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## Hair transplant FUE (Follicular Unit Extraction) technique

**Raees Khan, Bilal Khan, Akhatar Hussain Choudhary, Manzoor Ahamd and Khurshid Alam**

### Abstract

Hair transplantation has come a long way from the days of Punch Hair Transplant by Dr. Orentreich in 1950s to Follicular Unit Hair Transplant (FUT) of 1990s and the very recent Follicular Unit Extraction (FUE) technique. With the advent of FUE, the dream of 'no visible scarring' in the donor area is now looking like a possibility. In FUE, the grafts are extracted as individual follicular units in a two-step or three-step technique whereas the method of implantation remains the same as in the traditional FUT. The addition of latest automated FUE technique seeks to overcome some of the limitations in this relatively new technique and it is now possible to achieve more than a thousand grafts in one day in trained hands. This article describes in detail of FUE hair transplant.

**Keywords:** Hair transplant, Follicular Unit Extraction, cosmetic procedure, balding, FUE technique

### Introduction

Hair transplant is a cosmetic procedure performed on men and occasionally on women, who have significant hair loss, thinning hair, or bald spots where hair no longer grows. A moderately balding man require upto 1000 grafts to get good coverage of a bald area, consequently a series of surgeries scheduled 3-4 months apart is usually required. Individuals may be completely aware during the procedure with just a local anaesthetic drug applied to numb the areas of the scalp. Some persons may be given a drug to help them relax or may be given an anaesthetic drug that puts them to sleep.<sup>1</sup>

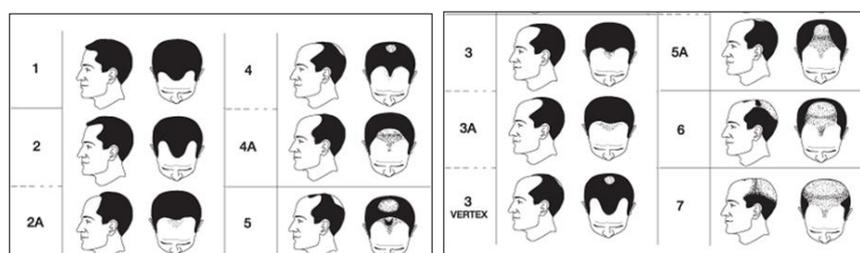
### Classification

- The *Norwood Classification* is a system that professionals use to characterize male pattern baldness. Depending on the location and the severity, pattern baldness is classified according to 1 of 7 stages. This helps hair surgeons understand both the extent of the current condition as well as the pattern in which balding is most likely to follow. These two variables play a critical role in determining which hair loss treatment options are capable of restoring areas of the scalp that are thin or completely bald.
- The Norwood Classification also provides a framework for understanding how the patient's baldness may progress. This becomes a very important variable when the patient chooses a hair transplant procedure. Understanding how baldness may progress enables the surgeon to deliver a beautifully natural-looking end result by strategically restoring areas that are thin, balding, or susceptible to future hair loss.<sup>2</sup>

### Norwood's Classification

#### The 7 stages of the Norwood Classification

are shown below. Each stage depicts a unique circumstance in which hair is thinning, shedding, or balding in specific areas:



### Causes

- Dust
- Smoke
- Air pollution
- Fumes
- Change in drinking water
- Bathing water
- Wrong eating habits
- Deficiency of vitamin A,C,E3

**Diagnosis Preparation** – Although hair transplant is fairly simple procedure, some risks are associated with any surgery. It is important to inform the physician about any medications currently being used and about previous allergic reactions to drugs or anesthetic agents. People with bleeding disorders also need to inform their physician before the procedure is performed.

### Harvesting Methods

- Strip harvesting
- Follicular unit extraction (FUE)
- Follicular unit transplant
- Robotic hair restoration

### Types of Surgery

- There are a number of applications for hair transplant surgery, including:
- Androgenetic alopecia
- Eyebrow transplant
- Frontal hair line lowering or reconstruction (naturally high hairlines without an existing hair loss condition)<sup>3</sup>
- If donor hair numbers from the back of the head are insufficient, it is possible to perform body hair transplantation (BHT) on appropriate candidates who have available donor hair on the chest, back, shoulders, torso and/or legs. Body hair transplant surgery can only be performed by the FUE harvesting method and, so, requires the skills of an experienced FUE surgeon. However, there are several factors for a potential BHT candidate to consider prior to surgery. These include understanding the natural difference in textural characteristics between body hair and scalp hair, growth rates, and having realistic expectations about the results of BHT surgery<sup>3</sup>

### FUE mechanism

- With Follicular Unit Extraction or FUE harvesting, individual follicular units containing 1 to 4 hairs are removed under local anesthesia; this micro removal typically uses tiny punches of between 0.6mm and 1.0mm in diameter. The surgeon then uses very small micro blades or fine needles to puncture the sites for receiving the grafts, placing them in a predetermined density and pattern, and angling the wounds in a consistent fashion to promote a realistic hair pattern. The technicians generally do the final part of the procedure, inserting the individual grafts in place.
- FUE takes place in a single long session or multiple small sessions. The FUE procedure is more time consuming than strip surgery. An FUE surgery time varies according to the surgeons experience, speed in harvesting and patient characteristics. The procedure can take anywhere from a couple hours to extract 200 grafts for a scar correction to a surgery over two

consecutive days for a mega session of 2,500 to 3,000 grafts<sup>[1]</sup>. With the FUE Hair Transplant procedure there are restrictions on patient candidacy<sup>[2]</sup>. Clients are selected for FUE based on a fox test<sup>[3]</sup>. though there is some debate about the usefulness of this in screening clients for FUE.

- FUE can give very natural results. The advantage over strip harvesting is that FUE harvesting negates the need for large areas of scalp tissue to be harvested, so there is no linear incision on the back of the head and it doesn't leave a linear scar. Because individual follicles are removed, only small, punctate scars remain which are virtually not visible and any post-surgical pain and discomfort is minimized. As no suture removal is required, recovery from Micro Grafting FUE is less than 7 days.
- Disadvantages include increased surgical times and higher cost to the patient<sup>[4]</sup>. It is challenging for new surgeons because the procedure is physically demanding and the learning curve to acquire the skills necessary is lengthy and tough<sup>[5]</sup>. Some surgeons note that FUE can lead to a lower ratio of successfully transplanted follicles as compared to strip harvesting<sup>3,4</sup>

### Investigations for Hair Transplant

- A number of investigations may be advised at the first consultation for hair transplant. These are necessary both to find out any causes for hair loss and also to ensure suitability for the surgical procedure.
- Blood routine investigations - hemoglobin, WBC, ESR.
- Random blood sugar
- Lipid profile - cholesterol, triglycerides, etc.
- Liver Function tests - serum bilirubin, SGOT, SGPT, etc.
- Thyroid function tests - T3, T4, TSH
- Iron metabolism tests - serum iron, Total Iron Binding Capacity, Ferritin
- Serological tests - like Hepatitis B
- Bleeding disorder tests - like bleeding times, clotting times
- This list is only an indication - all these tests may not be required or some additional tests may be given depending on the patient.<sup>2</sup>

### Complications of hair transplant surgery

- There are some minor, temporary complications:
- Temporary Thinning of Pre-Existing Hair
- Although rare, after the surgery some pre-existing hair can thin. The pre-existing hair will return to normal, full condition within a few months of the surgery.
- Bleeding
- Some bleeding is normal and will stop with simple pressure. Persistent bleeding occurs in about one in a few hundred cases. Additional stitching is rarely required.
- Pain
- Pain is usually rare and fairly minimal. Half of our patients do not require any pain relievers, and the others take Solpadine or Panadol for a few days.
- Numbness
- Some transient numbness is inevitable, usually in the donor area, and generally lasts from 3 to 18 weeks. It is rarely troublesome or long-lasting.

- Hiccups
- Hiccups may occur after surgery. The cause is not known, but hiccups seem to occur more frequently after hair transplantation than scalp reduction. The incidence of this complication is about 5%. It usually lasts several hours to several days.
- Itching
- Some itching commonly occurs but is rarely troublesome and lasts only a few days. Shampooing the hair daily will help the discomfort
- Swelling
- There is rarely any swelling. When there is, it can affect the forehead and the area around the eyes and last 1 to 2 days. In about 1% of cases, a “black eye” can develop.
- Infection
- This happens in one in several thousand cases and is easily treated with antibiotics.
- Scarring
- Keloid scarring occurs only in pre-disposed individuals, and even more rarely (one in one thousand cases) this scarring can cause a ridging effect.
- Cysts
- One or more cysts may occur in the recipient area when many grafts have been inserted. They usually disappear by themselves after a few weeks or immediately with various simple treatments. They are usually no more than 2 or 3mm in diameter, i.e., the size of small pimples.<sup>4,5</sup>

#### Precautions

- DO's
- DO have someone drive you home after the procedure. The anesthetic sedative administered to relieve pain and help you relax during the procedure takes time to wear off, and it probably has not worn off yet by the time the surgery is done. So driving yourself home while the sedative is still kicking is not advisable as it might pose a danger to both you and to others.
- DO remember all the instructions given by your surgeon for postoperative hair transplant care. While there are general guides for most hair transplants, it is best to adhere to the instructions given by the person who administered your hair transplant, as that person knows what post-surgery care is best for your case.
- DO have the clinic's contact number saved in your phone and taped to your fridge so that you or a family member may reach your surgeon in case of adverse side effects or emergencies.
- DO keep your scalp dry especially on the first day to allow for the skin to heal.
- DO keep the area around your scalp clean throughout recovery. While there may be soreness and numbness in the grafted area, refrain from putting anything on your scalp, which has not been approved by your surgeon as it may only bring negative side effects.
- DO take care of your scar. As with any surgery, there will be a certain amount of scarring and itchiness when you get a hair transplant. You can apply the antibiotic topical cream your surgeon have given you to prevent infection and reduce scalp irritation and swelling. Otherwise, call the surgeon for any medication you can use.
- DO take painkillers if you experience pain and discomfort 3 to 4 hours post-surgery. This is roughly

- the time it takes for the anesthesia to wear off and you may experience minor soreness or swelling.
- DO sleep in a semi-upright position and use two or more pillows to elevate your head on the first night home after the procedure. Do the same for next two nights post-surgery. This position is important to avoid any excess swelling on your scalp. Try sleeping on a reclining chair if you can to keep your head elevated. If the grafts were implanted in the lower crown, or if there is a strip scar, you should sleep on the side on the first two nights so as not to disrupt hair growth or cause the grafts to fall off when it gets rubbed against the pillow.
- DO try to take time off work to rest adequately and allow the bruising around the hairline to subside.
- DO return to your surgeon's clinic two days after the procedure to have the clinic remove any bandages and for them to wash your hair.
- DO wash and shampoo your hair a day after the initial wash at the clinic to remove any more dead skin and to clean the scabs around the grafted hairs. Cleaning the scabs will prevent them from damaging the hair follicles and thwarting hair growth
- DO ask your surgeon for advice on the shampoo that is best for you. Apply this on the donor hair, as well as on the grafted parts of the scalp on the next day.
- DO hand wash your hair during the first couple of days after surgery instead of putting your head directly below the shower head. You can take a low-pressure shower around 4 days after the procedure. This will help the scabs to peel off, accelerate the healing process and lessen any signs of the operation.
- DO use an ice pack to reduce any bleeding or swelling on the first week. However, refrain from placing the ice pack directly onto the grafted area. Place it only on your forehead or on the back part of the head.
- DON'Ts
- DON'T expose yourself to direct sunlight immediately after and even a few days after the procedure, especially if the scalp is still swollen. If going outdoors in daytime is unavoidable, wear a hat.
- DON'T touch or fidget with the newly-grafted scalp. A little itching and some soreness are normal side effects, so picking at or rubbing the sore scalp might result to the new grafts falling out before they can have a chance to grow.
- DON'T drink alcohol for the first five days after the procedure as it interferes with the blood supply to the head.
- DON'T smoke for an entire month after the surgery as doing so can interrupt blood flow to your hair follicles. Blood flow is crucial for the growth of new hair, as such, refraining from, or even better, completely giving up smoking can hasten the growth of your hair. To prevent yourself from going cold turkey, start reducing your cigarette daily count a few months before your scheduled hair transplant.<sup>1,2,3,</sup>

#### Results

- Normal results –
- The transplanted hair will fall out within few weeks however new hair will start to grow in the graft sites within about 3 months. A normal rate of hair growth is about 0.25-0.5 in (6-13mm) per month

### **Morbidity and mortality rates**

Major complication as a result of hair transplant is extremely rare. Occasionally a person may have problems with delayed healing and infection, scarring or rejection of the grafts but these are uncommon 3

### **Conclusion**

An exciting advancement that propels the field of hair transplant surgery one step closer to the elite minimally invasive status. The promise of an almost scarless surgery is enticing to both patient and the surgeon. The reasons for selecting FUE rather than a strip harvest may be the avoidance of a linear scar, the desire for a naturally pain free post-op period or simply the idea of having a minimally invasive procedure. The technique can serve as an important alternative to traditional hair transplantation in certain selected patients. More research is needed to render the procedure faster, cut short the surgery time and improve the transaction rates, so that it can be adopted in greater number of patients.

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