Preoperative Assessment of the Aging Patient

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ABSTRACT

The issues related to preoperative evaluation and facial analysis for patients undergoing facial rejuvenation procedures are discussed in this article. A key component of the preoperative evaluation begins with a thorough understanding of the patient's concerns and desires for improvements. Other components of the evaluation should include a detailed assessment of the patient's medical and psychiatric history, informed consent, and photographic documentation. Additionally, we discuss facial changes associated with aging, paying special attention to some of the differences that occur between male and female patients. Different aesthetic scales and their applications in facial plastic surgery are also presented. Finally, we consider the process of facial analysis in the context of common facial plastic procedures including rhytidectomy, blepharoplasty, browlift, and minimally invasive techniques.

KEYWORDS: Aesthetic surgery, aging, preoperative evaluation, facial analysis

With new advances in medicine proving to prolong life and preserve physical health, there is often an incongruity between how people feel inside and how they actually appear. With the advance of minimally invasive cosmetic surgical techniques and the popularization of nonsurgical interventions such as botulinum toxin injections and injectable fillers, it is not surprising that the demand for facial rejuvenation procedures is on the rise. This trend is not limited solely to the aging population. In fact, statistics have shown that the number of cosmetic operations performed in young adults aged 18 or younger have more than quadrupled from 13,300 to 81,000 during the past decade.¹

Much research has been devoted to defining what constitutes facial beauty. Although it is well recognized that cultural and racial differences exist in the conceptualization of beauty, certain ideals have been theorized to transcend culture and time (Fig. 1). As our society becomes more culturally diverse, the facial plastic surgeon needs to become aware of the various cultural-specific ideals of attractiveness to achieve a "natural" look.

Although women have typically been the focus of facial aesthetic procedures, middle-aged men represent an emerging group, expressing an interest in facial rejuvenation procedures. It is therefore important to understand the complex differences between the male and female patient's motivation, psychosocial factors, and facial anatomic changes associated with aging. To maximize postoperative results and patient satisfaction, the facial plastic surgeon must adjust his or her perioperative management and surgical techniques when performing facial rejuvenation procedures on men.²

PREOPERATIVE EVALUATION

Initial Consultation

The importance of a thorough patient interview cannot be overemphasized; it establishes the opportunity for the patient and surgeon to develop a personal relationship to exchange valuable information. During the initial consultation, it is important to create a

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Modern Surgery of the Aging Face; Guest Editors, Adam T. Ross, M.D., Jeffrey B. Wise, M.D.


comfortable environment that will encourage the patient to share his or her aesthetic concerns, motivations, and expectations.

Although the final outcome of achieving a youthful appearance is the same regardless of gender, men and women present with important differences in psychosocial and anatomic aspects of aging. For instance, male rhytidectomy patients have generally reported concern regarding their midface and neck, and female patients tend to be more concerned with the upper face. In contrast to female patients who tend to be more accustomed to change in appearance through application of makeup and different hair treatments, male patients can have more difficulty in accepting their postoperative "new look." Therefore, although female patients may choose to undergo multiple rejuvenation procedures simultaneously, for the aforementioned reasons it may be prudent to proceed in a stepwise fashion in a male patient, allowing him to gradually adapt to the changes in appearance.

Preoperative Assessment
A thorough medical history is a crucial component of the preoperative assessment and may be facilitated by having the patient complete a medical history questionnaire prior to the initial consultation. Medical conditions that can prevent adequate healing including diabetes, autoimmune or connective tissue disorders, hepatic or renal insufficiency, and other chronic illnesses should be investigated during the preoperative assessment. Any personal history of hypertension, peripheral vascular disease, or cardiopulmonary disease is vital to identify, as these conditions may have significant impact upon the perioperative plans. For example, patients with comorbidities such as diabetes and peripheral vascular disease are not ideal candidates for simultaneous multimodality treatments because of the increased risk of perioperative complications. Given the elective nature of facial aesthetic procedures, the need to maximize cosmetic outcomes while minimizing the likelihood for complications is paramount.

The patient with a history of psychiatric illnesses warrants further investigation prior to surgery; however, patients may not be comfortable with disclosing such history. Although selecting the appropriate surgical candidate relies significantly on experience and intuition, there are certain helpful predictors. For instance, patients who have undergone multiple procedures on the same body part, without signs of an obvious deformity, may suffer from body dysmorphic disorder. Similarly, patients who rely on others such as friends and spouses to provide reasons for surgery tend to lack internal motivation for surgery. This subset of patients represent poor candidates for adequately handling the emotional stress that may be associated with rejuvenation procedures. Additionally, a disheveled patient with an apparent lack of interest in his or her appearance, yet seeking some type of cosmetic procedure also warrants further evaluation. Finally, severe emotional crises such as divorce and the loss of a relative may be temporary contraindications until one regains emotional stability. A formal psychiatric assessment by a qualified mental health professional should be considered in those patients who arouse suspicion of a psychiatric disorder.

A complete medication history is also essential. In addition to known anticoagulant medications such as coumadin and clopidogrel, the surgeon should also inquire about the use of other over-the-counter medications such as aspirin-containing medications and nonsteroidal anti-inflammatory drugs. Herbal and health supplements including vitamin E, ginko biloba, and St. John's wort may also increase the likelihood of developing a postoperative hematoma and should be stopped 2 weeks prior to surgery. Additionally, the use of steroids and retinoid compounds such as isotretinoin should be documented and stopped, as they may impede the healing process. Clinical observations as well as animal studies have suggested that isotretinoin may delay healing and the wound contraction response. The social history, especially regarding the use of cigarettes, is an important component of the preoperative
evaluation. Smokers have an increased chance of postoperative wound complications.\textsuperscript{7} The patient should be made aware of the increased risks and encouraged to stop smoking. If complete smoking cessation is unrealistic, the patient needs to stop smoking ideally 2 weeks preoperatively.\textsuperscript{8} Pharmacotherapy such as bupropion and a short-term course of benzodiazepine can be used to help patients with the anxiety associated with smoking cessation. Although nicotine exposure had been experimentally associated with endothelial dysfunction, recent evidence suggests that nicotine replacement therapy (NRT) may not adversely affect soft tissue wound healing response and the cardiovascular system.\textsuperscript{9,10} However, until larger studies are available to confirm these findings, the use of NRT should be avoided during the perioperative period.

Basic laboratory tests such as a complete blood cell count, electrolytes and coagulation profiles, and a pregnancy test in women of childbearing age should be obtained as part of the preoperative workup. For those patients 40 years of age or older, an electrocardiogram is recommended. In our practice, we request a medical preoperative evaluation and clearance on all patients seeking facial plastic procedures. Additionally, a formal preoperative anesthesiology evaluation should be performed on patients who possess risk factors for airway obstruction, such as known airway or craniofacial abnormalities, prior history of difficult intubation, morbid obesity, and sleep apnea.

Informed consent is a critical component of the preoperative assessment. Most legal settlements to patients who have had cosmetic procedures are not for malpractice or negligence reasons; rather, they are based on "breach of contract" violations on the part of the surgeon who did not produce the promised result. Surgery is not a perfect science, and the artistic aspect of the process is especially important in facial plastic surgery. Therefore, it behooves both the surgeon and patient to reach a preoperative consensus on the goals of surgery, along with full disclosure of the possible complications.

Photodocumentation is another crucial aspect of the facial plastic surgery consultation process and should be used primarily as an educational tool that enhances the ability of the surgeon and patient to communicate. Consent for photodocumentation should be obtained prior to the photography session. A light blue background is generally preferred, and the photographs should be taken in the Frankfort horizontal position where the infraorbital rim is at the same level as the supratragal notch. The standard rhytidectomy photographs including frontal, left and right lateral, as well as left and right oblique views should be obtained. Additional photographs may be necessary depending on the procedure being considered, such as for blepharoplasty or rhinoplasty, and is well described in other standard texts.

### FACIAL ANALYSIS

#### Skin and Hair

The process of facial analysis begins with an assessment of the skin characteristics. The surgeon should pay particular attention to the texture, thickness, and the degree of sun damage. Assessment of the skin type according to the Fitzpatrick classification scheme (Table 1) can assist in predicting response to therapies such as skin resurfacing. In addition, the Fitzpatrick classification may aid in pretreatment strategies. The extent of sun damage and rhytids can be classified according to the Glogau photoage damage scale (Table 2).\textsuperscript{11} Areas of dyschromia, telangiectasias, rhytids, and scars should be noted and discussed with the patient. Any suspicious lesion warrants further evaluation and possible biopsy.

The extent of hair loss and temporal recession, as well as hairline position, should also be noted. This is particularly important in males and can have an impact on the placement of rhytidectomy and browlift incisions. The androgenetic alopecia pattern and the severity of hair thinning can be documented according to the Norwood classification scheme.\textsuperscript{12}

<table>
<thead>
<tr>
<th>Type</th>
<th>Severity</th>
<th>Typical Age Range</th>
<th>Characteristics</th>
</tr>
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<tbody>
<tr>
<td>I</td>
<td>Mild</td>
<td>Late 20s to 30s</td>
<td>Little wrinkling, no keratosis, requires little or no makeup</td>
</tr>
<tr>
<td>II</td>
<td>Moderate</td>
<td>30s to 40s</td>
<td>Early wrinkling with facial motion, early actinic keratosis</td>
</tr>
<tr>
<td>III</td>
<td>Advanced</td>
<td>50s or older</td>
<td>Persistent wrinkling, discoloration with telangiectasias, visible actinic keratosis</td>
</tr>
<tr>
<td>IV</td>
<td>Severe</td>
<td>60s to 70s</td>
<td>Generalized wrinkling, actinic keratoses with or without malignancy</td>
</tr>
</tbody>
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### Table 1 Fitzpatrick's Classification of Skin Types

<table>
<thead>
<tr>
<th>Type</th>
<th>Skin Color and Features</th>
<th>Tanning Ability</th>
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<tbody>
<tr>
<td>I</td>
<td>White skin, blue eyes, blonde/red hair</td>
<td>Always burn, does not tan</td>
</tr>
<tr>
<td>II</td>
<td>White skin, blue eyes</td>
<td>Easily burns, tans poorly</td>
</tr>
<tr>
<td>III</td>
<td>Darker white skin</td>
<td>Mild burn, average tan</td>
</tr>
<tr>
<td>IV</td>
<td>Brown skin</td>
<td>Occasionally burns, tans easily</td>
</tr>
<tr>
<td>V</td>
<td>Dark brown skin</td>
<td>Rarely burns, tans vary easily</td>
</tr>
<tr>
<td>VI</td>
<td>Black skin</td>
<td>No burns, dark tan</td>
</tr>
</tbody>
</table>
Upper Face

Analysis of the upper face consists of evaluation for signs of aging in the forehead, brows, and eyelids. A gradual elongation of the upper face is characteristic as the hairline recedes posteriorly and the brow droops inferiorly secondary to gravitational pull. Other features of the aging upper face include deep forehead rhytids, crow's feet, and lateral brow hooding.

Deep furrows of the foreheads are caused by the repeated contractures of the upper face mimetic muscles. The frontalis muscle is responsible for the transverse forehead rhytids. Chronic contractile force of the procerus muscles produces the horizontal glabellar rhytids. Vertical glabellar rhytids are produced by the repeated pull of the corrugator supercili muscles.

The ideal female brow position has been described to begin medially at the level of an imaginary vertical line drawn through the alar base and medial canthus. Laterally the brow terminates at a point on the line drawn from the alar base to the lateral canthus. The medial head of the brow should have a club-head appearance and lie at approximately the same horizontal level as the lateral end. The brow should arch superiorly ~1 cm above the supraorbital rim with the highest point lying above the lateral limbus or lateral canthus. In males the arch of the brow should assume a more leveled appearance positioned at or slightly above the level of the supraorbital rim (Fig. 2). Assessment of the resting brow position is important and can be achieved by having the patient close his or her eyes for 10 to 15 seconds prior to the examination. Brow ptosis is secondary to the increased skin and soft tissue laxity associated with aging as well as the constant downward gravitational pulling force. It is important for the facial plastic surgeon to make the correct diagnosis, as this can sometimes be mistaken for dermatochalasis or upper eyelid ptosis.

The upper eyelid crease normally lies 8 to 12 mm from the upper lid margin in the Caucasian population. An inferiorly shifted upper lid crease, a frequent finding associated with aging, tends to convey an unintentional appearance of fatigue and sadness. Dermatochalasis and prominent fat pads are the most commonly encountered aging changes of the upper eyelids. True upper eyelid ptosis, however, is secondary to levator aponeurosis dehiscence and correction requires reattachment of the levator aponeurosis to the tarsus. This is suspected when the tarsal width is increased with a prominent supratarsal fold. The distinction of true ptosis from dermatochalasis is important to recognize as a simple blepharoplasty may result in worsening of the existing deficits.

Lateral hooding as a result of brow ptosis and upper eyelid dermatochalasis affects more than just the appearance. Functional implications may involve impairment of the superior and lateral visual fields. This can be manifested by clinical complaints of eye fatigue and frontal headache secondary to overuse of the frontalis muscle to raise the brows. A simple assessment of visual acuity should be performed in the office. If necessary, a formal visual acuity and field assessment by an ophthalmologist should be considered. In evaluation of the upper face, the surgeon should also be mindful of other medical conditions that can manifest in this region. For instance, periorbital edema or thickening of skin in a blepharoplasty candidate should prompt an evaluation of thyroid function. Similarly, exophthalmos should alert the surgeon of the possible presence of Grave’s orbitopathy. Enophthalmos may indicate prior facial trauma or other facial skeletal abnormality; maxillofacial computed tomography imaging should be considered in these cases.

Lower eyelid pseudoherniation of the orbital fat secondary to a weakened orbital septum is often the first sign of an aging face. Lower eyelid dermatochalasis can be diagnosed by an abnormal snap test, characterized by a delayed return of the grasped excess lower eyelid skin to the globe surface upon release. In patients with accompanying nasojugal deformity, also known as the “tear trough” deformity, repositioning of the fat pad via the transconjunctival suborbicularis oculi fat pad lift blepharoplasty has shown to be an effective facial rejuvenation technique in selected patients. In rare occasions, patients can present with isolated orbicularis oculi muscle hypertrophy secondary to muscle overuse from frequent squinting, manifested by firm palpable muscle at the margin of the lower eyelid.

Midface

Midface convexity and its relative fullness compared with the lower face give a youthful appearance. The
malar eminence, composed of the zygomatic and maxillary facial bones, is among the most noticeable of facial landmarks. With age, there is descent of the melolabial mound and atrophy of the fat within the midface, leading to deepening of the nasolabial crease. The inferior and lateral bony orbital rims become skeletonized, creating a hollowed appearance. The buccal fat pad, located in the masticator space, also descends with age. The protic buccal fat pad can present as volume loss in the midface with an increase in inferior cheek volume or jowling along the submandibular jaw line.

A unique concern and important consideration in facial plastic surgery for males is the pattern and distribution of facial and temporal hair. There are three basic hair distribution patterns in the temporal region: normal full growth, thinning hair growth with temporal recession, or male pattern baldness. Modification of the rhytidectomy incision is required for any temporal hair growth pattern other than normal to avoid altering the hairline position. For instance, the upper segment of the rhytidectomy temporal incision may need to be shortened to prevent extension into an area of thinning and recessed hair.

Lower Face and Neck
With age, the upper lip lengthens with thinning of the red lip and a relative increase of the white lip height. As a result, there is an appearance of drooping lateral commissures. This change is exacerbated by the development of perioral rhytids with aging, which extend vertically from the commissures. Along with these changes is the appearance of "marionette" lines, characterized by the deepening and inferior extension of the nasolabial groove.

A sharply defined mandibular line is a characteristic of youth that diminishes with age. Jowling is seen when there is loss of definition along the submandibular jaw line secondary to gravitational downward pull of the perimandibular soft tissue and fat. The appearance is accentuated by gradual bone resorption of the aging edentulous mandible, resulting in decreased mandibular height and projection. Submental fat accumulation and increased prominence of submental crease creates the appearance of chin ptosis. Several techniques including removal of the excess fatty tissue, chin augmentation, and standard rhytidectomy/neck lift have been used.

A sharply defined cervical angle of 90 degrees or less is another defining characteristic of the youthful neck. The aging process results in blunting of the cervical angle secondary to prolapse of excess skin, fat, and the submandibular glands. Furthermore, dehiscence of the platysma muscle in the anterior neck creates vertical bands that radiate from the submental region to the clavicle. In males, the combination of thick redundant skin, dehiscent platysma, and excess submental fat tend to contribute more significantly to the appearance of heaviness in the neck. These changes can usually be addressed by a standard rhytidectomy and neck-lift approach. Sometimes the fullness in the submental region can be corrected with liposuction and direct excision of skin with reapproximation, although overexcision of skin needs to be avoided. Additional attention is directed toward the position of the hyoid bone, which ideally should be positioned at the level of the fourth cervical vertebrae. A low hyoid bone contributes to the appearance of an obtuse cervicomenatal angle and can hinder corrective surgical efforts.

CONCLUSION
As the demand for facial plastic surgery continues to increase, the facial plastic surgeon must be aware of contemporary trends and the various treatment modalities available. Perhaps the most daunting challenge faced by both experienced and young facial plastic surgeons alike is the process of patient selection. Against this background, a comprehensive medical evaluation, along with thorough facial analysis and frank discussion of expectations and potential complications, is fundamental for successful surgical outcomes and patient satisfaction.

REFERENCES


