Eyebrow Transplantation

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The refinement in follicular unit micrografting techniques has enhanced the ability to restore hair to non-scalp areas. Next to eyelash restoration, a procedure I limit to those with a complete absence of all or a section of eyelashes, no procedure has benefited more from these technical advancements than eyebrow restoration. Using all 1- and 2-hair grafts, it is possible to restore essentially natural appearing eyebrows to patients who, as a whole, the most grateful of my patients, as they no longer have to live with the psychological toll due to thinning or absent eyebrows. Eyebrows, of course, play an essential role in facial aesthetics, serving to complement the most important component of the face—the eyes—that serves as a vital non-verbal communicator of emotions, intelligence, and, especially, beauty.

Loss of eyebrows may be due to several factors. For many patients, the condition may have been self-inflicted, as a result of voluntary plucking when tapered fine eyebrows were in fashion, or it may be attributed to trichotillomania. Other causes of loss of eyebrow hair include trauma, medical conditions, and genetics. When due to trauma, such as burns, skin avulsion, or prior surgery, the loss of hair is made more noticeable because of the typical hypopigmentation of the skin. Approximately one-third of patients I see attribute the thin eyebrows to their heredity. While important to identify any potentially treatable etiologies so as to slow down or stop the further progression of hair loss, nearly all patients with an absence or thinness of the eyebrows can be successfully treated with transplants.

Demographically, approximately two-thirds of my patients are women and one-third men. Asians, who make up almost 15% of my patients, tend to have hair that grows very straight and is somewhat more difficult to transplant, because the lack of curl to the hair makes it even more important that the recipient sites have an acute angle to the skin. While a slight curl of the scalp hairs is desirable, an extensive amount of curl can be a contraindication. While reluctant at first due to the extreme curl of the hair, I have now performed procedures on several African-American patients, and have achieved good results, especially for those with a soft curl of the hair.

The following is a description of my technique for eyebrow restoration. It is based upon performing over 104 of these procedures over the past 3 years. Assisted by my "eyebrow team," I have developed a technique of single procedure eyebrow restoration where as many as 375 grafts, but most commonly 225 to 250 grafts, are transplanted into each eyebrow.

Technique

In consultation, patients are evaluated to determine if they are candidates and then educated about the pluses and minuses of the procedure. It is explained that the goal of the procedure is not to create "perfect" eyebrows, but rather to significantly improve their appearance, making the pluses greater than the negatives. Typically, of the hairs transplanted, 70% will grow, and of these hairs that grow, 10-15% of them will grow in an aberrant direction (either too vertical or not flat enough to the skin) despite being planted in an aesthetic direction. These "rogue" hairs can be either cut short or simply plucked out, and have not been enough of a deterrent to having the transplant for my patients. Because the hairs usually come from the scalp, they will need to be trimmed monthly. Sometimes the application of hair gel may also be of benefit to control the direction of hair growth.

Prior permanent makeup is not a contraindication to the procedure (Figure 1). If the patient plans on having the dye removed, it should be performed prior to the transplants. In several patients who had permanent tattoo placed in an unesthetic position, I have done a direct excision and primary closure of the tattooed skin, resulting in a fine line that can be easily concealed with transplants six months later.

In young men in whom there is a risk of the development of male pattern hair loss, it is explained that, although quite small in number and obtained from a small donor strip, fewer hairs will be available for potential future scalp transplants, and that there will be a small donor scar. When trauma was the etiology of the hair loss, a waiting period of at least 12 months before transplanting is recommended to both ensure that no further original hairs will grow, and to attain reasonably mature scar tissue into which to transplant (Figure 2).

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Marking Out the Eyebrows

Because most patients, especially females, have a definite idea of what they are looking for, I find it useful to have them pencil in their eyebrows to demonstrate what they want. Any original hairs can serve as a guide to the natural shape, as well as the direction of hair growth. While the skin where the eyebrows once existed typically appears slightly thicker and more porous than the surrounding skin, it must be recognized that, especially in older patients, a slightly higher (more cephalic) location is desirable to overcome the effect of brow ptosis with aging. Because the transplanted hairs will

continued on page 122
Eyebrow Transplantation

extend beyond the borders of the markings. I have found it beneficial to draw the superior, and sometimes the inferior, borders slightly closer together than intended.

The eyebrow can be divided into three parts: medially is the head, centrally the body, and laterally the tail. While subtle variations exist, especially between women and men, certain generalities can be made about the shape and size of each part. In general, the eyebrow is 4.5–5.5 cm in length, arcing to some degree in women, minimally or not at all in men. Aesthetic guidelines dictate that in women, the peak of the arch (which correlates to the junction of the body and tail portions) occurs along a vertical line drawn somewhere between the lateral limbus and lateral canthus, with some women desiring the tail to continue in a horizontal direction at the same height as the peak of the arch (Figure 1).

The head portion is perhaps the most critically defining portion of the eyebrows. Measuring 0.5–1 cm in length, it generally has a square to somewhat rounded medial border located 1–1.5 cm lateral and cephalic to the central glabella. A more medial border creates an “older” appearance, and with aging, the action of the corrugator muscles will tend to pull the eyebrows even closer together. The approximately 2.5 cm-long body is the area of maximal density and, for the most prominent appearance, is usually the widest portion of the eyebrows. A heavier and more dramatic appearance is provided by a flat horizontal caudal border along the medial half of the body (along with the lateral half of the head), which then changes to a slightly cephalic direction correlating with the narrowing of width that typically occurs, especially in women. Note that, in some men, this narrowing of the lateral half of the body and along the medial aspect of the tail does not occur, and in fact, in some men, this area is the widest portion (Figure 3). Finally, the approximately 1 cm-long tail is the narrowest portion, and has the lowest density of hairs, especially extending laterally. It usually extends in a slightly downward, caudal direction as it descends from the peak of the arch, but as mentioned earlier, some patients prefer it to continue on a flatter, horizontal position.

Harvesting and Dissecting the Grafts

Most procedures are performed under mild oral sedation and local anesthesia. Once anesthetized, the donor strip is excised and the defect reapproriated, which recently has involved the use of the trichophytic technique whereby the lower edge of the donor site defect is deepithelialized to promote hair growth through the scar. A donor strip 1 cm in width by 3–4 cm in length can usually provide 350–450 1 and 2-hair grafts, while allowing for the discarding of any gray or less than perfect hairs. Larger procedures of as many as 700 grafts require a longer donor strip. The donor area usually extends from above one ear to the lateral occipital region, because the hairs in this area tend to be the last to turn gray, and they tend to provide variation in their caliber and curl that allows for the achievement of subtle variations along different portions of the brows, as explained below.

I have experimented using body hair for donor grafts, including from the toes and legs. In the three cases to date I have performed, the hairs seem to grow, and do not need to be trimmed. However, the small number of cases does not afford enough feedback to allow me to recommend this yet.

The grafts are dissected under binocular microscopic visualization. The majority consists of single hairs, but 2-hair grafts are used for patients with medium to finer hairs to achieve greater density when desired, especially in the central aspect of the body.

Recipient Site Creation

In the medial-most aspect of the approximately 1 cm-long head, the hairs tend to grow vertically, and the grafts are spaced sparsely to accentuate the “feathering” for the most natural appearance. The hairs then rapidly change from a vertical to a horizontal direction of growth as one proceeds laterally along the head into the body. Along the entire length of the body, the cephalic-most hairs tend to grow at a slightly downward, caudal angle, while the caudal-most hairs tend to grow at a slightly upward, cephalic angle, resulting in a cross-hatching, thus enhancing the density (Figure 4).

The direction of hair growth tends to be horizontal to a slightly caudal direction. In the lateral-most portion of the tail, a second “feathering” zone is created by the use of the finest single-hair grafts placed in a progressively sparse distribution. Finer single-hair grafts are also placed all along the cephalic border of the entire portion of the brows to produce a soft natural appearance.

Meticulous attention to the three-dimensional direction of natural hair growth is essential. In addition to the vertical and horizontal axes, the angle of the recipient sites should be as shallow to the skin as possible to allow for the hairs to grow in a flat position relative to the forehead, so the grafted hairs do not “stick out.” The recipient sites are made using Personna® blades cut to 0.5 mm in size, with a 0.6 mm blade required in those occasional patients with extremely thick hairs. These tiny blades have several advantages: they al-
low for the closest possible placement of the hairs to each other; they minimize the risk of damage to already existing hairs; and they allow for greater control of the direction and angle of hair growth. The sites are made in a “sagittal” orientation (parallel to the direction of natural hair growth). This allows for a slightly wider opening to place the grafts.

Placing the Grafts

Because of the small size of the recipient sites, the grafts can sometimes be difficult to place, and good counter-traction facilitates graft placement. Because of the relatively small number of grafts typically placed, every hair counts, so the emphasis must be on minimizing trauma to ensure the highest percentage of hair growth. The finest single-hair grafts are placed along the periphery, with any 2-hair grafts going in the central areas when indicated. This achieves a peripheral thinning, as well as greater central density, for what is usually the most aesthetic appearance. It is in achieving the ideal direction of hair growth that the natural curl of the transplanted hairs can be used to their advantage. While trimmed short to the length of natural eyebrow hairs, the curl of the donor hairs should be assessed, then the grafts placed so that the direction of curl complements the direction of the recipient site, so that the hairs curl into the skin as well as in the slight cephalic or caudal direction as desired.

At the end of the initial placing of grafts into all of the recipient sites, every patient is provided the opportunity to look at the eyebrows and provide feedback. In all but a few cases, some revisions are required, typically the placing of more grafts in certain areas. Several patients have required four or five revisions prior to leaving the procedure area to achieve that “perfect” appearance.

Post-procedure Care

Post procedure care is quite simple. Using GraftCyte® spray, the transplanted area is kept moist for the first 72 hours with hourly spraying. Careful face washing is permitted on the third post-procedure day, and normal face washing as well as full resumption of exercise, is permitted on the fifth day. Crusting in the area is usually gone by the fourth day, leaving only mild pinkness and the short transplanted hairs. Like scalp hairs, these hairs will fall out, starting to regrow in as soon as two months when minoxidil is applied.

Conclusion

Eyebrow transplantation has become one of the most challenging yet rewarding parts of my practice. These patients are amongst the most grateful of my transplant patients. Having patients thank me for allowing them to “wake up without having to run to the mirror to make up their eyebrows” makes this a wonderful part of my practice.