

# Current Concepts in Hair Transplantation for Men and Women

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Hair transplantation can consistently restore a natural, undetectable frame of hair for men and women. The era of the “plug” is over. The transition from grafts comprising 10 to 20 hair follicles to those with 1 to 4 hair follicles is the reason for the consistently natural appearance of transplanted hair. The efficient use of the donor region, graft preparation, hairline design, creation of the recipient site, and graft placement are all key components to the success of the procedure.

At the beginning of the consultation, the hair-restoration surgeon should perform a complete scalp examination and question the patient fully regarding hair loss and medical history. For men, the diagnosis of male pattern hair loss is almost always clear. For women, there is often a differential diagnosis to consider, including telogen effluvium, medications, acute weight loss, hair styling, hair loss from an underlying medical condition such as iron deficiency or thyroid disorder, and diffuse alopecia areata. A careful history and review of systems helps establish the correct diagnosis. If there is any doubt, a scalp biopsy should be performed. The donor density and caliber of hair follicles will create realistic expectations. Patients with fine hair and a donor density that is below average will have natural but thin transplanted hair. Those with hair density and caliber that is above average can expect a greater perceived density after hair transplantation.

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Minoxidil, finasteride, or both are excellent adjuncts to help maintain existing hair (Table 1). Both medications are more effective for treating patients with early stages of hair loss and are excellent treatment options for patients who have begun to lose their hair but are not good candidates for surgery. For patients who do receive hair transplantation, continuing medical treatment will often help increase the density of transplanted hair by slowing down the rate of loss of existing hair and increasing the caliber of existing and transplanted hair.<sup>1</sup> In addition, minoxidil and finasteride may help reduce postsurgical telogen effluvium in women and men with diffuse thinning. Although long-term studies have confirmed the safety and benefit of minoxidil and finasteride, it is imperative that surgeons apply the same criteria for candidate selection and hairline design to patients who have been successfully treated with these drugs as they would to those who have not received such treatment. These medications are elective and should always remain that way for patients. If a patient decides to stop medical therapy, the transplanted hair must have a natural appearance with even distribution.

Hair transplantation creates a permanent scar in the donor region. For most patients, the donor scar is of no practical significance. However, for patients who shave their hair or cut it close to the scalp, the donor scar will be visible. Patients should be informed prior to the procedure that hair transplantation will result in a donor scar.

**THE PROCEDURE**

**Donor Harvesting**

The limiting factor in hair transplantation is the amount of hair available in the posterior scalp of the patient. For decades, steel punches measuring 3 to 5 mm were used to harvest donor tissue from the posterior scalp, resulting in extensive scarring over the posterior scalp and an inefficient use of valuable donor hair. The introduction of the scalpel in donor harvesting has made this procedure obsolete.<sup>2</sup> By taking an ellipse from the posterior scalp, the surgeon is able to optimize the amount of donor hair used while limiting the extent of scarring over the posterior scalp. To produce thin (1–3 mm) scars, the width of the donor ellipse should not exceed 1 cm. The size of the donor ellipse harvested is a reflection of the density of the donor hair. The average patient has, on average, 70 to 85 of 1 to 4 follicular units per cm (Table 2).

Prior to the procedure, the donor region is anesthetized with lidocaine 1% with 1:200,000 epinephrine. Saline (10–20 mL) is added to create an infiltrated donor region. The increased turgor improves hemostasis and reduces transection of hair follicles. The ellipse is removed with scissors/scalpel by carefully dissecting below the bulbs of the hair follicles. The donor strip is placed in chilled saline, and the site is closed with staples or sutures, which are removed in 7 to 10 days.

Recently, the use of 1-mm punches to harvest donor tissue has been advocated.<sup>3</sup> This proposed method has an important but limited role in donor harvesting because: (1) harvesting smaller amounts of hair will lengthen the duration and increase the number of treatments required to achieve comparable density; (2) this procedure produces a higher rate of transection of hair follicles than the ellipse method, which may affect the hair growth.

**Graft Creation**

The surgical team carefully separates the natural bundles (1–4 follicular units) from the donor strip. The hair grafts are produced by a variety of methods. Cutting instruments include No. 11 and No. 15 blades, as well as No. 10 prep blades and other instruments. Good lighting, comfortable chairs, and well-designed instruments are prerequisites for producing thousands of high-quality grafts. Microscopic dissection of 1 to 4 follicular unit grafts from donor tissue helps create high-quality grafts.<sup>2</sup> Data regarding microscopically dissected donor tissue and subsequent yield of transplanted hair is still inconclusive. What is not debated is the need to create intact, minimally traumatized follicular groupings and to place the transplanted hair as efficiently and quickly as possible into the recipient sites to optimize hair survival and density.

Surgical assistants routinely create the grafts, and the physician anesthetizes the recipient region with a

TABLE 1		
Properties of Minoxidil and Finasteride		
	Minoxidil	Finasteride
Mechanism of action	Unknown	5- $\alpha$ reductase type II inhibitor blocking conversion of testosterone to dihydrotestosterone
Key to success	Emphasize maintenance over hair regrowth and compliance for at least 6–8 mo to see benefit	Emphasize maintenance over hair regrowth and compliance for at least 6–8 mo to see benefit
Side effects	Dryness and pruritus of the scalp; rare allergic reaction	Sexual dysfunction in 2% of men (reversible within days if discontinued) No allergic reactions, blood monitoring, or drug interactions. Females should never handle or take medication. Not effective in postmenopausal women
Clinical onset of action	6–8 mo	6–8 mo
Dose	2–4 drops 1–2 times daily to frontal and vertex of scalp	1 mg qd with or without food
Candidate selection		
Norwood II–IV	Highly effective	Highly effective
Norwood V–VI	Somewhat effective	Somewhat effective

TABLE 2

### Elliptical Strip Harvesting

Average No. of follicular units (1–4 hair graft) per cm <sup>2</sup>	65–85 follicular groupings/cm <sup>2</sup> Average 75 follicular groupings/cm <sup>2</sup>
Size of strip for 1000 hair grafts containing 1–4 follicular units	13 cm long × 1 cm wide (75 × 13=975) or 16 cm long × 8 cm wide

combination of lidocaine 1% and marcaine 0.25% with epinephrine using a combination of field blocks and local infiltration. The key to success with anesthesia and hemostasis is superficial infiltration into the dermis.

#### THE HAIRLINE

The hairline is what defines the cosmetic success of a hair transplant for men. As with creating hair grafts, the trend in hairline design has been toward mimicking as closely as possible what occurs in nature. The goal of creating a hairline is to frame the face in an undetectable manner.

For decades, hair-transplantation surgeons took the word *hairline* literally, and the result was a straight, sharp demarcation between skin and thick hair-bearing skin. A literal hairline does not exist, but rather a natural transition zone of gradually increasing density from skin to terminal hair-bearing skin occurs. The level at which the transition zone is created varies from individual to individual. It is important for the surgeon to assess each patient in a global, 360° view before deciding where to place the hairline. Androgenic alopecia is progressive, but transplanted hair will continue to grow. Therefore, when evaluating hairline placement, surgeons must assume that all patients will progress to complete hair loss.

Hairline height varies from person to person. Hard and fast rules regarding how many centimeters a hairline

should be placed above the glabella should not be followed, but the shape of a patient's head, forehead, and level of temporal hairline recession will determine the ideal aesthetic placement of grafts to produce a natural frontal hairline. The posterior hairline should mimic the natural semicircle that expands as hair loss progresses in the vertex of the scalp. As with the frontal hairline, it should appear to be designed anticipating progressive hair loss. To avoid future aesthetic complications, the posterior hairline should be placed in the same plane as the frontal hairline. This will avoid "chasing" the ever-expanding ring of hair loss on the vertex of the scalp with valuable donor grafts.

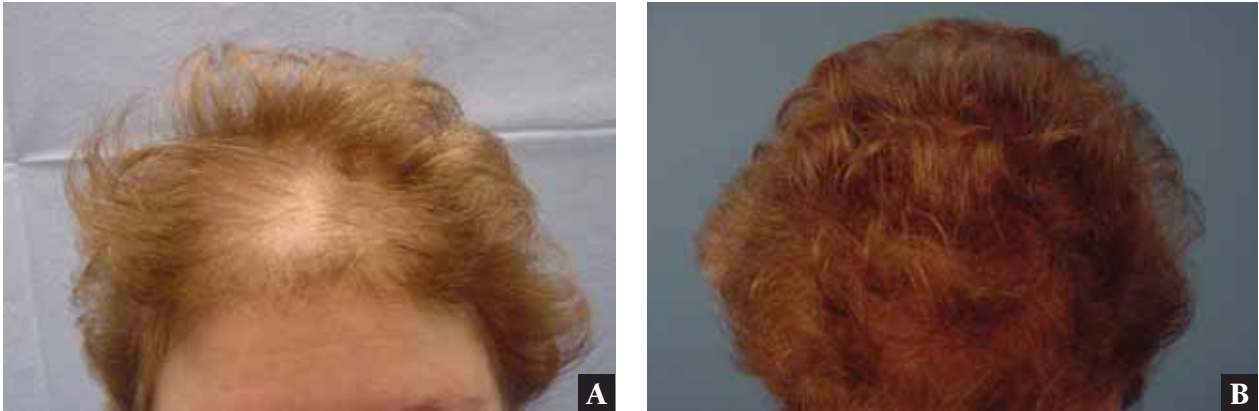
Once the grafts are placed, the patient is sent home with a dressing that should be left on overnight to protect the grafts. Patients can resume normal activities immediately and exercise 5 to 7 days after the procedure. The transplanted hair begins to grow 3 to 4 months after surgery and has the full cosmetic impact 1 year postsurgery (Figures 1 and 2).

#### HAIR TRANSPLANTATION IN WOMEN

The advent of hair grafts comprising 1 to 4 follicular units has created a highly effective natural solution for the millions of women with female pattern hair loss. Unlike men, hair loss is socially unacceptable for women.



**Figure 1.** Patient before (A) and 1 year after hair transplant (800 hair grafts containing 1–4 follicular hair units)(B).



**Figure 2.** Patient before (A) and 1 year after hair transplant (650 hair grafts containing 1–4 follicular hair units)(B).

Unfortunately, a woman's concerns about this condition are often dismissed by her spouse, physician, or both.

In women, hairlines thin but do not recede. This transparent appearance is the main source of anxiety for women. The goal of hair transplantation in women is not to create a new hairline but to place hundreds of hair grafts containing 1 to 4 follicular units behind the frontal hairline to recreate density. Most transplanted grafts are placed in a 3- to 5-cm zone behind the frontal hairline to maximize density and minimize the risk for a postsurgical telogen effluvium. The increased density in the frontal hairline gives women the freedom to style their hair.

Transplantation of hair grafts containing 1 to 4 follicular units also restores a natural hairline in women with significant hair loss of the temporal hairline following a face-lift or endoscopic forehead surgery, giving them the option of pulling the hair back over their ears.

### THE FUTURE

Hair-transplant teams can consistently create natural-appearing transplanted hair for both men and women. The legacy of the large graft is the main obstacle challenging hair-transplant surgeons. The public image of hair transplantation remains the "cornrow." Hundreds

of thousands of patients have benefited from the revolutionary changes in technique and are in the position to voluntarily inform a friend or the public of their surgery. Over time, the legacy of the "pluggy" transplant will finally disappear.

The next quantum leap will be cloning hair follicles. Cloning hair will allow a limitless supply of donor hair for men and women. Although a variety of private laboratories are currently examining the viability of cloning, it is difficult to determine when this procedure will become available as a treatment option for androgenic alopecia.

In the early 21st century, all patients can expect consistent natural-appearing transplanted hair. Cloning will allow an unlimited amount of donor hair. The aesthetic result will continue to be natural.

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