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Hair Raising

Jeffrey S. Epstein, MD, FACS, on
hair transplantation in women

Hair Transplantation: A New Relationship

The latest treatments for pattern hair loss, hairline advancement, and eyelash and eyebrow restoration in females

By Jeffrey Frentzen and Jeffrey S. Epstein, MD, FACS

In 1994, Jeffrey S. Epstein, MD, FACS, opened his aesthetic surgery practice in Miami, and his priority for a first few years was building up business. A graduate of Swathmore College and the medical school at the University of Vermont, Epstein opened his practice in 1994 and, as he put it, "Had a desire to specialize in hair."

In marketing his practice, Epstein was an early adopter of the Internet for promoting his services. "This was really before the days when everyone was using the Internet," he says. "I built my Web site in 1996 and 1997, and it was very prominent."

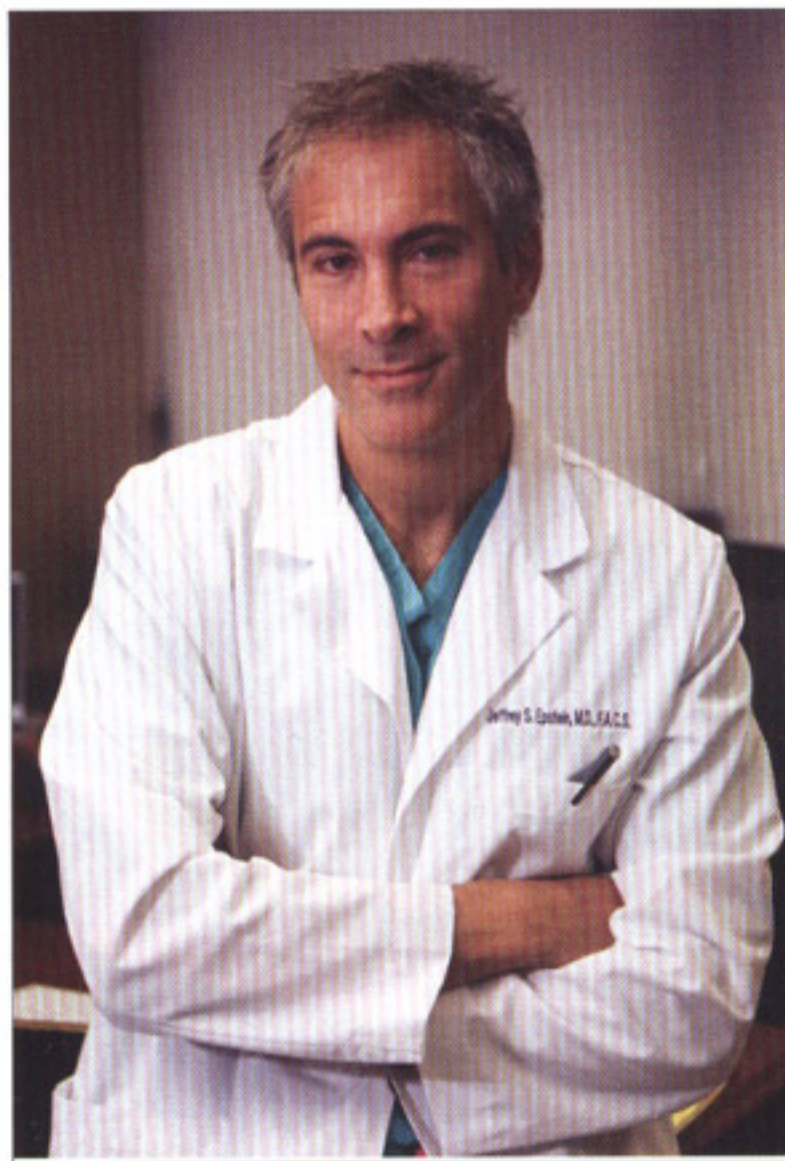
After 10 years, Epstein has opened a satellite office in New York City and has developed his hair specialty. Currently, his patients consist of 75% men and 25% women. In 2004, he opened the Women's Center for Hair Loss, which has become a "very busy part of the practice," he notes.

After considerable success in the area of hair transplants, what is his biggest challenge?

"Hiring the best people," he states without hesitation. "I have 22 employees, which is necessary, but quite a bit of overhead comes along with that. It's a matter of designating assistants and the right people. I hold onto my assistants, pay them well, keep them happy. I have a very low turnover rate."

Epstein continues to attract new patients via his Web site, and has one staff person dedicated to handling all online consultations.

What does Epstein recommend to anyone currently starting a practice? For



one, specialize. "Find your niche, and do the best work you can," he says. "I think you have to be patient—no pun intended. Bottom line is not to compromise on quality. It seems that these days, everyone is trying to lowball everyone else in price. It creates a market in which plastic surgery has become a commodity. Guys in New York are doing hair transplants for under \$3 per graft. You can't give any kind of good quality at that price."

Epstein's specialty these days: hair transplantation in women.

For many years, men were the pri-

mary beneficiaries of hair transplantation. However, with the development of increasingly refined techniques, there are now many applications of hair transplantation in women, including the treatment of female pattern hair loss, hairline advancement, eyebrow and eyelash restoration, and the repair of the sequelae of certain plastic surgery procedures.

Six or 7 years ago, it was rather unrewarding for Epstein to consult with women who had hair concerns. "Currently, though, I eagerly looks forward to treating them due to the tools and experience I've acquired to successfully treat them," he says. "They now compose more than 20% of my patients, and that number continues to grow."

EVOLVING CHOICES

Follicular unit grafting, now the state-of-the-art technique, has evolved over the last 7 years to become the technique of choice for female hair transplantation, and it is capable of creating the most natural-appearing results.

Of particular benefit to women is that these tiny follicular-unit grafts can be placed into similarly tiny-sized incisions, expanding the applications to such refined areas as the eyebrows, and permitting the placement of donor hairs between existing hairs in areas of thinning.

Follicular-unit grafting involves the microscopic dissection of grafts that consist of just the follicular unit, which is the hair-bearing portion of the scalp. Within each follicular unit are one to four—most commonly, two—terminal

hairs and supporting elements, typically wrapped in a fine adventitial sheath. Under slightly magnified visualization (or really good eyesight), these follicular units can be seen at the surface of the scalp as tiny bundles of a few hairs that all emerge as a group.

To obtain these follicular units, the donor tissue is removed as a single strip, typically 10 mm to 14 mm in width; the defect is then sutured-closed primarily. From the donor strip, the microscope permits the dissecting away of all non-hair-bearing tissue, leaving just these tiny individual follicular units.

The microscopic nature of these follicular units allows for them to be placed into similarly sized tiny recipient-site incisions. These incisions measure 0.5 mm to 0.9 mm in size, depending upon the location of the transplant and the number of hairs contained in the graft.

THE PROCEDURES

A team is needed that can successfully perform these procedures, which can consist of up to 2,600 or more grafts

"In my practice, 11 hair-transplant technicians assist me, each using a binocular microscope and each bringing with them certain areas of expertise," Epstein explains. "Whereas some specialize in placing grafts and others specialize in the dividing up of the large donor strip into individual slivers, all assistants participate in the dissecting process."

Care is taken to maintain the grafts in a moist environment. They are kept in chilled saline in Petri dishes, each containing the same-sized grafts awaiting placement into recipient sites.

"Due to the importance of the recipient site in determining the pattern, direction, angle, and distribution of trans-

planted hairs, I make all of the incisions," he notes. "For the past 2 years, we have cut our own recipient-site blades to the exact size needed."

To ensure proper recipient-site size such that the grafts atraumatically but snugly fit into the sites, proper size is confirmed early on by test planting some grafts. When the proper sizes are deter-



Figure 1. Epstein (left), wearing microscopic goggles, plants grafts on a New York City-based patient with an assistant's help.

mined, all of the recipient sites in an area are made; then the grafts can be placed. Later on in the case, to achieve greater density, more recipient sites can then be made between the already-placed grafts.

Typically, these procedures take 3 to 5 hours to perform. Afterward, no bandages are applied, and the patient may begin hair washing on the second day. Growth of the transplanted hairs typically begins by 3 months, with full density reached at 8 to 12 months depending upon the rate of hair growth.

In the future, if desired, an additional procedure can be performed to increase density or provide a greater amount of coverage.

TREATING FEMALE PATTERN HAIR LOSS

Affecting as many as 10% of all women, female pattern hair loss is, as with its male counterpart, a genetic process. As such, it is progressive, starting in women as young as their late teens but

much more commonly in women who are peri- or postmenopausal.

A variety of conditions can accelerate the hair loss, but almost always some genetic component is the basis of the process. Some of these more

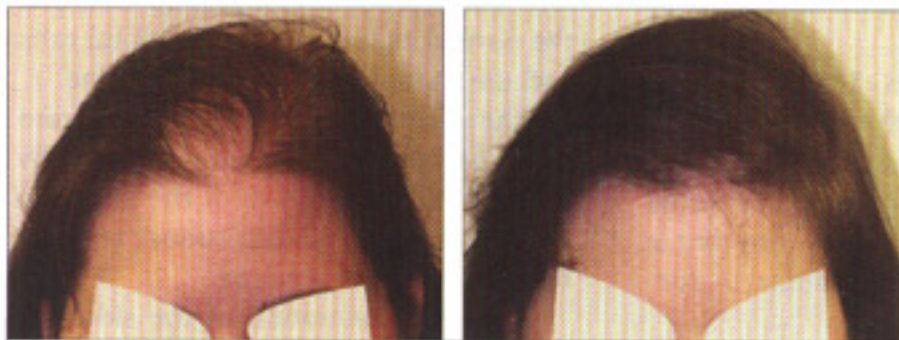


Figure 2. Hairline advancement was performed in a single procedure. In this case, up to 2,400 grafts were completed in order to advance the patient's overly high hairline.

The Issues: Women and Hair Loss

Increasingly, women are learning that they can benefit, as do men, from the newer techniques in surgical hair restoration. There are inherent limitations in the results of hair transplantation for the treatment of female pattern hair loss. However, my experience is that, when working with appropriate candidates, these patients are very happy with their results.

For many, the results of a relatively small number of hairs transplanted strategically into areas of maximum benefit can restore confidence and avoid the need for the wearing of a hairpiece or hair system.

When transplanting into scar tissue, hair growth can often be compromised. This is probably because the decreased blood supply is not able to support the growth of transplanted hair follicles.

In my experience, as well as that of others in the literature, transplanted hairs will indeed grow in the scar. The percentage of "take" of the transplanted hairs is reduced, sometimes by as much as one third—versus the greater than 90% growth rate of hairs transplanted into normal nonscarred tissue.

To compensate for the reduced percentage of hairs that will grow, I will transplant four hair grafts where it is hoped that two or three hairs will actually grow. It is also important that recipient sites be made slightly larger and/or deeper, so as to promote bleeding and potentially enhance the neo-vascularization of the graft hairs.

While this article has focused upon the surgical treatments for hair loss, it is important to remember the role of the medical workup for female pattern hair loss.

Though very unusual, hair loss in women can be due to a number of medical causes, including elevated levels of testosterone, hypothyroidism, anemia, nutritional factors, and post-pregnancy hormonal changes.

In the female presenting with pattern hair loss, in addition to taking a thorough history and examination, several lab tests are conducted, including thyroid function, total testosterone, and DHEA-sulfate.

—JSE



Figure 3. Epstein and an assistant in his New York City-based office inspect samples from a hair graft under a microscope.

common conditions include poor nutrition (often associated with special diets), anemia, and hypothyroidism.

Female pattern baldness (FPB) occurs along several different patterns. The most common consists of diffuse thinning along the top and upper sides and back of the head, often sparing the frontal hairline.¹ In this classic FPB pattern, the hair loss is divided into three stages according to the Ludwig classification scheme, with stage one consisting of mild hair loss and in stage three, extensive hair loss.²

However, although this classification scheme is useful from an academic standpoint in its description of the degree of hair loss, it does not have much efficacy in assessing the degree of improvement that can be expected and, therefore, can help in counseling the patient.

This is because the two most important predictors of success or disappointment are the density of the donor area and the pattern (diffuse thinning versus patchiness) of hair loss in the recipient area(s). Density of the donor area refers primarily to the presence of hairs of thick caliber as the most important predictor of success, and secondarily to hairs that grow closely together (dense concentration).

By type of hair loss in the recipient area, the most important feature that determines success is a pattern of hair loss characterized by patchiness—large areas of non-hair-bearing skin between the existing hairs. Of secondary importance is the presence of hairs that are of normal to above-normal caliber.

The worst candidates are those with fine donor hairs (no matter the concentration of these hairs) and recipient areas characterized by diffuse thinning without large spaces between existing hairs, into which large numbers of grafts can be inserted.

To help deal with these variables, I developed a simple classification scheme in which the caliber of the hairs and the degree of patchiness between these hairs are rated on a 1 to 5 scale (with 3 being the average) for both the recipient- and donor-site areas.

For example, a great candidate for a transplant procedure would be a woman who has, most importantly, a donor-area hair caliber of 4/5 or greater, and a recipient-area patchiness of 3/5 or greater.

COVERAGE LIMITATIONS

When transplanting women with FPB, the finite supply of donor hairs limits the amount of coverage that can be obtained. While most women would like to have all the thinning areas treated, the work should be concentrated in those areas where it will provide the maximum benefit.

Most commonly, these areas are the frontal region just behind and up to the hairline, and along the part line. For the best results, the procedure should maximize the number of hairs transplanted while minimizing the trauma to the existing hairs. This is usually best accomplished by the placing of two or three follicular-unit grafts (for a total of, on average, three to five hairs) into each recipient site—except along the hairline, where only a single graft containing one or two hairs is placed to ensure a natural appearance.

Patients can be assured that the growth of several hairs from a single recipient site will in no way give an unnatural “transplanted” appearance, because they are used to fill in areas between existing hairs.

In the typical case, 1,000 to 1,200 grafts (or around 2,400 hairs) are transplanted. The recipient sites are slits made by blades that are 0.6 mm and typically up to 0.9 mm in size—very tiny but a major boost in avoiding trauma to surrounding hairs.

The grafts are carefully placed into the incisions, keeping them moist to maximize hair growth. To minimize ischemic

shock to the existing hairs, the local anesthetic contains a low concentration of epinephrine, generally less than 1:200,000.

To further minimize the loss of hairs due to shock, and to accelerate the regrowth of the transplanted hairs, at 2 weeks postprocedure the patient starts a daily application of minoxidil 2%. With this regimen, the hairs can be expected to start growing at 2 months rather than the typical 4 months.

THE SEQUELAE OF PRIOR PLASTIC SURGERY

Another common condition in women effectively treated with hair transplants is the alopecic scarring and hairline distortion associated with prior plastic surgery. The most common types of distortion are hair thinning and loss in the superior temporal region, and the loss of the sideburns from rhytidectomy incisions that extend superiorly into the upper temporal region, thus pulling the temporal tuft along this superior vector.^{3,4}

While this incision design helps to improve ptosis of the lateral eyebrow, it can result in hairline distortion. Another



Figure 4. This woman had a facelift and lost her sideburns. In this procedure, the sideburns were reconstructed in a single procedure.

distortion is the excessive elevation of the frontal hairline associated with coronal browlift incisions in patients with preexisting high foreheads.⁵

Meanwhile, alopecic scarring most commonly occurs along the frontal and temporal incisions of browlifts, and the occipital incisions of rhytidectomy. The goal of hair transplantation in these cases is to restore hair growth in the scarred and thinned-out areas, and to re-create the normal anatomy of the temporal tufts and the frontal and temporal hairline.

The management of scarring from prior facial aesthetic surgery usually includes the restoration of the sideburn and other areas of distortions, and the repair of alopecic scarring.

Aesthetic restoration of the sideburn begins with the recognition of its natural appearance in terms of location, direction of hair growth, and feathered look.

Of particular importance are the superior to inferior, anterior to posterior direction of hair growth; and the fineness of the hairs, especially along the anterior and inferior borders.

Areas of scarring, typically located in areas surrounded by hair, should be transplanted with larger grafts, so that even if there is less than the expected 90% of hair growth in the scar tissue, there still is the potential for sufficient coverage.

ADVANCING OVERLY HIGH HAIRLINES

Lowering overly high hairlines is effectively treated by one of two different procedures. "The most common technique that I use is hair grafting," Epstein explains. "In a typical case, 1,700 up to as many as 2,600 grafts are closely placed to fill in the preexisting hairline (so as to



Figure 5. Lowering high hairlines can be effectively done using hair grafting or a surgical approach, shown above, in which a sufficiently flexible mobile hairline is advanced onto the forehead.

maximize density) and in front of the frontal hairline to lower it as desired.

"Attention must be paid to the direction of the existing hairs. Many recipient sites need to be placed at varying angles and directions, including following cowlicks, to ensure naturalness."

The other procedure for hairline advancement is the surgical technique, in which a sufficiently flexible mobile hairline is advanced forward into the forehead, removing excess

forehead skin then approximating with a trichophytic closure technique to ensure hair growth through the scar.

In some patients, a browlift can be combined with the hairline-advancement procedure if the brows are ptotic. Furthermore, in those patients with quite tight scalps, scalp expansion can be used to enhance the amount of hairline advancement achievable.

EYEBROW AND EYELASH RESTORATION

No procedure has benefited more from the technical advancements in hair grafting than eyebrow and eyelash restoration. These hairs not only play an important role in facial aesthetics, they also help to protect the eyes. These



Figure 6. The restoration of eyelashes is one of Epstein's specialties. This relatively new procedure can be done not only to address reconstructive needs but cosmetic purposes, as well.

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procedures are effective for restoring density, or for completely restoring the normal anatomy, for both aesthetic and reconstructive indications.

The etiologies of hair loss in these areas are numerous, and include:

- Voluntary plucking when tapered fine eyebrows were in fashion, or involuntary plucking (trichotillomania);
- Genetics;
- Alopecia areata and other dermatologic conditions;

- Medical conditions, such as hypothyroidism; and

- Trauma.

When due to trauma, the absence of hair is made more noticeable because of the typical hypopigmentation of the skin. While it is important to identify any

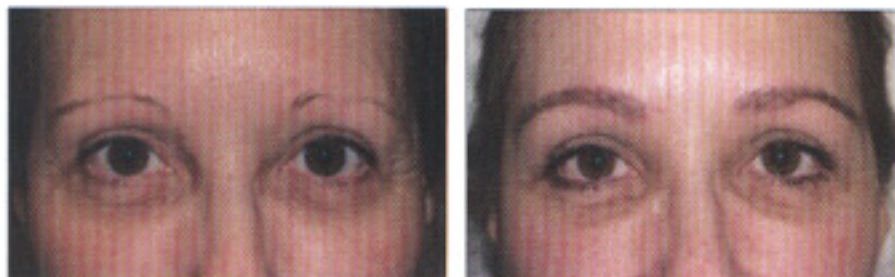
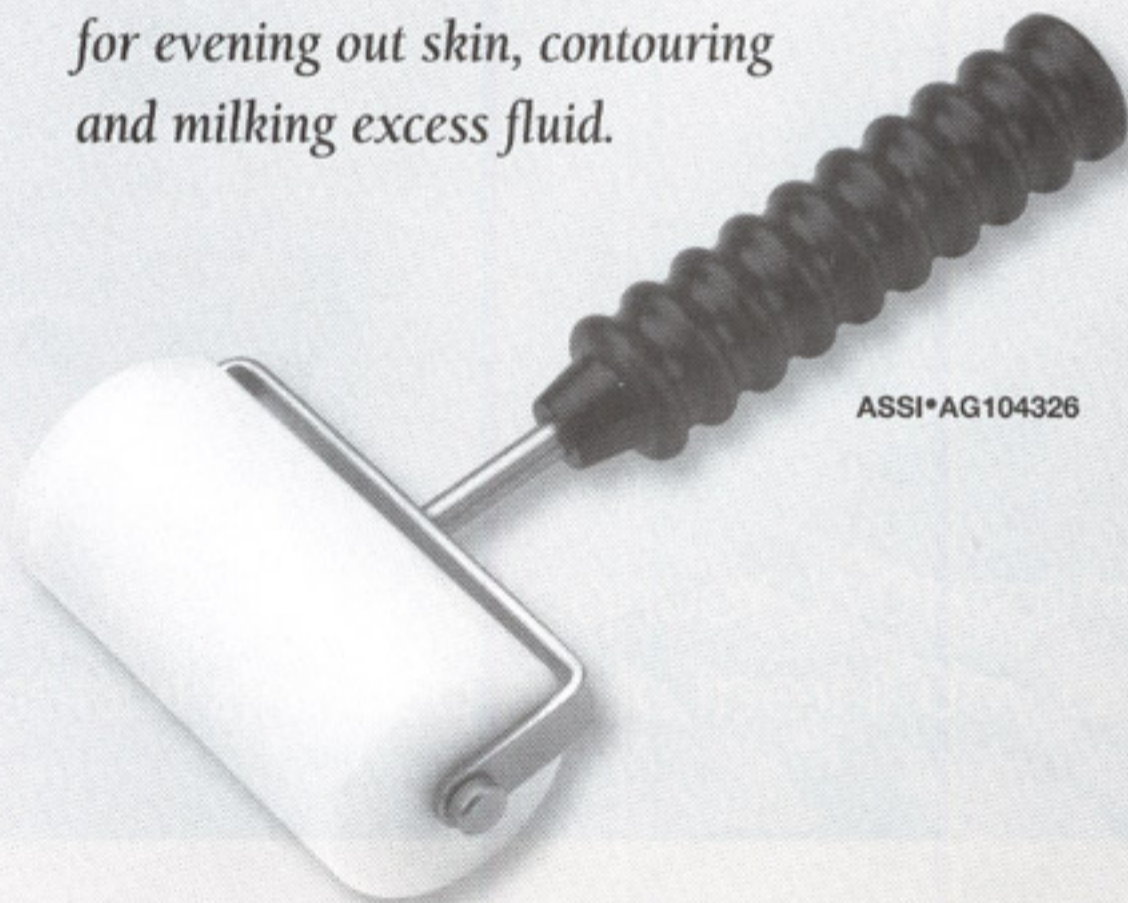


Figure 7. In this eyebrow transplant procedure, as many as 700 grafts can be transplanted into each eyebrow.

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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 or eyelashes can be successfully treated with transplants.

Prior permanent makeup is not a contraindication to having the procedure; however, with the eyebrows the presence of a tattoo may largely determine the position of the new eyebrows. "I have achieved excellent results, though, in the occasional case where the tattooed eyebrows were placed in a significantly unaesthetic position, with the complete excision of the tattoo and primary closure of the fine line scar, which is then concealed with a subsequent eyebrow-transplant procedure." Epstein says.

In terms of indications, the best candidates are those with a slight curl to their donor hairs, so that the curl can be harnessed to assist in the desired direction of growth.

For African Americans, Epstein has performed only eyebrow—not eyelash—transplants with nice results. "The hairs usually come from the scalp, although I have performed several procedures using leg or big toe hair," he says. "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.

For eyebrow restoration, most patients have a procedure that ranges from 250 to 300 grafts per side; however, he has transplanted as many as 375 grafts into a single eyebrow.

Typically, of the hairs transplanted, 70% will grow, and of the hairs that grow, 10% to 15% of them will grow in an aberrant direction. Either too vertical or not flat enough to the skin, and despite being planted in an aesthetic direction, these "rogue" hairs can be either cut short or simply plucked out.

"For my patients, this has not been enough to deter them from having the transplant," the doctor notes.

The grafts are dissected under binocular microscopic visualization. The majority consist of single hairs, but two-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.

GETTING THE SITE RIGHT

Recipient-site creation is the essential aesthetic step. In the medial-most aspect of the brow, the hairs tend to grow vertically. The hairs then rapidly change from a vertical to a horizontal direction of growth as one proceeds laterally, with the hairs cross-hatching in the middle section, enhancing the density.

In addition to the vertical and horizontal axes, the angle of the recipient sites should be as shallow to the skin as possible, in order to allow for the hairs to grow in a flat position relative to the forehead, avoiding their growing or "sticking out."

The recipient sites are made using 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 the following advantages:

- They allow for the closest possible placement of the hairs to one another;
- They minimize the risk of damage to

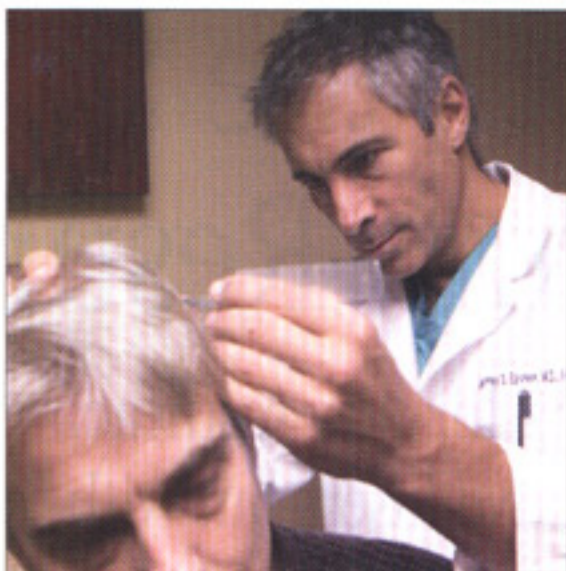


Figure 8. Epstein inspects a patient's donor area in order to assess whether or not he is a good candidate for surgery.

already existing hairs; and,

- They allow for greater control of the direction and angle of hair growth

For eyelash restoration, "I have to date limited all but one of my cases to the upper eyelid," Epstein says. "In my one case of lower-eyelid transplanting, a good outcome was achieved with a procedure of approximately 15 grafts to the lower eyelid to provide at least a minimum amount of growth."

The technique of eyelash transplant-

ing is completely different. Rather than trimming the donor hairs quite short and inserting them into recipient sites, the donor hairs (which are left long) are first threaded onto a curved needle, which is then placed into the upper eyelid at or just below the superior tarsal crease to emerge at the lid margin—pulling through the donor hair.

The hairs are pulled so that the follicle rests inside the skin. These curved needles can avoid trauma to any existing eyelash hair and create a desirable slight curvature to the hairs. In any case, curling of the hairs—along with monthly trimming—is to be expected. ■

Jeffrey S. Epstein, MD, FACS, is the Director of the Women's Center for Hair Loss, and Director, Foundation for Hair Restoration, both of New York City and of Miami, Boca Raton, and Tampa, Fla. He is also a clinical instructor at the University of Miami.

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