incised and excess fat lying anterior to the inferior orbital rim is excised. The steps of surgery from incising the orbital septum to excising the three lower fat pads essentially remain the same as elaborated later in the transcutaneous approach. After the desired fat excision the conjunctiva is closed with interrupted 6'0 vicryl sutures (fig. 20 and 21).



Fig. 19a: A 56-year-old patient with lower lid bags.



Fig. 19b: Traction sutures applied and transconjunctival incision marked at least 5mm below the punctum so as to prevent canalicular damage.



Fig. 19c: Incision given with a radio frequency cutting device. Conventional 11 no blade may also be used for the same.



Fig. 19d: Exposed fat pads after the orbital septum is incised.



Fig. 19e: Central pad of fat identified and excised.



Fig. 19f: Excision of nasal fat pad. It appears white as compared to the central and lateral pads of fat.



Fig. 19g: Lastly the lateral fat pad is being identified and excised.



Fig. 19h: Conjunctiva is repositioned back and is sutured with 6'0 vicryl in interrupted or continuous fashion.



Fig. 19i: On table appearance after excision of the prolapsing fat pads.



Fig. 20: Preoperative and postoperative (2 weeks) appearance after transconjunctival lower lid blepharoplasty in a 56-year-old male.



Fig. 21: Preoperative and postoperative (1 day) appearance after transconjunctival lower lid blepharoplasty in a 26-year-old photographer.

TRANSCUTANEOUS LOWER LID BLEPHAROPLASTY³³

A subciliary incision below the lower lashes is marked extending from punctum to about 5mm lateral to lateral canthus. Sutures are applied for traction and the incision is given with blade. Dissection is done till we reach the inferior orbital rim. Orbital septum is identified incised and the fat is exposed. Excess fat is removed from nasal, central and lateral fat pads. The lateral fat pad is covered with more septae than the central pad and may not spring forward as easily. The medial fat compartment is the most difficult to locate. Sometimes, partial resection of the central fat pad is required to expose the medial fat pad. It is interesting to note that the medial is different from the central and lateral fat in that it appears white and membranous. Excision of the fat should be done judiciously, as excessive fat removal posterior to inferior orbital rim would result in a hollow look. The end point of the fat excision is reached when the anterior border of the fat lies flush with the inferior orbital rim while applying light pressure on the globe simulating upright posture. The skin and muscle excision is performed conservatively as excess removal may result in ectropion. Skin is closed with 6'0 non

absorbable suture material.

In the older patient with marked horizontal laxity, the eyelid must be horizontally tightened to avoid the possibility of postoperative eyelid retraction and scleral show.

Pinch blepharoplasty: The pinch blepharoplasty technique removes redundant skin without undermining. This allows for more controlled wound healing, predictable recovery, and potential for simultaneous laser resurfacing. The combination of pinch blepharoplasty with transconjunctival fat removal leaves the middle lamella intact and reduces the chance of scleral show or ectropion. Kim et al in their series demonstrated that pinch excision of redundant lower eyelid skin can be safely performed and that it can be **used with laser resurfacing and/or transconjunctival fat removal** for optimal treatment of the aging eye³⁴. They also reported **pinch blepharoplasty** to be a versatile technique that produces consistent results.

FAT REPOSITIONING FOR “THE TEAR TROUGH DEFORMITY”

Rejuvenation of the lower eyelid complex is based on the principle that the contour changes characterizing aging involve not only prolapse of orbital fat but also descent of the cheek tissues, resulting in accentuation of the orbital rim and tear trough groove. When a deep groove is present along the orbital rim in the area of the tear trough deformity, it is advantageous, to reposition the fat over the orbital rim through the opened arcus marginalis onto the superior face of the maxilla rather than removing it³⁵. Orbital fat repositioning can be accomplished through a transconjunctival approach. The arcus marginalis is exposed and incised, and a subperiosteal pocket is created over the superior face of the maxilla. The subperiosteal pocket shape and location are customized based on the desired location of the orbital fat pedicle. Medial and central fat pedicles are created and rotated over the orbital rim into the subperiosteal pocket^{35,36}. A 6-0 polypropylene externalized suture is used to fixate the fat pedicle in position. The suture can be removed after 3 to 5 days. A few authors have named this technique as **tear ‘TROUF’ procedure**. Although the fat pedicle undergoes some variable resorption, the viability of the graft, the texture and contour of the repositioned fat after a healing period of 1 to 2 months, and the excellent patient acceptance are indicative of the viability of orbital fat repositioning.

Some authors have also performed another procedure known as **the shade procedure**³⁷ for patients with lower lid fat herniation, particularly when depression at the inferior orbital rim accompanies convex prominence of the lower lid profile. The shade procedure treats the fat herniation contour change by repositioning the fat as an apron over the orbital rim and elevating depressed midface fat and muscle.

Traditionally, the lower eyelid herniated fat has been removed, which may create a sunken or hollow lid appearance, especially in patients with a tear-trough deformity (nasojugal groove). Lower eyelid transconjunctival fat repositioning, defined as the subperiosteal repositioning of the medial and central lower eyelid herniated orbital fat into the nasojugal fold, may prevent the surgical hollow lower eyelid appearance while treating the herniated fat.

Fat repositioning may be combined with an endoscopic subperiosteal midfacelift, transcutaneous skin pinch, and transconjunctival orbicularis oculi excision³⁸.

Midface correction

Midface lift, also known as midface suspension, primarily aims at elevation and tightening of the soft tissues (fat, muscle) of the cheek area. It restores a more youthful lower eyelid-cheek “continuum”, with lifting of the **nasolabial fold** (fold of tissue between nostril and

cheek), partial softening of the “**tear trough deformity**” (hollowness between the lower eyelid and upper cheek) and improvement in the appearance of the **malar bags** (“cheek bags”). It is pertinent here to re-emphasize a thorough evaluation of the face before planning any surgical procedure, especially the mid-face lift.

Because of the extensive dissection and/or complex instrumentation, deep intravenous local sedation or general anesthesia is usually employed. The less invasive “SOOF lift” may be accomplished during blepharoplasty without much added manipulation.

The surgery may be carried out under direct exposure utilizing larger incisions or through the endoscope using smaller incisions.

Various surgical approaches may be carried out used for the midface lift. The midface may be lifted through **incisions on the lower eyelid** either through the **transcutaneous** or the **transconjunctival** route. Second approach is a **combined oral mucosal and temporal endoscopic approach**. An **endoscopic approach through the lateral canthus** can also be made.

The plane of dissection can be above the periosteum i.e. in the plane of the orbicularis muscle (preperiosteal) or in the plane of the SOOF or below the periosteum (subperiosteal).

PREPERIOSTEAL MID-FACE LIFT (SOOF LIFT)

SOOF lift is a procedure directed primarily at repositioning a single smaller fat pad of the upper cheek rather than the entire midface. The access can be through a transconjunctival or a subciliary incision. The transconjunctival incision can be combined with lateral canthotomy.

In either of the approaches the incision is given below the inferior tarsal border and the dissection of tissues is done down till the infraorbital rim. The orbit is not entered and SOOF can be visualized on the anterior maxillary surface (fig.22). Fat forming SOOF is darker yellow in color and tougher in consistency than the orbital fat. An incision is then given on SOOF and the periosteum extending through the whole length of the infraorbital rim. SOOF is elevated following the dissection in the **preperiosteal plane** and is secured to the arcus marginalis. *Thus SOOF lift forms the preperiosteal approach for the midface rejuvenation.*

It has the advantage of being less invasive, non-incisional “quickie” technique-utilizing suture (**cable lift, feather lift, lunchtime lift, meloplication**) to suspend the soft tissues without creation of extensive surgical flaps. However, because of the vector of pull (from the cheek towards the temple), suture suspension does little to alleviate a tear trough depression.

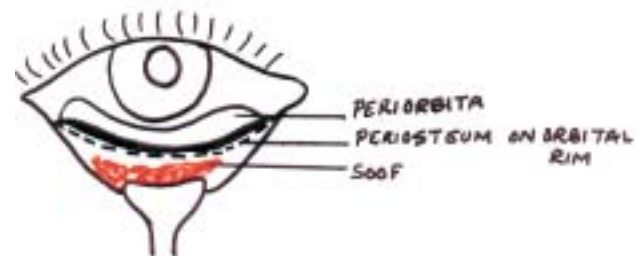


Fig.22: Exposure for the SOOF lift

SUBPERIOSTEAL MID-FACE LIFT

This is done in cases of severe retraction of the lower lid. It is usually combined with forehead/ brow lift³⁹ or lower face-lift. The dissection plane is **subperiosteal** in this technique. In cosmetic cases, *the access is typically through a temporal scalp incision and gingival sulcus*

incision.

The anterior maxillary surface is approached as discussed above for the SOOF lift. A transconjunctival incision is also used and, in this case, the periosteum is incised 3-4 mm inferior to the orbital rim, leaving a rim of periosteum from which the cheek SOOF and periosteum will be suspended. A periosteal elevator is used to lift the periosteum from the maxilla and medial zygoma. The infraorbital neurovascular bundle is visualized and spared. Dissection extends to the piriform aperture medially, the superior alveolar ridge inferiorly, and the anterior border of the masseter muscle laterally. The periosteum is released with electrocautery or digital blunt dissection. The endpoint is a well-mobilized midface. The cheek is secured to the arcus marginalis medially and the intermediate temporalis fascia laterally. This multivector lift corrects the infraorbital depression secondary to SOOF descent and softens the nasolabial fold.

ENDOSCOPIC MIDFACE LIFT (SUBPERIOSTEAL)

The endoscopic technique is used when significant elevation is needed and the patient has redundant forehead and mid-facial skin. There are three major steps. *First*, a temporal pocket is created as for standard endoscopic brow lifts. *Second*, the midface is mobilized by subperiosteal dissection via either transconjunctival or superior gingival sulcus oral mucosal incision. The *third step* is elevation and suspension of the midface to the deep temporalis fascia with sutures passed through the temporal pocket. The oral incision, if used, is closed with 4-0 chromic gut, with the remaining incisions closed as previously described.

The approach through the eyelid was until quite recently the most common; however, it is now avoided by many surgeons because of postoperative distortion at the canthus and a significant risk of lower eyelid retraction³⁹.

NON-SURGICAL AESTHETIC PROCEDURES

Most common non-surgical cosmetic facial procedures in 2008 were Botox Injection, Hyaluronic acid dermal filler injection & chemical peels⁴⁰.

FACE AUGMENTATION PROCEDURES

Dermal fillers

Dermal fillers, one of the latest developments in aesthetic surgery, have been popular for facial cosmetic enhancements. The injectable substances fill facial lines, gaps and grooves with different durations of effectiveness to replace volume lost due to aging, thus helping in tissue augmentation.

Among the dermal fillers that can be injected in the eye and eyebrow area are **temporary options**, such as autologous fat, nonanimal stabilized hyaluronic acids (NASHAs), calcium hydroxylapatite, and poly-L-lactic acid. **Permanent options** include polymethylmethacrylate or silicone. Temporary fillers are acceptably safe and have predictable results, thus are used more commonly than the permanent fillers^{41,42,43}.

Hyaluronic acid gel (Restylane) is currently used more frequently than any other synthetic filler.

Excluding **calcium hydroxylapatite** and **fat**, all of the following fillers discussed are used off label in the eye and eyebrow area; they are **currently approved predominantly for the correction of nasolabial folds**^{44,45}.

Dermal fillers can also be used in the **forehead** and **crow's feet** area,

as well as in the midface, over the **cheekbones**, deep in the **temple area**, and in the **tear trough** to improve the appearance of the eye.

FACE REJUVENATION PROCEDURES

Facial rejuvenation procedures include non-surgical treatment to alter problems of skin texture and contour. These can be categorized as resurfacing procedures and adjuvant procedures. **Resurfacing procedures** include dermabrasion, chemical peels, laser, radiofrequency and infra-red light. **Adjuvant procedure** includes botulinum toxin injection.

DERMABRASION

The dermabrader consists of an electric hand engine with a high-speed rotary motor and an interchangeable abrading end piece. The most common indication for dermabrasion is the treatment of **acne scars, traumatic or surgical scars, photo damage, some benign tumors, actinic keratoses, and perioral rhytides**. Also, pigmentary changes due to **melasma, tattoos, or postinflammatory hyperpigmentation** can be lightened with dermabrasion.⁴⁶ In general, dermabrasion yields 35-50% improvement. Patients should not expect restoration of perfect skin, and dermabrasion does not affect skin redundancy or eliminate the possible need for rhytidectomy. Patients should be told that the **greatest improvement** is usually observed **6 months after surgery**⁴⁷.

CHEMICAL PEELING

Chemical peeling as a therapeutic technique dates back to 19th century. **Stronger agents** such as **phenol** (with various additives such as croton oil and glycerin) and **trichloroacetic acid (TCA)** produce a chemical necrosis of the skin to variable depths, depending on numerous controlled and uncontrolled variables⁴⁸.

The **weaker agents** (eg, AHAs) change the pH sufficiently to cause a superficial shock to the cells and, depending on many variables, cell injury or death. When used with a moisturizer, the acid acts simply to cause cellular and intercellular swelling and plumping, leading to transient increase in cell and matrix size and lessening of fine lines and rhytides. Sequential treatments lead to exfoliation and a smoother complexion^{49,50}.

As the limitations and complications of laser resurfacing have become more apparent, chemical peeling has seen an increase in popularity. Chemical peeling can be combined with laser resurfacing to treat various areas of the face.

LASER RESURFACING

Currently, two laser wavelengths are in common use for facial skin resurfacing: pulsed carbon dioxide (CO₂) and erbium:yttrium-aluminum-garnet (Er:YAG). The practice of combining these wavelengths in sequence is also gaining popularity. The latest generation of resurfacing lasers combines Er:YAG with subablative carbon dioxide energy in the same unit^{51,52,53}.

Fractional laser is a fractional approach to skin rejuvenation where **spatially selective patterned photothermolysis of skin** is done for **dyschromia** and **rhytids**. The stratum corneum remains intact which allows for rapid healing. Multiple fractional photothermolysis treatments using the fractional CO₂ lasers may provide results similar to one CO₂ laser treatment and with less downtime, although final results from clinical trials are not yet known.

RADIOFREQUENCY AND INFRARED LIGHT

Current methods for achieving a 'non-surgical face lift' include

Radiofrequency and infrared light devices, which **disrupt non-covalent collagen bonds and stimulate collagen production**⁵⁴. Ultrahigh frequency radio wave produces an electric current that generates heat through resistance in the dermis and subcutaneous tissue. The natural resistance of the skin to electron flow reorients the electric particles within the dermis, causing remodeling and thus, a tissue tightening effect.

Pan G Lift⁵⁴ is a treatment modality suggested by Pan Germinal systems, Clearwater, Florida which uses infrared light with radiofrequency to elevate soft tissues. Electrical stimulations of the muscle with the Pan G Lift to enhance skin and induce soft tissue lifting via hypertrophy of the facial musculature yields significant three dimensional improvements of the face and the neck. It demonstrates progressive improvement with continued monthly treatments over time.

BOTULINUM TOXIN INJECTION

The use of botulinum toxin type A for facial enhancement is **the most common cosmetic procedure** currently undertaken⁴⁰.

Botulinum toxin type A (*Botox*; Allergan, Inc; Irvine, California)⁵⁵ is a muscle paralytic that is effective and safe in both the short and long term. Aesthetic oculoplastic clinicians can inject botulinum toxin into just one area or into many areas to provide maximum eyelid elevation⁵⁶. It should be noted that the use of botulinum toxin for **any area other than the glabellar frown line is off label**. Aesthetic surgeons worldwide are using Botulinum toxin for various areas of the face to elevate the tissues and provide a natural, younger look. These include **glabellar lines, horizontal forehead lines, "crow's feet", "bunny lines"** (downward radiating lines on the sides of nose), the **perioral area, the dimpled chin, and platysmal bands**.

Clostridium botulinum toxin type A (Botox; Allergan, Inc., Irvine, Calif.)⁵⁵ is supplied in a vial containing 100 U of vacuum-dried neurotoxin complex (50 U is also available). According to the prescribing information, powder in each vial may be reconstituted with 2.5 ml of 0.9% nonpreserved saline to a final concentration of 4.0 U/0.1 ml⁵⁵ (fig. 23). The full prescribing information also states that botulinum toxin type A should be used within 4 hours of reconstitution. However, recently published data suggests that **potency can be maintained for up to 6 weeks with proper storage at 4°C**. Another study showed that reconstitution 30 days before also did not decrease its **efficacy**⁵⁶. An insulin syringe is used with topical anaesthesia at the injection site. Results are gratifying, reducing the dynamic wrinkles for a period lasting up to 6 months (fig.24a-d; fig.25a-d).

Mesobotox is a new simple concept, which aims to achieve mesoglow, enhance skin texture and decrease pigmentation. It uses microdose quantity of botox, injected intradermal in a number of points within the treated area

NEWER MODALITIES

The innovation of radio surgery has resulted in less bleeding & bruising after surgery, speeding recovery time.

Reloxin (an injectable form of botulinum toxin Type A) will gain FDA approval and will compete with Botox (the most popular cosmetic procedure for the past 5 years.)

Plasma Skin Regeneration (PSR) system developed by Rhytec (Waltham, MA) uses energy delivered from plasma (ionized gas) to heat the skin and induce a natural regenerative process. PSR technology works as a non-invasive modality for skin rejuvenation.s Palomar has received FDA over-the-counter (OTC) clearance for a home-use light-based hair removal device.

Xthetix is developing a handheld, high-frequency ultrasound device



Fig.23: Reconstitution of Botox powder with 0.9% non-preserved saline



Fig. 24a: Glabellar frown lines in a 54-year-old male.



Fig. 24b: Injection sites marked.



Fig. 24c: Botox injected in the glabellar complex muscles.



Fig. 24d: Reduction in the glabellar frown lines as observed one-week post injection.



Fig. 25a: Crow's feet in the same 54-year-old male.



Fig. 25b: Injection sites marked.



Fig. 25c: Botox injected in the orbicularis oculi muscle.



Fig. 25d: Reduction in the crow's feet as observed one-week post injection.

for treatment and prevention of acne.

Stem cell therapy- cells are extracted from other areas of the body, compressed and concentrated and injected in proper areas to rejuvenate the face without surgery.

In December 2008, Allergan received U.S. food & drug administration approval for Latisse (Bimatoprost ophthalmic solution 0.03%), a novel treatment for eyelash hypotrichosis. It causes the eyelashes to lengthen & change in thickness and color⁵⁷.

CONCLUSION

Tailor made treatments are the need of the day. The customization of treatment for the individual patients in field of aesthetic surgery has significantly improved in recent years. Surgeons now tailor the procedures according to the specifics of patient's facial structure^{58, 59, 60}.

Past five years have witnessed a considerable growth in Indian cosmetic or aesthetic surgery market. Overall Indian aesthetic industry increased from Rs. 268 crore approx in 2005 to approx. 460 crore in 2007. In 3 years from 2005 to 2007, the Indian aesthetic industry has recorded a compound annual growth rate of 33.8% in terms of revenue generation. Also, 20 to 30% growth has been noticed in number of patients seeking cosmetic surgery every year. It has been estimated that overall Indian cosmetic surgery will grow by 95% in 2010⁶¹.

REFERENCES

- Poore SO, Shama L, Marcus B. Facial resurfacing of the male patient. *Facial Plast Surg Clin North Am.* 2008 Aug;16(3):357-69. vii.
- Dhalwal J, Friedman O. Injectables and fillers in male patients. *Facial Plast Surg Clin North Am.* 2008 Aug;16(3):345-55. vii.
- Downs BW, Wang TD. Midcheek and lower face/neck rejuvenation in the male patient. *Facial Plast Surg Clin North Am.* 2008 Aug;16(3):317-27. vi.
- LaTeranta, Gregory S. *The Aging Face. LaTeranta, GS: Atlas of Aesthetic Face & Neck Surgery, 1st ed.* Philadelphia, WB Saunders, 2004, pp 46-67.
- Goldberg RA. New Approaches to Aesthetic Blepharoplasty. Summary of 20th Anniversary International Symposium. Korean Society of Ophthalmic Plastic and Reconstructive Surgery, June 21-22, 2008.
- Goldberg RA. The three periorbital hollows: a paradigm for periorbital rejuvenation. *Plast Reconstr Surg.* 2005;116:1796-1804.
- Stupak HD, Maas CS. New procedures in facial plastic surgery using botulinum toxin A. *Facial Plast Surg Clin North Am.* 2003 Nov;11(4):515-20.
- Chen AH, Frankel AS. Altering brow contour with botulinum toxin. *Facial Plast Surg Clin North Am.* 2003 Nov;11(4):457-64.

- Sapijaszko MJ. Dermal fillers: ever-expanding options for esthetic use. *Skin Therapy Lett.* 2007 Oct;12(8):4-7.
- Booth AJ, Murray A, Tyers AG. The direct brow lift: efficacy, complications, and patient satisfaction. *Br J Ophthalmol.* 2004 May;88(5):688-91.
- Chisholm BB, Lew D. Modified brow lift: an adjunct to blepharoplasty. *J Oral Maxillofac Surg.* 1996 Mar;54(3):281-4.
- Nassif PS. Evolution in techniques for endoscopic brow lift with deep temporal fixation only and lower blepharoplasty-transconjunctival fat repositioning. *Facial Plast Surg.* 2007 Feb;23(1):27-42; discussion 43-4.
- Dayan SH, Perkins SW, Vartanian AJ, Wiesman IM. The forehead lift: endoscopic versus coronal approaches. *Aesthetic Plast Surg.* 2001 Jan-Feb;25(1):35-9.
- Tower RN, Dailey RA. Endoscopic pretrichial brow lift: surgical indications, technique and outcomes. *Ophthalm Plast Reconstr Surg.* 2004 Jul;20(4):268-73.
- Höing JF, Frank MH, Knutti D, de La Fuente A. Video endoscopic-assisted brow lift: comparison of the eyebrow position after Endotine tissue fixation versus suture fixation. *J Craniofac Surg.* 2008 Jul;19(4):1140-7.
- Apfelberg DB, Newman J, Graivier M, Petroff MA, Levine R. Multispecialty contralateral study of clinical experience with the Ultratone forehead fixation device: evolution of the original Endotine device. *Arch Facial Plast Surg.* 2008 Jul-Aug;10(4):280-2.
- Boehmler JH 4th, Judson BL, Davison SP. Reconstructive application of the endotine suspension devices. *Arch Facial Plast Surg.* 2007 Sep-Oct;9(5):328-32.
- Chowdhury S, Malhotra R, Smith R, Arnstein P. Patient and surgeon experience with the endotine forehead device for brow and forehead lift. *Ophthalm Plast Reconstr Surg.* 2007 Sep-Oct;23(5):358-62.
- Flowers RS, Caputy GG, Flowers SS. The biomechanics of brow and frontalis function and its effect on blepharoplasty. *Clin Plast Surg.* 20:255-268, 1993.
- May JW Jr, Fearon J, Zingarelli P. Retro-orbicularis oculi fat (ROOF) resection in aesthetic blepharoplasty: A 6-year study in 63 patients. *Plast Reconstr Surg.* 86:682-689, 1990.
- Flowers RS, Flowers SS. Precision planning in blepharoplasty. The importance of preoperative mapping. *Clin Plast Surg.* 20:303-310, 1993.
- Jelks GW, Jelks EB. Preoperative evaluation of the blepharoplasty patient. Bypassing the pitfalls. *Clin Plast Surg.* 20:213-223, 1993.
- Perman KI. Upper eyelid blepharoplasty. *J Dermatol Surg Oncol.* 18:1096-1099, 1992.
- Sheen JH. Supratarsal fixation in upper blepharoplasty. *Plast Reconstr Surg.* 54:424-431, 1974.
- Flowers RS. Upper blepharoplasty by eyelid invagination. Anchor blepharoplasty. *Clin Plast Surg.* 20:193-207, 1993.
- Chashi K. The double eyelid operation using electrocautery. *Jpn Rev Clin Ophthalmol.* 46:723, 1951.
- Pang HG. Surgical formation of upper lid fold. *Arch Ophthalmol.* 65:783, 1961.
- Uchida K. The Uchida method for the double eyelid operation in 1,523 cases. *Jpn J Ophthalmol.* 30:593, 1926.
- Fernandez LR. Double eyelid operation in the oriental in Hawaii. *Plast Reconstr Surg.* 25:257, 1960.
- Sayoc BT. Plastic construction of the superior palpebral fold. *Am J Ophthalmol.* 38:556, 1954.
- Baylis HI, Long JA, Groth MJ. Transconjunctival lower eyelid blepharoplasty: Technique and complications. *Ophthalmology.* 96:1027-1032, 1989.
- Tomlinson FB, Hovey LM. Transconjunctival lower blepharoplasty for removal of fat. *Plast Reconstr Surg.* 56:314-318, 1975.
- Neuhaus RW. Lower eyelid blepharoplasty. *J Dermatol Surg Oncol.* 18:1100-1109, 1992.
- Kim EM, Buckley LP. Power of the pinch: pinch lower lid blepharoplasty. *Ann Plast Surg.* 2008 May;60(5):532-7.
- Goldberg RA. Transconjunctival orbital fat repositioning: transposition of orbital fat pedicles into a superotestic pocket. *Plast Reconstr Surg.* 2000 Feb;105(2):743-8; discussion 749-51.
- Kawamoto HK, Bradley JP. The tear "TROUF" procedure: transconjunctival repositioning of orbital unipedicled fat. *Plast Reconstr Surg.* 2003 Dec;112(7):1903-7; discussion 1908-9.
- Persing JA, Knoll B, Shin J. The shade procedure: for lower lid deformities. *Plast Reconstr Surg.* 2008 Apr;121(4):1398-404.
- Nassif PS. Lower blepharoplasty: transconjunctival fat repositioning. *Otolaryngol Clin North Am.* 2007 Apr;40(2):381-90.
- Williams EF 3rd, Vargas H, Dahiya R, Hove CR, Rodgers BJ, Lam SM. Midfacial rejuvenation via a minimal-incision brow-lift approach: critical evaluation of a 5-year experience. *Arch Facial Plast Surg.* 2003 Nov-Dec;5(6):470-8.
- <http://www.plasticsurgery.org>
- Monheit G, Coleman KM. Hyaluronic acid fillers. *Dermatol Ther.* 2006;19:141-150.
- Tan SR, Glogau RG. Fillers esthetics. In: Carruthers J, Carruthers A, eds. *Procedures in Cosmetic Dermatology: Soft Tissue Augmentation.* 2nd ed. New York: Elsevier-Saunders; 2007.
- American Society for Aesthetic Plastic Surgery. Quick Facts: Highlights of the ASAPS 2007 Statistics on Cosmetic Surgery. Available at: <http://www.surgery.org/download/statsquickfacts.pdf> Accessed February 25, 2008.
- Narins RS, Michaels J, Cohen JL. Hylans and soft tissue augmentation. In: Carruthers J, Carruthers A, eds. *Procedures in Cosmetic Dermatology: Soft Tissue Augmentation.* 2nd ed. New York: Elsevier-Saunders; 2007.
- Rotunda AM, Narins RS. Poly-L-lactic acid: a new dimension in soft tissue augmentation. *Dermatol Ther.* 2006;19:151-158.
- Baker TM. Dermabrasion. As a complement to aesthetic surgery. *Clin Plast Surg.* Jan 1998;25(1):81-8.
- Manaloto RM, Alster TS. Periorbital rejuvenation: a review of dermatologic treatments. *Dermatol Surg.* Jan 1999;25(1):1-9.
- Liton C. Chemical face lifting. *Plast Reconstr Surg Transplant Bull.* Apr 1962;29:371-80.
- Baker TJ. The ablation of rhytides by chemical means. A preliminary report. *J Fla Med Assoc.* Nov 1961;48:451-4.
- Hetter GP. An examination of the phenol-croton oil peel: Part III. The plastic surgeons' role. *Plast Reconstr Surg.* Feb 2000;105(2):752-63.
- Münker R. Laser blepharoplasty and periorbital laser skin resurfacing. *Facial Plast Surg.* 2001 Aug;17(3):209-17.
- Alster TS, Bellew SG. Improvement of dermatochalasis and periorbital rhytides with a high-energy pulsed CO2 laser: a retrospective study. *Dermatol Surg.* 2004 Apr;30(4 Pt 1):483-7; discussion 487.
- Alster TS. Cutaneous resurfacing with CO2 and erbium: YAG lasers: preoperative, intraoperative, and postoperative considerations. *Plast Reconstr Surg.* Feb 1999;103(2):619-32; discussion 633-4.
- Taub AF. Evaluation of a nonsurgical, muscle-stimulating system to elevate soft tissues of the face and neck. *J Drugs Dermatol.* 2006 May;5(5):446-50.
- Allergan, Inc. Botox Cosmetic (botulinum toxin type A) purified neurotoxin complex (Package Insert). Irvine, Calif.: Allergan, Inc.
- Garcia, A., and Fulton, J. E., Jr. Cosmetic denervation of the muscles of facial expression with botulinum toxin: A dose-response study. *Dermatol Surg.* 22: 39, 1996.
- <http://www.latisse.com>
- Kelly PE. Injectable success: from fillers to Botox. *Facial Plast Surg.* 2007 Feb;23(1):7-18; discussion 19-20.
- Landau M. Combination of chemical peelings with botulinum toxin injections and dermal fillers. *J Cosmet Dermatol.* 2006 Jun;5(2):121-6.
- Bosniak S. Combination therapies: a nonsurgical approach to oculo-facial rejuvenation. *Ophthalmol Clin North Am.* 2005 Jun;18(2):215-25. v.
- www.expresshealthcare.in