

## 22 Pretrichial Brow Lift

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### Summary

Pretrichial brow lift is a powerful surgical procedure to restore harmony between the upper and lower face in the properly selected patient. This technique can be used in the context of functional or aesthetic surgery to elevate the brow. Understanding the anatomic layers and relationship between the facial mimetic musculature is important to achieve the goals of the procedure. To avoid complications, knowledge of motor and sensory nerves is key. The pretrichial lift has distinct advantages. It allows direct mechanical elevation of tissue and does not require special instrumentation. In addition, pretrichial brow lift can shorten the forehead, which is useful in select patients. The key disadvantage of this procedure is the postoperative scar. Patient selection is critical. There is risk of injury to the facial nerve and sensory nerves and understanding these nuances is important before performing the pretrichial brow lift.

**Keywords:** brow lift, forehead, pretrichial, brow ptosis, temporal branch of facial nerve

### 22.1 Goals

Anatomically and functionally, there is an intimate relationship between the forehead, the brow, and the upper eyelids. Understanding this relationship is key to avoiding pitfalls of upper eyelid surgery in which the eyelids are raised without considering descent of the forehead and brow.<sup>1</sup> Many different procedures exist to address the brow region, from foreheadplasty surgeries such as the coronal or endoscopic forehead lift to more direct procedures addressing the brow region via a direct or transblepharoplasty approach.<sup>2</sup> The purpose of the current chapter is to discuss the pretrichial brow-lift procedure.

The goal of the procedure is to accomplish elevation of the brow in patients in which brow ptosis is contributing to the aesthetic appearance of looking “tired” or the functional consequence of interference with the visual field. Descent of the brow can exacerbate limitation of the superior visual field in patients with preexisting dermatochalasis. This is especially pronounced laterally, and indeed the main goal of the procedure in the modern era is to accomplish lateral elevation and reshaping of the brow. During the advent and growth period of endoscopic brow elevation in the mid-1990s, many advocates of this procedure had focused on medial and lateral brow elevation as an important goal of the procedure.<sup>3</sup> But as long-term results have been evaluated, this is an area that—if raised significantly relative to the lateral elevation—can induce a facial expression of surprise that can be aesthetically displeasing. In addition, extirpation of the corrugator or procerus muscles can increase the risk of intraoperative and postoperative bleeding as well as dysesthesia. The goal of any brow procedure in the modern era is lateral more than medial elevation, especially in the female population where the arch of the brow is more pronounced.<sup>4</sup> In select patients with an elongated forehead, however, the goal

may be intentional forehead shortening, best accomplished with a pretrichial or coronal lift over other techniques.<sup>5</sup>

It is important to understand the anatomy of the frontalis muscle and its relationship to the orbicularis oculi and brow depressors (► Fig. 22.1). The lateral portion of the upper eyelid orbicularis extends past the insertion of the frontalis muscle into the temple region, and the contraction of the orbicularis unopposed can lead to lateral brow ptosis. During patient evaluation, it is also helpful to consider the concept of “facial thirds” (► Fig. 22.2), and the pretrichial lift is the most direct option to restore the upper third of the face that can elongate with aging (► Fig. 22.3).<sup>6</sup>

### 22.2 Advantages

The advantage of the pretrichial brow lift over other techniques is the significant amount of mechanical elevation and skin excision that can be safely accomplished, as well as the open surgical exposure compared to the endoscopic approach. In patients who style their hair with bangs or have sufficient follicles at the anterior hairline, the incision from this approach can be concealed. In addition, patients with an elongated forehead may be able to achieve better symmetry between the upper, middle, and lower thirds of the face with a forehead shortening procedure via this approach.<sup>5</sup> The other practical advantage of the pretrichial brow lift is that it does not require any special instrumentation in contrast to the endoscopic approach. Lastly, although many different procedures have been proposed to address the ptotic brow, the coronal and pretrichial approaches have stood the test of time as reliable procedures to raise the brow, despite the larger incision.<sup>7</sup>

### 22.3 Expectations

Setting expectations is important during the preoperative planning and evaluation of any aesthetic patient, but especially in the case of the pretrichial brow lift, given the longer incision and postoperative swelling that can occur. It’s important to have a frank conversation about the postoperative scar and—where possible—to advise the patient to consider styling their hair appropriately to conceal the scar for the first few months after surgery until healing has taken place. Patients should be advised that despite the best techniques to address brow ptosis, given the gravitational effects of aging there is a possibility of recurrence and descent after surgery.

### 22.4 Key Principles

The main principle of open brow-lift surgery is that it will involve a postoperative scar and require time for healing, and that point should be driven home to the patient during the preoperative evaluation. If patients are willing to accept this fact, the results from the surgery can be extremely satisfying. Patients best suited for this procedure include individuals with long

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foreheads. The key advantages of the procedure are its time-tested effectiveness, the ability to perform the procedure without special instrumentation, and the open exposure with the ability to mechanically and directly elevate the brow.

### 22.5 Indications

Indications for the surgery include descent of the brow. Some authors have suggested that a pretrichial lift should be considered especially in cases where a high forehead exists, defined as greater than 6 cm from the anterior hairline to a line drawn across the top of the brow cilia.<sup>7</sup>

### 22.6 Contraindications

There are relative contraindications to pretrichial brow-lift surgery. Patients with vertically short foreheads or low anterior hairlines may not be the best candidates for this approach, given that the surgery may further shorten the forehead. Patients with thin hairs in the anterior hairline or with balding may not be good candidates for the procedure, given the visibility of the scar.

### 22.7 Preoperative Preparation

Evaluation of the patient's goals is of paramount importance in the preoperative preparation. There are many different options to elevate the brow, including the coronal, pretrichial, endoscopic, mid-forehead, direct supraciliary approach, and transblepharoplasty approach. If a patient desires a durable method to lift the brow and is willing to accept the healing period associated with the incision, they may be a good candidate for a pretrichial approach. It goes without saying that it is also important to evaluate the presence of dermatochalasis and ptosis of the eyelid preoperatively.

It is also important to preoperatively evaluate medical conditions that may affect the choice of brow surgery. Patients who are at higher risk from an anesthesia standpoint may be better suited for direct or transblepharoplasty brow elevation procedures that can be done under purely local anesthesia. In addition, given the extensive vascular supply of the forehead during the pretrichial incision and dissection, patients who are on blood thinners may be at higher risk for postoperative hematoma or seroma formation.

### 22.8 Operative Technique

There are several variations of the incision for the pretrichial lift that can be considered. The authors prefer an irregular pattern at the anterior hairline, and it is helpful to make a central "V" in the central forehead to assist with alignment at the time of closure (► Fig. 22.4). A lateral subcutaneous variant of the surgery can also be considered with two shorter incisions (► Fig. 22.5).<sup>8</sup>

A mixture of lidocaine with epinephrine and bupivacaine may be used for local anesthesia under the incision. Many authors also prefer to infiltrate the central forehead and glabella, as well as the arcus marginalis, with tumescent anesthesia to create a "vascular tourniquet."<sup>7</sup>

The incision may be made with a 15 or a 10 blade, and the authors prefer the latter, given its larger belly to cut through the thicker forehead skin. Beveling the incision from posterior to anterior may be helpful in preserving hair follicles and preventing postoperative alopecia at the incision. It is helpful to minimize cautery in the dermis at the site of the incision for this reason as well, although several vessels will be encountered in the subdermal layer.<sup>9</sup>

The level of the dissection depends on the type of procedure chosen. For a more extensive lift or, if the goal of surgery is to lower the forehead, then subperiosteal dissection may be necessary to try to advance the posterior scalp forward. The authors' preferred approach is along the posterior galea anterior to the periosteum, which provides a smooth dissection plane down to the arcus marginalis. If dissection is kept at the deep portion of the galea, the surgeon will avoid injury to the deep branch of the supraorbital nerve as it crosses the temporal line of fusion.<sup>1</sup> A third variant for the dissection is a subcutaneous approach on top of the frontalis muscle. This may be appropriate in select patients and does not present as much risk to neurovascular structures. Through the galeal approach, the central forehead muscles may be released as well as the arcus marginalis, taking care not to disturb the supraorbital neurovascular bundle. Finger dissection can also be used to release down to the lateral canthal area.<sup>8</sup>

After dissection is complete, the flap is mobilized upwards to determine the amount of skin resection. It is helpful for an assistant to provide countertraction on the scalp at the posterior edge of the incision to determine the amount of resection. A heavy marker is used to delineate the resection amount, being careful to follow the shape of the original incision with a slight taper as it approaches the lateral edge. A #10 blade or monopolar cautery on the coagulation setting may be used to resect the excess skin. The authors prefer buried, interrupted 4-0 polygalactin suture for deep closure and running, locking 5-0 polypropylene for the skin. A postoperative head wrap in the central forehead may be useful but is not necessary, as this may exacerbate swelling in the periorbital area.

### 22.9 Tips and Pearls

With any aesthetic or functional procedure, the goal is often to achieve the most benefit at the least amount of risk. For the pretrichial brow lift, this downside risk includes the scar and healing period, as well as risk of motor or sensory nerve damage during the procedure. The temporal branch of the facial nerve is adjacent to the inferior portion of the dissection in the region of the arcus marginalis, and can be avoided by staying on the deep temporal fascia without dissecting into the superficial temporal fascia. This is uncommonly at risk during pretrichial brow-lift surgery, and yet must be kept in mind. The more likely nerve affected by pretrichial approaches is the deep branch of the supraorbital nerve, which travels obliquely from the supraorbital notch superotemporally to the hairline under the frontalis muscle. Damage to this nerve can cause sensory dysesthesias. The nerve is best avoided by dissecting along the deep galea, or subperiosteally, taking care to release the temporal line of fusion from lateral to medial to avoid damage to this nerve.<sup>1</sup>

## 22.10 What to Avoid

Patient selection is key for the pretrichial brow lift. Patients with male-pattern baldness or significant thinning in the anterior hairline may not be the best candidates for the procedure. It is important also to have a discussion with patients before surgery about expected outcomes such as postoperative swelling and scar remodeling, as well as possible complications including dysesthesias of the forehead. These can occur from any type of brow lift, but are most likely in procedures that affect the supraorbital nerve, especially the deep branch. The dysesthesia can cause debilitating pruritus and sensory disturbance. It is best to take all measures to avoid this complication rather than having to treat one afterwards.

## 22.11 Complications/Bailout/Salvage

For the pretrichial lift, the most common complication that can occur is alopecia at the site of the incision. It is best to warn patients about this possibility ahead of time. Making a beveled incision, minimizing cautery to the dermis and follicles during dissection, and avoiding excessive tension on the wound can avoid widening of the scar band and minimize alopecia.

Motor or sensory nerve damage is a potential complication of any forehead lift. For the temporal branch of the facial nerve, stretch injury can occur from tension on the flap during dissection. This injury can result in a temporary palsy of the nerve. Transection of the nerve is rare but usually permanent. Sensory dysesthesia from damage to the supraorbital nerve has been discussed. If a patient develops this complication, it may resolve after 3 to 6 months or be more permanent. Several measures can be tried. For one, it is important to instruct the patient to be careful using hot compresses in this area. Patients can get burns of the forehead and be unaware as a result of dysesthesia.<sup>10</sup> Distracting measures can be tried such as encouraging the patient to wear a headband or tight-fitting hat, which will stimulate the damaged sensory nerve into habituation and may relieve the symptoms. In rare cases, gabapentin or pregabalin can be tried as well.

## 22.12 Postoperative Care

Patients should be instructed to use ointment along the incision line for 10 to 14 days. Permanent sutures can be removed at 10 days. Some surgeons apply a wrap to the forehead after surgery with a Kerlex followed by Coban, but this is surgeon preference. The wrap may “squeeze” the postoperative edema into the periorbital area rather than prevent it from forming entirely. Hematoma is certainly a potential complication of the surgery, and patients should be checked shortly after surgery. A drain can be used if the concern for hematoma is high.

## 22.13 References

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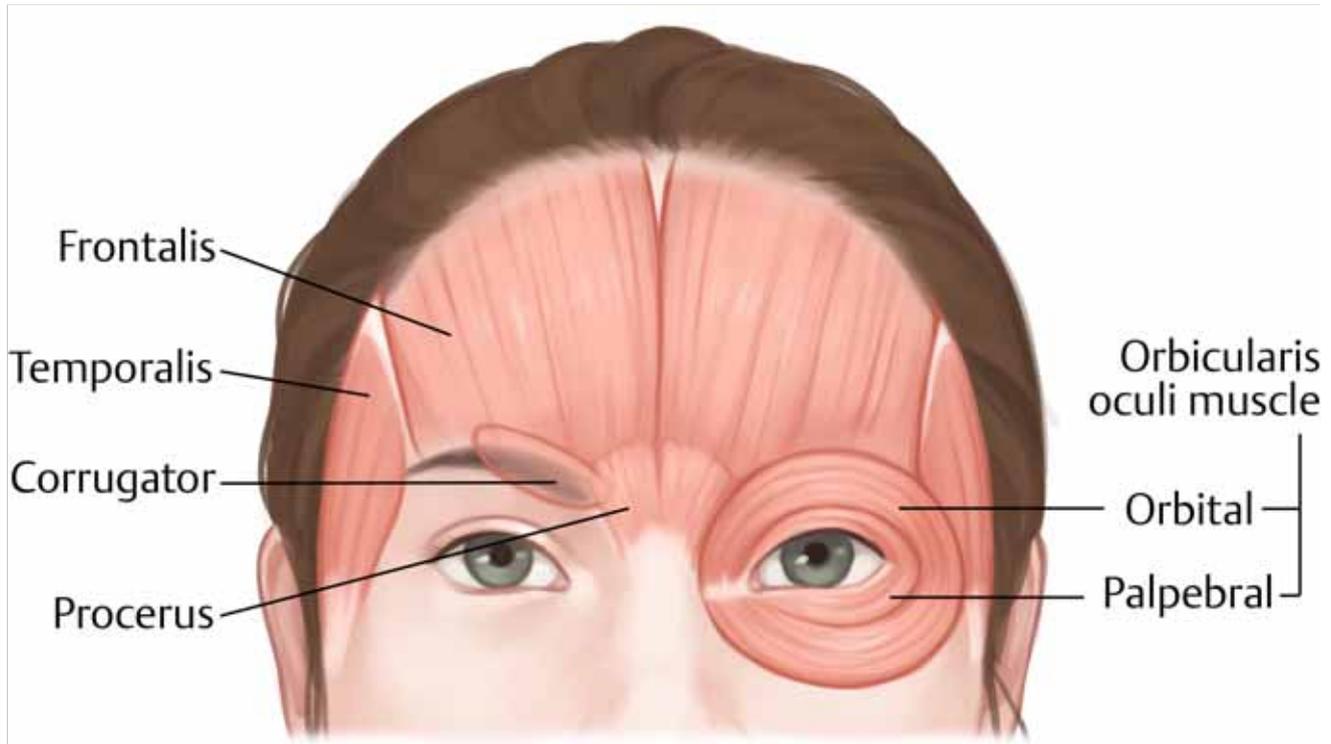


Fig. 22.1 Muscles of the forehead and periorbital region.

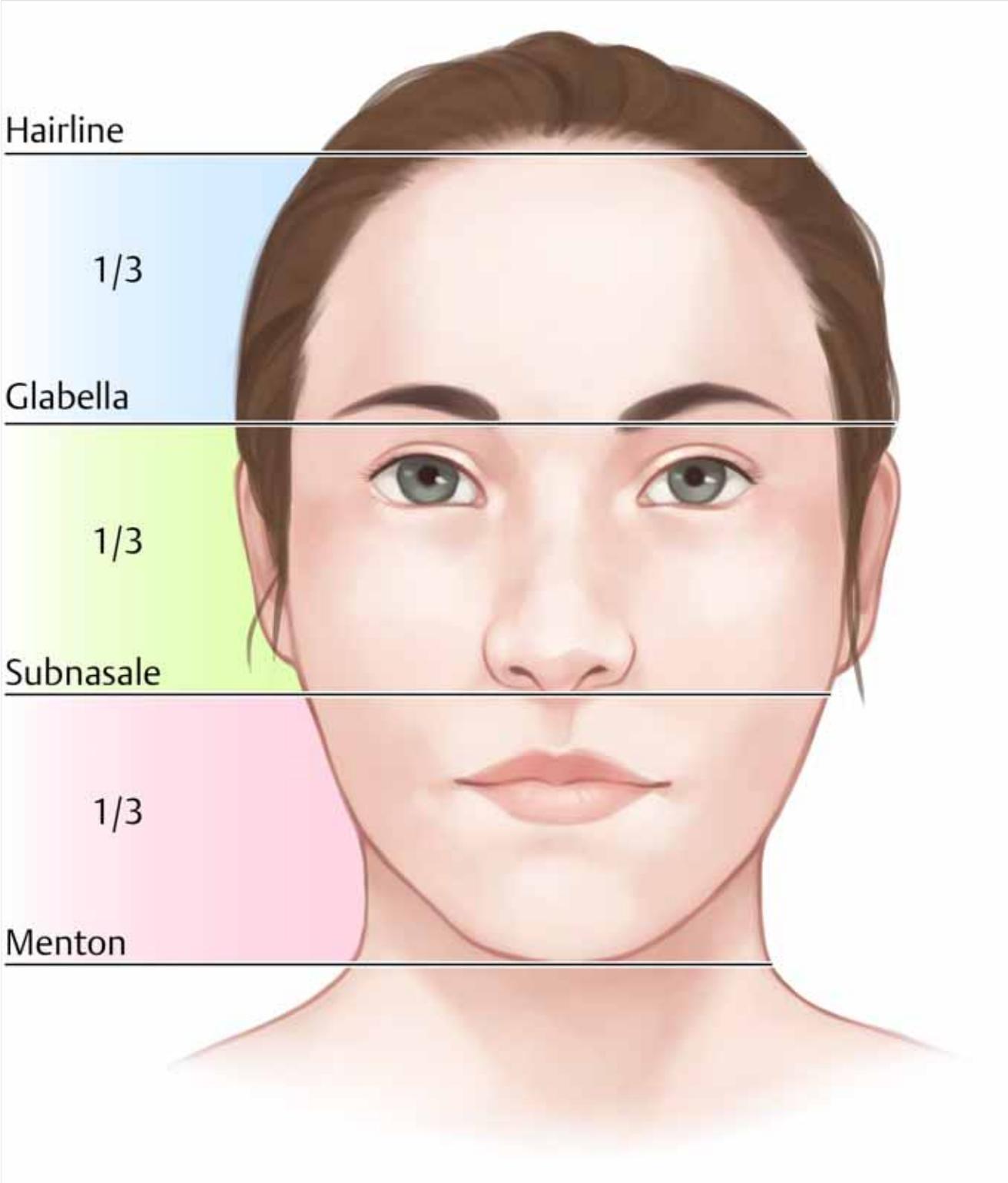


Fig. 22.2 The concept of facial thirds in the idealized face.

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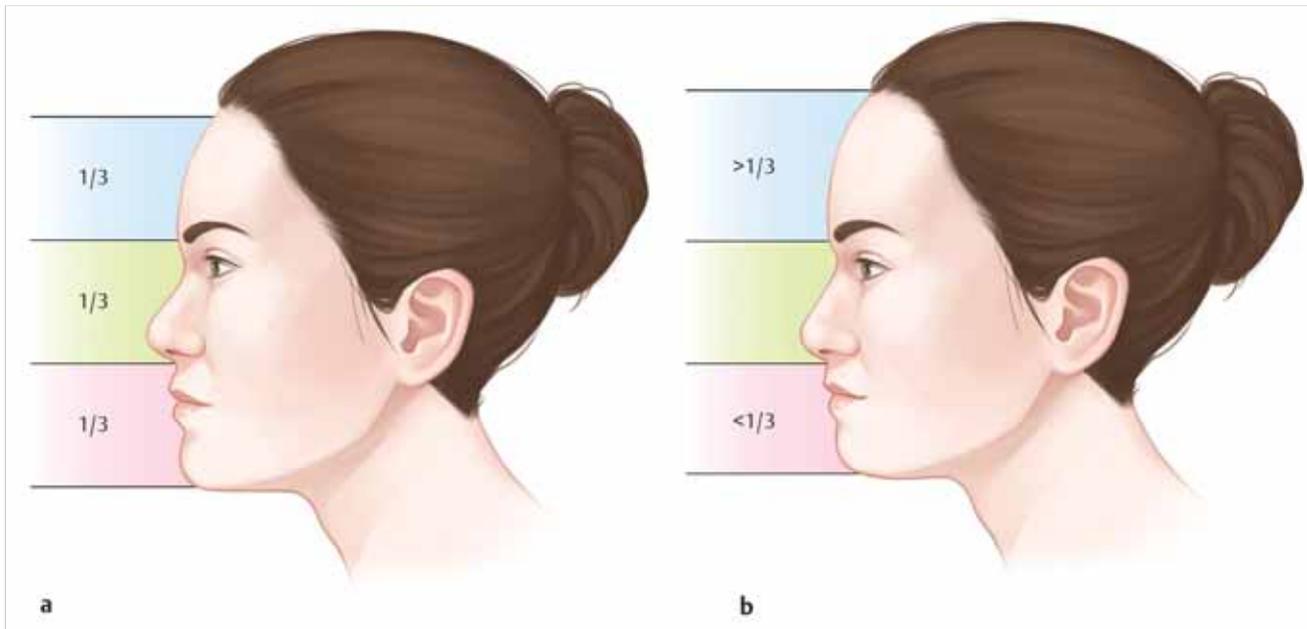


Fig. 22.3 Facial thirds in profile (a) in the idealized face and (b) showing the elongation of the forehead with aging.

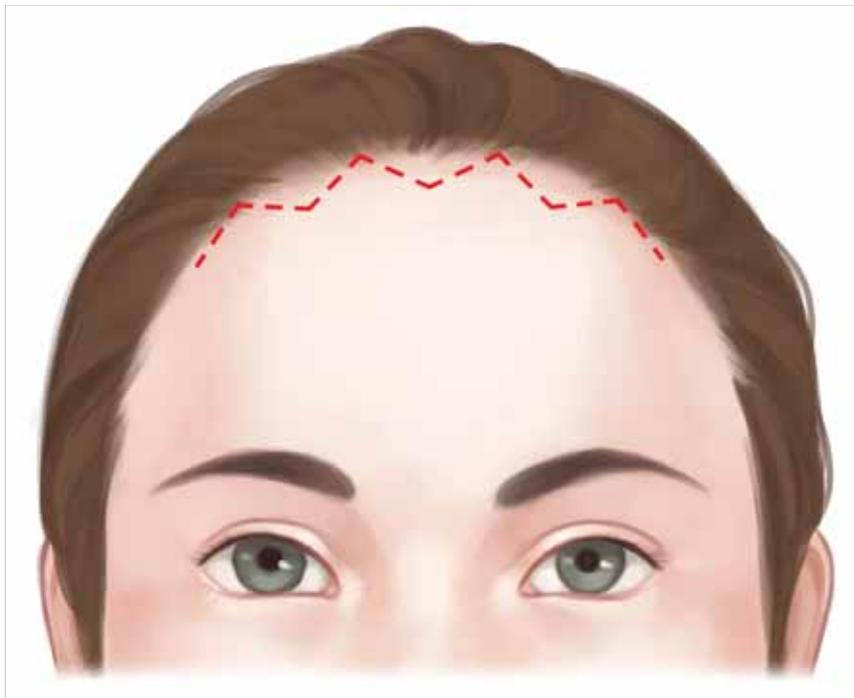


Fig. 22.4 Traditional pretrichial brow-lift incision.

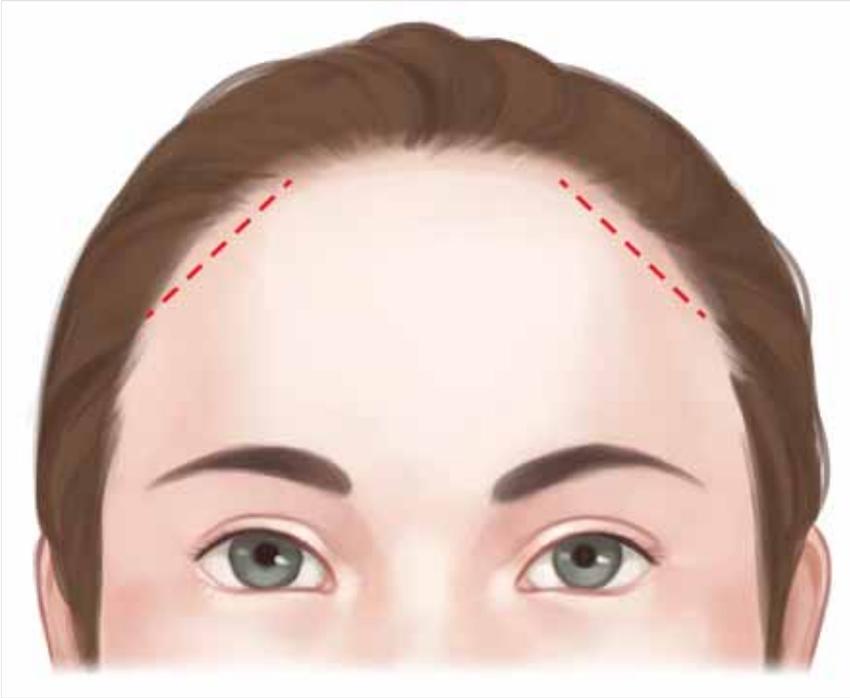


Fig. 22.5 Lateral pretrichial brow-lift incision.

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