Surgical Manipulation of the Periorbital Musculature

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KEYWORDS

• Blepharoplasty • Brow • Periorbital • Surgical technique • Transblepharoplasty • Plastic surgery

KEY POINTS

- Brow position has a great impact on facial aesthetics and emotional portrayal.
- The corrugator supercilii, depressor supercilii, procerus, and orbicularis oculi muscles all contribute to brow depression as the aging process progresses.
- The gender of the patient, position of the hairline, presence of forehead tissue redundancy, and patient preference determine the approach to the brow and periorbital musculature.
- Many patients present with the false notion that eyelid surgery elevates the brow. It is important to demonstrate and discuss the influence of brow position on the outcome of upper blepharoplasty surgery.
- A transblepharoplasty brow lift in combination with brow depressor myotomy and extensive subgaleal forehead undermining can provide mild to moderate brow elevation in carefully selected patients.

INTRODUCTION

The position of the brow has an impact on the apparent state of facial aging, general facial aesthetics, and the status of human emotion. Achieving a youthful result with brow-lifting procedures, while maintaining a natural appearance and facial dynamics, may be challenging no matter which surgical approach is selected. When tissue redundancy or a heavy brow is not present, stand-alone weakening of the brow depressor muscles may yield a satisfactory elevation. In this scenario, a transblepharoplasty approach to the periorbital musculature can provide excellent exposure and produce natural-looking results.[1,2]

ANATOMY OF THE UPPER FACE

The upper third of the face is defined by the boundaries of the forehead—from the hairline to the glabella. A forehead with a gentle convexity on profile is most aesthetically ideal. The ideal nasofrontal angle is from 115° to 135°.[3,4]

Brow

In both men and women, the medial brow head lies along a tangent with the medial canthus and nasal ala, whereas the lateral brow head lies along an oblique line drawn from the nasal ala through the lateral canthus (**Fig. 1**). In women, the ideal shape displays the highest point of the brow arch above lateral limbus or lateral canthus, with the brow lying just above the supraorbital rim. In men, the ideal brow has little to no arching and sits at the supraorbital rim.[3,4]

Orbit

The orbit is located in the lower third of the upper face and the upper third of the midface. The width

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0094-1298/13/$ – see front matter

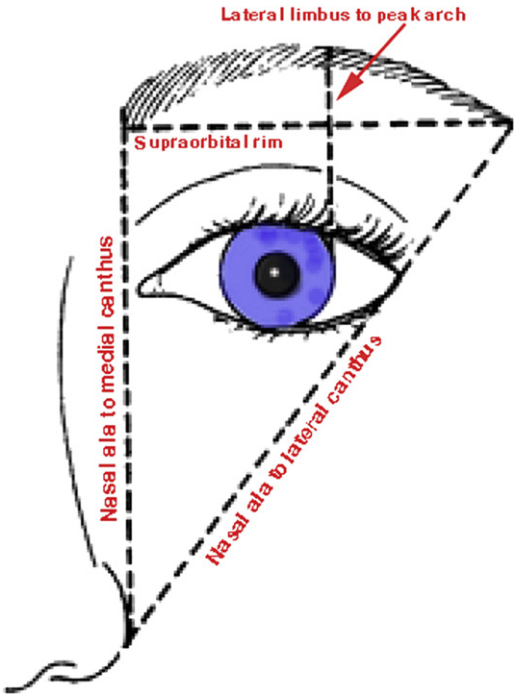

Fig. 1. Ideal brow position.

of one eye from medial to lateral canthus ideally measures one-fifth of the facial width and the intercanthal distance equals the width of one eye. Average intercanthal distances are[4] for women, 25.5 mm to 37.5 mm, and for men, 26.5 mm to 38.7 mm.

Eye and Lid

The ideal eye is almond-shaped with the lateral canthus positioned slightly higher than the medial canthus. The palpebral opening averages 10 mm to 12 mm in height and 28 mm to 30 mm in width.[4] The upper lid crease averages approximately 11 mm from the lash line but can vary between 7 mm and 15 mm.[4] Although the upper eyelid normally covers a small portion of the iris, it does not cover the pupil. The lower eyelid lies on 1 mm to 2 mm of the iris on neutral gaze, without scleral show below the iris margin.[3,4]

Corrugator Supercilii, Depressor Supercilii, Procerus, and Orbicularis Oculi

The corrugator supercilii, depressor supercilii, procerus, and orbicularis oculi muscles all play a role in brow depression as the aging process progresses.[1,2,5–7] The procerus muscle originates from the nasal bone (where it is a continuation of the frontalis muscle) and inserts on the skin medial to the brow. The procerus acts to draw the brow inferiorly, producing horizontal wrinkles across the nasal bridge. The corrugator supercilli muscle originates from the medial portion of the supercilliary arch, orbital portion of the orbicularis occuli muscle, and lateral portion of the nasal bone. It inserts into the skin of the medial half of the brow and serves to draw the eyebrow in an inferomedial direction, producing vertical wrinkles across the nasal bridge and forehead. Lastly, the orbicularis occuli muscle, which has 3 distinct portions, serves as a brow depressor as well. The orbital portion is responsible for both medial and lateral brow depression. The orbital portion of the orbicullaris occuli muscle originates from the medial orbital margin and the medial palpebral ligament and inserts on the skin of the upper lateral cheek. Other portions of this muscle include the palpebral and lacrimal segments, which have minimal bearing on brow depression. With brow depression, the frontalis muscle tone increases to compensate for the brow depression. With aging, this compensatory frontalis tone results in horizontal forehead rhytids.

EVALUATION OF THE BROW

With aging, the loss of skin elasticity, subcutaneous tissue atrophy, and increased skull bone resorption along with extrinsic factors, such as genetics, facial expression habits, skin type, sun exposure, and smoking history, all play a role in the development of forehead and eyebrow ptosis.[4] A heavy and depressed brow may make a person appear angry, tired, or sad. Brow ptosis is typically associated with tissue redundancy, an overactive depressor muscle action, or both.

When planning brow-repositioning surgery, along with an appropriate history, physical, and eye examination, patient expectations are addressed and asymmetries are pointed out. Particular attention is paid to the position of the hairline, the position of the brow in relation to the superior orbital rim, and lid laxity. The gender of the patient and the position of the hairline influence the decision on approach to the brow and periorbital musculature. If tissue redundancy is present, an open brow or endoscopic approach can be selected. If brow depression is mostly due to depressor muscle action, then neuromodulation and/or myotomy may be indicated. When muscle modulation is all that is necessary, the approach to myotomy need not necessarily be approached through a coronal, pretricheal, direct brow, or endoscopic access. In this situation, a transblepharoplasty brow approach can be considered.

A demonstration and discussion of the dynamic nature of brow position, as well as the impact of the change in brow position related to the differences seen between the upright or recumbent