

Hair transplantation

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ABSTRACT

Hair transplantation is a technique in which hair follicles are harvested from the occipital area and re-transplanted in the frontal bald area. Hair transplantation is the most common cosmetic procedure in the United States nowadays despite the fact that it is expensive. Usually, patients need more than one session to receive a cosmetically acceptable result and patients need to be understanding and have realistic expectations. Although most of our patients are males, females represent about 10-15% of our new patients. This article reviews the basic principals of hair transplantation and describes new and improved techniques of hair transplantation.

Keywords: Hair, transplantation, graft.

Saudi Medical Journal 2000; Vol. 21 (9): 821-825

The basic principals of hair transplantation were introduced in the early 19th century when Dieffenbach published a thesis at Wurzburg in 1822 describing investigations in allotransplantations and autotransplantation of hair.¹ However, it was only in 1939 when Okuda; a Japanese dermatologist, described the use of small full thickness autografts of hair bearing skin for the correction of alopecia.^{2,3} In 1959, Orentreich described the principals of donor dominance and introduced the use of small trephins for both the donor harvesting and recipient area preparation.⁴ Since then, there has been great improvements in hair transplantation especially over the last 10 years. This article will describe the technique of hair transplantation.

Donor area. A safe donor area is defined by Dr. Unger as having a minimum of 8 hairs per 4 mm diameter punch. The height of this area is 70 mm in the occipital region, 80 mm in the parietal region, and 50 mm in the temporal region. The majority of our patients have a permanent donor area large enough to yield 6 surgical sessions of 500 mini and micrografts.⁵ In evaluating the donor area, there are 5 factors that are of importance. 1. Density. Since the advent of strip harvesting or elliptical harvesting, the density of the donor area has become the prime parameter in allowing us to harvest the maximum amount of hair per square centimeter. Previously

when harvesting was carried out with a 4 mm punch, we would harvest the exact same amount of grafts per area independently of the density. 2. Caliber. The caliber of the hair is very important in that the thin calibered hair gives us the most natural look. If the hair shaft is very thick and wiry and the grafts are placed into slits, there will be a compression causing the individual graft to appear thicker than the surrounding hair. The thicker the hair shaft, the more density is required to achieve a natural look. 3. Color. The ideal candidate for hair transplantation should have a gray, or salt and pepper colored hair. These individuals need less grafts to achieve a natural result as compared to people with dark hair. People with blonde and red hair are also good candidates. 4. Curl. Curly and wavy hair gives us a very natural look with the minimum amount of hair transplanted. 5. General condition of the scalp. It is our impression that if the scalp is neglected before hair transplantation, this patient is less motivated to do the post operative care.

Anesthesia. The anesthesia is achieved using 1.0% xylocaine with 1:100,000 epinephrine. We use a 3cc syringe with 30 gauge needle and inject slowly to decrease the discomfort of the anesthesia. We do not add any buffering solution because it decreases the efficacy of the anesthetic and diminishes some of the hemostatic effect.

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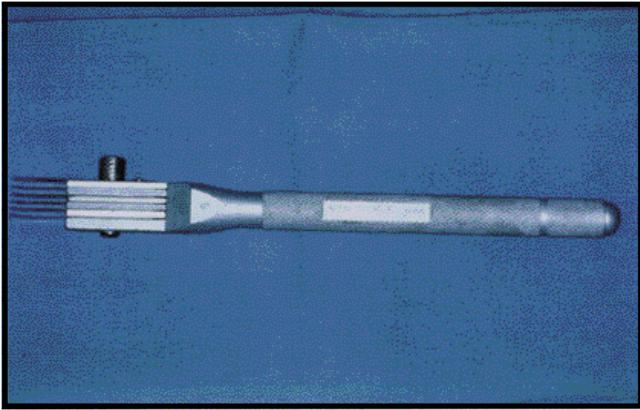


Figure 1 - Van Sickle multibladed knife with interchangeable spacer size.

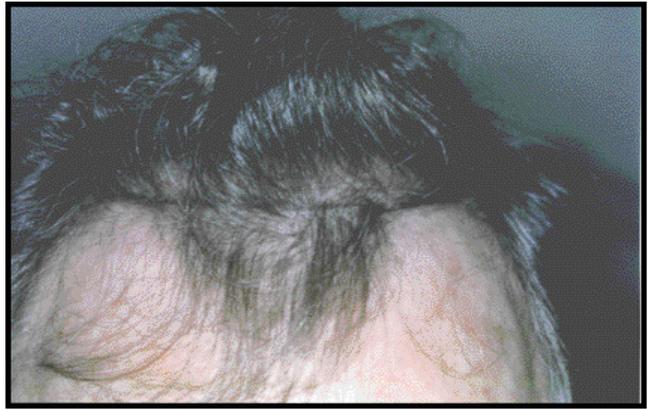


Figure 4 - Hair transition zone should be 1-1.5cm in height, U shaped. Grafts should be spaced randomly. Nothing in nature grows in rows.

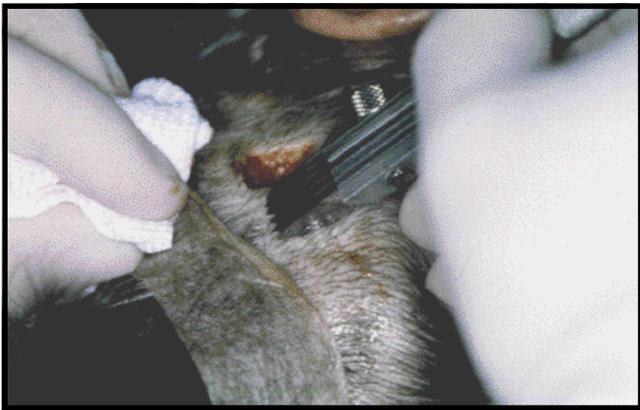


Figure 2 - Vertical strip harvesting. Each strip is 1-1.5 cm in height and 1.5 mm in thickness.



Figure 5 - Conversation look. The hair line should be 3-4cm above the superior one third of the face.



Figure 3 - Tumescence is carried out in 2 plains superficial and deep to increase the turgor of the skin.

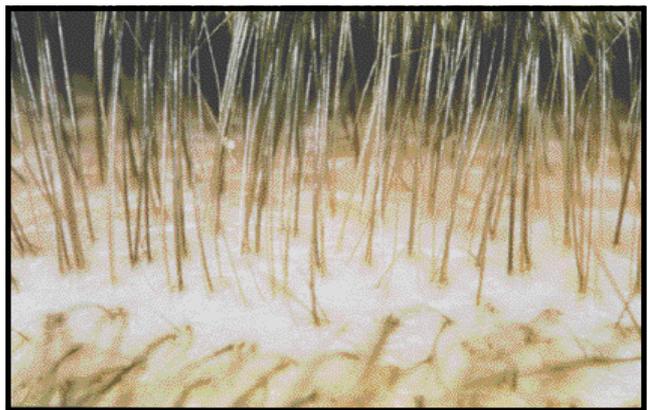


Figure 6 - Follicular units. In nature hair grows in bundles of 1, 2, 3, 4 hairs.

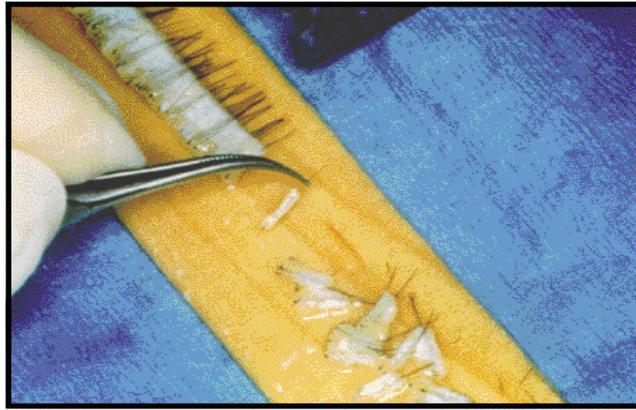


Figure 7 - Long strip being cut into follicular units.

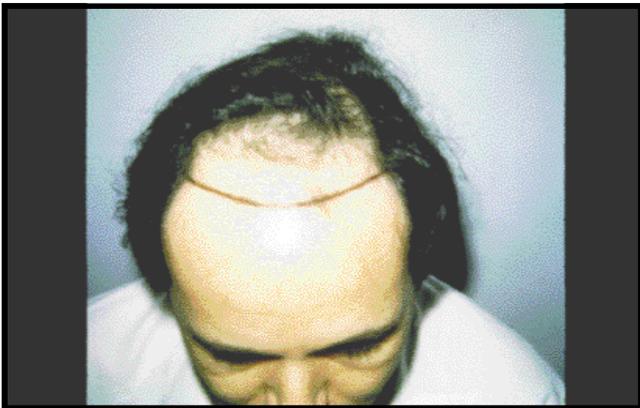


Figure 8A - A 42 year old male patient with grade IV baldness on the Hamilton scale before the 1st session.



Figure 8B - Same patient 2 years after the 3rd session, 600 grafts each. Sessions were 6 months apart.



Figure 9A - A 28 year old Seryan male patient, grade VI baldness on the Hamilton scale before the 1st session.

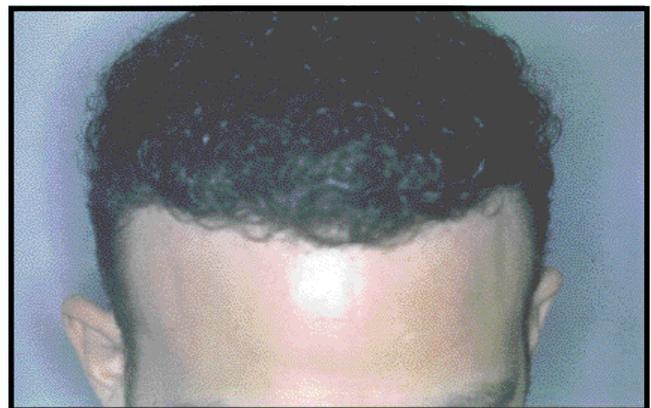


Figure 9B - Same patient 18 months after the 6th session, 600 grafts each. Sessions were carried out every 6 months.

Harvesting. Many steps are carried out and are discussed as follows:-

Saline infiltration (tumescence). Prior to harvesting each of the strips, the donor area is tumesced to the extent that it is hard and cannot be indented by the finger (Figure 1).⁶ It is our contention that if the donor area is not properly tumesced, it may lead to transection of the follicles.

Multibladed knives, horizontal strips verses vertical strips. The grafts used to be harvested as a 4 mm punch. This gave way to 4.5 mm punch and quartering of grafts. In recent years, many authors, such as Brandy, has refined a multibladed knife (Figure 2).⁷ This multibladed scalpel has been used for the last 10 years to harvest strips in a horizontal fashion. We feel that the ideal way to harvest stripes is in a vertical fashion (Figure 3). Each vertical strip measures from 1-1.5 cm in height and 1.5 mm in thickness. Multiple stripes parallel to each other are harvested creating a defect of about 10 cm in length and 1.5 cm in height. The advantage of this technique over horizontal harvesting is: 1. Complete visualization of the follicles; 2. Less transaction of the roots because we can adjust to the angle of the hair every 3/4 of cm and 3. Less cutting of hair for the technician. The disadvantage is that it is more time consuming.

Excision of previous scars. The greatest advance in hair transplantation surgery since its inception is not only the minigrafts, micrografts, laser assisted hair transplantation, follicular grafts or even preparation of grafts using the dissecting microscope; but also the way in which we can maximize the amount of hair we can harvest from the donor area. We recommend harvesting the hair from the superior aspect of one ear to the midline; the "filet mignon" in the first session and from the midline of the donor area to the superior aspect of the other ear in the second session. This allows us to harvest grafts from two virgin areas. From the third session on, the scar of the previous transplant will be removed so as to leave the patient with only a single scar on completion of all his hair transplantation.

Sutures versus staples closure. In a study carried out in HotSprings, Arkansas by Dr. Dow Stough on 10 physicians having hair transplantation; half of the donor area was closed using sutures, the other half was closed using staples. All preferred the healing and the cosmetic result on the stapled side.⁸

Recipient area. The recipient area has to be designed according to the following parameters.

Absence of visible hair line. The greatest mistake we have seen over the years is the placement of an inappropriate hair line, or rather the transition zone between the bald forehead and the thicker hair of the scalp. This transition zone varies according to the caliber, color, and curl of the hair, but it should be approximately 1-1.5 cm in height (Figure 4). It should be emphasized that this zone should be U-

shaped as apposed to V-shaped because it does not appear to be natural in a V-shaped form. Straight lines should be avoided in cosmetic surgery.

Conservative look. In designing the hair line (frontal transition zone), one should keep in mind that the average hair line of a 65 year old is considerably different from that of an 18 year old. It is often difficult to resist the temptation of giving the patient an adolescent hair line. Many patients insist on having the hair line placed at its original level. We attempt to design the hair line using the following parameters. The face is divided into three parts. The third part of which starts from the glabella to the hair line and is half the distance from the chin to the glabella. The crucial point to remember is not where the placement of the line is but where the hair meets the forehead in a naturally groomed fashion. This means that it is any where from 3-4 cm above the superior third (Figure 5).⁹ The younger the patient, the more conservative the hair line should be, but unfortunately it is these patients who insist on having the hair line as low as possible. We cannot reliably predict the extent of future baldness. This fact should be kept in mind prior to beginning a hair transplantation. The donor area has a finite amount of hair and as the baldness proceeds, the demands increase. When a young patient insists on having the crown transplanted, it is imperative that the physician plans accordingly. We do not want to run out of grafts and end up with having "hare-krishna" type of tufts. The more extensive the baldness, the more limited the expectations of the patient has to be. We can achieve good results in even type V baldness, provided that the donor area is good. Transplanting patients with type VI-VII baldness requires compromises, the patient has to settle for less than complete coverage.

Random spacing. In the past, hair transplantations were obvious because they had a tufty-doll haired look. Nothing in nature grows in rows. We should not be placing our grafts in perfect rows because it catches the eye of the casual observer. The frontal transition zone should be placed in a random fashion using finer hair from the temporal area or from the inferior aspect of the occipital area for the very front and thicker hair for the area further back (Figure 4). We do not want our patient to be complimented on their beautiful hair transplantation. Contrarily they should be able to have a totally unapparent non obvious natural look.

Different types of grafts. There are different types of grafts: (i) Drill grafts, (ii) Slit grafts, (iii) Follicular units grafts, and (iv) Laser grafts.

(i) **Drill grafts.** Drill grafts of all types using different instrumentations including laser, serve in removing bald skin, while in slit grafts no bald skin is removed. When using drill grafts, we can achieve more density because removal of 1500, 1-1.5 mm cylinders of bald skin is equivalent to doing a scalp

reduction, ie, leaving less bald skin to transplant.

ii. Slit graphs. Slit graphs, on the other hand, are advantageous in their use for the frontal hair line, as well as in certain conditions such as female pattern baldness, thickening of different hair loss types in both men and women and transplantation of the whorl or calyx. We have to remember that it is the number of hairs not the number of grafts that counts

iii. Follicular units. In the last 2 years there has been much discussion about the follicular unit grafts. In nature, hair grows in bundles of 1, 2, 3 or 4 hairs (Figure 6).¹⁰ There is nothing new about this phenomena. Our technicians have been cutting follicular units for years, because it is almost impossible to separate the follicles without destroying them (Figure 7). All our grafts are prepared under magnifications using a wall mounted 4 X magnifier Lamp.

iv. Laser grafts. These are slits created by vaporization of the bald skin using CO² laser or more recently ERBIUM laser. The disadvantages of the laser in creating recipient sites are:- 1. Excessive crusting; 2. Delayed healing; 3. Destruction of the surrounding hair follicles; and 4. Delayed hair regrowth.¹¹ The advantage is that it gives more density and less compression of the grafts than the regular slits created by the knife. However, this is an inappropriate comparison as laser grafts should be compared to drill grafts and not slit grafts.

Laxy of the scalp. A patient with advanced baldness; type VI or VII, that is not a candidate for hair transplantation may be converted into a candidate by doing a scalp reduction, allowing us to remove the maximum amount of skin possible, thus decreasing the demand to hair ratio. In recent years this technique has lost its popularity.

Post operative. Usually, we discharge our patients with a turban dressing which is removed the following day, and the hair is washed. Afterwards, the patient continues to use an antibiotic ointment as liberally as possible for about 10 days to enhance the

healing process. The staples are removed within 10 days. We encourage our patients to start using Minoxidil 5% (Rogaine) twice a day and Finasteride 1 mg (Propecia) once a day 2 weeks postoperatively.¹²

In conclusion of this article, we summarized our technique of hair transplantation emphasizing the new advances in the technique in the past 5 years. We believe that the new era of hair transplantation will begin when we succeed in cloning the hair follicles and thus all patients will be candidates with no limits to the number of sessions (Figure 8A and B and Figure 9A and B).

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