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Criteria for the Forehead Lift

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Abstract. We have developed clinically useful measurements to assist the surgeon in deciding when to do the forehead lift and where to place the incision. Also, we have reviewed our experience over the past decade and discuss the four categories and applications of forehead lifts. We use three indications for forehead lift: ptosis, creases, and previous facelift (PCP). There are four basic surgical techniques applicable to the upper face: (1) direct browlift, (2) midforehead crease incision, (3) prehairline incision, and (4) posthairline incision. We determined more accurate guidelines from measurements taken on 50 volunteers, as well as patients seeking a facelift. The line of measurement in a vertical plane extends from the midpupil to the top of the eyebrow and up to the hairline. We have found that the normal distance from the midpupil to the upper edge of the eyebrow on average is 2.5 cm and that the distance from the upper edge of the eyebrow to the hairline is approximately 5 cm on average. If the distance from pupil to brow is less than 2.5 cm, then the patient may benefit from a forehead lift. If the distance from brow to hairline is less than 5 cm, then we use a posthairline incision in females. If this same distance is greater than 5 cm in females, we advise the prehairline incision. In male patients we strongly consider direct crease incision. The direct browlift is reserved for minimal ptosis, asymmetry, or patients who wish a minimal procedure. We have found these criteria for the forehead lift to be simple, reliable, and clinically useful.

Key words: Forehead lift — Incisions

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The forehead lift is a popular procedure. Stated indications are somewhat vague and rely upon the artistic inclination of the surgeon and the local culture. For example, some surgeons on the East Coast have stated that they do the forehead lift in approximately 15% of facelift patients, whereas some surgeons on the West Coast do forehead lifts in 80% of facelift patients [13].

Our indications for the forehead lift are (1) ptosis of the eyebrows, (2) creases in the forehead, and (3) previous facelift (PCP). Two important aspects not well borne out in the literature are the definition of eyebrow ptosis and the determining factor in placement of the incision for the forehead lift. We have developed some simple and clinically useful guidelines to help clarify these details. In addition the patient that has had a previous lift may require a coronal lift to alleviate the excess tissue that may accumulate in the temple region. This skin may collect here due to the angle of the skin pull from the previous rhytidectomy and must be anticipated as well for the second rhytidectomy.

History

Early forehead lifts were limited to short excisions of the scalp [11, 14]. In 1926, Hunt [8] used the full coronal approach for the forehead lift. He placed the incision either pre- or posthairline and performed this procedure for the "irradication of wrinkles." Though many articles have since been published on the subject, it was not until the 1960s that the forehead lift, as we now know it, was popularized [1–4, 7, 9, 12, 15–21]. Though many authors have discussed the basic indications for forehead or browlifting, few have given specific guidelines other than the "position" of the eyebrow with respect to

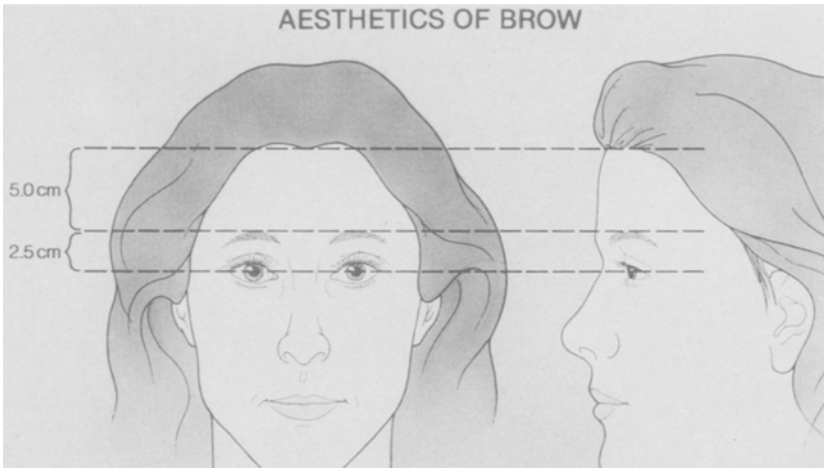

Fig. 1. An average of 2.5 cm is found in the aesthetic brow. If a distance on a vertical line from midpupil to the top of the brow is less than 2.5 cm, then brow ptosis exists and the patient may benefit from a browlift procedure. Measuring on this same vertical line from the top of the brow to the hairline helps the surgeon determine incision placement for the forehead lift. The average measurement here is 5.0 cm

the supraorbital rim [3, 4, 15]. Measurements are helpful when evaluating facial features, though they only complement the aesthetic judgment of the surgeon. We have developed measurements from the pupil to the top of the brow and from the top of the brow to the hairline to assist us in determining when to do a forehead lift and where to place the incision. These measurements are consistent with those of Farkis [5].

Materials and Methods

Fifty normal and healthy female volunteers ages 14–32, with aesthetically pleasing facial appearance, had bilateral measurements taken from the midpupil to the top of the brow and from the top of the brow to the hairline. The average distances were 2.5 and 4.8 cm, respectively (Fig. 1). Ranges were 2.3–2.9 cm for pupil–brow and 4.0–6.2 cm for brow–hairline. Reviewing the experience of the senior author (PMK) over ten years (1978–1988), 100 forehead lift patients were evaluated retrospectively. Forehead lift was performed for at least one of three indications: (1) ptosis of the brow, (2) creases of the forehead, or (3) previous facelift. Brow ptosis was considered to exist if the distance from the pupil to the top of the brow was less than 2.5 cm. Placement of the incision was based on several factors. If the distance from the top of the brow to the hairline was 5.0 cm or less in female patients, an incision behind the hairline was used. If this distance was greater than 5.0 cm, a prehairline incision was used. In a few select patients other incisions were utilized. For example, in males with a personal or strong family history of alopecia, a crease incision was used [3]. Creases, if severe, were treated with galea incisions or some frontalis excisions although this was done in a conservative fashion. If a previous lift had been performed, the temporal region was even more carefully evaluated for redundancy and, if present, a coronal lift considered.

The subgaleal dissection plan was used exclusively, though others have recently advocated the subcutaneous forehead lift for certain indications [6, 22]. Occasionally, a direct suprabrow excision was used [18, 21] for cases of mild asymmetry in an older patient with dry skin, or when the patient would not accept the more extensive forehead lift but would accept the scars over the eyebrows. The direct browlift in dry-skinned older patients leaves a less objectionable scar than it does in younger, smooth-skinned people. Though occasionally useful, we hesitate to use this latter incision because the scar is often noticeable and difficult to hide with makeup. Also, this approach offers only a limited correction. For example, the direct incision does not improve the glabellar area and it corrects only in a minor way the lateral brow area.

Surgical Technique

Using the measurements discussed previously and clinical judgment, incision placement is also decided upon during preoperative assessment. Our surgical approach is much the same as discussed by others [2–4, 7, 9, 12, 18, 19]. A gull-wing pattern at least 5–6 cm behind the hairline is used (Fig. 2A,B). The prehairline incision starts at the midline, just in front of the hair shafts, then extends bilaterally into the hair and runs parallel to the shafts of the temporal regions (Fig. 3A,B). The prehairline incision is made parallel to and 1–2 mm away from the hair shafts with a slight bevel to avoid the roots. If the incision is made just at the hair line, there is a demarcation that is straight and sharp whereas a normal hairline is staggered. Either incision can be extended to be incorporated into the "facelift"

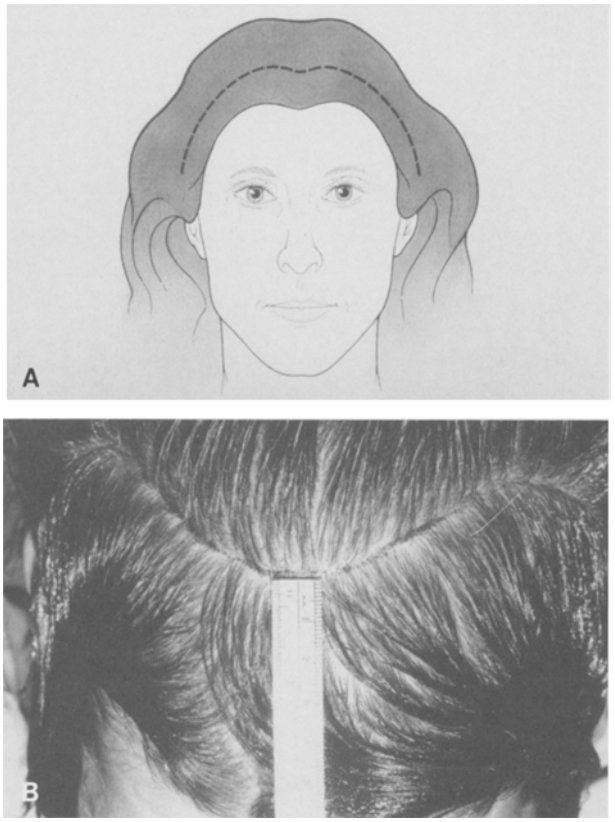

Fig. 2(A) If the hairline is far enough foreward, (i.e., 5 cm or less from the top of the brow), a posthairline incision may be used. **(B)** This incision is usually placed at least 5–6 cm behind the hairline and parallel to the hair shafts as it will advance with resection of the flap. This helps to keep the scar hidden within the scalp

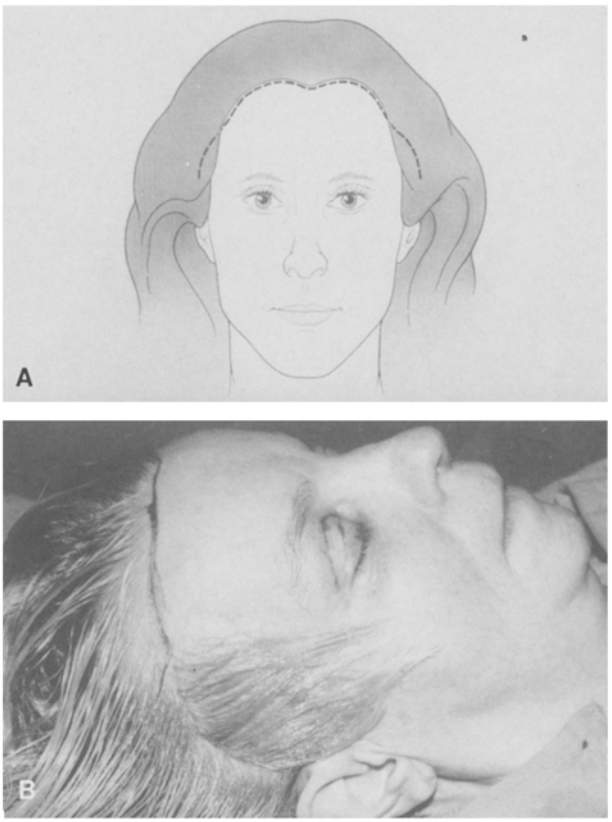

Fig. 3(A) If the patient has a "high" forehead (i.e., the vertical distance from the top of the eyebrow to the hairline exceeds 5 cm), a prehairline incision may be selected. **(B)** This incision begins anterior to or just within the hair shafts and continues into the temporal scalp, which is more anterior and can accept some recession. It may be joined to the rhytidectomy incision

incision. As mentioned, dissection is carried out at the subgaleal plane but becomes subcutaneous in the temporal region. A subcutaneous route is preferred only in those patients who have severe creases where the skin appears more excessive than the muscle. The soft tissue attachments of the supraorbital rim are completely released from the bone. The corrugator and procercus muscles are trimmed if creases in this region are noticeable (Fig. 4A). If deep creases exist in the region of the frontalis muscle, the frontalis is incised above and below the creases (Fig. 4B). This incision varies depending on the amount and depth of the forehead creases. If these creases are particularly deep, the galea may require strip excision. Even a small amount of frontalis may be excised. Care is taken not to damage the supraorbital or supratrochlear nerves. After the above steps in the operation, the scalp edges are overlapped. Tension points are placed in the midline and at the lateral extreme of each eyebrow depending, of course, on where maximum pull is required. The D'Assumpcao clamp is used to place maximum tension on the proposed resection (about 1.5–2 lbs of pull), then 2–3 mm is released prior to incision of the flap at these points (Fig. 5A,B). This relieves excess tension resulting in a narrower scar and providing less chance for alopecia. The amount of pull is measured. The amount of flap excision is measured to assist in creating symmetry. Following the placement of sutures at these three key points, the remainder of the flap is trimmed and inset without tension. A combination of deep and superficial absorbable sutures are used for the prehair incision and deep absorbable sutures and clips are used for the hair incisions. Crease and direct suprabrow excisions are used only rarely, but when done we follow the approaches described by others [2, 3, 16, 18, 21].

Results

In our operative series of 100 patients ages 42–64, the most common indications for forehead lift were

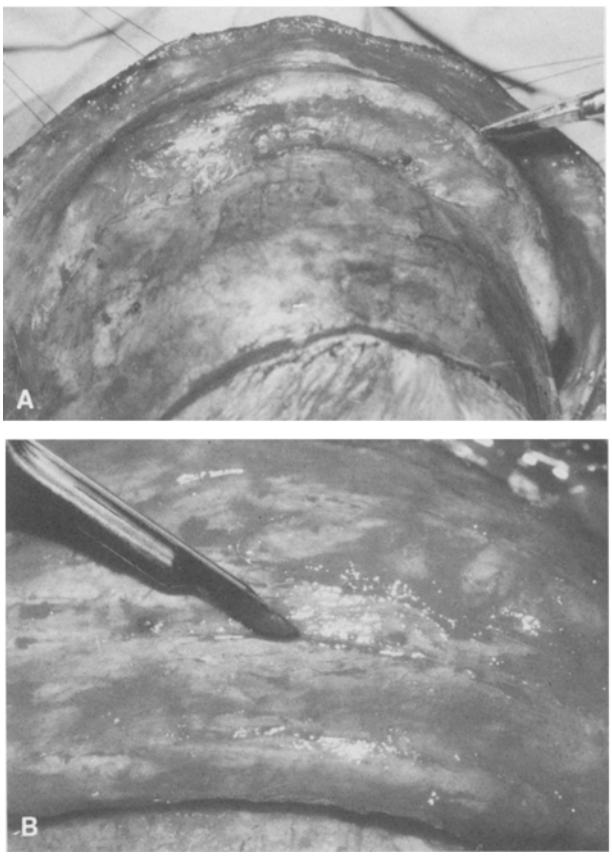

Fig. 4(A) The flap is raised in the subgaleal plane and continues inferiorly just beyond the supraorbital rim. The supraorbital and supratrochlear nerves are seen on either side of the midline and are preserved. Procercus and corrugator muscles may be trimmed if creases are prominent. **(B)** If frontalis creases are prominent, the galea or frontalis is incised to allow expansion of the flap. If severe creases are present, a portion of the galea or frontalis may be resected

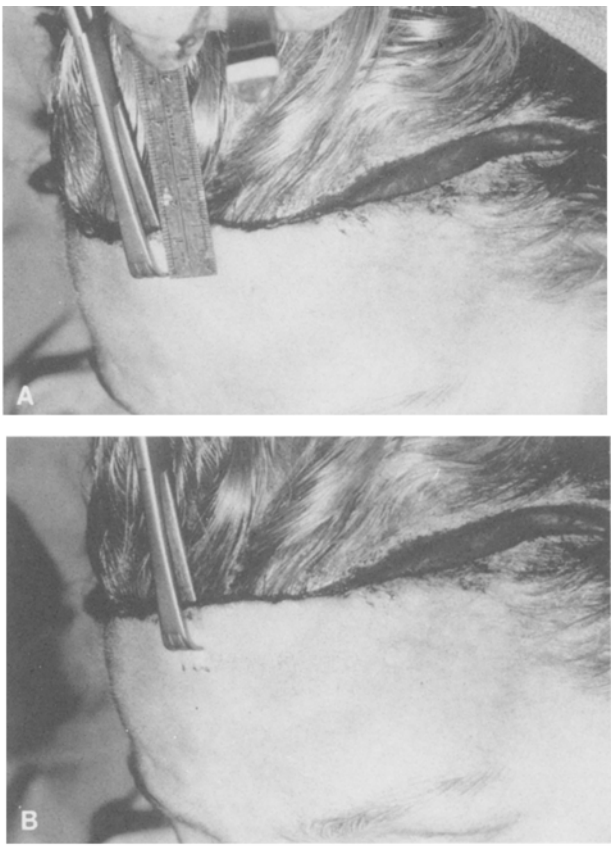

Fig. 5(A) Whether pre- or posthairline, the forehead flap is overlapped with the posterior scalp and the amount to be resected measured with the D'Assumpcao clamp. Approximately 2 lbs of pull is used. **(B)** To reduce scar width and, if posthairline, decrease alopecia, tension is reduced with a slight (2–3 mm) release of the clamp. The three dots mark the initial pull

brow ptosis combined with forehead creases. In 15 patients, preoperative pupil to top of the brow distances ranged from 1.6 to 2.2 cm, with an average of 1.9 cm. Postoperative distances ranged from 2.4 to 2.8 cm, with an average of 2.5 cm. The amount of tissue excised at or behind the hairline at the maximum tension point, which varied depending on where the tissue needed excision, ranged from 1.4 to 2.1 cm, with an average of 1.7 cm. Followup of these patients ranged from 6 to 12 months. It was interesting to note that the measurements taken postoperatively at two weeks, six months, and one year did not change. Thus, what was created at surgery, adjusted for edema, did not migrate in the 12 months. We have seen the occasional patient at 18–24 months whose brows have descended to the preoperative position. We have no statistics for this group. Forehead lifts were done in 15% of 500 facelift patients operated on between 1978 and 1988. The most frequent incision, used in 62% of the female patients, was the posthairline incision (Fig. 6A–D). The prehairline incision was used in 35% of the patients (Fig. 7A,B). The remaining 3% had either a crease or a direct suprabrow incision (Fig. 8). The only crease incisions or prehair incisions were done in male patients and the suprabrow incisions were used in select female patients (Fig. 9A,B).

For the full forehead lift, we have found that more lift is required medially and laterally to produce a more pleasing aesthetic eyebrow [4] without producing a "surprised look." The ratio of scalp excision (at or near the hairline) to eyebrow elevation is between 2 : 1 and 3.5 : 1. This difference in rotation depends upon both how much the posterior scalp shifts forward and where the incision is placed, i.e., the nearer the hairline, the greater the

Fig. 6(A) A posthairline incision forehead lift was utilized for this patient. She also underwent simultaneous four-lid blepharoplasty and rhytidectomy. Portions of the corrugator muscles as well as frontalis were resected. **(B)** The one-year postoperative result demonstrates lessening of the creases, elevation of the brow, and posterior shift of the hairline. **(C,D)** Another patient showing a six-month postoperative result of the posthairline forehead lift with simultaneous facelift. She did not have upper or lower lid blepharoplasty so these results show the reduction of the upper eyelid skin from the forehead lift alone

lift. This measurement varies also because the excision is never completely symmetrical. Thus, it takes approximately 1.5 cm of skin excision to produce 0.5 cm of eyebrow elevation with incisions at or near the hairline. The direct suprabrow incision is closer to a 1 : 0.75 excision-to-lift ratio (the cephalad portion shifts caudally to some extent), and the mid-forehead crease incision is approximately a 2 : 1 excision-to-lift ratio.

No major complications were encountered. Minor complications occurred only rarely. Scalp anesthesia and itching are to be expected, but patient education has increased satisfaction as these problems all resolved within several months postoperatively. We did not have an accurate measurement of the shift in the hairline position. Others are currently evaluating this in reference to a bony point [10]. We feel that the hairline shifts posteriorly with the posthairline incision and anteriorly with the pre-hairline incision by about half of the measured amount of excision. However, it is an impression only at the moment until we measure these points in the future.

Discussion

Though many articles have been published on the forehead lift, few authors offer guidelines for when to perform this procedure and produce predictable results. Brow "ptosis" and incision placement have been particularly ill-defined in the literature. We

Fig. 7(A) A patient with a high hairline and brow ptosis. **(B)** The six-month postoperative result following a prehairline forehead lift in conjunction with facelift. This photo shows the scar just anterior to the hairline, elevation of the eyebrows, and improvement of the upper lid skin without blepharoplasty

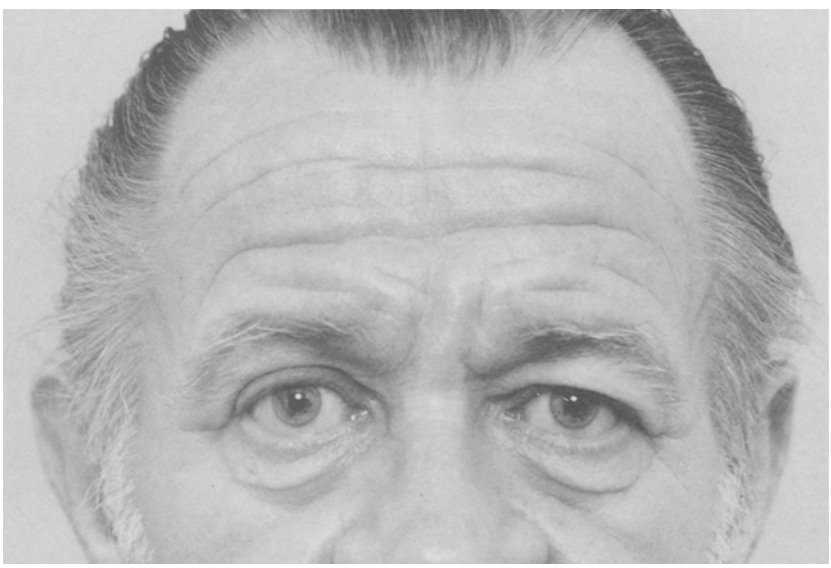

Fig. 8. The ideal patient for the direct crease incision is one with deep frontal creases. This is particularly true for the male patient. In this patient, the incision would span the lower two creases

have developed these measurements for use in planning forehead lift operations. We have found that simple bilateral measurements taken from midpupil to the top of the brow and from the top of the brow to the hairline are helpful in both defining brow ptosis and in planning the appropriate forehead lift incision.

Indications for forehead lift are (1) ptosis of the eyebrow, (2) creases of the forehead, and (3) previous facelift (PCP). Eyebrow ptosis is present when the distance from midpupil to the top of the brow is less than 2.5 cm. Decisions regarding placement of the incision in females are guided by the distance from the top of the brow to the hairline. If this distance is less than or equal to 5.0 cm, then a posthairline incision is indicated, and if the distance is greater than 5.0 cm and the patient is agreeable, then a prehairline incision should probably be used. Crease incision and direct suprabrow incisions are used only for selected cases. It should be noted that this is "soft" data in the sense that the measurement varies depending on the observer, the tone of the frontalis muscle (some patients simply will not relax their frontalis), and the tilt of the head. However, we have judged them to be accurate within a 1–2-mm range.

Conclusion

We have presented the results of our eyebrow and forehead measurements of normal, aesthetically

Fig. 9(A) Direct brow incisions are reserved for select patients. This procedure has limited effectiveness as it does not address the glabellar or crow's feet areas. It does elevate the brow and may be used occasionally in those patients with a high forehead and no crease deformity, such as this patient. Ignore the half blink; she does not have eyelid ptosis. **(B)** The one-year postoperative result demonstrates elevation of the eyebrow without affecting the hairline

pleasing faces. To this we have added our ten-year operative experience with the forehead lift. From these two groups of patients, we have set forth guidelines that are clinically useful in defining the indications for and planning the incision for forehead lifting.

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