

Facial Hair Restoration: Effective Techniques for Beard and Eyebrow Restoration

Anthony Bared* and Jeffrey S Epstein

Private Practice, Sunset Professional Building, 6280 Sunset Drive, Suite 509, Miami, FL, United States

Introduction

Hair restoration has long been thought of as restoring hair predominantly in the scalp in men and women who have lost hair for various reasons. Advances in hair restoration techniques have made it possible to transplant hair in non-scalp areas of the face where patients may have never had hair. Refinements in techniques have allowed for the restoration of beard hair and eyebrow hair with very natural appearing results. Pick up any of the latest fashion magazines and you see female models with thick, full eyebrows, or men sporting full beards. In part, due to these fashion and culture trends, along with advancements in techniques that we have developed, our practice has seen a large increase in the demand for beard and eyebrow restoration. This article describes the pre-operative evaluation, operative technique and post-operative care developed from the experience of over 1,000 procedures in facial hair restoration.

Beard Restoration

Pre-operative planning

Treatment goals in beard restoration are often set by the patient. Patients typically present with a rather specific understanding of how they want their facial hair to appear. A patient's goals may vary from increasing the density of an existing beard while maintaining the same shape, to transplanting full beards where very few hairs exist. The design and density of the beard may be limited by the quality and quantity of the donor area. Transplantation of full beards requires large amount of grafts and patients are always made aware of the possibility of undergoing secondary procedures after around one year if further density is desired. These grafts, it must be made clear, once transplanted will no longer be available for use in the scalp in the future if male pattern hair loss is to develop.

With refinements in FUE, most patients seen in our office elect to have the procedure performed in this manner so as to avoid a linear scar, allowing them to maintain a short hairstyle [1,2]. FUE has largely replaced the traditional strip donor extractions for beard transplantation in our office [3]. Regardless of the donor technique used, patients are made aware of the potential limitations of the donor hair quantity and therefore "size" and density of the beard which can be achieved through solely one procedure. It is our experience that the scalp hair transplants to the face have a very high regrowth percentage and if properly performed patients can achieve a very natural outcome.

As in any cosmetic procedure, listening to the patient's exact goals and desires is imperative. Patients who desire facial hair restorations, in general, express a very specific desire for how they want their beard designed. Depending on the exact design and density, graft counts can range from 250 to 300 grafts to each sideburn, 400 to 800 grafts to the mustache and goatee, and 300 to 500 grafts per cheek. These numbers can vary based on the pre-existing hair, design, and thickness of the donor hair.

Most patients seeking facial hair restoration are men with a genetic paucity of facial hair (Figure 1). Other reasons for patients seeking facial hair restoration are for poorly thought out prior laser hair removal, scarring, burn, or cleft lip repair (Figure 2). Another small

group is female to male transgender patients seeking a more masculine appearance.

As with other hair transplantation cases, patients need to be in good general health and off medications, supplements and vitamins which can worsen bleeding.

Surgical preparation

There is no ideal facial hair pattern and there are many differences among different ethnic groups [4]. As mentioned, most patients have a specific idea of the design they wish for their facial hair. Using the patient's guidelines, the areas to be transplanted are marked out using a surgical marking pen with the patient in a seated position. The markings

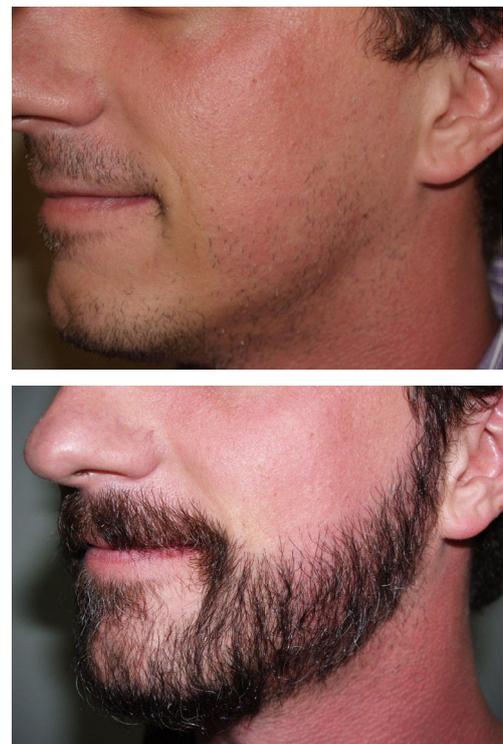


Figure 1: Before (a) and after (b) beard transplantation with 2,200.

*Corresponding author: Anthony Bared, Private Practice, Sunset Professional Building, 6280 Sunset Drive, Suite 509, Miami, FL-33143, USA; Tel: 305-666-1774; E-mail: abmd@fhrps.com

Received May 10, 2016; Accepted June 22, 2016; Published June 27, 2016

Citation: Bared A, Epstein JS (2016) Facial Hair Restoration: Effective Techniques for Beard and Eyebrow Restoration. Hair Ther Transplant 6: 140.doi:[10.4172/2167-0951.1000140](https://doi.org/10.4172/2167-0951.1000140)

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Figure 2: Before (a) and after (b) beard transplantation with 800 grafts to conceal facial scar.

are checked for symmetry between the two sides. Measurements are used to help ensure symmetry. Patients are shown the markings in a mirror, for the two-dimensional perspective provided by a mirror-which is what the patient sees in a mirror- is different than what the surgeon sees in direct three-dimension. If then needed, alterations are made according to patient desires.

The one area of caution in patients with thick or dark hair is the area immediately inferior to the lower lip referred to as the “soul patch” area and the chin mound. Particularly in patients with thick and dark hairs this area is susceptible to bump formation at each graft site. Because of the risk of bump formation this area is avoided or a few “test” grafts are placed in this area at the time of the initial procedure. If no bumps form after eight months, then further grafting can be done to this area.

Procedural approach

If the (rare) strip procedure is performed for donor site harvesting, the patient is maintained in a seated position. Once the donor area has been anesthetized, the “strip” is harvested in the standard fashion using a trichophytic incision and closure to minimize donor site scarring [5]. Once the “strip” has been removed it is then dissected under a microscope, dividing grafts into their follicular units. Follicular units utilized are those of 1, 2 and 3 hair grafts [6]. In cases of patients with thick and dark donor hairs the 3 hair grafts are divided into single and 2 hair grafts.

Currently in our practice, the great majority of patients seeking facial hair restoration elect to have their procedure via the FUE technique in order to avoid a linear scar. In these cases, the donor area is shaved and patients are placed in a supine position. The smallest possible drill size avoiding graft transection is used for the extractions. The donor area consists of the occiput only in smaller cases and extends into the parietal scalp for larger cases. Graft extractions are evenly distributed throughout the donor area to avoid areas of focal alopecia.

Once the extractions have been completed from the occipital area, the patient is then turned to lie in the supine position.

Local anesthesia is then applied to the face starting in each sideburn and cheek area. The area around the mouth is not anesthetized at this point but rather the area around the mouth is typically worked on after the patient has eaten lunch. The recipient sites in the sideburn and cheek area are made first. The smallest possible recipient sites are made using 0.6, 0.7 or 0.8 mm slits. The one, two and (if used) three hair grafts are tested to ensure size compatibility with the recipient sites. In the periphery of the sideburns one hair grafts are used while two hair grafts can be placed in the central aspect of the sideburn to allow for more density. Counter traction is provided by the non-dominant hand and an assistant while making the incisions. The key aesthetic step is to make the incisions at an ultra-acute angle to the skin, with the direction of the incisions determined by either existing surrounding hairs or the fine “peach fuzz” of the face. This being said, the direction of growth is generally downward, but more centrally closer to the mouth/goatee region can be somewhat anterior. In the cheek area, three hair grafts are sometimes used in the central beard in patients with finer hair to allow for the achievement of greater density without a compromise of naturalness. If further grafts are needed, they are extracted at this time from the parietal scalp. The patient’s head is slightly turned, allowing for the simultaneous extraction of grafts from the parietal area and the placement of grafts in the ipsilateral cheek and sideburn.

After the patient is given lunch, the area around the mouth is then anesthetized. Infraorbital and mental nerve blocks are used to provide initial anesthesia. The goatee and mustache area anesthesia is then reinforced with field subdermal local anesthesia complemented by epi 1:50,000 to minimize bleeding. Incisions in the goatee and mustache area are then made. On the mustache, hairs will grow slightly laterally and then transition downward along the goatee. Patients need to be made aware of the difficulty in creating density along the entire mustache, particularly centrally within the ‘cupid’s bow.’ The creation of density in this area is difficult owing to the undulations created by the upper lip’s ‘cupid’s bow’ area. It is also important to maintain as acute of an angle as possible in this central area of the upper lip as grafts have a tendency to grow straight outward in non-acute angles. The transition from the mustache to the goatee is an important area for the creation of density, which is usually created by the maximal dense packing of two hair grafts.

The grafts are placed into these recipient using jeweler’s forceps. Counter-traction splaying the incision sites open with the non-dominant hand helps in the placement of the grafts given the laxity of facial skin. The importance of having experienced assistants for this process is critical, as they need to understand the “pattern” of graft distribution as created by the surgeon. Towards the conclusion of the case, the patient is given a mirror before all grafts are placed. Given that the immediate results closely replicate the final results, it is helpful for the patient to view their beard in order to assess the design and density of the grafts. This allows for feedback, fine-tuning and alteration before the conclusion of the case (Figure 3).

Potential complications and their management

Given the senior author’s (JSE) experience with treating patients who are seeking revision work secondary to their dissatisfaction from prior facial hair restoration work, the most common complaint seen is the improper angle of hair growth. Hairs can grow out perpendicularly giving the beard an unnatural appearance. As previously mentioned,



Figure 3: Before (a) and after (b) beard transplantation with 1,200 grafts.

the area of the face where improper angulation poses the greatest challenge is in the mustache. To avoid the improper angulation it is helpful to use the smallest possible incision at a very acute angle. It is helpful to use a longer blade so as to allow it to lay flat across the skin permitting a sharply acute angle. If needed, the perpendicular hair grafts can be removed via the FUE technique and the resulting hole is left to heal by secondary intention.

Tiny bumps can form in the soul patch and chin mound areas at the site of the transplanted grafts. The etiology for the formation of these bumps is not known, however, this is mostly seen in patients with thick, dark hairs. In fact, patients of Asian ethnicity, particularly those with dark thick hairs, are the most challenging on whom to avoid complications, both in this bump formation but also in achieving naturalness due to the difficulty in getting the grafts to look natural particularly in angulation. With these Asian patients, the less-experienced surgeon is strongly encouraged to proceed conservatively, with the primary use of all single-hair grafts and smaller number of grafts until proficiency is achieved. As the hair grows in this soul patch and chin mound area, a small bump can form where the hair exits the skin. For this reason, if a patient desires hair in these regions, a small “test” procedure can be performed at the time of the initial procedure. If in six to eight months, no bumps have formed then further hair can be transplanted [7].

Post-procedure care

Patients are told to keep the face dry for the first 5 days after the procedure. This allows for the grafts to set properly, helping assure the maintenance of proper angulation. Topical antibiotic ointment is applied to the donor area whether a strip or FUE technique was used. Patients are then to wet the face after 5 days with soap and water, starting to remove the dried blood and crusts. Shaving is permitted after 10 days.

Pinkness to the face can be present after the procedure and usually resolves after a few weeks. In patients with very light complexion this

pinkness can persist for longer periods. We have found that the oral antihistamine diphenhydramine taken once or twice daily can help reduce this pinkness. Hair regrowth usually starts around four to six months. The transplanted hair can be treated as any other facial hair and allowed to grow out or shaved. Most patients are satisfied with the initial density from one procedure but a secondary, touch-up procedure can be performed after 1 year to create further density.

Eyebrow Transplants

Pre-operative planning

The goal in eyebrow restoration is to restore the desired shape and density, and natural direction and angle of growth of eyebrow hair. Unlike with beard restoration, particularly in men (who compose close to 40% of our eyebrow patients), most patients seeking eyebrow restoration do not have a very clear picture of how they want their eyebrows shaped. The most common presentation in women is the thinning of the eyebrows either from over-plucking, aging, or genetic causes. In cases of complete eyebrow absence, types of alopecia (such as alopecia totalis) need to be ruled out before considering transplantation [8]. Men typically lose the lateral aspect of the eyebrows with aging and are seeking overall thicker eyebrows. Some of our female patients have had prior permanent makeup, and are advised that this may compromise regrowth in the occasional case. These tattoos can often help guide the design of the eyebrows, but oftentimes we find that they were made asymmetrically and or not aesthetic. The majority of our female patients are able to draw their desired eyebrows, which we encourage, but then often require some fine-tuning by the surgeon to create a nicer look.

The donor hair is almost always the scalp because of its reliable regrowth, although other areas of the body can be used as well but the regrowth is not as reliable nor is supply oftentimes as readily available. In most cases, scalp donor hair extraction is performed from a small “strip” from the occipital scalp. In some cases, for instance men who wish to shave their head, the donor hair is harvested via the FUE technique. The transplanted hairs from the scalp have to be trimmed regularly as they will continue to grow like scalp hair.

Surgical preparation

Patients are seated in front of a mirror in the pre-operative suite. Women generally have a very good idea of the shape they desire for their eyebrows. They are asked to bring in photos of “model” eyebrows to help guide their design. After pre-operative photos are obtained, the patients are offered an eye-liner pen and are given the time to draw in their desired eyebrow shape. The patient’s active involvement in the design of their eyebrows is important. After they are given some time to design their eyebrows, final markings and refinements are made with a semi-permanent fine marker. Measurements are taken for symmetry. Men seeking eyebrow restoration typically are seeking to fill in areas within the eyebrows which are lacking density. The male eyebrow is designed with less of an arch and as an extension of the existing eyebrow. Photos are obtained after the final markings have been made.

We like to divide the eyebrow into three sections:

1. Head (innermost 5-8 mm)
2. Body (central 2.5-3.5 cm)
3. Tail (outer 2-2.5 cm)



Figure 4: Male eyebrow—the arch of the eyebrow is not formed by a peak as in women but a widening of the brow.

In women, the point at which the tail and body meet forming the arch is usually located at or just lateral to the lateral limbus of the eye. For a more dramatic look, this arch can be as far lateral to the lateral canthal region. However, it can vary in position and roundedness. In men, the arch of the brow is not so much as a peak but rather a widening of the eyebrow along the area correlating to the lateral limbus. This is best demonstrated in (Figure 4).

Procedural approach

If a “strip” harvesting technique is to be utilized, the patient remains in the upright, seated position for the excision. The “strip” is typically harvested from the occipital scalp and, depending on the number of grafts needed, varies in length and width from about 3 to 6 cm and 10 to 15 mm, respectively. If the FUE technique is used, the patient is placed in the prone position for donor harvesting. Given the smaller number of grafts needed, shaving of the entire donor area can be avoided. Small “tunnels” can be made in various locations throughout the occipital and parietal areas with the surrounding hair kept long to avoid the donor area from becoming visible.

Once the donor hairs have been harvested the patient is then positioned in a supine/ “beach chair” position for incision site placement. Highly experienced technicians perform the dissection of the harvested donor hairs under the microscope under the supervision of the surgeon. Naturally occurring 1 and 2 hair follicular units are dissected, although in some cases, 3 hair follicular units will be used to achieve maximal density without compromising naturalness.

The eyebrows are anesthetized, and 1:50,000 epi is injected for hemostasis. Recipient sites are created by the surgeon using the smallest blade size appropriate for the grafts, most commonly 0.5 mm, but sometimes 0.6 mm for the occasional larger 2 hair grafts and even 3 hair grafts. Recipient sites are first made along the boundaries of the eyebrow along the pre-operative markings as these markings can be lost with the subsequent bleeding and wiping of the blood from the recipient sites. Paying attention to the proper direction of growth is critical. Within the head of the eyebrow, hair usually grows in a more vertical/superior direction. Moving from the more inferior to the more superior aspect of the head of the brow the hairs quickly change direction to grow in a more horizontal then inferior/ downward direction particularly along the superior border. Moving laterally, the

hairs along the superior border are oriented in an inferior/ downward direction, while the hairs along the inferior border are oriented in a superior/upward direction, creating a herring-boned pattern. This cross-hatching continues throughout the body of the eyebrow until the tail portion, where the hairs then are primarily oriented horizontally. Incisions are made as flat (acute an angle) as possible to the skin (Figure 5). Once all the recipient sites are made bilaterally, the grafts are then inserted. Care is taken to orient the hairs so that the direction of growth (i.e. the curl) of the hair is in an acute angle with the skin. We like to place as many 2 hair grafts as possible, except along the inner-most head and lateral-most tail portion where 1 hair grafts are used. If 3 hair



Figure 5: Acute angling of the incision for eyebrow transplantation.



Figure 6: Before (a) and after (b) 650 graft eyebrow transplantation in a male patient.



Figure 7: Before (a) and after (b) eyebrow transplantation in a female patient with 650 grafts.

grafts are deemed appropriate, they are placed in the central aspect of the body portion, to achieve maximal density. It is critical to make just about all of the recipient sites before any planting is to be done, then after all these recipient sites are filled with grafts, the patient is asked to sit up and the eyebrows are inspected then small adjustments can be made with the placement of more grafts. Then, the patient can then view the eyebrows to obtain his/her feedback regarding symmetry and the desired shape (Figures 6 and 7).

Potential complications and their management

The most common complications related to eyebrow hair restorations are asymmetry, less than anticipate hair regrowth, and poor hair angulation. It is important when marking the eyebrows that symmetry is checked and re-checked. It is also helpful to view the immediate photo once the markings have been made. The viewing of the photos helps to provide a “third” eye and different perspective often revealing asymmetries which may not have been immediately apparent. As aforementioned, recipient sites are first made along these markings along the boundaries of the eyebrow before they can be rubbed off and lost. The local anesthesia and the swelling can create asymmetries during the procedure, making one eyebrow appear higher than the other and thus creating artefactual asymmetric appearances that are more difficult to correct at the end of the procedure. To limit this phenomenon, it is best to place the local anesthetic in the very beginning of the case and to have the patient sit up to check for symmetry before adding more local anesthetic during the procedure.

Another potential complication is that related to poor density. This is most likely due to lower than expected percentage of regrowth. Despite the best efforts to keep the grafts moist as well as atraumatic placement of the grafts, at times, in certain cases 20-25% of the hair may fail to regrow. To minimize poor regrowth rates, the grafts are kept “chubby” with a small cuff of surrounding protective fat, and the most experienced assistants perform the insertion of the grafts. Patients are advised that this is not necessarily a complication but rather something that simply sometimes occur, and thus a second smaller procedure can be performed after 10 months or more to achieve greater density.

Lastly, poor hair growth angulation can occur in the occasional case despite the best efforts in acute recipient site angulation and hair placement. This is likely due to the effects of healing and subtle wound contracture. It is most commonly seen in patients with very straight hair not allowing for the harvesting of the natural curl to assure flat growth of hairs. To best help prevent this, a very acute angle is taken with the skin when making recipient sites and rotating the hair upon insertion so that the natural curl of the hair is aimed downward. It is also best not to trim the hair in the donor area- if by strip- in order to better visualize the hair curl.

Post-procedure care

Patients are instructed to keep the eyebrows dry for the first 5 days. If “strip” harvesting was performed, sutures are removed around 10 days post-operatively or the dissolvable sutures are expected to be gone by four weeks. Antibiotics and pain medications are given for the first several days. Patients are allowed to use makeup in the eyebrow area after all the crusts have fallen out at typically five days.

Eyebrows will start to regrow around 4 to 6 months after transplant and will continue to fill in for a full year, gradually increasing density. A variety of products can be used to train any misdirected hairs. The hair must be trimmed to the patient’s desired length. If a patient so desires, second smaller procedures to increase density are performed 10 months or later.

Conclusion

Beard and eyebrow restorations are effective procedures and with the proper expectations have a very high satisfaction rate amongst patients. It is a very rewarding yet challenging procedure for the hair restoration surgeon.

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