

SURGICAL FACIAL REJUVENATION

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Abstract: The signs of facial ageing can tremendously affect how a person feels about himself and how he is seen by others because the face is an individual's most visible feature. Current thinking regarding the causes of facial ageing is that there is more to facial ageing than just loss of elasticity and the effects of gravity as has been hitherto thought. Loss of firmness, sagging of tissues, development of deep lines, and wrinkles as well as depressions and irregularities in the face are now thought to be due to a combination of factors. These include loss of volume, migration of tissues and their entrapment by ligaments that extend from the skin to the deeper tissues, as well as ptosis of subcutaneous fat which result in the formation of jowls and nasolabial folds. Current concepts of surgical facial rejuvenation for the upper third, middle third and lower third of the face are geared at restoring volume with fillers, repositioning ptotic tissues, liposuction of excess and displaced fat, and excising cutaneous or other redundant tissue.

INTRODUCTION

There are many factors which contribute to the loss of youthful appearance of the face. Ageing of the face is dependant on heredity, gravity, environmental conditions, and stress. These factors can result in the development of depressions, deep lines and furrows, grooves under the eyelids, deep nasolabial folds, and jowls (fig.1 & 2). The development of hollow areas in the face is the result of facial tissue atrophy. Tear through deformity of the lower eyelids and nasolabial folds are caused by entrapment of sagging subcutaneous fat by cutaneous ligaments. Jowls are the result of accumulation of displaced fat trapped by labiomandibular ligament. Submental lipodystrophy is due to excess localized fat deposit. Loose skin under the neck is due to

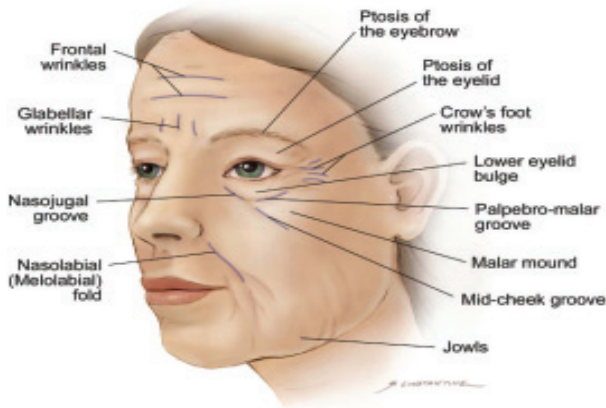


Fig.1 An illustration to show the signs of ageing on the face (courtesy Contour threads).

skin redundancy. Current concepts of surgical facial rejuvenation are aimed at addressing these etiological factors either individually or in combination. Surgical facial rejuvenation is presented under the following topics- upper third, middle third and the lower third. In addition to direct surgical excision of redundant skin, SMAS (submusculo-aponeurotic system) plication, ancillary procedures such as fat grafting and the judicious use of implants in the malar or chin region need to be addressed.

While addressing facial rejuvenation, it is very important to consider the overall face. Patients desiring only segmental rejuvenation should be warned that after surgery, the untreated areas can by a contrast look worse than they did before surgery (fig.3). It is, therefore, important to

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Fig.2 Two patients showing all the signs of facial ageing as marked in fig. 1.

consider total facial rejuvenation rather than regional correction of facial ageing.

UPPER THIRD 1. Forehead; 2. Eyebrow; 3. Upper eyelids

Forehead : The wrinkling of forehead and sagging of tissues in this region has traditionally been corrected by performing a forehead lift. Several different ways of lifting the forehead have been used in the past. Until recently, the coronal forehead lift was traditionally popular¹. This entailed making an incision from the upper pole of one ear to the other across the frontal scalp. Through this approach the entire forehead was undermined up to the eyebrows and then this



Fig.3 Showing pre and post operative views of a patient who underwent rejuvenation of the middle and lower thirds of the face but declined forehead and brow correction. The upper face is now disharmonious with the middle and lower thirds.

undermined flap was pulled back and excess tissue in the anterior flap was resected. The undermining was sometimes combined with removal of the frontalis muscle, either totally or segmentally, to correct the brow furrows. This sometimes resulted in an expressionless and mask-like appearance. It was an extensive procedure and it was difficult to convince the patients to undergo a surgery of such magnitude for drooping forehead. This procedure also left a scar in the hairline. The scar was sometimes devoid of hair resulting in an unsightly band of alopecia which could be very noticeable in dark-haired individuals. Another frequent complication was the loss of sensation due to the transection of the supraorbital neurovascular bundles. This could sometimes be associated with troublesome dysaesthesia such as itching, tingling, or numbness. Other disadvantages of this technique included the alteration in the height of the forehead. Pretrichial incisions (in front of the hairline) were used to prevent increasing the forehead height. However, this placed the scar in a more noticeable position. This procedure is now seldom used as much better alternatives are available and they are discussed below.

Eyebrows :

Browlift : Sagging of the brows can give a sleepy look and sometimes they contribute to impairment of the visual field. There are many different ways of correcting sagging eyebrows. In the past, direct excision of the skin just above the eyebrow was used. However, this can result in an unsightly residual scar. Mid-forehead excisions were also used. These can still be used judiciously to excise very deep horizontal forehead furrows. These direct excisional procedures are not indicated in dark-skinned individuals as they often result in unsightly and visible scars on the forehead.

More recently, an endoscopic browlift has been used². This procedure is done through three small vertical incisions in the hairline. Using an endoscope, the forehead is undermined up to the level of the superior orbital rims. The periosteum under the eyebrows, along the supraorbital rim is incised endoscopically. The supraorbital and supratrochlear neurovascular bundles are identified and preserved. If the patient desires excision of glabellar frown lines, then the procerus and the corrugator supercillii muscles can also be excised endoscopically. The scalp is undermined posteriorly. The entire undermined forehead flap is then pulled posteriorly to elevate the brows. Fixation of the flap can be achieved in different ways. In the past, galeal overlap stitches were used. Later, temporary K-pins³ and metal screws were then used for fixation to the outer table. However, metallic screws were permanent and they sometimes caused difficulties with subsequent MRI evaluations⁴. Presently, these are not in favor. Absorbable screws have now been developed which can be used for fixation⁵. The most recent advance has been the use of endotine⁶. This device has several tines into which the flap is engaged by digital pressure. The device gets resorbed in four to six months. It has many advantages over the other methods like the ease of placement, multiple point fixation and resorbability. The endoscopic browlift has enjoyed great popularity because of the small incisions which are located within the hairline, and gratifying functional and cosmetic results (fig 4a-d).

Browpexy: More recently, the development of transpalpebral browpexy has become popular for correction of brow ptosis. In this procedure, the eyebrow is elevated through the upper eyelid incision during upper blepharoplasty procedure. The sub-brow fat is dissected just above the orbital margin, excess fat is removed and the brow can be sutured with a non-absorbable suture to the underlying periosteum of the supraorbital rim. Even more recently, an endotine fixation through the



Fig.4(a&b) Showing pre operative views of a patient with drooping eyebrows and upper eyelids.



Fig.4(c&d) Post operative views of the same patient after a bilateral upper lid blepharoplasty and an endoscopic brow lift procedures.

transpalpebral approach is being favoured. Small three mm absorbable devices which have spikes at an angle are anchored into the supraorbital bone by a drill hole. The eyebrow is then cinched into the tines and brow fixation is accomplished through the transpalpebral approach. This procedure is very recent, but initial results in the author's experience have been very satisfying.

Upper Eyelids : The redundancy of skin in the upper eyelids can also lead to a sleepy appearance. If the redundancy is severe it can also compromise peripheral visual field (fig 5a), particularly on upward gaze. This can be corrected by doing an upper blepharoplasty (fig 5b). The procedure entails removal of redundant skin and the herniated fat pads which are the cause of the bulge. In performing the upper blepharoplasty, care is taken to ensure that the incision is concealed within the supra-tarsal fold when the eyes are open. An over aggressive resection of fat pads can result in sunken eyes. More recently, some surgeons have advocated preservation of fat and repair of the orbital septum following reduction of the herniated portion⁷. Some patients may have dehiscence or fenestration of the levator aponeurosis which gives rise to ptosis in addition to blepharochalasis. In these cases repair of the levator aponeurosis by plication or reinsertion into the upper border of the tarsal plate is necessary, in addition to removing the redundant skin.

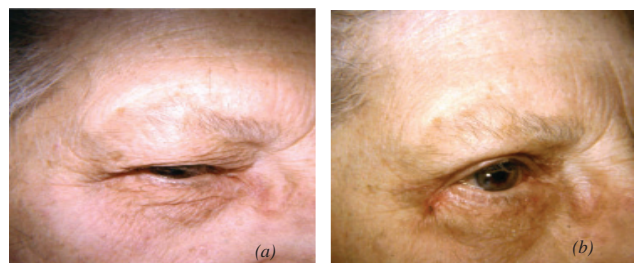


Fig.5 Showing pre(a) and post(b) operative views of a patient after blepharoplasty for drooping upper eyelids which are giving the patient a sleepy appearance and limiting his visual fields.

MIDDLE THIRD (1) Lower eyelids (2) Eyelid-cheek junction
(3) Malar eminence (4) Nasolabial folds (5) Midface (6) Perioral lines (7) Lip augmentation

Lower Eyelids :Ageing of the lower eyelid is evident as laxity of the lid margin, sagging of the lower lid tissues, wrinkling of skin of the lower eyelids, and bulges due to herniation of lower eyelid fat pads⁸. The lower lid blepharoplasty is a very rewarding procedure in facial rejuvenation. It is also one of the most difficult procedures because there is very little room for error, and the complications can be both functionally and cosmetically devastating. There has been a change in the concept of lower lid surgery⁹. In the past, skin was removed through a subciliary incision extending into one of the crow's lines laterally. Either skin alone or skin muscle flap was elevated, and the redundant tissue was excised. Extreme care is required in removing the exact amount of skin. If too little skin is removed patient's preoperative deformity will persist. However, removal of even 1 or 2 mm of excess skin can result in lower lid lag or frank ectropion. As in upper lid blepharoplasty, it was customary to aggressively resect the herniated fat pads¹⁰. Again recently, the concept has changed and now an attempt is made to preserve the fat by strengthening the lax orbital septum to prevent the herniation of the fat pads. Repositioning the herniated fat, particularly to correct the tear through deformity and the nasojugal folds has become increasingly popular¹⁰ (fig 6). In younger patients where there is only herniation of fat pads without much skin redundancy the deformity can be corrected by removing the herniated fat through



Fig.6 Showing pre and post operative views of a patient who underwent bilateral upper and lower lid blepharoplasty with redistribution of herniated fat pads.

a transconjunctival approach, which eliminates an external scar. Sometimes, a transconjunctival fat resection is used in conjunction with the transcutaneous skin excision in the so called 'no touch' technique to prevent any manipulation of the middle lamella, thus eliminating the possibility of lid lag or lid retraction¹¹. Horizontal laxity of the lid is corrected by excising a full thickness wedge of the lid margin. Many surgeons routinely use some form of lateral canthal suspension with tarsal strips or non absorbable sutures in conjunction with lower lid blepharoplasty⁹. Complications of lower lid blepharoplasty include dry eye syndrome, lateral bowing, scleral show, frank ectropion, and lid retraction due to middle lamellar scarring¹².

Nasojugal Groove : In a youthful face, there is imperceptible transition between the lower lid and the cheek. The earliest manifestation of facial ageing is the development of a groove between the lower eyelid and the cheek, called the 'nasojugal groove'. This is due to the presence of a ligament which extends from the skin along

the lower border of the lower eyelid which extends down to the malar region¹³. As the fat pads herniate with age, and descend due to gravity and loss of elasticity, the migration of the tissues is trapped by this palpebro-malar ligament resulting in a bulge and a depression. Recently, there has been much interest in correction of this deformity. This is frequently accomplished by taking some of the fat excised during the blepharoplasty and placing it into this so called 'tear through' region (fig 6).

Malar Eminence: A high cheekbone is a hall-mark of youthful appearance. With ageing, there is descent of the malar fat pads giving rise to malar bags'. Malar bags can be corrected during blepharoplasty procedure by plicating the involved tissues. It is not always possible to completely correct it. The sagging of the malar eminence can be corrected by elevating the malar region through a subperiosteal facelift which can be done through a lower eyelid incision. Other methods of elevating the malar pad include the recently introduced subcutaneous thread lift. Flattening of malar eminences can also be corrected by placing malar implants¹⁴. This can be done in combination with a facelift or during lower lid blepharoplasty. The author has frequently used autologous tissue, such as SMAS, as malar grafts during facelift surgery. The malar implants are of many different types, and the choice of the implant is dictated by whether correction of the malar eminence alone is desired or a sub-malar augmentation is also desired. The implant can also be inserted through an intra-oral route to eliminate the need for an external excision.

Nasolabial Folds : The nasolabial folds are a prominent sign of facial ageing. Its etiology has been controversial, as has been its treatment. The current hypothesis for the development of the nasolabial fold is that there is migration of fat inferiorly and its accumulation at the nasolabial ligament. The correction is geared at elevating the tissues during facelift or by removing the accumulated fat by suction-assisted lipectomy¹⁵. During a facelift the nasolabial fat pad can be aspirated by liposuction done at the time. If this deformity has to be addressed individually, then liposuction, using a small cannula, can be performed through the transnasal approach. Quite recently, subcutaneous thread lifts have become popular for correcting nasolabial folds and for lifting the middle third and lower third of the face¹⁶. Nasolabial folds in younger individuals can be improved by injecting fillers, such as autologous fat or hyaluronic acid.

Midface : The ageing of the midface and the correction of deep nasolabial folds has traditionally been accomplished by doing a cervicofacial rhytidectomy or conventional facelift¹⁶. In this procedure, an incision is made in the temporal region up to the upper pole of the ear and then anteriorly in the preauricular region (sometimes taking it posterior to the tragus) up to the level of the lobule of the ear, from where it is directed posteriorly into the auricular cephalic sulcus, and then across the mastoid and along the posterior occipital hairline¹⁷. Through this incision, the skin is undermined over a predetermined area (fig. 7a). If the focus is on correcting the midface, then the dissection is limited to an area up to the free border of the mandible. If there is redundancy of the skin in the submandibular region and the neck, then the undermining is continued inferiorly up to the midline of the neck. The fat pads in the nasolabial folds and the jowls are suctioned. In doing an open liposuction, a flat spatula type of cannula works much better than the traditional round cannula. If necessary, the SMAS layer is dissected, elevated and plicated. If more definition along the free border of the mandible is desired a SMAS flap can be sutured along the mastoid region. The platysma muscle can be elevated as a flap and pulled posteriorly to correct the platysma bands¹⁸. Sometimes, it requires a more direct approach and the bands can be resected at different levels under direct vision. The skin flap is pulled upwards



Fig.7a Showing the extent of skin undermining done for a surgical facelift operation. It is also showing the extent of skin excision being made in the preauricular and post auricular regions.



Fig.7b Showing skin closure after a surgical facelift operation.

and posteriorly, and the redundant skin is excised before closure¹⁹ (fig. 7b).

Facelift surgery has undergone considerable evolution in recent times. In the past, skin only was undermined and resected. This gave short lived results. Then, came the development of SMAS dissection, excision or plication. This has given better and enduring results (fig. 8). More recently, short scar facelifts have been introduced in which the scars are limited to the face and the area just behind the ear, eliminating the scars in the temple and in the mastoid region²⁰. In author's experience, the short-scar facelifts can be used very effectively in younger patients and in secondary facelifts. Short-scar facelifts can frequently be done as outpatient procedures under local anesthesia.

Currently, 'thread lifts' are in vogue²¹. The procedure has been around for many years but the results were disappointing because the threads used earlier were plain sutures²². The pull was concentrated at points of placement along the nasolabial folds resulting in dimpling and inadequate elevation of tissues of the mid face. The recent introduction



Fig.8 Preoperative and postoperative views of a patient who underwent a surgical facelift with SMAS plication and a simultaneous insertion of chin implant to improve the cervico-mental projection.

of the barbed threads has remarkably improved the results as the pull is distributed along the entire extent of the thread²³. It is believed that the results of this lift should last at least five years. In the author's experience, the preliminary results are very encouraging (fig. 9a-d). Barbed threads are also being used for brow lifts, and in the neck for defining the cervico-mental angle.

Perioral Ageing: Signs of ageing around the mouth can be very distressing²⁴. These consist of marionette lines, stomal creases, and perioral rhytides²⁵. Surgical correction of perioral ageing involves use of fillers to correct the marionette lines and stomal creases²⁶. Many different types of fillers are available, but the most commonly used substance is hyaluronic acid²⁷. The only drawback of hyaluronic



Fig.9 (a&b) Preoperative views of a patient showing signs of facial ageing. The profile view also shows the direction of the three threads proposed to be inserted.



Fig.9 (c&d) Postoperative views of the same patient after a 'Contour Thread' facelift.



Fig.10 Pre (a,b) and post (c,d) operative photos of a patient who had lip augmentation using autologous dermal fat grafts.

acid is that it is temporary and the effect lasts for nine months only. Use of more permanent fillers is fraught with long-term complications and is not advocated by the author^{28,29}. Intra oral mucosal flap transposition can be used to elevate the down turned commissures of the mouth. Perioral rhytides can be corrected by using fillers, chemical peels, or laser resurfacing. Judicious use of Botox is also rewarding in the hands of the very experienced³⁰.

Lip Augmentation :With advancing age there is hypoplasia of the lips³¹. Lip augmentation can be done as an isolated procedure but it is frequently done as a part of facial rejuvenation³². There are many different ways of augmenting the lips³³. The author does not endorse the use of alloplastic materials as it gives an unnatural appearance and feel. Fat grafts are favored by many surgeons but has the drawback of an uneven take³⁴. There is also a significant resorption rate of the injected fat³⁵. The author has had much success with the use of 'Alloderm' but autologous tissue, like temporalis fascia, is preferred. During a concomitant facelift the use of SMAS graft has been very satisfying³⁶. If the patient has scars in other parts of the body or if she is undergoing another surgical procedure, dermal fat grafts can be harvested for lip augmentation and they also give very gratifying and long-lasting results (fig. 10a-d).

LOWER THIRD 1. Jowls; 2. Cervicofacial angle; 3. Neck-a) Lipodystrophy; b) Receding chin; c) Mandibular border; d) Mandibular angle; e) Platysma bands; f) Submandibular gland;

Jowls : The development of jowls is a very prominent feature of facial ageing³⁷. This is again due to ptosis of subcutaneous tissues, particularly migration of fat inferiorly, and its entrapment by the labio-mandibular ligament. The author feels that the most effective method of correcting a jowl is by



Fig.11 Showing pre and post operative views of a patient who underwent a surgical facelift operation along with simultaneous liposuction of the face and neck.

suction-assisted lipectomy³⁸. SMAS dissection, its elevation and plication also improve the jowl deformity during facelift surgery (fig. 11).

Cervico-facial Angle and Neck : The angle between the face and the neck is very important. The sharp youthful cervico-facial angle of the neck gets obtunded with age. The restoration of a sharp cervico-mental angle and the establishment of a clean jaw line is a hallmark of youthful appearance and is, a very important facet of surgical facial rejuvenation. The obtunding of the cervico-facial angle can be due to a single or multiple factors. These include accumulation of fat, receding chin, loss of definition of mandibular border, presence of platysmal bands, and the ptotic submandibular gland. Surgical rejuvenation of this region will depend upon which of these factors are operative³⁹. The treatment is geared at addressing each of these factors individually or in combination. Liposuction alone can be used to correct the deformity of the lower face and neck (fig.12). For the most part, liposuction alone should suffice in correcting lipodystrophy, eliminating jowls, defining the mandibular border or the mandibular angle.



Fig.12 Showing pre and post operative views of a patient who underwent neck rejuvenation by liposuction alone.

Mandible :The appearance of the mandible has a great impact on the lower face. Three key elements of mandibular importance include chin projection, a well-defined mandibular border and the mandibular angle. The judicious use of chin implants can greatly enhance the cervico-mental angle⁴⁰ (fig. 8). An ill-defined mandibular border and angle can be aesthetically enhanced by performing liposuction and placement of alloplastic implants⁴¹. More recently, barbed threads have been used to define the face neck angle⁴³.

Platysma Bands :Platysma bands can be resected or plicated through a submandibular incision. A very popular procedure for addressing this deformity is the called 'corset platysmaplasty'. In this procedure the platysma muscles are sutured in the midline through a submental incision⁴². Another method of addressing the problem includes raising platysma flaps which are

then pulled laterally towards the mastoid^{43,44}. The author has also corrected these bands by simple fraying at different levels with the blunt tip of a suction cannula, under direct vision, during a facelift⁴⁵.

Submandibular Gland : Ptosis of the submandibular gland is a difficult problem⁴⁶. In the past, elevation of the submandibular gland during facelift operation, and reinforcement of the fascia around the submandibular gland and the platysma muscle have been used with limited success. More recently, a total excision of submandibular gland has been recommended. Others have used partial excision of submandibular gland⁴⁷. Total excision of the gland is a rather radical cure and can be associated with significant morbidity.

CONCLUSION

Facial ageing is the result of multiple factors⁴⁸. The surgical rejuvenation of ageing face entails a detailed analysis of the factors causing the ageing⁴⁹. Surgical rejuvenation should be approached comprehensively to address the etiological factors affecting each region of the face⁵⁰. If executed properly, surgical facial rejuvenation is a very rewarding procedure.

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