

Does haphazard implantation of follicular units affect the long term outcome of hair growth redirection in hair restoration surgery in male baldness?

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Abstract

The ideal goals of hair restoration surgery are to achieve dense hair, naturally matching with the recipient hair direction and minimal donor site scarring. This study was done on 15 male patients with grades II, III and IV male pattern baldness to evaluate the one-year cosmetic outcome of hair restoration surgery, regardless of their initial direction of implantation at the recipient bald area. The strip graft technique was used for harvesting the follicular units. The study showed that hair could be directed as willingly through regular combing, even though other surgeons have postulated the theory of a fixed direction at the initial insertion of the follicles during surgery, in order to maintain a more natural look post-surgery. In conclusion, time wasted during surgery for insertion of follicular units in certain direction at the recipient site aiming for a natural post-operative outcome, proved unworthy.

Introduction:

Hair transplantation has been of major concern to a considerable percentage of men with male pattern baldness, thus increasing the demand for hair transplantation or other methods of hair treatment.¹ With evolution of instrumental technology, follicular unit transplantation has evolved to higher standards of satisfactory results to both patients and surgeons.² A major concern was always the direction of transplanted hair, how natural it appeared after surgery and minimal scarring at both the donor and recipient sites.³

Extracting follicular units is time consuming, and in addition, this procedure also has a higher liability of wasting precious follicular units in the inexperienced hands and lack of appropriate 3D stereomicroscope. The sole advantage of harvesting follicular units over strip grafts is the minimal donor scar, and faster wound healing at the donor site.⁴

Scarring at the recipient site is now minimized by the use of special introduction needles, which render small slit or oval incisions.⁵ These instruments also help produce

a more natural post-operative outcome of transplanted follicles, avoiding epidermal hypertrophy at the recipient site, and the old hair doll appearance of larger diameter harvested follicles in need of wider incisions at the site of bald areas.⁶

The concern now is directed to the long-term outcome of hair transplantation when hairs grow to noticeable lengths, and whether their direction of growth will be in harmony with the naturally occurring hairs or not?^{7,8} For this reason, we carried out this study to evaluate the long-term outcome of the hair direction after follicular implantation regardless of their initial direction of implantation at the recipient bald areas.

Patients and methods:

The study was done on 15 male patients with grades II to IV male pattern baldness with their variants that became stable for at least - 12 months. Their ages ranged between 25 and 30 years. Exclusion criterion included patients with systemic co-morbidity, malnutrition, previous scalp surgery and scalp infection. A

written consent was taken from each patient according to the regulations of the research ethics committee in Ain Shams University Faculty of Medicine. One hair transplantation session was done for nine patients, two sessions

for five patients and three sessions for one patient **Table(1)**. The interval between the sessions was at least nine months apart and one year follow up after each session.

Table (1): Shows the number and percentage of patients who underwent single session, two sessions and three sessions of hair restoration surgery.

Total no. of patients for hair restoration surgery sessions	One session	Two sessions	Three sessions
15	9	5	1
Percentage of patients in relation to sessions	60 %	33.3 %	6.67 %

Technique of hair restoration surgery:

Donor site preparation:

The safe donor area for permanent folloicle harvesting was marked at the occipital area of the scalp between two imaginary lines, superiorly joining the highest points to the two ear helical arches and inferiorly a line located 2cm above the inferior hair line while the patient is sitting upright. The hair is cut to 2mms in height using a sterile electric hair trimmer. The donor area was injected with 2% lidocaine in a mixture of adrenaline solution and 0.9 % normal saline solution in a ratio of 1:50. Injection of the mixture was done at

depths of the scalp to render the strip site bloodless and turgid for easier strip harvesting.

Recipient site preparation:

The recipient bald area was also marked to mock the original male pattern hair and aided with any old photos of the patients looks prior to their baldness. The same mixture of the donor area was injected at the recipient area.

Slits at the recipient area were done using a special sharp spear of 1.2 mm in diameter and 5 mm length **Figure(1)**. The slits at the recipient area were all created in no particular direction to the scalp and were then dilated using a special slit dilator **Figure(2)**.



Figuer (1): Showing spear shaped instrument for slit incisions.



Figure (2): Showing recipient slits made in no particular direction.

During the initial phase of follicular unit transplantation, the concept of fixed arrangement of follicular units in one direction, or even a direction in match with nearby follicles was not considered. Follicles were

introduced at the recipient site in no particular direction, and the wound was dressed and secured by vaseline gauze and crepe bandage. The follicles were inspected six days later. Stitches were taken out from the donor area

two weeks post-operatively, and follow up every two months was recommended until 4 cm of hair length could clarify the direction of hair and its harmony gained by hair combing with the original follicles adjacent to the treated bald area. In order to reach a 4 cm hair length suitable for appropriate combing, a period of at least seven months is necessary.

Evaluation of the aesthetic outcome was done subjectively by patient self- evaluation with four Likert subscales for the degree of satisfaction (very satisfied, satisfied, less satisfied and unsatisfied). Objective evaluation of standard pre- and late postoperative photos was assessed by hair transplantation surgeons who had not participated in the surgical procedure, based on hair density, direction and symmetry of the hairline.

Results:

Patients were followed up for a period of 12 months post-operatively, to allow hair to grow to 4 cm or more in length. All patients showed natural harmony of hair direction to nearby follicles. None of our patients commented on the transplanted hair direction, but rather its density, and the possible need of another hair transplantation session in the near future.

The aesthetic outcome of the patients was highly acceptable by most of the patients. Satisfied and very satisfied patients constituted 73.2 % of our cases **Table(2)**. The low percentage of very satisfied patients was based on their judgment of hair density alone and not hair direction.

Table (2): Showing results of the aesthetic outcome shown by Likert subscales.

Patient's self evaluation	Number of patients N= 15	
	Number	%
Very satisfied	1	6.6 %
Satisfied	10	66.6 %
Less satisfied	4	26.6 %
Unsatisfied	0	0 %

The objective evaluation of the standard photographs considered the aesthetic outcome good to very good in 80 % of cases. In general, unfavorable results of patient dissatisfaction, and fair to poor aesthetic outcome were limited to cases subjected to one hair transplantation session with insufficient hair density. None of

our patients commented on the hair direction or the anterior hairline and its symmetry **Table(3)**. **Figures (3-6)** Complications were few and limited to postoperative pain at the donor site and mild edema of the forehead and upper eyelids that resolved completely within 72 hours.

Table (3): Showing objective evaluation results.

Observer's evaluation	Number of patients N= 15	
	Number	%
Very good	3	20 %
Good	9	60 %
Fair	3	20 %
Poor	0	0 %



Figure (3a): Pre-operative marking. Figure (3b): 6 month post-operative frontal view. Figure (3c): 6 months post-operative lateral view.

Figure (3): Case 1: Showing preoperative and 6 month post-operative views with harmonious hair.

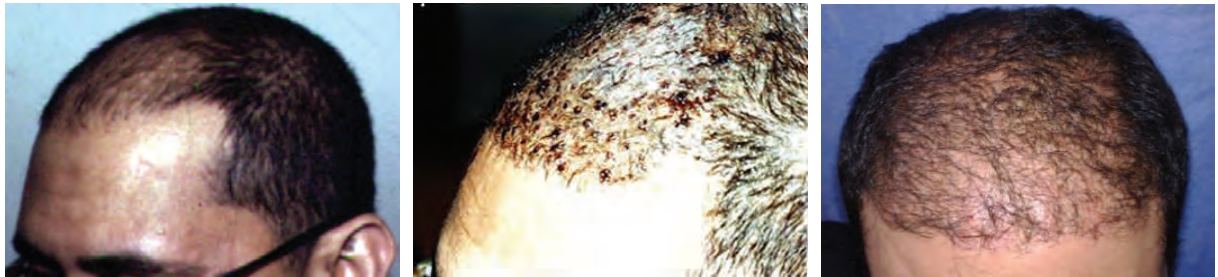


Figure (4a): Pre-operative. Figure (4b): Early post-operative. Figure (4c): Post-operative 6 mths.



Figure (4d): One year follow up right side.



Figure (4e): One year follow up left side.

Figure (4): Case 2: Showing preoperative, early and late postoperative harmonious hair direction.



Figure (5a): Pre-operative frontal view. Figure (5b): 6 months post-operative. Figure (5c): 1 year post-operative.

Figure (5): Case 3: Showing preoperative and post-operative direction and hair length.



Figure (6a): Showing haphazard arrangement of sparse hair.



Figure (6b): Showing harmonious arrangement of transplanted hair.

Figure (6): Case 4: Showing preoperative and post-operative direction and hair length.

Discussion:

The techniques of hair transplantation were refined over decades in an attempt to achieve the best aesthetic outcome. The goals of hair restoration surgery are achieving natural appearance of the transplanted hair, providing as much density as possible in the least number of sessions, and minimizing donor site morbidity.³

Debate among hair transplantation surgeons has been focused on adjusting the direction of the slit incisions made at the recipient site, the direction of introducing follicular units, or both. Unger, 2004, stressed that slits should

be made at the recipient bald area to mimic directions and angles seen in natural hair.⁸ Bernstein, 2005, recommended creation of lateral slits at the recipient sites, also called coronal or horizontal slits. He mentioned that lateral slits have the advantage of orienting the hair within the follicular unit to match the way it grows in nature.⁹ Beehner, 2005, considered that misplacing follicular units at the time of introduction to be of greater importance.¹⁰

Sparse hair near the recipient bald area usually shows haphazard direction and arrangement. Literature was lacking as to whether this arrangement is due to weak hair

unable to maintain a certain direction, hair vulnerability to external factors as wind, or finally whether patients lose intimate care of the sparse area they usually call “totally bald”.¹¹

In our study, this important fact of the haphazard arrangement of the sparse hair at the frontal area was noted in all 15 patients. The enhanced post-operative results were based on improvement of hair direction and density and thus the ability to comb denser homogenous hair, as compared to pre-operative haphazardly arranged sparse hair.

We preferred the use of a spear shaped instrument (1.2mm in diameter and 5 mm in length). As reported by many authors, a slit incision of less than 1.5 mm in diameter at the recipient bald area leaves no visible scars.¹² The spear created limited depth incisions, minimized injury to the deeper scalp vessels and ensured non-visible post-operative scars. These scars are responsible for pitting or surface irregularities seen with other instruments used in hair restoration procedures.¹³

Because transplanted follicles have to pass through all phases of hair growth (catagen, telogen and anagen) phases, enough hair length for proper assessment of hair direction could not be judged before at least a “seven” month period from the operation. This is explained by the fact that after follicular transplantation, the catagen phase sets in, and the follicles are between shedding and new growth. This phase lasts for about two weeks. Catagen phase is then preceded by the telogen phase, where the old hair is dead but in place, until the new roots of the growing hairs are strong enough to remove them. This phase lasts for nearly two to four months. Two and half to four and a half months later, the final anagen phase commences, where hairs start to grow. This phase lasts for two to seven years. Hair growth is about 1cm every 28 days.⁸

This study proves that neither fixing the direction of slit incisions created at the recipient area, nor adjusting the direction of follicular units themselves, to have any unfavorable effect on the pattern of hair growth and its direction in relation to the original hair after reaching considerable lengths of more than 4 cm. Hair could be directed as willingly through

regular combing, even though other surgeons have postulated the theory of a fixed direction at the initial insertion of the follicles during surgery, in order to maintain a more natural look afterwards.¹⁴

Conclusion:

Direction of both slit incisions at the recipient site and transplanted hair has no effect on the remote final direction of hair. Time wasted during surgery for insertion of follicular units in certain direction at the recipient site, proved unworthy.

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