Recent Advances in Face Lift to Achieve Facial Balance

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Abstract

Introduction Facial balance is achieved by correction of facial proportions and the facial contour. Ageing affects this balance in addition to other factors. We have strived to inform all the recent advances in providing this balance.

Method The anatomy of ageing including various changed in clinical features are described. The procedures are explained on the basis of the upper, middle and lower face. **Results** Different face lift, neck lift procedures with innovative techniques are demonstrated.

Conclusion The aim is to provide an unoperated balanced facial proportion with zero complication.

Keywords Facial balance · Facial proportions · Facial contour · Anatomy of ageing · Face lift

Introduction

Facial balance is achieved by obtaining acceptable facial proportions well known to Maxillofacial Surgeons and contours mainly discussed in aesthetic circles. Osteotomies with inlay and onlay grafting will correct facial disproportions. It is generally accepted that the facial contour should follow the bone. This is only possible in certain sites such as chin or angle of the jaw. The nasal contour can generally be achieved by bone and cartilaginous surgery. Ageing plays a

main role in upsetting facial balance irrespective of the facial proportions. The balance varies during the patient's growth cycle from young to middle age as opposed to facial proportions which remain mostly unchanged. The concept of describing the facial balance starts at the hair line and ends along the neck contour. The factors which determine facial balance is dependant on the genetic predisposition, familial history, intrinsic and extrinsic changes in the muscles, ligaments, periosteum and the skin.

To achieve the desired aesthetic destination of good facial balance there are primary as well as adjuvant procedures. Aesthetic expectations and contours varies from nation to nation, continent to continent and to some degree altered and modified by trends at a certain period.

The upper facial balance and a pleasing aesthetics are obtained via a brow lift with its numerous modifications. An upper blepharoplasty has become part and parcel of such rejuvenation process. Where the recent advances is in obtaining the contour of the forehead from the follicle hair transplants.

The mid and lower facial balance is achieved by various face lift procedures as the primary surgery. The adjuvant procedures are lower blepharoplasty, cheek and perialar implants, malar osteotomy, genioplasty plus or minus rhinoplasty and otoplasty. If the facial proportions need correction simultaneous bony surgery could be combined with a face lift procedure.

The surgery in recent times is dictated by what the patient wants rather than what the Surgeon can do. The techniques over the years have become custom made to an individual patient with a result of producing a lasting effect. The surgical process should be via a smaller incision, with minimal down time and to provide an unoperated look. The aim is to provide a useful shape within the above parameters.

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Fig. 1 A front profile of patients aged 25 and 60 showing the tapered face becoming squarer as a result of intrinsic and extrinsic changes

Fig. 2 **a** Front profile of a patient aged 65 showing loss of facial balance in contour and proportions after losing teeth. **b** The balance is restored with occlusal rehabilitation, face lift and three weeks post operative Erbium laser resurfacing

Anatomy of Aging

A youthful face will have a good quality of skin, muscles and ligaments maintaining tone and a well supported facial fat. The skin quality will have proportioned epidermal and dermal components. Aging causes multiple, clinical, histology and physiological changes in the skin.

The areas of dominant fat presentation are the malar eminence extending to the zygomatic arches overlying the parotid, masseteric and lateral chin sites [1]. The submalar

concavity together with a well defined mandibular border gives the angular, tapered, young face. As the patient matures the facial shape becomes squarer as a result of loss of support of the facial fat (Fig. 1).

The high density retaining ligaments such as osteocutaneous and fascio-cutaneous in origin plays a major role in retaining the volume of fat. The zygomatic and the mandibular ligaments are examples of osteocutaneous and they originate from the periosteum and are inserted directly into the dermis. The masseteric and the parotid cutaneous

Fig. 3 a A patient aged 62 showing extrinsic and intrinsic signs of aging with loss of alveolar height. **b** Postoperative was after implant dental restoration, genioplasty, face lift and laser resurfacing

ligaments are formed of the fascial coalescence and get attached to the dermis [2, 3]. Attenuation of these ligamental support results in shift in facial fat and its spatial position. Hence, the clinical presentation of a squarer face with malar fat descent, prominent naso labial fold, buccal fat pad bulge and the jowls.

Real expansion of the skin and subcutaneous fat in certain areas also add to a facial deflation. This is more noticeable lateral to the oral commissure [4].

The facial skeleton maintains the physiological resorption and absorption process. The ageing, loss of dentition and secondary dento alveolar resorption does effect the facial balance (Figs. 2a, b, 3a, b).

The hair loss as a result of hormonal or hereditary factors do affect the contour of the forehead and the temple areas further upsetting the facial balance.

The ideal youthful neck profile does show distinct features. The cervico mental angle should be between 105° and 110° and the sternocleidomastoid and mandibular angle should be less than 90° [5]. Similar to the retaining ligaments within the face such arrangement exist in the neck which holds the platysma to the underlying floor of the mouth and the thyroid cartilage. As aging proceeds the cervical support for the platysma becomes attenuated. The anterior edges of the muscle descend inferiorly accounting for the prominence of the platysmal band. The cervico mental angle becomes more obtuse and the sternomastoid mandibular angle becomes not visible.

The dermal elastosis and facial lipoatrophy and dystrophy further affects the facial contour.

The superficial muscular upper aponeurotic system (SMAS) is a discreet fascial layer that separates the subcutaneous fat from the underlying parotid-masseteric fascia and facial nerve branches. It is an aponeurotic connection between the mimetic muscles and the overlying skin. It is indeed an extension of the superficial cervical fascia cephaled into the face. Further cephaled extension is termed the temporo parietal fascia and then the galea. When traced medially it is thinner overlying the masseter and the buccal fat pad and further becomes thinner comprising only the epimysium of the upper lip elevators [6]. There is no structural change reported in the literature in SMAS anatomy as a result of aging.

The superficial mimetic muscles which are involved in the facial rejuvenation procedures are platysma, orbicularis oculi, risorius, zygomatic major and minor muscles. There is quantitative volumes loss of these muscles as a result of aging. The facial nerve innervates these muscles from below the muscle belly. However, the facial nerve innervates the upper lip elevators from a superficial position. The mandibular branch of the facial nerve is between the deep cervical fascia and the platysmal muscles. The platysma also receives two or three cervical branches in the cleft between the anterior border of the sternocleidomastoid and the angle of the mandible [7].

Hence mobilisation of the platysma inferior to the tail of the parotid gland requires a blunt dissection parallel to the nerve branches.

Clinical Features

The clinical features of ageing along the mid face are prominent tear trough, malar palpebral groove, naso jugular groove and naso labial folds. These are as a result of the attenuation of the osteo and fasciocutaneous ligaments showing asymmetry along the orbital, SOOF, malar and buccal fats. In the lower face the prominent features are the marionette lines, jowls, loss of mandibular definition and obtuse cervico mental angle, loss of sternomastoid mandibular angle with platysmal folds and bulging submental fats. The upper face will have varied forehead horizontal lines, lateral brow ptosis and hooding upper lids.

Types of Face Lift

Modern face lifts are first described by the German Surgeons in 1910 [8].

Since then the techniques have evolved from skin only, skin SMAS, modifications of the SMAS, skin platysmal flap, composite, deep plane, subperiosteal, endoscopic, suture suspension and short scar procedures [9–15].

The techniques are being tailor made to each patient with a sole aim of achieving patient satisfaction. The modern advances are in minimal excision, limited dissection, more plication and suspension rather than extensive dissection. Zero complications and obviously reduced downtime are the other requirements in these tailor made surgical exercises.

Comparison of various published face lift techniques for outcome and complication [16] failed to recommend a definitive technique, however, complication risks was statistically higher in extensive SMAS procedures.

The ideal requirements for the midface are malar elevations, restoration of the submalar concavity and improvement in the nasolabial fold along the mid face. The requirement for the lower face are elevation of the corner of the mouth, improvement of jowls and the neck contour restoration of the cervico mental angle, eradication of the submental bulge and the platysmal bands..

The Standard Technique

Temporal incision is placed within the hair line beginning at a point immediately superior to the junction of the ear and the temporal skin. The temporal extension varies depending on the type of face lift. Then it follows parallel to the descending helix. Then the incision either conforms to the margins of the tragus or pretragal. If it follows the tragal margins at the junction of the tragus and ear lobe the incisura of the tragus should be preserved with the incision carried around the ear lobe approximately 1–2 mm caudal to the junction of the earlobe with the cheek skin. The reattachment of the earlobe should be slightly posterior to the vertical axis of the pinna approximately 15° [17]. The post auricular incision is in the postauricular sulcus and the scalp extension is varied according to patient's hairstyle and hair distribution. The angle of the posterior flap should

Fig. 4 Pre and postoperative view of a 17 year old female oriental patient showing the improved forehead contour following 1800 follicular unit hair transplant (courtesy of Dr. Dae-Young Kim, Seoul, South Korea)

be approximately 90°. The incision extends into the hair-line for 4–6 cm, where it is bevelled to prevent damage to hair follicles.

The skin dissection depends on the need. It is important that the ligamentous attachment is released particularly along the MacGregor's pad. The undermining serves two purposes, addresses the skin laxity and allows access to SMAS management. Undermining beyond this is not necessary.

Since the introduction of the SMAS by Mitz and Pironie in 1976, the management of SMAS is a recognised part in any face lift procedure [18].

In a standard technique the SMAS elevation is designed in an inverted 'L' arrangement with a horizontal limb is just below the malar arch which is in front of the tragus up to the malar eminence. The vertical limb is 90° along the preauricular area extending below the angle of the jaw. A diluted local anaesthetic solution is infiltrated after raising the skin flap which will aid in the dissection of the SMAS. When the SMAS is elevated and mobilised to the required position it is divided into two vectors, the cheek malar component is lifted in a superolateral direction and sutured to the zygomatic arch soft tissues. The excess can be rolled over to give a zygomatic prominence, volumisation with an autologous graft. The lower half of the SMAS flap is used to contour the jaw line and the jowl which is transported in a horizontal vector fashion and sutured posteriorly behind the ear.

The skin draping is mostly lateral with slight cephalic rotation and two key sutures are placed along the helical attachment and the superior aspect of the post auricular incision. Any dog ears are removed at the apex rather than at the ear lobe area. The ear lobe is replaced 15° posterior to the vertical position to reduce the tell tale sign. The excess skin is excised followed by layered repair.

Advances in Face Lift

Historically, the skin flap only is advanced to the inclusion of fascia and platysma by skin [19].

The attention was then turned towards the nasolabial fold. Later the deep plane facelift was described to include the malar fat. Still periorbital rejuvenation was not included in these processes. In 1991 orbicularis oculi and later septal reset was introduced to improve the midface aesthetics. In a standard facelift the tissues of the face and cheek are moved in a superolateral direction. The need for superomedial vector is aroused to correct the elongated eyelid cheek junction and the concavity of the lower eyelid. The composite facelift is an advancement described by Hamra to provide these above corrections [20].

Multiple modifications in the literature are towards SMAS management. They group together as elevation, plication, smasectomy and imbrications.

The alternative to the standard SMAS elevation is the lateral smasectomy [21, 22]. Here a 1–2 cm strip of SMAS is excised along the anterior border of the parotid extending from the lower mandible border in an oblique fashion towards the malar eminence. Further modification of the smasectomy have also been described with varied success.

The short scar rhytidectomy is where the majority of the advances are in the last few years [23]. Its concept was initially described by Passot [24] in 1919. In the 1990s Saylor and later Fulton described the S lift [25]. The preauricular skin is excised in a S shape followed by purse string suture plication of the mobile SMAS and the extended supra platysmal plane (ESP) which is fixed to the periosteum/fascia of the zygomatic arch. Later Tonard et al. [26] introduced a technique called the minimal access cranial suspension (MACS). Here the sagging soft tissues with the SMAS are vertically suspended with purse string sutures anchored to deep temporal fascia. The anchorage and vector pull is where the differences are between the 'S' and MACS lift. In the latter the skin lift also cranial as opposed to the 'S' lift where the direction is lateral.

There are various modifications towards the SMAS suspension in the MACS lift. The recognised two variations are standard (SMACS) and extended (XMACS) lifts. In the former the two purse string sutures are placed for the correction of the neck and the lower third of the face. In the extended MACS lift a supplementary third purse string suture is placed to suspend the malar fat pad. This suture will have an extra effect on the naso labial groove, upper midface and the lower eyelid. The concept of anchoring to the deep temporal fascia is in our opinion is superior to that of zygomatic arch tissues.

Another modification of the S and MACS lift is a short scar lift called 'S Plus lift' [27]. Here the exposure is similar to the MACS lift. It combines a smasectomy with purse string suture suspensions as in MACS lift. It also includes ESP point anchoring which was recommended by Saylor. The vertical smasectomy of the redundant preauricular SMAS is combined with the first MACS anchor suture in a 'U' form anchoring the ESP point at the inferior end. A lateral smasectomy is carried out lateral to the naso labial fold and the second suspension suture in the form of 'O' is placed similar to the second MACS suture. The tightening of the suture will close the lateral smasectomy defect. The 'M' suture which is the third is also similar to the third suture of XMACS lift. This 'S' plus lift can be combined with a postauricular incision followed by dissection which then removes the excess neck skin and in turn a simultaneous cervicoplasty.

Management of the Neck

The aim of the neck rejuvenation is to restore the cervicomental, sternocleidomastoid mandibular angles. Various techniques have been described including cervical supra platysmal liposuction, wide supra platysmal undermining, direct excision of the subplatysmal fat and approximation

of the platysmal edges with lateral support and suspension sutures [28–31].

We firmly believe platysmal management should be carried out in any face lift procedure. We prefer a submental incision as access to plicate the platysma in the middle up to the thyroid followed by lateral plication

Fig. 5 Pre and postoperative profile and occlusion of a 20 year old patient whom underwent a mid face advancement osteotomy and onlay implants to malar and perialar areas

Fig. 6 A 50 year old oriental patient before and after 6000 follicular unit hair transplant (courtesy of Dr. Dae-Young Kim, Seoul, South Korea)

Fig. 7 A 35 year old Indian patient before and after 3000 follicular unit hair transplant (courtesy of Dr. Kishore Babu Bangalore India)

Fig. 8 A 28 year old male, oriental patient pre and postoperative sideburn follicular hair transplant (courtesy of Dr. Dae-Young Kim, Seoul, South Korea)

to the sternomastoid/deep fascia and a suspension cinch suture which will be anchored to the mastoid fascia [32].

Adjuvant Procedures

Upper Face

Increasingly patients prefer a contoured forehead. This is becoming the norm in the Far East. With the advance of follicular hair transplant success this has proven to be an

extremely effective adjuvant procedure particularly in younger patients (Fig. 4).

The other procedure which is useful in achieving an aesthetic balance is Botox injection to obtain a balance between the elevators and depressors of the forehead muscles. A lateral brow lift is versatile in achieving a natural brow contour. This can be combined with an upper blepharoplasty if required with the benefit of the scar not passing beyond the supra tarsal fold. Autologous fat and other fillers when combined with laser resurfacing are adjuvant techniques toward complimenting the surgical procedures [33].

Fig. 9 Line drawing demonstrating box genioplasty

Fig. 10 Pre and post operative lateral view of a patient who underwent rhinoplasty and advancement augmentation box genioplasty

Fig. 11 Line drawing for a modified MACS lift

Midface

In the midface cheek implants and malar osteotomies are important adjuvant tools to achieve an aesthetic balance (Fig. 5). The malar implants are mostly in the caucasian population and the malar osteotomies are popularised amongst oriental patients. Volumising with autologous fat particularly along the naso jugular groove will compliment the SMAS plication Dermal fat graft has been used to enhance voluminising along the outer eyebrow tear trough, malar eminence, nasolabial and marionette lines [34–36]. Follicular grafting along the sideburn area may be needed to achieve lateral facial balance as well as to mask the temporal extension of the face lifts (Figs. 6, 7, 8).

Lower Face

In the lower face the genioplasty is a recognised surgical procedure to achieve a vertical and anteroposterior aesthetic balance. We carry out a box genioplasty which has the advantage of zero complication of mental nerve paraesthesia and a bone cut is within the symphyseal region resulting in no obvious step deformity which is known on standard genioplasty approach (Figs. 9, 10). Chin implants is another option to achieve aesthetic balance [37].

In oriental patients contouring of the angle of the mandible is a recognised procedure to present a tapered face.

What We Do

Although we perform the standard facelift with necessary modifications to a suitable patient, recently due to increased patient choice our activity is more towards short scar procedures.

Fig. 12 A 48 year old patient who underwent lower blepharoplasty and modified MACS lift (pre and post operative profile)

Fig. 13 A 45 year old patient side profile who under platysmal plication and a neck lift

We carry out varied modifications of all these procedures. The standard MACS lift skin incision is made where the transverse incision does not cross the sideburn area (Fig. 11). The two purse string sutures are carried out in the usual form. We carry out the third purse string suture if required via a half a centimetre crow's foot incision with direct exposure of the malar fat. Any excess skin along the lower lid is corrected by a pinch blepharoplasty. If a formal lower blepharoplasty is required we would plicate the orbicularis oculi muscle prior to the malar suspension and the skin excision (Fig. 12). We can combine this with

supraplatysmal dissection of the neck, skin, corset platysmal plication with the resection of the excess postauricular skin (Fig. 13).

Therefore the advances in face lift in the recent times are based on incisions, the dissection, the management of SMAS with plication, elevation and fixation and the removal of excess skin.

The aim is to provide a balanced face with no real tell tales signs. The balance is achieved by obtaining proportions along the vertical anteroposterior and transverse dimensions and the contour by a face lift with adjuvant

procedures. One needs to perform what the patient wants rather what a surgeon can perform. The endoscopic techniques and deep plane composite flaps are not gaining popularity in the recent years due to the increased downtime and possible complications. The tumescent solution has transformed face lift procedures and made possible the advances so that the surgeon can produce an unoperated outcome with zero complication with what the patient wants.

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