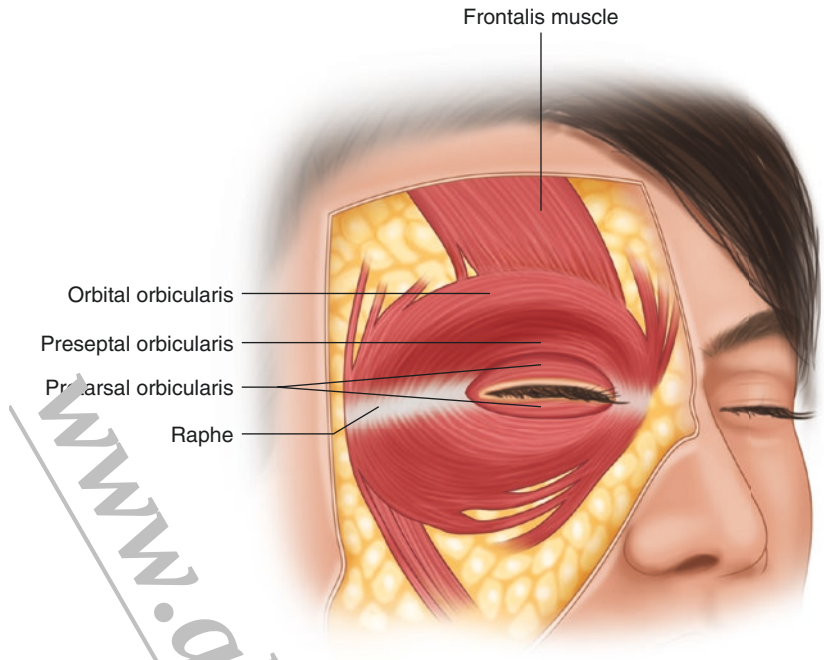

Fig. 1.4 Pretarsal, preseptal, and orbital orbicularis oculi muscle

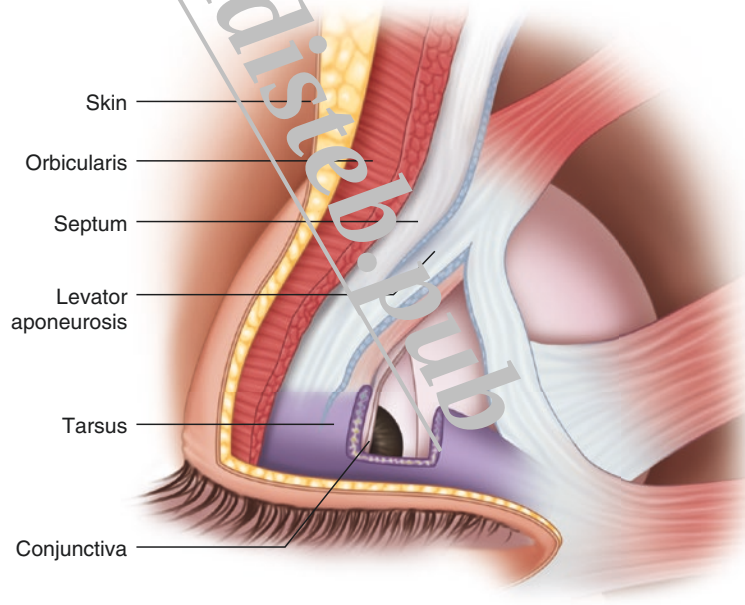

Fig. 1.5 Levator muscle and its relationship to surrounding structures

of the tarsus. Also at the level of Whitnall's ligament, the levator sends off lateral and medial horns. The lateral horn attaches to the zygomatic bone. The medial horn fuses with the posterior arm of the medial canthal ligament and inserts on the posterior lacrimal crest. The lateral and

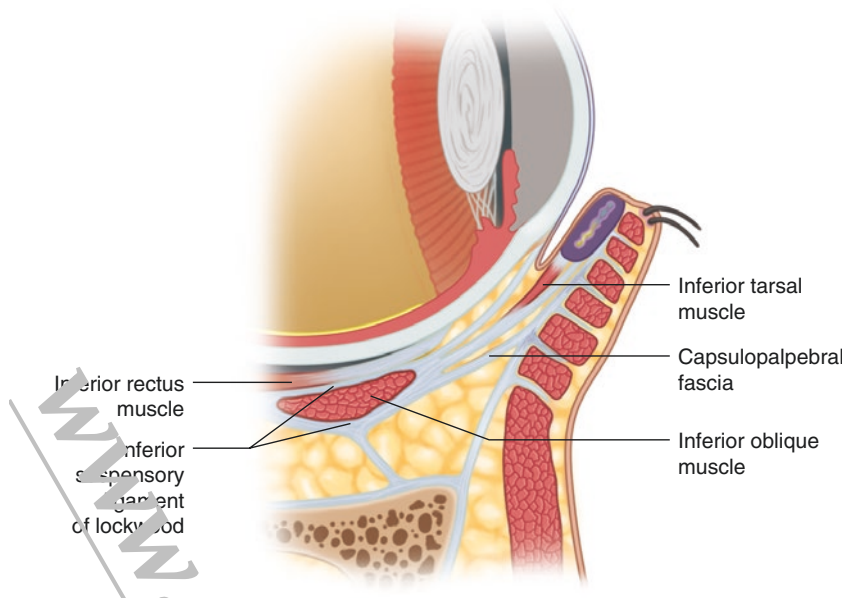

Fig. 1.7 Sagittal view of the capsulopalpebral fascia and its relationship with the lower eyelid retractors

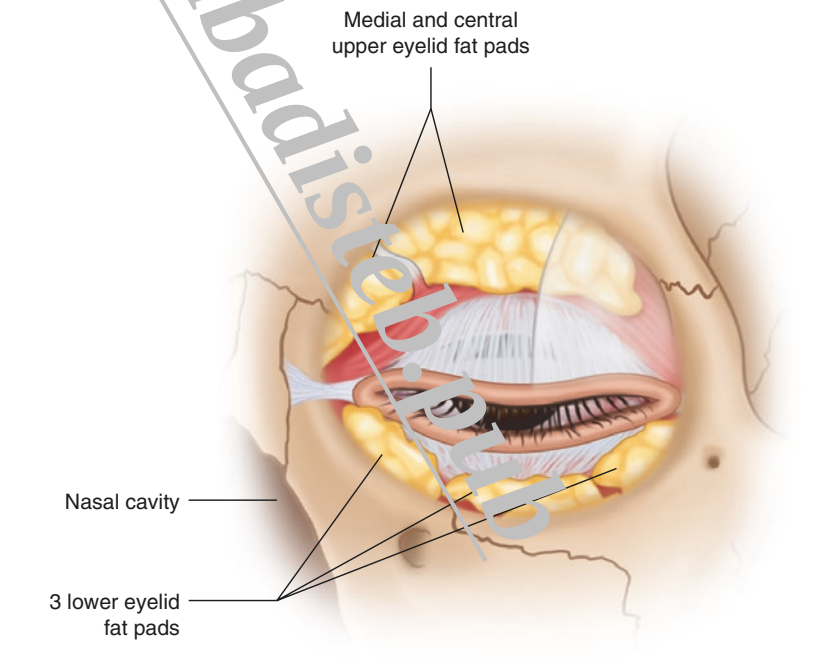

Fig. 1.8 Diagram showing the two fat pads on the upper eyelid, which are located posterior to the orbital septum and immediately anterior to the levator muscle and aponeurosis. The lower eyelid contains three fat pads

and lower eyelids. With age, atrophy of eyelid fat can cause the eyelids to sink posteriorly, resulting in involutional enophthalmos and a lid crease displaced away from the lid margin [27]. In addition, weakening of the orbital septum can allow anterior prolapse of the anterior orbital fat, resulting in puffy-appearing eyelids, known as steatoblepharon [19].

The upper eyelid contains two fat pads, separated by the trochlea and superior oblique ten-

patients, injection into the central orbicularis oculi below the brow can alleviate some brow ptosis. This technique may be used independently or in conjunction with a forehead lifting procedure. For moderate to severe brow ptosis, however, botulinum toxin alone is unlikely to produce a significant, noticeable change. It is essential for those administering botulinum toxin to understand that placing this medication in the frontalis muscle will *not* raise the brow. This will inhibit frontalis function and may lower the brow and/or decompensate the frontalis effort that the patient is using to keep the brow elevated.

Surgical Management

Several surgical options exist for lifting the brow. Preoperatively it is important to discuss the patient's goals and expectations to determine the appropriate surgical option. If the patient is interested in lifting the brow for functional purposes only, and they don't mind the potential resultant scar, direct or temporal direct brow lifts are good options. These procedures involve excising an ellipse of tissue directly above each brow. A mid-forehead lift is an option in patients with deep forehead rhytides. The incision line is marked the entire length of the forehead within a forehead furrow and an ellipse of tissue is excised (Fig. 2.1). An internal brow pexy or transblepharoplasty brow lift is performed through an upper blepharoplasty incision by dissecting to the superior orbital rim and fixating the brow with either suture or fixation devices. Cosmetic options include pretrichial, coronal, and endosopic forehead lifts. A pretrichial forehead lift is best used in patients with a high forehead, as it is a forehead shortening technique. A pretrichial incision just anterior to the hairline and a direct visualization dissection is carried out to release the forehead. A coronal approach raises the forehead through an elliptical scalp incision anterior to the coronal suture extending from ear to ear. Finally, an endoscopic forehead approach allows a minimally invasive forehead lift with incisions hidden in the hairline (Video 2.1).

For an endoscopic forehead lift, marking is critical when planning for the surgery (Video 2.2). The supraorbital nerve can be measured approximately 2.4 cm from the midline, and the supratrochlear nerve is usually 1.6 cm from the midline. Sometimes branches of the supraorbital nerve are located more temporally and supply the surface of the skin. An arch extending 1.5–2 cm above the brow is marked to prevent injury to the supraorbital nerve. This nerve exits at the notch most frequently but emerges from a foramen up to 1 cm above the brow (Fig. 2.2). Blunt subperiostial dissection can be done up to this point. A 1 cm safety zone is marked in the temporal area to prevent injury to the facial nerve. Blunt dissection can be performed temporally with reasonable safety up to this point.

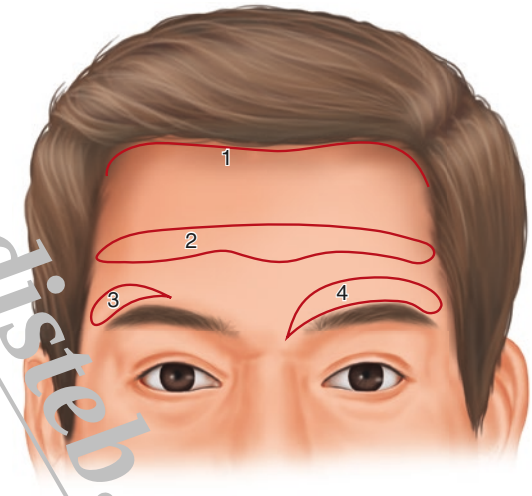

Fig. 2.1 Incision placement for varies types of forehead lifts

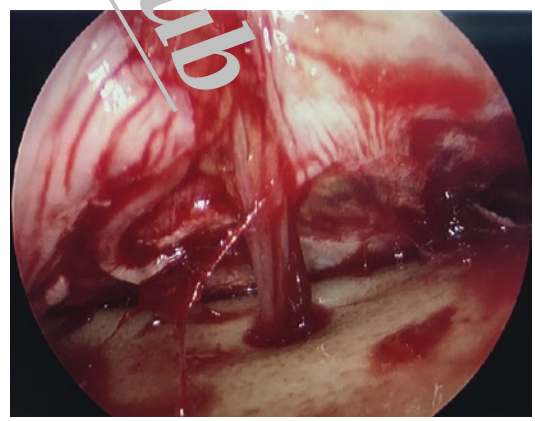

Fig. 2.2 Supraorbital nerve emerging from a foramen

common for patients who present with upper eyelid ptosis or dermatochalasis to also have eyebrow ptosis. This sagging of the eyebrow can add fullness and weight that, when combined with excessive eyelid skin, can result in more hooding and loss of superior visual field. Recognition is crucial to prevent inadequate surgical management and failure to help the patient.

Gender differences exist, with eyebrows being higher, more arched, and slightly raised laterally in women. Male eyebrows are usually described as T-shaped: They tend to be flat and lower, with the inferior border at the level of the superior orbital rim. This baseline difference could be the reason that brow ptosis is more prevalent in men than in women.

The preoperative evaluation is always performed with the patient sitting upright with relaxed frontalis muscle action. A 1:1 lift desired/skin excised ratio is used. The eyebrow is manually elevated to an appropriate position. This amount of lift is measured using a ruler in the lateral, central, and medial aspects of the eyebrow. A fusiform skin incision pattern is usually obtained where the upper line of eyebrow hair follicles dictates the inferior marking, and the superior marking is given by the measurements previously taken for each portion of the eyebrow. It is recommended that the supraorbital notch be marked to maintain awareness of where the supraorbital neurovascular bundle exits and becomes more superficial.

Surgical Management

After the skin markings are outlined with a surgical marking pen, the area is adequately infiltrated with local anesthetic. The incision (Fig. 3.1) is started at the inferior marking where the superior-most brow follicles follow a cephalad orientation. The incision must be made with the blade beveled approximately 15° away from these follicles in order to prevent both excessive loss of eyebrow hair and a conspicuous scar (Fig. 3.2). The incision on the superior marking follows, with the blade angled in the same direction to provide adequate apposition and eversion of the wound edges. Care should be taken to incise superficially in the area of the supraorbital neurovascular bundle to avoid inadvertent injury. Deeper sharp dissection and excision of the skin and subcutaneous tissue are done laterally, where there is no risk of

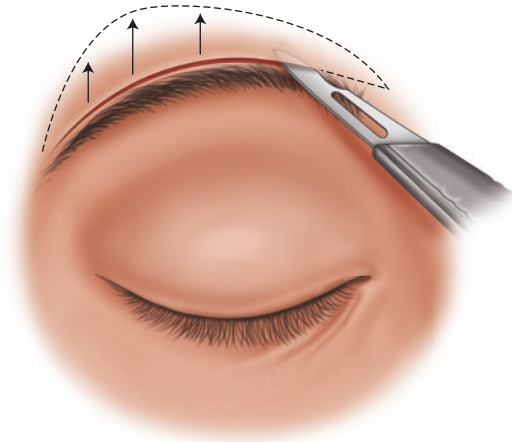

Fig. 3.1 Suprabrow incision after marking the incision site

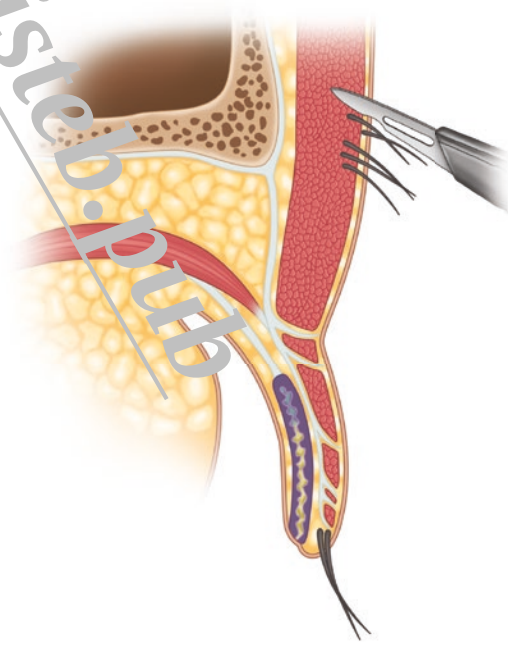

Fig. 3.2 Incision is beveled away from the brow hairs to parallel the direction of the follicles

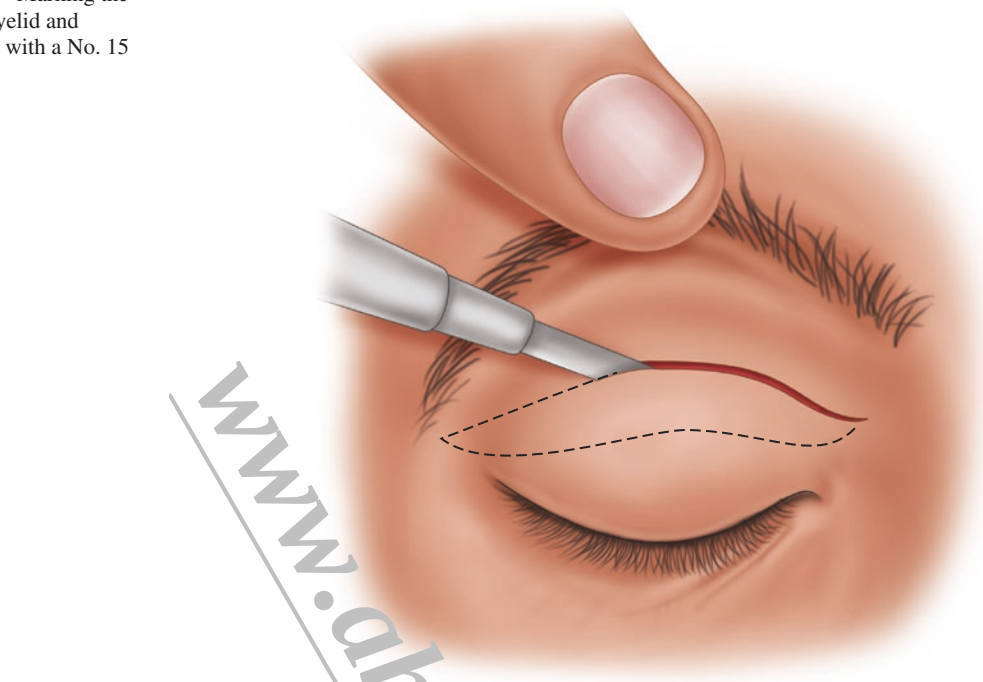

Fig. 5.1 Marking the upper eyelid and incision with a No. 15 blade

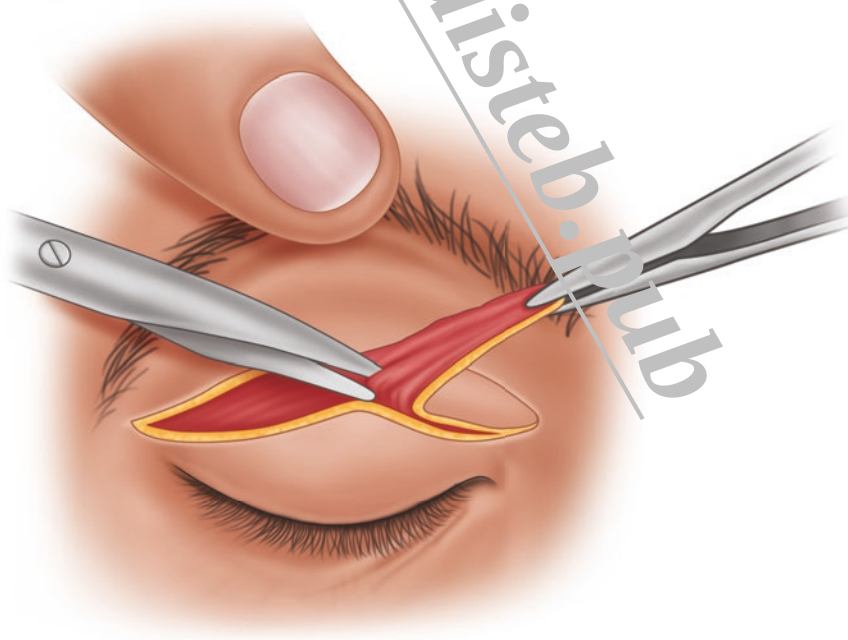

Fig. 5.2 A skin/muscle flap is removed with scissors

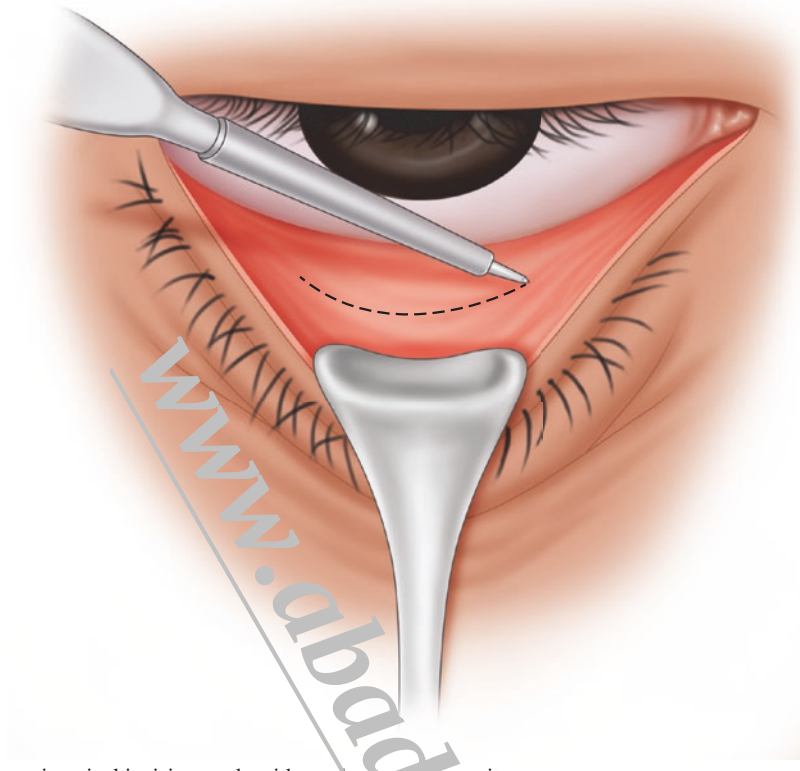

Fig. 6.1 Transconjunctival incision made with an electr[illegible]ery unit

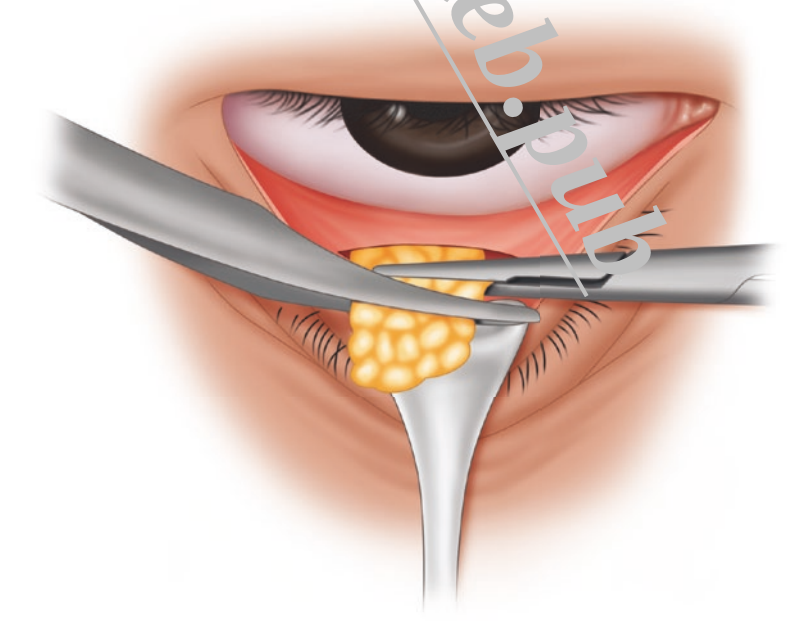

Fig. 6.2 Orbital fat is removed with scissors after being clamped with a hemostat

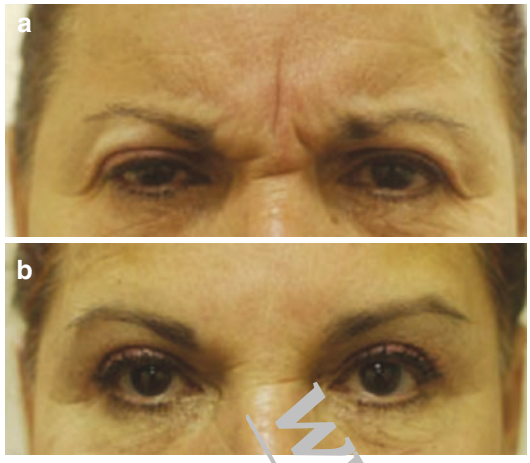

Fig. 8.3 (**a**), Before Botox. (**b**), 40 units Botox in glabellar region

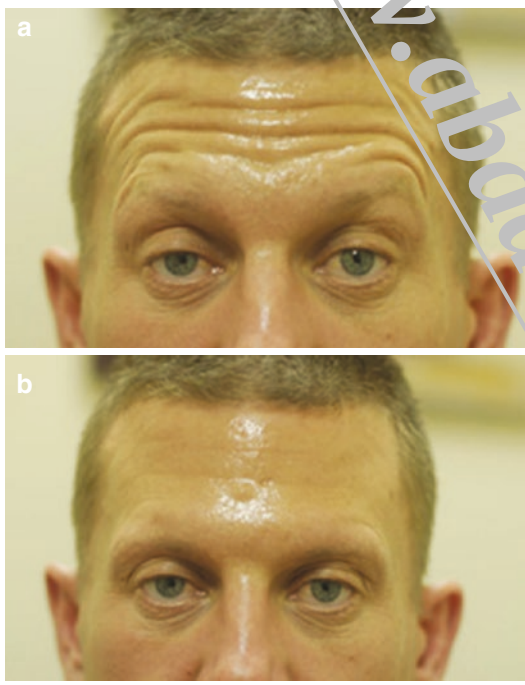

Fig. 8.4 (**a**), Before Botox brow lift. (**b**), 8 units per side lateral orbicularis muscle

it has been estimated that nearly one-third of treatment failures are due to antibody formation [5]. Failure is rarely seen in blepharospasm patients because such a low dose is administered. Patients at risk of developing antibodies are those

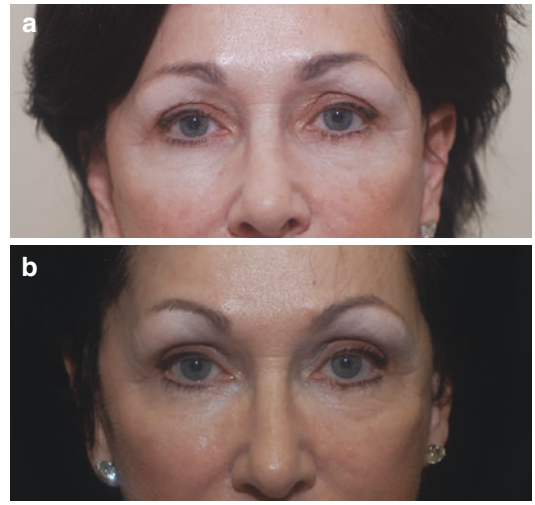

Fig. 8.5 (**a**), Before Botox to forehead rhytids. (**b**), 40 units Botox

given the toxin at doses of more than 100 units per session, booster injections within 30 days of initial injection, or injection into the systemic circulation. For these reasons, it is probably best to give patients the lowest possible dose needed to achieve the desired effect. Higher doses do not result in a better or longer-lasting effect and may predispose to antibody formation.

Other sites for injections are: **Brow Lifting** using the superolateral fibers of the Orbicularis Oculi Muscle, 2–4 units per side; **Bunny Lines** (Nasalis Muscle) where 2–4 units are injected in to the upper nasalis; **Gummy Smile** (Levator Labii Superioris aleque nasi [LLSAN] Muscle): 1–2 units per side; **Perioral Lines** (Smokers Lines—Orbicularis Oris Muscle): 1 unit injected per lip line just above the vermilion border in area of muscle contraction; **Square jaw** (Masseter Muscles): 15–20 units per side; **Chin Dimples** (pebbled chin, orange peel chin—Mentalis Muscle): 3–5 units per mentalis band; **Downturned lips at the sides** (Depressor Anguli Oris [DAO] Muscle): 2 units are injected directly into the DAO on each side; **Vertical Neck lines** (Platysmal bands of the Platysma Muscle): 4–5 units per site, not to exceed over 25–30 units total for each session to avoid dysphagia.