

Ethnic Considerations in Hair Restoration Surgery



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KEYWORDS

- Hair transplant • Follicular unit extraction • Ethnic hair transplant • Eyebrow transplantation
- Hispanic hair transplant • Asian hair

KEY POINTS

- Different ethnic groups have specific characteristics of the hair that affects the results of hair transplants.
- Asian hair, typically of thick caliber and dark, is often more challenging to achieve natural appearing results.
- Patients of African ethnicity are good candidates for eyebrow and scalp hair transplants, because the curly hair and minimal color contrast between scalp and hair facilitate achieving results that appear natural.
- Follicular unit extraction is the preferred technique for harvesting grafts in patients of African and most of Asian ethnicity.

INTRODUCTION

Consistent with the trends acknowledged by the other contributors in this issue of *Clinics*, and confirmed by demographic shifts in the United States, the ethnic patient constitutes a growing trend in the use of plastic surgery, and the specialty of surgical hair restoration is no exception. In our practice, with offices located in 2 ethnically diverse cities, most of our patients are non-European/nonwhite. This diversity is further magnified by the wide scope geographically in which our patients reside; more than 70% of them travel for surgery commonly from throughout Latin America but also the Middle East and Asia, including East Indians and Asians. This ethnic diversity provided to us by our international presence is duplicated by the ethnic makeup of our patients, who come from throughout North America, not only Miami and New York. In particular, this North American trend includes increasing

numbers of African Americans and also Middle Easterners, Asians, East Indians, and, of course, Hispanics seeking out hair restoration.

As hair restoration surgeons, we essentially perform 1 common procedure: hair grafting, in which hair is transplanted from the back or sides of the head into areas of hair loss, most commonly the frontal and midscalp and crown regions, but sometimes, into other areas, including the beard and eyebrows. In addition to these hair transplants, we perform several other procedures, including hairline lowering surgery (surgical hairline advancement [SHA]), in which the hairline is advanced and the forehead shortened, and the repair of previous plastic surgery procedures, including but not limited to the repair of alopecic scarring and hairline distortion caused by previous browlifts and facelifts. With these procedures, ethnic considerations affect not only technique and patient candidacy but more subtly and just

The authors have no disclosures to make.

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Facial Plast Surg Clin N Am 22 (2014) 427–437

<http://dx.doi.org/10.1016/j.fsc.2014.04.007>

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as importantly, patient motives, expectations, and concepts of beauty as a result of ethnicity (ie, Middle Eastern men desiring full beards so as to appear masculine). In this article, these considerations are presented.

ANATOMIC AND HAIR CHARACTERISTIC ETHNIC DIFFERENCES

Although there exist a multitude of hair types in the lay literature, within the medical literature, human hair has been categorized into 3 ethnic groups according to distinguishable characteristics: Asian, white, and African hair. These ethnic groupings show distinct characteristics in hair density, diameter, shape, mechanical properties, and composition.¹ The hair follicle itself determines the appearance of the hair. The typical hair follicle of Asian hair is round, whereas those of whites and African are ovoid and elliptical, respectively.² The shape of the hair follicle is thus believed to contribute to the appearance and the geometry of the hair. Asian hair has a circular geometry, African hair has an elliptical shape, and hair of whites is of an intermediate shape. The chemical and protein composition of hair does not vary across ethnic groups, and there is no difference in the keratin types. However, African hair generally has less tensile strength and breaks more easily than hair of whites. The hair follicles of Asians are metabolically more active than those of whites, and therefore, the grafts of Asians are more vulnerable to dehydration and a prolonged preservation period.

An important issue when considering ethnic characteristics in evaluating patients for hair transplantation is the density of hairs in the donor site. This density is a product of 2 factors: the concentration of hairs and the size or caliber of each individual hair. The concentration of hairs is presented in the form of follicular units per cm^2 ; a single follicular unit is the natural occurring grouping of hairs as they grow in the scalp. A follicular unit, as described by Headington,³ Sperling,⁴ and Kim,⁵ consists of 1 to 4 hairs, surrounding by an adventitial sheath, which also contains some supportive structures. A hair graft typically consists of a single follicular unit, which is the building block of aesthetic hair restoration. Asian hair has the largest cross-sectional diameter or caliber, whereas the density of hair is intermediate in whites (whose highest density of hair follicles is 100 follicular units/ cm^2) and lowest in Africans. This characteristic may be deceptive to the novice hair transplant surgeon, because African hair gives the appearance of a higher density, given the curly nature of the hair. This characteristic is beneficial

to the patient because the appearance of higher density may be achieved with lower graft density in the recipient area. Asians have a high proportion of single hairs (24%–30% compared with 14% found in whites).

HAIR GRAFTING TO THE SCALP *Donor Site Follicle Extraction*

We use 2 hair transplantation techniques: the follicular unit grafting (FUG) or strip technique and the follicular unit extraction (FUE) technique. Both use the same basic concept of transplanting hair from more permanent donor areas (usually the sides and back of the scalp, but in cases of severe limited supply of donor hairs, usually as a result of previous procedures, the donor area can be the chest or beard) into the recipient areas, where more hair is desired. FUG and FUE differ in how these donor hairs are obtained. FUG is the traditional technique of donor hair harvesting, whereby parallel incisions are made in the donor scalp area to remove a strip. The length and width of the excision depend on the amount of grafts being transplanted in the procedure. From this strip, individual FUGs are then dissected under the microscope, a process that requires a team of trained assistants, and separated out based on the number of hairs per graft (1, 2, 3, or 4).

In the FUE technique, individual punches, typically ranging in size from 0.8 to 1.0 mm, are used to extract individual follicular units from the permanent donor areas. As the fastest growing component of our practice, the FUE technique is relevant in ethnic hair transplantation cases. We perform FUE procedures almost exclusively in patients of African American and Asian ethnicity. FUE obviates the linear scar from a traditional FUG strip procedure (**Fig. 1**). Because of the geometry of the hair in Asians, resulting in more a more spiky pattern of hair growth, whereby the hairs tend to grow less vertically downward instead of growing more outward or horizontally, the linear scar in patients of Asian ethnicity can be more conspicuous. Similarly, in the African American patient, FUE provides a cosmetic advantage, because the African American patient can continue to cut his hair very short and avoid the appearance of a linear scar. The hair transplant surgeon needs to be aware of the geometry of the African American hair follicle when performing an FUE procedure. The curliness of the hair does not stop at the skin, so the surgeon needs to be cognizant of the potential change in hair direction underneath the epidermis.

In our practice, most of our FUEs are performed by a specially designed handheld drill and do not

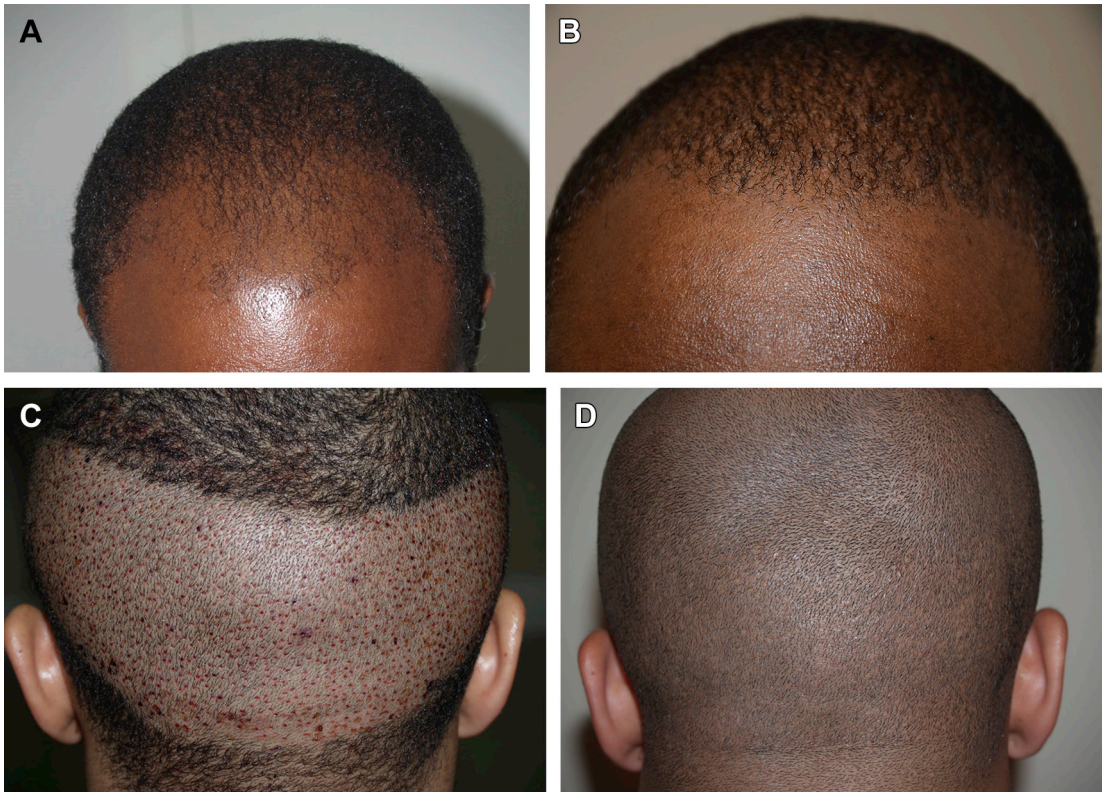


Fig. 1. FUE procedure on an African man. (A) Before; (B) 1 year after; (C) donor site 1 day after; (D) donor site 1 year after.

rely on automated extraction tools or robotic devices. We find that extracting the follicles in this way allows for minimal graft transection, even when using smaller punch sizes, which have as an advantage the reduction in scarring of the donor area. In the case of African American curly hair, blunt dissection is critical to avoid excessive graft transection. The remainder of the graft extraction then may be facilitated by forceps extraction. Hair follicles of Asians are not only straight but also tend to be longer than those of whites, and therefore, the probability of transection during FUE is higher. We suggest using a sharp punch when dissection is limited to the dermal layer (dermal papilla is on average 5–6 mm from the skin surface in Asians compared with 4–5 mm in whites), and the rest of the extraction is facilitated by forceps as well. Postoperatively, patients apply antibiotic ointment for 5 days to the donor area.

Hairline Design and Recipient Site Formation

As in every cosmetic procedure, realistic expectations need to be communicated to the patient during the initial consultation. The 2 most common

goals of patients are a natural appearance and the achievement of maximum density, both of which are now described in terms of ethnic considerations.

The appearance of density is a factor of the following: the concentration of hairs (number of follicular units times the number of hairs in each follicular unit in a given area); the thickness or caliber of each hair; the color contrast between the hair and the scalp; and the angulation of the hair with the scalp (the more acute the angle, the greater the appearance of density). Some of the characteristics that maximize density also help with providing a more natural appearance (less color contrast between scalp and hair, more acute angulation), whereas others are associated with making appearances more difficult (thick caliber hairs) (**Fig. 2**). Probably in no ethnic group is this shown so well as in the Asian patient, in whom the color contrast between the hair and the scalp and the geometry of the hair make the achievement of density and natural appearances more difficult (**Fig. 3**). The opposite holds for the African American patient, in whom the curl of the hair and the similarities in color between the scalp and the hair make the achievement of density easier

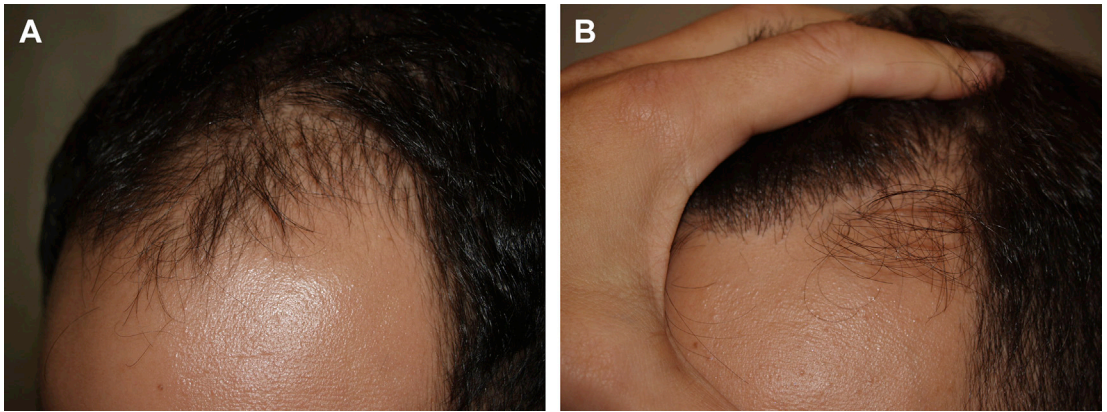


Fig. 2. Before (A) and 1 year after (B) FUG/strip procedure on Hispanic man. Note the irregular hairline with hairs acutely angled anterior.

(**Fig. 4**). With the East Indian and dark-skinned Hispanic and Middle Eastern individual, the lack of color contrast helps with density and naturalness (**Figs. 5–7**).

The recipient sites in patients of African and Asian ethnicity tend to be larger than those for average hair of whites. This difference is caused by the geometry and the thickness of the hair follicles. Whether obtained by FUE or FUG, follicles are preserved in their naturally occurring follicular units, and recipient sites are sized so that they match up with the size of the grafts. For fine-haired patients, 0.5-mm blades work for single-hair grafts, 0.6 and 0.7 mm for 2-hair grafts, and 0.7 and 0.8 mm for 3-hair grafts. In Asians and most East Indians, each of these blades needs to be 0.1 to 0.2 mm larger. In most African patients, these recipient sites also tend to need to be larger. Asian hairline design is treated similarly to the white hairline, in that sites are made in an irregular-regular manner to mimic a natural hairline.

In the African American patient, although the single-hair grafts tend to fit into 0.6-mm recipient sites, 2-hair grafts and 3-hair grafts are typically planted into recipient sites 0.8 to 1 mm in size, primarily because the grafts are large as a result of the curliness of the hairs. This curl of the African hairs allows for a hairline to appear natural.

Although beyond the scope of this article, natural appearing hairlines are generally created by the irregular distribution of single-hair grafts into small irregularly made triangles. Behind these several rows of single-hair grafts, 2-hair then 3-hair and 4-hair grafts are successively placed. An exception to this irregular triangle distribution is typically in patients of African ethnicity, in whom a more even, straighter hairline is usually preferable, because the curliness of the hairs makes the hairline appear natural. In Asian patients, it is rare to use grafts larger than 2 hairs, because of the unnaturalness that can be created by the use of 3-hair grafts, except in the most unusual

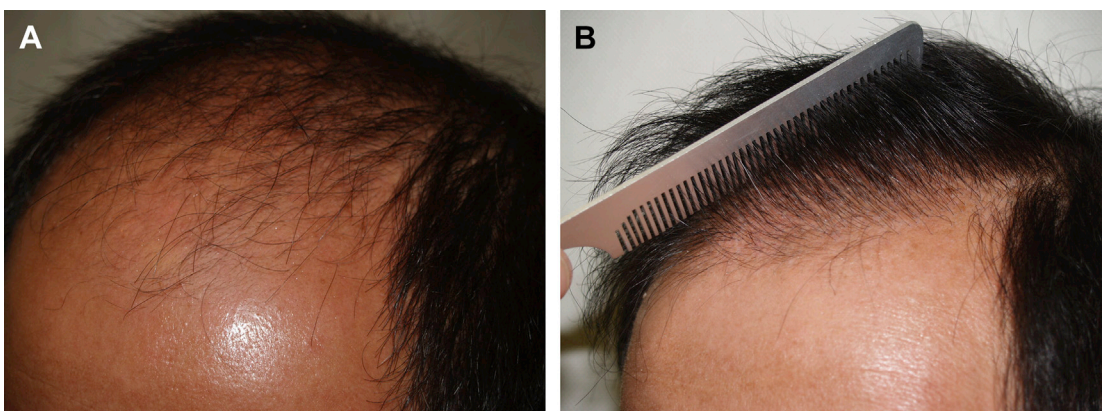


Fig. 3. Before (A) and 18 months after (B) FUG/strip procedure on Asian man. To achieve naturalness, most of the grafts consisted of 1-hair and 2-hair follicular units.



Fig. 4. Before (A) and 1 year after (B) FUG/strip procedure on African woman for hairline lowering.

circumstances. For the same reason, in no other ethnic group is forward angulation of grafts more imperative. Likewise, in African patients, this forward angulation is not so important because of the curl of the hairs.

Planting grafts into the recipient sites can be more challenging in patients of East Asian ethnicity, because of the challenges in visualizing the sites. For reasons that are unknown, the grafts of Pakistani patients tend to be soft or mushy, making them more difficult to plant. This difficulty is exacerbated because these patients tend to

have a higher incidence of bleeding from the recipient sites.

HAIR GRAFTING TO THE BEARD

This procedure has increased dramatically in popularity over recent years. This popularity increase has 3 causes: the popularity of American men sporting beards (epitomized by the Brooklyn hipster trend, which goes beyond white urban America); the information provided through the Internet as well as a deluge of media coverage

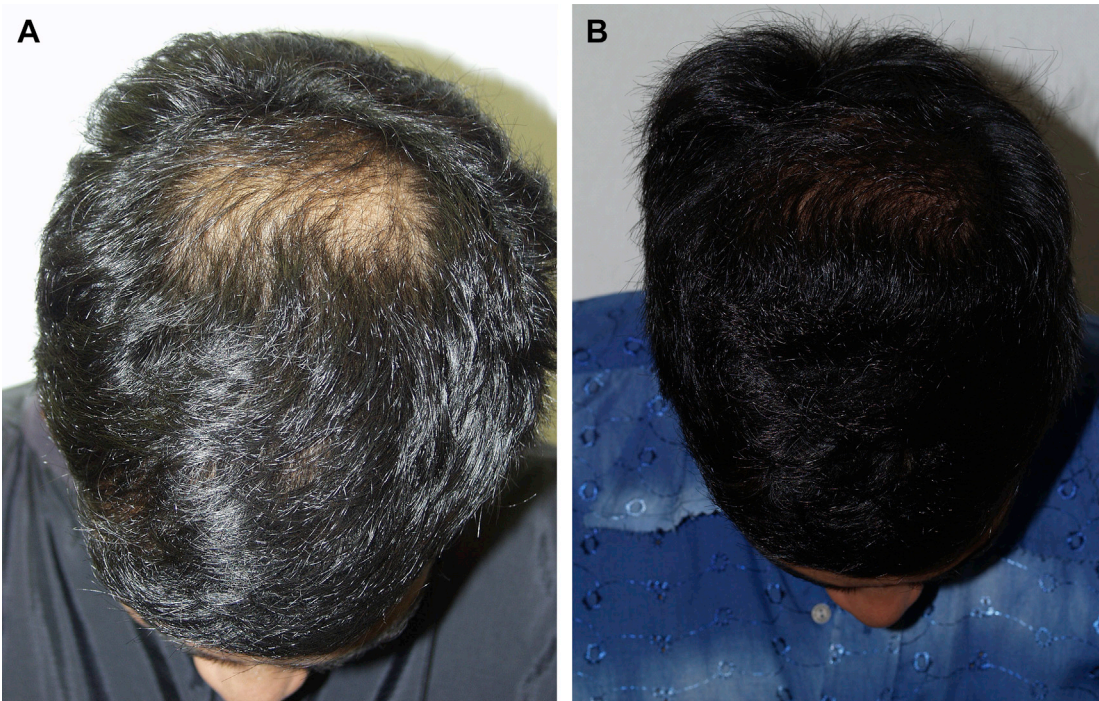


Fig. 5. Before (A) and 1 year after (B) FUG/strip procedure on man of East Indian ethnicity.

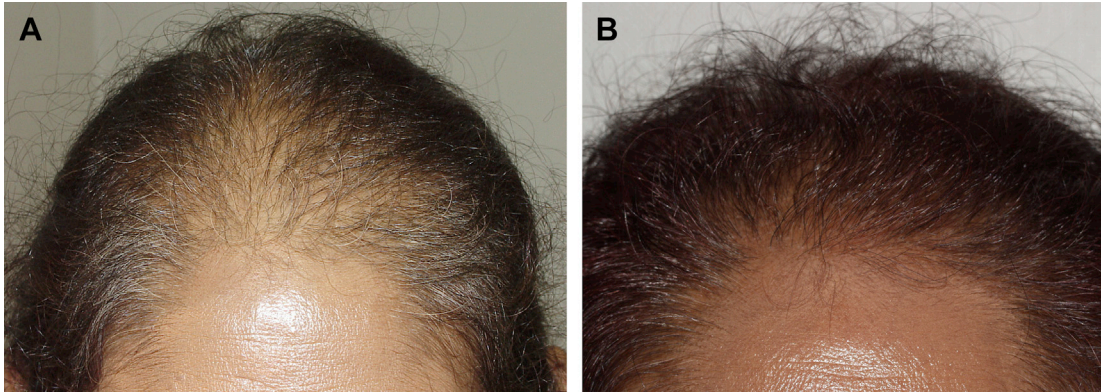


Fig. 6. Before (A) and 1 year after (B) FUG/strip procedure on woman of East Indian ethnicity.

that this procedure is available; and the not insignificant numbers of men of certain ethnicities desiring fuller beards. In addition, consistent with the increasing numbers of men in general seeking hair transplantation procedures because of the availability of the FUE technique, part of the growth in requests for beard transplantation is from men who shave or cut the scalp hair very short who also want more facial hair.

Hair transplantation to the beard consists of transplanting hair from usually the scalp to the face, where the hairs continue to grow (just like regular facial hair); if the procedure is performed properly and aesthetically, the hairs appear natural. A wide variety of requested patterns is desired, ranging from longer sideburns, to a strong goatee and mustache, to a narrow strap beard, to a full thick beard, including sideburns and goatee/mustache. The most common cause of a deficiency of facial hair is genetics, but other less common reasons include scarring from trauma (eg, burns) or previous surgery (eg, cleft lip repair, skin cancer, facelifts) and previous laser hair removal.

Both the FUG and FUE techniques can be used for obtaining the donor hairs; FUE is becoming more popular. Similar to the ethnic considerations for choice of technique with scalp hair transplant procedures, men of African and Asian ethnicity are usually best served by the FUE technique (African American because of the popularity of shaving the hair short, Asians because the typically spiky direction of hair growth in the back of the head makes it more likely that even a well-healed narrow linear donor site scar could be visible at nearly any hair length).

Whether obtained by the FUE or FUG technique, preparation of the grafts for transplanting includes trimming the surrounding epithelium from the edges to minimize the chance of scarring where the grafts are placed, and when indicated, subdividing the naturally occurring 3-hair and 4-hair follicular units into 2-hair and 1-hair grafts to ensure a more natural nontransplanted appearance. This subdividing is especially important in patients who have thick straight donor hairs, such as Asian men, in whom every hair is particularly visible, given the combination of thick hair

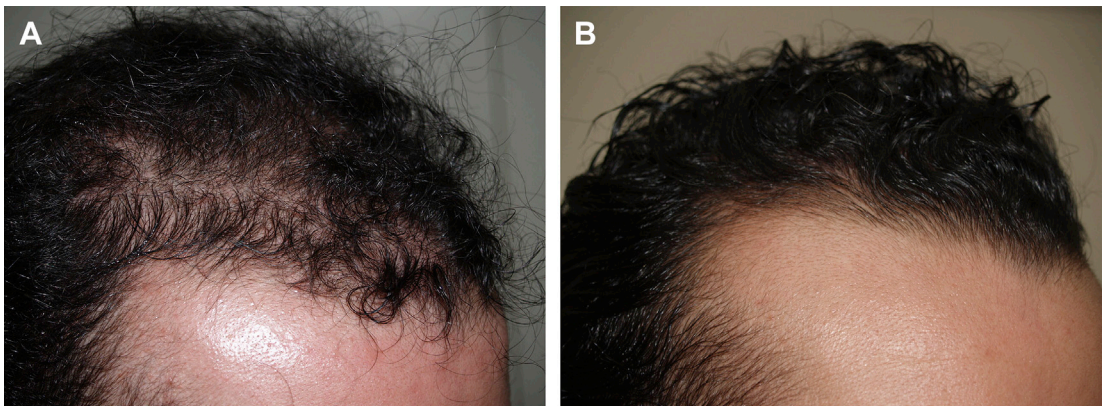


Fig. 7. Before (A) and 1 year after (B) FUG/strip procedure on man of Middle Eastern ethnicity.

caliber and the contrast of the dark hair color with light skin color, which is exacerbated because the goal of most Asian men is not a full thick beard but rather a well-defined but thin goatee or sideburns or strap beard, which leaves each graft to be more visible (**Fig. 8**). The transplanting of 3-hair (never 4-hair) naturally occurring FUGs can be beneficial to maximizing density in men with fine light-colored hairs or in some Middle Eastern and most East Indian men, in whom the goal is often the thickest possible beard (thus limiting the visibility of an individual graft), and many men of African ethnicity, in whom the curliness of the hairs makes them even less visible as individual follicular units.

Patients need to be aware that because the total number of donor hairs is limited, any hairs transplanted to the beard are no longer available for transplanting into the scalp into areas of existing or future male pattern baldness. The number of grafts needed for the face is a factor

of the areas to be filled in and the desired fullness and size of these areas (ie, narrow strap beard vs full cheek beard), which must be reconciled (and explained to the patient) with the safe number of available donor supply, keeping in mind the likelihood of further hair loss. The following is an approximate graft count needed for filling in areas of the face, and the number can be 40% higher or lower; higher, for example, when maximum coverage is desired (ie, Middle Eastern or East Indian men) or when donor hairs are thin in caliber (ie, more white or European Hispanic men); lower, for example, when only a thin amount of coverage is the goal (ie, Asian men):

Sideburns: 250 to 350 grafts per side

Mustache: 250 to 450 grafts

Full goatee (including mustache): 450 to 750 grafts

Cheek beard: 300 to 650 grafts per side



Fig. 8. Before (A) and 1 year after (B) FUE procedure to the beard on Asian man. Note the donor site at 1 year (C) free of detectable scarring.

One of the most important keys to achieving a natural appearing result is angling the recipient sites so that the transplanted hairs grow as flat as possible to the facial skin to avoid them sticking out from the face. This goal is best achieved by the use of the smallest possible recipient site blades (0.6 or 0.7 mm when possible; sometimes, 0.8 mm, when 3-hair grafts are used), which minimizes the rotational movement of the grafts with healing, thus keeping them at the intended angulation. It is imperative to keep the blade handle at this shallow angle to the facial skin, especially in the mustache, where the lip border often slightly protrudes because of the normal shape of the lip, which can undesirably push up on the blade handle.

Beard design varies tremendously amongst ethnic groups, because of ethnic considerations of masculinity as well as individual desires. For East Indian and Middle Eastern men, a thick beard is desired to enhance masculinity; for many men in India, this can improve the prospects of an arranged marriage; for some Hispanic men, a thick mustache is particularly desirable; for the Hassidic Jew, a beard is almost essential for social acceptance; for some Asian men, a well-defined yet not particularly dense sideburn as well as goatee, which can extend to a narrow strap beard that runs along the lower jawline, can provide a desired look, which is sported by some magazine models and actors.

HAIR GRAFTING TO THE EYEBROWS AND EYELASHES

Like with beard transplantation, restoring hair to the eyebrows depends on careful graft dissection and then placement in the proper angulation to achieve natural appearing results. Most eyebrow transplants are performed for women who have overplucked, but there are also men and women who have lost their eyebrows because of genetics, thyroid disease, trauma, and other causes.

The procedure typically requires the transplanting of primarily 1-hair, sometimes 2-hair grafts into recipient sites, made most commonly with a 0.5-mm width blade. These grafts are most often obtained by the FUG/strip technique, in which an incision 6 cm long can provide under microscopic dissection 600 to 750 grafts to allow for satisfactory filling in of the eyebrows. For patients who wish to keep their hair cut short, in particular African American men, and those at risk for a visible donor site scar, such as Asian men with coarse hair that is spiky such that it grows more outward than downward from the scalp, it is best to obtain the grafts by the FUE technique. Caution

needs to be paid when dissecting down 2-hair and especially 3-hair FUGs to obtain the more typically desired 1-hair and occasionally 2-hair grafts, so that the surrounding supportive tissue is left intact to ensure hair regrowth.

As with other hair transplants, those individuals with dark straight hair with light-colored scalps are more challenging, because the color contrast enhances the visibility of each graft and also increases underlying skin show, which is associated with the appearance of lower density. Thick straight hair is also more challenging than hair that is fine or curly, because it is difficult to make straight hair lie flat and thus grow in a more anatomic direction. Given these criteria, it can be deduced that the patients who typically achieve the most aesthetic results are those of light complexion and light-colored hair, or hair that is fine, or those with dark curly hair, especially those of dark complexion, such as those of African ethnicity. Although the hairs are more difficult to harvest and dissect, and the grafts require more care in placement into recipient sites to ensure that the native curl complements the desired direction of hair growth flat onto the brow skin, these patients can expect good results (Figs. 9 and 10). Other ethnic groups in whom results are typically more impressive include East Indians and some Middle Eastern individuals of darker complexion, whereas working with many Asian patients can be the greatest challenge (Fig. 11).

HAIRLINE LOWERING SURGERY

There are 2 techniques for advancing the overly high hairline in women. The more common is hair grafting, but the SHA technique has a definite role, with several advantages. Also called the hairline lowering or forehead shortening procedure, SHA involves making an incision along the hairline, then advancing the entire frontal scalp by as much as 3 to 5 cm, excising the overlapped forehead skin so that the hairline is now in a lower position. Endotine hooks are inserted into the frontal bone, positioned so that they engage the galea to secure the frontal scalp into its forwardly advanced position, and then, the incision is reapproximated in a trichophytic fashion so that the hairs can grow through what is typically a fine line scar. Although the procedure is most often performed under local anesthesia and oral sedation, the occasional patient chooses twilight sedation. If desired, a browlift can be added, performed in the subfrontalis muscle plane, to achieve a more youthful appearance.

Although wide undermining is performed in the subgaleal plane back to the vertex and 2 or

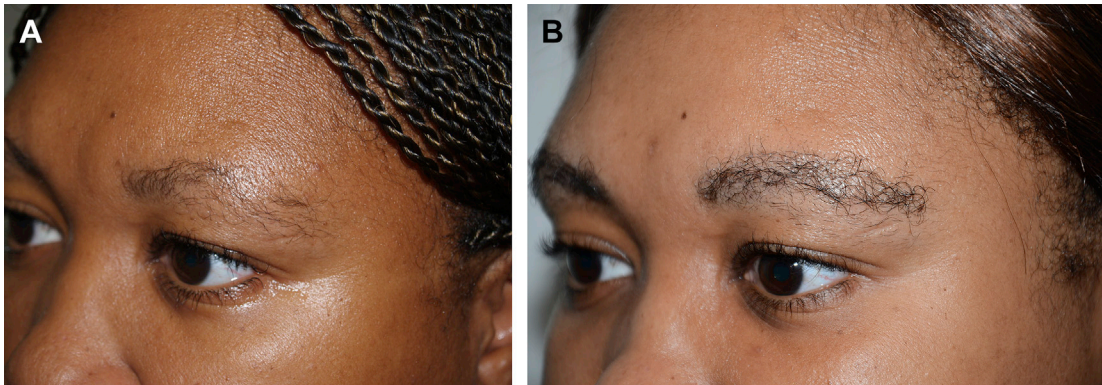


Fig. 9. Before (A) and 10 months after (B) eye-brow transplant on African woman.

3 galeotomies are made in the coronal plane to maximize the total amount of advancement, this procedure is indicated for patients with a flexible scalp that allows for sufficient advancement. Scalp laxity can be assessed by placing a finger on the midaspect of the prospective patient's hair-line and observing how far anteriorly and posteriorly it can be moved, which approximates the amount of advancement that can be achieved, with each galeotomy typically adding another 2

to 3 mm. For patients with an inflexible scalp, if highly motivated, a cycle of balloon tissue expansion of the frontal scalp over a 4-week to 6-week period can allow for as much as 5 to 6 cm of additional advancement.

Other indications for SHA, in addition to a sufficiently mobile scalp, include a stable (nonthinning), reasonably dense frontal hairline, best assessed through physical examination and history. Patients with an inelastic scalp or thinning



Fig. 10. Before (A) and 18 months after (B) FUG/strip procedure to advance hairline, along with eye-brow transplant, on African woman.

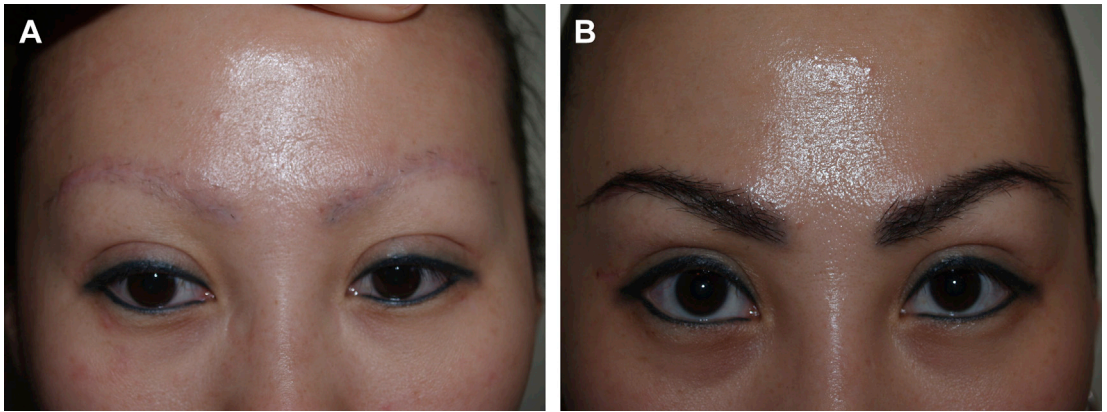


Fig. 11. Before (A) and 1 year after (B) eyebrow transplant on Asian woman.

hairline are better candidates for hair grafting. In addition, for patients who desire a more rounded hairline, hair grafting has to be performed, whether as a staged second procedure several months after SHA or as a stand-alone treatment. These hair grafts can also be transplanted into the hairline to both soften it as well as help further conceal the fine line scar that may be visible in the occasional patient.

SHA is appropriate for patients of all ethnicities but seems to be particularly popular for patients of African ethnicity. The reasons for this situation include the observed higher prevalence of genetically large foreheads associated with high hairlines that would require many grafts to sufficiently lower the hairline to where desired, and many African ethnicity patients having a mobile scalp that allows for 3 to 5 cm of advancement (**Fig. 12**).

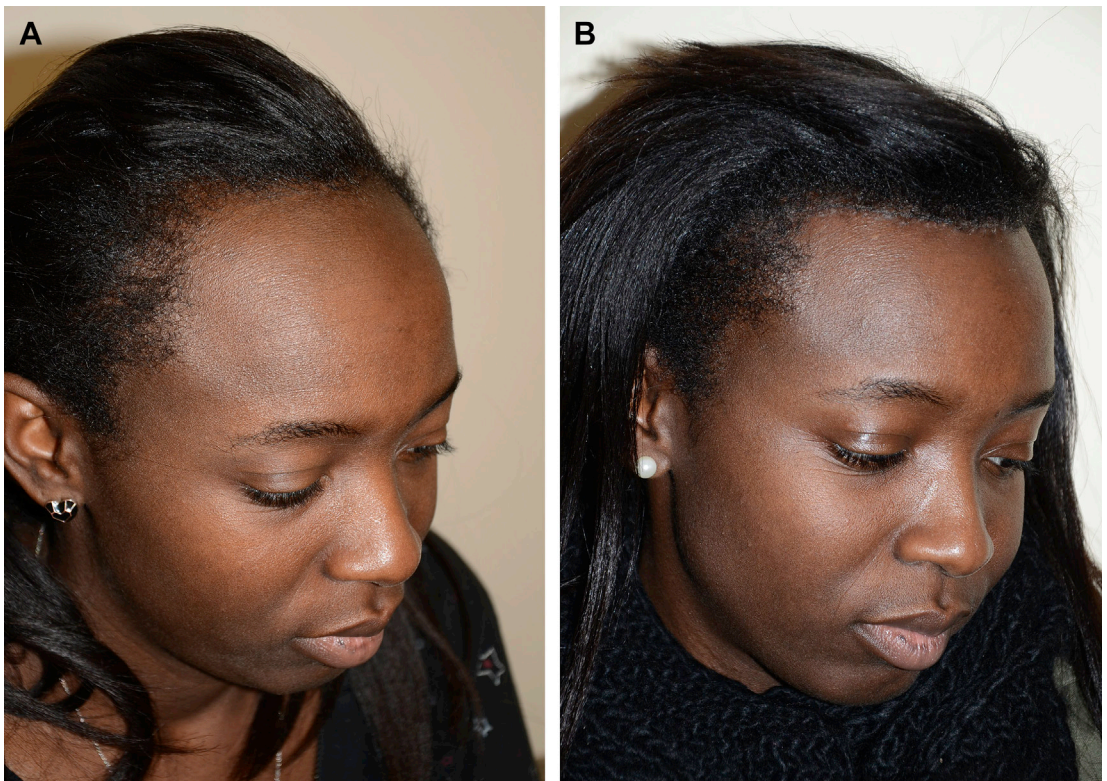


Fig. 12. Before (A) and 4 weeks after (B) SHA/forehead shortening procedure on African woman.

Hypertrophic or keloid scarring of the hairline incision does not seem to be a problem, and hair grafting can help conceal these fine line scars. Hair grafting in patients with dark skin (which blends in well with the dark hairs), whether of Hispanic, East Indian, or African ethnicity, usually results in a fuller look, a phenomenon enhanced with curly hair, making hair transplantation a good option to SHA. Similarly, light-colored hair coupled with fair skin color is another favorable combination for achieving denser appearances from hair grafting.

The more commonly chosen procedure to advance the overly high hairline is hair grafting. This is a typically less surgical procedure, involving the transplanting of 1200 to 2400 grafts (depending on how much lowering is desired) in a single procedure, taking 3 to 8 hours to perform (it is a meticulous procedure). Every graft is placed into tiny recipient sites (0.5–0.8 mm in size), each one made by the surgeon; these sites then determine the direction, pattern, and angulation of growth to ensure a natural appearance. The transplanted hairs typically fall out within 3 weeks, then start to regrow at 4 months, taking a full 10 months or longer for final results. The hair grafting procedure

is ideal for hairlines that are thin or thinning out, for those who want a hairline that is not only lower but also more rounded, and for those who opt not to have or are not good candidates for SHA. Some patients desire a touch-up after 10 months or so to achieve greater density, but most do not need this touch-up.

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