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Editors Note

The field of Hair restoration surgery has seen rapid progress in recent years, particularly in the surgical techniques. At the same time, there has been an exponential increase in awareness about hair and beauty. Fuelled by repeated advertisements in press and on internet, people have become interested in hairloss and its treatments.

However it is rather unfortunate that there is much confusion in the minds of lay public about hairloss, baldness and their treatments. The advertisements which are often initiated by nonmedical beauty clinics, often contain exaggerated , misleading information which confuse the lay public.

This book is an effort to provide scientifically and ethically correct information in simple language to our patients and public. The chapters have been contributed by well known experts in the field from all over India.

We hope that the book will provide an useful source of information.

As the editor of the book, I thank the authors for their contribution.

Venkataram Mysore
Editor
President Association of Hair Restoration surgeons India

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Hair Restoration patient Booklet

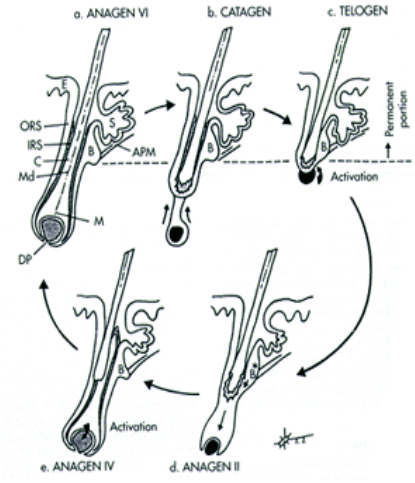
Chapter 1 Hair cycle,Hairloss , and Permanent pattern baldness;

Venkataram Mysore

Hair is a very important structure cosmetically. Ironically it does not serve much useful function for the body. However, it in a way serves as our passport to the society- how we look is largely decided by the appearance of the hair. - it contributes to the self-image of an individual, thus affecting the personality of a person. This explains the society's obsession with hair. More money is spent on hair cosmetics and hair treatments than any other ailment!. Advertisements of all types abound in the lay press, often giving false and incomplete information. Hence it is very important to understand the causes of hairloss, and their treatments.

The normal hair growth cycle and Natural shedding

The human body contains approximately five million hair follicles while the scalp (prior to any kind of hair loss) contains 100,000-150,000 hair follicles. Blondes have the greatest number of scalp follicles, followed by brunettes. Humans with red hair have the fewest number of scalp follicles. The normal growth rate of scalp hair is one-fourth to one-half inch per month **.At full maturity, the human scalp maintains an average of 100,000 hair follicles. Hair is made up of proteins called keratins. Human hair grows in a continuous cyclic pattern of growth and rest known as the "hair growth cycle." Normal hair goes through 3 stages: (fif1)**



Growth cycle of Hair
1. growing phase or anagen: 3-5 years
2. resting phase or catagen: 2-4 weeks
3. falling phase or telogen: 2-4 months
90% of hairs are in growing phase
Hair grows at 1cm per month
50-100 hairs are lost daily during bathing
Hormonal, nutritional factors, stress, deficiency of vitamins, internal diseases affect hair growth
Male hormones are the most important factor for hair growth

Fig 1 Hair cycle

Of **the 100,000 hairs in the adult scalp, 90% are in growing stage (called anagen) . The average duration of anagen is 1000 days. The average daily loss of telogen hairs is 100, which is considered normal. After any illness or stress, delivery etc, this number of telogen hairs can go up leading to hair loss and is referred to as telogen effluium.This is the most common cause for hair loss.**

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What causes hair loss?

The most common cause of hair loss is inheritance. Men and women inherit the gene for hair loss from either or both parents. Men are most commonly affected by the inherited gene as the hormone, testosterone, activates the genetic program causing loss of hair follicles. Currently there is no known method of stopping this type of hair loss. The age of onset, extent, and rate of hair loss vary from person to person. Severe illness, malnutrition, or vitamin deficiency can accelerate this process. When applied incorrectly, permanent hair color and chemical relaxers damage the hair and follicle to the extent that hair loss can be permanent. Causes of hair loss do not include wearing a hat, excessive shampooing, lack of blood flow, or clogged pores.

Among the many medical conditions that can cause hair loss, the most common ones are:

* anemia
* thyroid disease
* other endocrine problems (especially those that produce excess androgens)
* gynecological conditions - such as ovarian tumors
* connective tissue disease (such as Lupus)
* surgical procedures and general anesthesia
* rapid weight loss or crash diets that are not nutritionally balanced
* severe emotional stress

It is also important to review the use of medications that can cause hair loss. The more common ones are:

* oral contraceptives
* thyroid medication
* blood pressure medication (such as beta-blockers or water pills)
* "mood" medication such as lithium, Prozac, or tri-cyclic antidepressants
* blood thinners such as heparin or coumadin
* cholesterol lowering medication
* medication for gout, such as Zyloprim
* anti-inflammatory drugs such as cortisone
* vitamin A or tryptophan in high doses

street drugs (such as cocaine)

Localized Hair Loss

There are others causes of hair loss in women that are relatively common. Hairstyles that exert constant pull on the hair, such as "corn rows" or tightly woven braids produce a characteristic pattern called "Traction Alopecia" that can be identified by a rim of thinning or baldness along the frontal hairline and at the temples. This is easily prevented by changing your daily habits, but once the hair loss occurs it may be permanent. Fortunately this condition is easily amenable to surgery.

It is not often mentioned, but brow- and face-lift surgery can often result in local hair loss in the vicinity of the incision. This may present as hair loss along the frontal hairline, in the temples or adjacent to a surgical scar. Fortunately, these women have not experienced other types of hair loss and thus have a good donor supply and make excellent candidates for hair transplantation.
It is important to remember that there are also medical conditions that can cause localized hair loss such as Lupus, Alopecia Areata, fungal infections and a number of other problems that would require a knowledgeable physician for diagnosis and treatment. Some of the simple tests used to diagnosis these conditions include a scraping and culture for fungus and a skin biopsy that may identify Lupus or other causes of scarring hair loss.
Some of the tests that your doctor might order in these situations include the following:

* Total and Free Testosterone - the hormone that is mainly responsible for male secondary sex characteristics
* DHEA-Sulfate - a precursor to testosterone
* Prolactin - the hormone that enables the breast to secrete milk

Other test that are commonly ordered for underlying medical conditions include:

* CBC (complete blood count) - for Anemia
* Serum iron (and TIBC) - for Anemia
* T3, T4, TSH - for Thyroid disease
* ANA - for Lupus
* STS - for Syphilis

MALE PATTERN HAIR LOSS (Androgenetic Alopecia)

It is estimated that 35 million men in the United States are affected by androgenetic alopecia. "Andro" refers to the androgens (testosterone, dihydrotestosterone) necessary to produce male-pattern hair loss (MPHL). "Genetic" refers to the inherited gene necessary for MPHL to occur. In men who develop MPHL the hair loss may begin any time after puberty when blood levels of androgens rise. The first change is usually recession in the temporal areas, which is seen in 96 percent of mature Caucasian males, including those men not destined to progress to further hair loss. Hamilton and later Norwood have classified the patterns of MPHL
Although the density of hair in a given pattern of loss tends to diminish with age, there is no way to predict what pattern of hair loss a young man with early MPHL will eventually assume. In general, those who begin losing hair in the second decade are those in whom the hair loss will be the most

severe. In some men, initial male-pattern hair loss may be delayed until the late third to fourth decade. It is generally recognized that men in their 20’s have a 20 percent incidence of MPHL, in their 30’s a 30 percent incidence of MPHL, in their 40’s a 40 percent incidence of MPLH, etc.

Using these numbers one can see that a male in his 90's has a 90 percent chance of having some degree of MPHL.

Hamilton first noted that androgens (testosterone, dihydrotestosterone) are necessary for the development of MPHL. The amount of androgens present does not need to be greater than normal for MPHL to occur. If androgens are present in normal amounts and the gene for hair loss is present, male pattern hair loss will occur. Axillary (under arm) and pubic hair is dependent on testosterone for growth. Beard growth and male pattern hair loss are dependent on dihydrotestosterone (DHT). Testosterone is converted to DHT by the enzyme, 5¤ -reductase. Finasteride (Propecia®) acts by blocking this enzyme and decreasing the amount of DHT. Receptors exist on cells that bind androgens. These receptors have the greatest affinity for DHT followed by testosterone, estrogen, and progesterone. After binding to the receptor, DHT goes into the cell and interacts with the nucleus of the cell altering the production of protein by the DNA in the nucleus of the cell. Ultimately growth of the hair follicle ceases.

The hair growth cycle is affected in that the percentage of hairs in the growth phase (anagen) and the duration of the growth phase diminish resulting in shorter hairs. More hairs are in the resting state (telogen) and these hairs are much more subject to loss with the daily trauma of combing and washing. The hair shafts in MPHL become progressively miniaturized(fig 2) smaller in diameter and length, with time. In men with MPHL all the hairs in an affected area may eventually (but not necessarily) become involved in the process and may with time cover the region with fine (vellus) hair. Pigment (color) production is also terminated with miniaturization so the fine hair becomes lighter in color. The lighter color, miniaturized hairs cause the area to first appear thin. Involved areas in men can completely lose all follicles over time. MPHL is an inherited condition and the gene can be inherited from either the mother or father's side. There is a common myth that inheritance is only from the mother's side. This is not true.

Fig 2Miniaturization of hair

In summary, male pattern hair loss (Androgenetic Alopecia) is an inherited condition manifested when androgens are present in normal amounts. The gene can be inherited from the mother or father's side. The onset, rate, and severity of hair loss are unpredictable. The severity increases with age and if the condition is present it will be progressive and relentless.

FEMALE PATTERN HAIR LOSS (Androgenetic Alopecia)

Female pattern hair loss (FPHL) differs from male pattern hair loss (MPHL) in the following ways. It is more likely to be noticed later than in men, in the late twenties through early forties. It is likely to be seen at times of hormonal change, i.e., use of birth control pills, after childbirth,

around the time of menopause, and after menopause. Recession at the temples is less likely than in men and women tend to maintain the position of their hairlines. Like in men, the entire top of the scalp is the area of risk. In women there is generally a diffuse thinning throughout the area as opposed to thinning in the crown of men. Ludwig has classified hair loss in women into three classes.

The vast majority of women affected fall into the Ludwig I class.

In the United States it is estimated that 21 million women are affected by FPHL. The incidence in women has been reported to be as low as eight percent and as high as 87 percent. It does appear to be as common in women as in men. The hair loss in women becomes particularly notable in menopause.

Androgens are responsible for hair loss in women by the same mechanisms they cause hair loss in men. Women do produce small amounts of androgens by way of the ovaries and adrenal glands. Also prehormones are produced by the ovaries that are converted to androgens outside of the ovaries or adrenal glands. Women rarely experience total loss of hair in an area if the loss is due to FPHL. If they do they should be evaluated for an underlying pathological (disease) condition. In women, the process of miniaturization of the hair follicle is more random with some hair being unaffected. Normal thick hairs are mixed with finer, smaller diameter hairs. The end result is a visual decrease in density of hair rather than total loss of hair. The hair growth cycle is affected as in men. The growth phase (anagen) is shortened resulting in shorter hairs and the resting phase (telogen) is increased resulting in fewer hairs.

If the cause of hair loss is suspected to be abnormally elevated or decreased amounts of hormones the patient should undergo laboratory tests to measure hormone levels.

OTHER CAUSES OF HAIR LOSS

ALOPECIA AREATA

Alopecia areata (AA) is a recurrent disease, which can cause hairloss in any hair-bearing area. The most common type of AA presents as round or oval patches of hair loss most noticeably on the scalp or in the eyebrows. The hair usually grows back within 6 months to one year. Most patients will suffer episodes of hair loss in the same area in the future. Those who develop round or oval areas of hair loss can progress to loss of all scalp hair (alopecia totalis). The cause of AA is unknown but commonly thought to be an autoimmune disorder (the body does not recognize the hair follicles and attacks them). Patients frequently blame stress and anxiety as the cause of their hair loss. The most common treatment is with steroids (cortisone is one form) either topically or by injection. The outcome of treatment is good when the AA process is present less than one year and poor, especially in adults, if the disease has been present for longer periods of time. Minoxidil (Rogaine®) can help to regrow hair. Surgical treatment of this disorder is not recommended. If you have questions concerning Alopecia areata, please contact an ISHRS physician.

TRACTION ALOPECIA

Traction alopecia is caused by chronic traction (pulling) on the hair follicle and is seen most commonly in African-American females associated with tight braiding or cornrow hair styles. It is generally present along the hairline. Men who attach hairpieces to their existing hair can experience this type of permanent hairloss if the hairpiece is attached in the same location over a long period of time. Trichotillomania is a traction alopecia related to a compulsive disorder caused when patients pull on and pluck hairs, often creating bizarre patterns of hairloss. In long-term case of trichotillomania, permanent hairloss can occur.

Chapter 2

Drugs in hair transplantation

Dr.Venkataram Mysore

It is very important to understand male pattern hairless is a progressive condition and hence patients need a combination of drugs in addition to HT. Otherwise, fresh areas will become bald in future. Presently, there are different options:

Approved drugs for this purpose:

a) Minoxidil lotions 2%, 3, 5, 7, 10, 12.5%-it has to be applied daily twice Over the affected area

b) Finasteride 1mg tablets (propecia) - one tablet daily for 3-4 years and is more effective over vortex

c) Combination of minoxidil with other drugs such as retinoic acid, azelaic Acid

d) Peptides, which are new drugs

Other nondrug options include Platelet rich plasma , micro needling and low level laser. These are second line options and are used when drugs don't work well.

THE DRUGS ARE OF GREAT VALUE IN PREVENTING FUTURE BALDNESS AND THEREFORE IN ALL YOUNG PEOPLE WITH EARLY HAIRLOSS, THEY ARE NEEDED TO BE TAKEN. Most young patients with early and moderate baldness need drugs, even after they do transplantation. Otherwise, they will lose their existing hairs and need further sessions of transplantations.

How long to take drugs?

There is no fixed period and course, as there is no curative effect of these drugs. The drugs need to be taken as long as one wants to maintain hairs. Usually for most people this means till they marry, establish their careers and settle down. This means several years for any young man.

Do these drugs have side effects?

This is the most frequently asked question; there is a lot of misinformation and exaggeration about the side effects. The patients need to understand that:

a) Any drug that has an effect will always have a side effect; there is no drug, which has no side effects.
b) So the real question should be: are these side effects serious, are they permanent and are they treatable?

Minoxidil cause minor itching; other wise it is safe. Finasteride is currently the best drug for treating baldness. There is much exaggerated fear about its side effects of impotence and infertility. This has been researched in detail in several studies- and has been found that at the dosage at which it is given for baldness, which is 1 mg daily or 5 mg weekly, it has been found to be relatively safe. The side effects which have happened in 2% of patients include sexual side effects such as sexual dysfunction, impotence. Even these have been found to be temporary and reversible in most patients . So the patient can stop them any time he wants to, around marriage time or pregnancy time. FDA(federal drug administration USA) has recommended that there is no causal relation ship between the drugs and the side effect .

What is our experience and position?

In our experience , we have found the drug to be safe. As a matter of caution, we use the drug at half the recommended dose.i.e. 1 tab alternate days and have found it to be effective and safe. We recommend that the drug be taken with out any hesitation, At the same time, we recognize the right of a patient .In case the patient is not willing to take the drug, we emphasise that the patient should understand :

a) There are only two proven drugs for treating pattern hair loss.
b) **The intake of drugs is not compulsory, but entirely voluntary.** These are not life saving drugs; therefore, a doctor does not force any patient to take them.
c) If out of any fear rimproper evidence, patient decides not to take them, it is entirely his decision-however, there are no other proven drug alternatives and therefore he should accept future hair loss and further sessions of transplantations

Chapter 3 Permanent baldness and hair transplantation

Venkataram Mysore

Permanent Pattern Baldness –commonly referred to as Common baldness of men and women- is an extremely common problem. Seventy percent of all men and fifty percent of women will experience some degree of pattern baldness in their lifetimes

Why does baldness occur?

Pattern hair loss of men and women (Androgenetic Alopecia) is an inherited condition caused by the normal level of androgens present in both men and women. For men (Male pattern hair loss-MPHL), permanent baldness generally follows a specific pattern which starts either in temporal areas (sides of head) or vortex(top of head). While it can also occur in women, total baldness is rare and women usually manifest only diffuse thinning of hair, around menopausal age. In pattern hairloss, hairs under go shrinking or miniaturization and then progressively disappear. Even, in the most extensive cases, a horseshoe-shaped fringe of hair remains in the back of the scalp. This hair-bearing fringe is insensitive to the androgen mediated balding process and usually will last a lifetime. These hairs, when transplanted into thinning or balding areas, will take root and grow, and continue to grow for the rest of a person's life.

How can baldness be treated? Who can undergo hair transplantation?

Both medical and surgical treatments are available. Medical treatments include minoxidil lotion and tablet finasteride. However the effect of these drugs lasts only as long as they are taken. Also these drugs can promote hair growth of existing follicles only and can not create any new hair. Hence surgical treatment by transplantation is a useful alternative. The transplanted hair is removed from back of the scalp (donor site) and transferred to the balding site (recipient site). The transferred hairs are not "rejected" as they are patient's own hairs and are not foreign tissue. The hair in the back of the scalp is insensitive to the androgen mediated balding process and hence the transplanted hairs will last a lifetime – this is the basis for transplantation. Thus, hair transplantation is the only permanent method of treating baldness.

Any person with significant baldness can undergo the procedure. Women can also under go the procedure in selected cases. However it is important to understand that pattern hairloss is a continuous process and hence frequently combination with drug therapy is also required. Very young people are not suitable candidates as they are not emotionally mature

and their pattern of hairloss is yet to be established. Like wise, elderly people with extensive baldness are also not good candidates. As in any surgical procedure, history of serious underlying medical illness is a contraindication for hair restoration.

<u>How is hair transplantation carried out?</u>

Previously, hair transplantation used to be done by a simple method called punch transplantation in which instruments called punches were used to transplant groups of 8-12 hairs. This method though simple, used to give an artificial , ugly "doll " look. This method has been abandoned in favour of a new method called Follicular unit hair transplantation. It has been found that hairs do not always occur singly, by in groups or units of 1-4 hairs called Follicular units.Hair transplantation of these units is called Follicular unit hair transplantation

The procedure is performed under local anaesthesia, as follows(fig-1):

1. Donor area: Strip 8-10 cm long and 1-1.5 cm wide is removed from occipital scalp(back of the head) This method is called strip dissection. The other method of harvesting donor hair is by making small holes less than 1 cm, and pulling out the hair units called Follicular unit extraction.

2. The donor area is then sutured . The suture is not visible and lies hidden under the hairs. FUE does not need suture.

3. The donor graft is then dissected into follicular units of 2 hair, 3 hairs and single hair, under a microscope to avoid transection (cutting) of roots.

4 The follicular units are then transplanted over the recipient area.

The procedure is simple, though time consuming (lasting for 3-5 hours depending on the number of hairs to be transplanted). Some discomfort is to be expected as the anesthetic is injected into the scalp. Once the skin is anesthetized, there is no pain. Hospital admission is not required and patient can return to work the next day wearing a cap

The effort is to transplant the maximum number of grafts in one session to avoid repeat surgeries. It is possible to transplant up to 3000 follicular units in one session. In some cases with extensive baldness, more than one session may be needed . The cosmetic result with the latest technique, Follicular unit hair transplantation is excellent as the architecture of the units is preserved by microscopic dissection . It is also important to note that the technique is skill oriented and involves team work.

<u>Are there any side effects? When will be the results seen?</u>

Since the procedure is performed under local anesthesia, there are no serious side effects. After the surgery, small scabs will form on the scalp at the graft sites, which disappear in 4-7days. A cap will have to be won to hide these scabs. Shampooing can be resumed 24 hours after surgery. Mild swelling of fore head can result on 3-4 days, which is usually mild and subsides in a day. The suture (stitch) used in the donor area is undetectable as it is completely covered by the existing hair and is removed two weeks after surgery. Typically, the grafted hair will shed in 2-4 weeks. New growth will begin in 3-4 months and length will increase approximately 1/2 inch per month. Full results are seen in 8-9 months(fig2,3,4).

What is laser Hair transplantation? Can artificial hairs be used?

Laser was used to create recipient holes and it was claimed that the use of laser caused less bleeding. However, laser also leads to destruction of tissue which can affect growth of hairs . Hence use of laser is not now preferred . Artificial hairs are poyproplylene fibres which look like hairs, These are fixed to the inner most layer of scalp called galea in a knot in a simple procedure. However, these fibres are on the banned list of FDA in USA and have a history of leading to frequent problems such as infections, allergy, frequent loss of fibres, cysts etc. Hence their use is not advocated. It is important to understand that many treatments are advertised in the lay press; often these treatments are costly and do not have sufficient proof. Hence patients have to be careful and seek proper information before resorting to such treatments.

Chapter 3 Follicular unit transplantation by Donor strip excision
Dr Manoj Khhanna

Q1: What is STRIP TECHNIQUE for hair transplant?
A1: Hair transplant is done in more than 70% cases all over the world by the STRIP TECHNIQUE, which is the gold standard for hair restoration. Hair fall occurs in the front and the centre of the head, but usually never at the back and sides of the head, as these hairs are independent of genetic control which cause hair loss. In this method, a strip of scalp usually 1.0 to 1.5 cm in width, including hairs with hair roots and skin is removed from this permanent hair-bearing zone. The defect is closed immediately and no gap is seen from where the hairs have been taken. The strip is kept under a microscope and the hair units are dissected.
2. How is it closed?
It can be closed either by suturing or stapling. Suturing is usually preferred by most surgeons in India.
3.What is trichophytic closure?
There is a special recent technique of closing the defect known as 'Trichophytic closure' where hairs grow through the scar, making it almost indiscernible. The scar can only be seen when you shave the head.

4.When do the sutures fall of?
Normally by two weeks
5.Can absorbale sutures be used?
Yes, they can be used- these dissolve by 2 weeks.
6.What are the advantages of strip technique?
There are many advantages of the STRIP technique. As it is under direct vision, that too under a microscope , the loss of permanent hair follicles in only 1-3%, compared to 6 to 10% in FUE. Moreover, much more hairs can be harvested in one sitting than in FUE, where at least 2-3 follicular units have to be left behind between once punch and the next to avoid visible bald gaps. Also, there is no need to trim or shave the head before the procedure, unlike in most cases of FUE, and no one can make out from the donor area that the patient had a HT immediately after the procedure.
7.What are the disadvantages of strip technique?
The stuture takes up to 10-15 days to heal and fall off.The technique is associated with a little more pain than FUE .

8. What postoperative care is needed for sutured area?
Normally only minimal care is needed such as an antibiotic ointment . Water can be put and bath can be taken. After two weeks, oil can be applied.
9. What are the complications?
Proper suturing needs adherence to basic principles of cosmetic surgery and skill. In trained hands complications are very rare. Taking too wide a strip as done by aggressive surgeons can lead to wide scar and should be avoided
10 .Can I undergo a second strip excision for a repeat transplant?
Yes, you can. In a second surgery, the previous scar will be excised so that finally you will be left with only one scar.

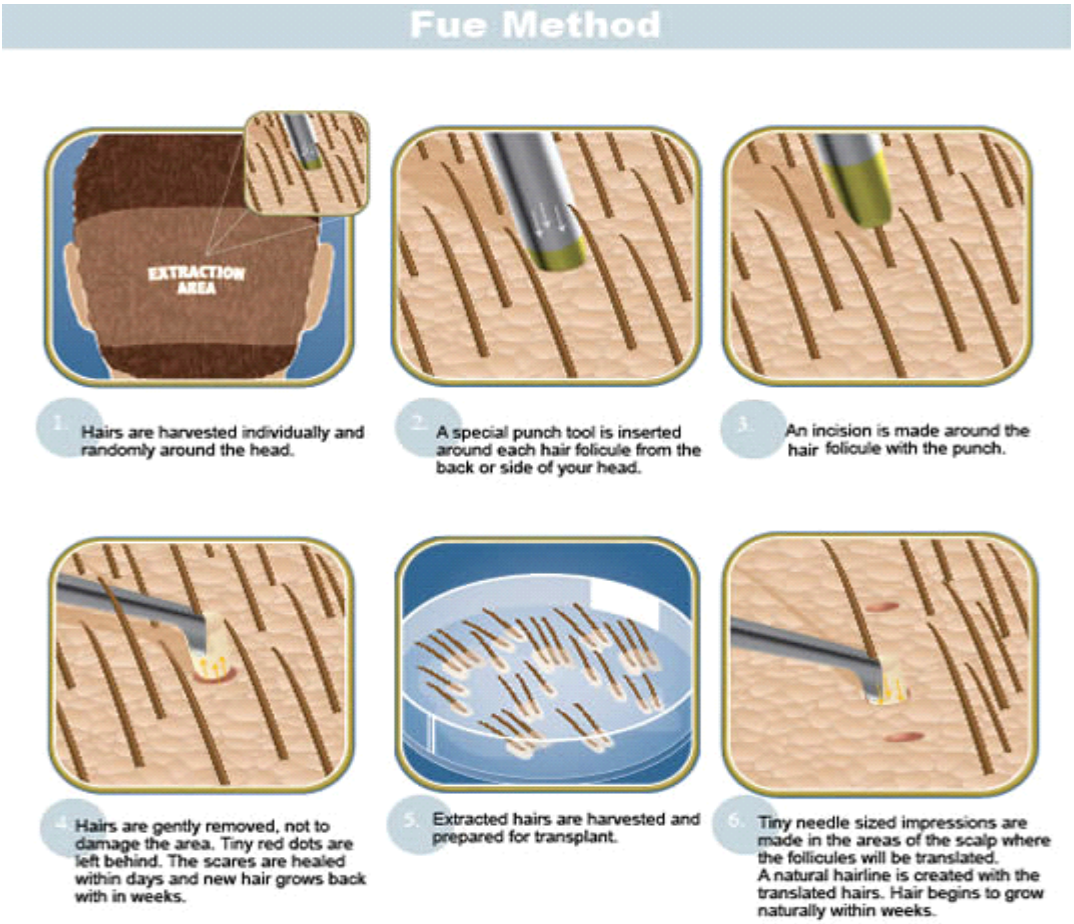
Chapter 4

FUE HAIR TRANSPLANT

Aman Dua, Kapil Dua

1. What is FUE technique?

Follicular unit extraction(FUE) is a method of graft harvesting in which individual follicular units are removed from the donor area one at a time. In contrast, in the strip technique (discused in the previous chapter) we remove a strip of skin from the donor area and then dissect the strip into individual grafts and implanted individually in the recipient area.



The difference between FUE and strip harvesting is that, in strip harvesting there is linear scar resulting from undermining the separated layer of skin in the donor area, but in FUE technique small holes are made with a small instrument called Punch, of diameter less than 1 mm. the punch holes heal with in a day, with less visible scarring and more rapid healing .

2. What are the difficultie and disadvantages s usually faced in graft harvesting with FUE method?

FUE is a blind procedure in which variability of follicle direction, curvature or splaying arrangement can result in graft dissection making the extraction of follicular units difficult. Hence the graft damage rate(also called transaction rate) is higher in FUE than strip method. To overcome this limitation, numbers of new innovations were made like introduction of blunt punches, control of motor speed and latest introduction of robotic method of extraction, which has limited the follicular transaction rate. The other disadvantage is that FUE procedure is slower, more time consuming, and is also more expensive.

3. What is Follicular Transaction Rate?

Grafts can get cut while extracting them from the donor area resulting in a transaction and this can result in lower number of hair per grafts and more damaged grafts and hence poor growth. World wide it has been recognized that the follicular transaction rate should be less than 10%.

4. What is the position of the patient while extracting grafts with FUE?

   Usually prone position is used, the patient lies on his chest, facing downwards, positioned on a comfortable prone pillow with donor area completely exposed.

5. What is the size of instrument used in FUE?

   Punches are custom made tips that bore into skin to a certain depth making a hole around the graft. The size of the punch depends upon the person's hair density and the size of the follicles, usually starts from .75mm .8mm, .9mm to 1mm.

6. How is the patient prepared for FUE procedure?

   First the density and diameter of hair in the donor area is measured and roughly the number of grafts to be extracted is calculated. The donor area is marked and the hair is trimmed to a length of 1 to 2mm in order to allow adequate punch placement..

7. What is the patient selection criteria for FUE?

   - Patients who like to wear their hair very short and want to avoid a linear scar.
   - Patients with unacceptable scarring from previous surgery that precludes strip excision.
   - Patients without adequate scalp laxity for strip harvest.
   - Patients who tend to heal with thickened or wide linear scar.
   - Patients who need to resume a high level of activity soon after the procedure.
   - Patients with significant aversion to pain.
   - Patients with extremely wide hair shaft who require finer hair from the supra auricular or low neck regions to create a finer, more aesthetic result.
   - Patients requiring body hair transfer.
   - Patients who require facial hair reconstruction with limited number of grafts.

- Patients with poor aesthetic results at the frontal hair line due to large grafts.

8. Which patients is not a candidate for FUE?

   Almost every patient who is a candidate for hair transplant is a candidate for FUE. Very few limitations are:

   - Young age
   - Poor donor capacity.
   - Unrealistic expectation.
   - Scar tissue that binds the follicular unit.
   - Patients who cant trim hairs very short

9. How is FUE done in curly haired patient?

   People who have curly hair, also means their grafts will curve , this makes extraction of grafts with sharp punch difficult but this can be possible with the use of blunt dissection technique.

10. What are the potential complications in FUE?

    - Follicles may be transacted.
    - The follicular unit may be inadvertently subdivided into two fractions with each containing fraction of the original number of follicles.
    - Small hairless gap, seen as thinning in the donor area.
    - Loss of pigmentation.

11. How is FUE used for repair surgery?

    FUE is very useful to reduce old plugs and eliminate larger multi-Follicular Unit grafts from hairline; this method is also used for grafting into strip scar.

12. What is safe donor area in FUE?

    In FUE area including behind the head, above the ears from both side, the maximum length of the strip is limited by head circumference varies from 25 to 32cm.

Summary: Both FUE and strip excision have their place in donor harvesting. Both have their advantages and disadvantages. It is the job of the hair transplant surgeon to discuss the pros and cons of both methods with the patient and choose the method which suits that patient best.

Chapter 5 **Graft Harvesting and Plantation**
Sanjeev Vasa

Q: What are the steps involved in hair transplantation?
A: Hair Transplantation process mainly includes three steps:a) Donor hair Harvesting, b) Donor hair dissection(Separation) and c) Plantation.

Q: Which are the areas from which Hair can be harvested ?
A: Harvesting can be performed from (A) scalp (head)-the standard proceedure or less commonly (B) other body areas
like chest, armpits, back, legs etc.

Q: Which area is the best match for covering the head?
A: Scalp (head)

Q: Can hair grow again in the same area after harvesting?
A: No.

Q: If not, then will I look bald in the harvesting area?
A: No, because special methods are used to harvest the hair.

Q: What are the different methods of harvesting?
A: This depends on whether you leave the wound after harvesting open or closed.
1. Close method (Strip known as FUT)
2. Open method (Punch known as FUE)

Q: Which method is good for which areas?
A: Harvesting from scalp can be done by both methods, but harvesting from areas other than scalp (head) can only be done by Open method (FUE).

Q: Which harvesting method will give the best result?
A: Only harvesting will not decide the end result. Harvesting is only 1/3 part of the whole procedure. The best result will depend entirely on how all the three steps are performed together.

Q: Is harvesting done under direct vision or blindly?
A: In closed (Strip) (FUT) method harvesting is done directly under vision while in open (FUE) method harvesting is done blindly.

Q: As mentioned in some brochures, is there any method in which there is no scarring?

A: Both methods FUT and FUE produce donor scarring. With FUT, in the form of

a line placed in the mid-portion of the permanent zone and with FUE in the

shape of small, round dots scattered all over the donor area. Scars produced by either method are covered by surrounding hair and so hardly visible in most of the cases.

Q: I am informed that, genetic baldness is an ongoing process and one requires repeated procedures of hair transplantation. If both methods produce scarring, will my scars increase with every subsequent procedure? I am worried about the final outcome.

A: With subsequent FUT procedures the first scar is removed, so scar volume is reduced and you have only one scar. With subsequent FUE sessions we are adding additional scars without removing the previous ones, so over the long-term the cumulative scarring over large areas can present its own problems of visibility.

Q: Will my planted hair multiply?
A: No.

Q: What will be the characteristics of my new hair?
A: It will be exactly the same as your donor hair. You cannot change anything from original colour, texture, number, thickness etc.

Q: Can plantation be done in other areas of the body?
A: Yes. Hair can be planted in other areas of the body to recreate beard, eyebrow, eyelash etc.

Q: Can plantation be done in baldness due to burns?
A: Yes.

Q: What the other conditions apart from genetic baldness where hair plantation can be helpful?
A: Scars due to accidents, morphoea (Subcutaneous atrophy), burns, cleft lip etc.

Q: Will I get the same result as my friend?
A: No. The result will vary for every individual. It will depend on the colour of the hair, colour of the skin, Straight or curly, thickness of each hair, number of

hair per root and density of plantation.

Q: What is the ideal density one should go for in the first attempt?
A: About 50 roots /sq. c.m. would be ideal density.

Q: What are the different methods of plantation?
A: In all the plantation techniques basic steps of the procedure remain same. They include creating the ideal recipient site, opening the site and placement of graft into the cavity. Meticulous plantation of hundreds of small delicate grafts in short time maintaining its integrity has been a real challenge. Many devices and methods for plantation have been used.

1. Multiple slit and place:

   Multiple slits are created by one person as a first step followed by simultaneous placement of grafts is done by several persons.

2. Slit and place:

   A single slit is created by one person followed by placement of graft in the created site as a second step by the same person.

3. Use of Transplanters:

   A transplanter device is first loaded with graft and the loaded transplanter is used to create the site and immediately place the graft in the created site in one single motion by one person. Several methods and instruments are known in prior art to perform such plantation.

Each of these methods have their advantages and disadvantages . Most experts are familiar with all the methods and choose the method depending on the requirements of a given patient.

Chapter 6 **Hair transplant in women**

Sandeep Sattur

Understanding hair loss in women

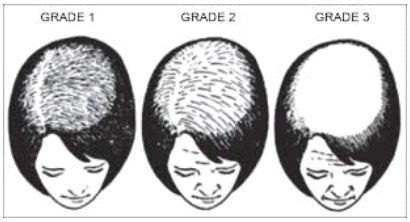
Hair loss cause significant psychosocial problems and impacts the women severely and can be emotionally crippling and disastrous for her self-esteem. Hair loss (alopecia) in women has many causes.

What are the causes of Hairloss in women?

There are many types of hair loss in women, but the ones that are commonly seen in practice are
1) Female Androgenetic Alopecia(FAGA)more appropriately called Female Pattern Hair Loss (FPHL),
2) Telogen effluvium- a common type of hair loss caused when a large percentage of scalp hairs are shifted into "shedding" or resting phase. The causes of telogen effluvium may be post-delivery, hormonal, nutritional, drug-associated, or stress-associated.
3) Alopecia areata - a possibly autoimmune disorder that causes patchy hair loss that can range from diffuse thinning to extensive areas of baldness with "islands" of retained hair. It is very unpredictable in its course with periods of remissions and exacerbations.
4) Scarring hair loss – Hair associated and caused by scarring which could be because of trauma and burns. It could also result from inflammation of the follicles which causes subsequent scarring. Scarring caused by burns or injury could be suitable for hair transplantation but active inflammation of follicles is not suitable for hair transplantation.
5) Traction hair loss – Caused by traction exerted on hair by pulling hair tightly into various styles. If the traction element can be altered these patients are suitable for hair transplantation
6) trichotillomania-It is a psychiatric obsessive compulsive disorder which is characterized by compulsive hair pulling leading to patchy hair loss in the front and top of the head. This condition needs psychiatric treatment and is not suited for hair transplantation

What is Female pattern hair loss

Patterns of hair loss are very distinct in men starting, predominantly as a recession of hair line with or without thinning on the crown. When women lose their hair they exhibit different patterns unlike the ones described for males. The female hair loss is mostly restricted to front and top with thinning but the hair line is maintained.The typical pattern of hair loss is an area of diffuse central thinning affecting the frontal region, classically presenting with increasing part width. The frontal hair line is typically retained and there is no temporal recession but sometimes thinning in the temporal area may be present
Ludwig's classification of hair loss in women, has 3 patterns which are described as grade I or minimal, grade II or moderate, and grade III or severe.



Rarely some women may have features of male pattern hair loss where the thinning affects the temples.

How is hairloss in women treated?

Because of this complex nature of hair loss in women, the hair restoration surgeon is faced with the onerous task of identifying the type of hair loss and suggesting appropriate **treatment only after identifying the cause of hair loss**. This is important because it decides the mode of treatment; some types of hair loss need only reassurance and/or medical treatment while some others benefit from hair transplantation.
Before any decision for surgical restoration is taken it is very important to be clear about the cause and permanence of her hair loss making sure other forms of hair loss that can co-exist or mimic FPHL are ruled out.

Can Hair Transplantation be done in women?

The last few years have seen a significant rise in the number of women who have undergone hair transplantation. This is attributed to improved technical skills and better instrumentation. But in comparison to males undergoing hair transplantation the number is still quite small. The reason for this is that the type of hair loss seen in women is usually of the diffuse variety. They generally do not have frank baldness and moreover do not lose their hair lines. The type of hair loss distribution decides the treatment modality for women. The factors which decide the eligibility of female patients for hair transplant are:

1. Age
2. Grade of hair loss
3. Quality and quantity of hair in the donor area (back and sides of the head)
4. Patient expectations

How does HT in women differ?

The rationale for hair restoration in women is primarily cosmetic—how conscious is the patient about her hair loss and its social and professional implications for her. Also it is equally important for the hair restoration surgeon to define achievable goals and clearly discuss the progressive nature of hair loss. Only if the patient's expectations fall within achievable limits then the patient is offered the option of hair transplantation.

The expectations of women with hair loss are different from men. The primary aim of hair transplantation in males is to frame their face. Therefore even with a nominal restoration of the frontal part leads to reasonable satisfaction.

In contrast the women who have hair loss, desire to restore their lost volume which is a more difficult goal to achieve.

The other problem in women is, that the hair loss affects the head globally, which has some thinning in the donor area. This compromises the donor supply leading to conservative goals for restoration. The way to overcome this limitation is to target areas of which are more affected and which have a bearing on the woman's hair style. The surgeon will use the limited donor hair strategically in order to create an illusion of increased density. For example when there is significant thinning affecting the entire top and some part of the temples it is ideal to transplant the front in an inverted T-shaped or L-shaped pattern depending on the way the woman parts her hair.

Hair transplant does not achieve significant cosmetic benefit in patients with diffuse thinning. Women with very early pattern loss also are not good candidates as the pre and post-transplant looks are more or less the same due to progress of hair loss. Finally HT can only be done **if the donor area (sides and back of the head) is optimal.**

Who is a candidate for hair transplantation?

The types of hair loss in women where hair transplantation may be a suitable option:

a)Female pattern hair loss where the hair line is weakened
b)Scarring hair loss which is in remission or is stable for a few years
c)Scarring hair loss caused by injury
d)Traction hair loss
e)Also patients who have failed medical therapy or who have been on medical therapy but desire further improvements are considered if they meet the eligibility criteria.

Who are not candidates for HT?

The types of hair loss where hair transplantation is not a suitable treatment:

a)Telogen effluvium
b)Alopecia areata
c)Active scarring hair loss
d)Trichotillomania
e)Diffuse hair loss

What is the technique of HT in women?

The hair transplantation can be done using the strip technique or extraction (FUE) technique. The choice of the technique will depend upon the density of follicles in the donor area, the hair style that the patient is following and grade of hair loss.

The procedure of donor hair harvesting:

a)Strip Method (FUT)

Under local anesthesia, a strip (or strips) of scalp containing healthy hair is removed from donor areas on the back and sides, generally in a long horizontal row. This donor area is then closed with sutures (stitches). This should leave a fine pale scar easily covered by one's own hair.

b)Extraction method (FUE)

Follicular Unit Extraction (FUE) is a method of obtaining donor hair for Follicular Unit Transplantation (FUT), where individual follicular units are harvested directly from the donor area, without the need for a linear incision. In this hair restoration procedure, a 1-mm or smaller punch is used to make a small circular incision in the skin around the upper part of the follicular unit, which is then extracted directly from the scalp.

The benefits of Follicular Unit Extraction include; the lack of a linear scar for those who want to wear their hair very short, the ability to resume strenuous activity almost immediately after the procedure, its use in corrective procedures, and for graft harvesting in body hair transplants.

In order to perform large sessions of FUE, the entire donor area must be shaved. This can present a significant short-term cosmetic problem for many patientsand hence some women may not find it acceptable.

Technique of Donor hair separation and placement: The hair grafts are carefully prepared under microscope, trimmed, and then placed into the recipient sites made in the bald or thinning scalp. Most grafts are "follicular units",

tiny grafts of 1-4 hairs, which are cut using microscopic magnification.The units are placed in to small holes . For different techniques pl. read chapter on harvesting and placement.

What happens after surgery? The tiny hair that is transplanted in the graft normally falls out within the first few weeks. The hair will then grow normally from the hair root and will be noticeable by approximately 4-5 months and carry on growing as fast and as long as your normal hair, usually about 1cm a month.

Post-operative sequelae

Apart from the usual post-transplant events like minimal pain, swelling, etc. another event which can occur is post-operative shock loss. In the transplanted area, one may experience shedding of existing hair following the surgery (a process called shock loss). This phenomenon is a little more pronounced in women as compared to men. This could be attributed to the presence diffuse miniaturization seen in women. If this hair is at or near the end of its normal life span (miniaturized hair), it may not return. A possible way to prevent or reduce this is to use medications before and after the transplant.

In general, hair transplantation is likely to result in a more satisfying outcome for a woman when there is adequate donor hair for optimal coverage. Also simultaneous use of medications like Minoxidil before and after surgery adds to the result of transplant. A less satisfying outcome is more likely when transplantation is used in a female patient with poor donor supply and who has high expectations.
Future grafting sessions may be needed as balding progresses in the years to come. The actual pattern and speed of loss in any particular person is hard to predict. It is important to bear in mind that further hair loss is likely and so transplanting too much too soon will use up the limited donor supply before the final pattern is established.

Summary:

1. In women, there are multiple causes for hairloss. These should be investigated treated before transplantation.
2. In women, hairloss is more diffuse and widespread, so a proper discussion about which area should be transplanted is necessary.
3. Women have long hairs and do not accept trimming of hairs. Hence transplantation should be done amidst these hairs. This is more time consuming.
4. Since women, wants hairs to be long, results take almost 1 ½ years, to grow to required length.
5. Finally, women have exaggerated expectations about their appearance. For these reasons a detailed discussion with the doctor is necessary.

Chapter 7 REPEAT HAIR TRANSPLANT

Anil Garg

A patient who has undergone hair transplant might need more sitting of transplant. The reason may be many. Broadly we can divide it in two groups.

1 .Second hair transplant for a patient with a very large bald area----When patient's requirement for hair was more then what was done at the time of previous transplant—Ex . A patient of grade VI hair loss needs around 6000 grafts. In first sitting he got 3000 grafts only and so he needs more 3000 Grafts to accomplish his requirement. For this he needs second s transplant. Like wise, a second transplant may be needed if new areas of baldness appears due to progression of bald process with age.

2. Revision or Correction of previous transplant:When a patient is unhappy / unsatisfied with previous hair transplant. Cause of this may be many—

A. Unrealistic expectation of patient—too much demand for density which cannot be full filled by existing status of donor hair. (Hair density, limited donor area, thickness, colour and curled hair).

B. Low density (distance between grafts) of transplanted hair

C. Poorly designed hair line.

D. Poor filling and or incorrect direction of hair in temple area.

E. Increasing baldness because of loss of non transplanted (temporary) hair or loss of transplanted hair if donor hair taken from unstable area.

F. Patient of body dysmorphic syndrome who has undergone transplant without proper counselling or treatment.

Because of above reason patient may ask for redo /secondary hair transplant.

Charecteristics of repeat transplant:

A repeat transplant always harvests less grafts than a first transplant. This is because hairs have already been harvested, elasticity has been lessened.

CAUTION BEFORE REPEAT HAIR TRANSPLANT

FOR PATIENT---1.Before consulting hair transplant surgeon he should note down all his problems and expectations and then discuss one by one with surgeon.

2. Patient should have realistic expectation and understand limitations of hair transplant in view of donor area, quality of hair and severity of baldness. He should understand that the number of hairs that can be harvested in a repeat transplant is less than the first transplant.

Chapter 8 **Transplantation from other donor areas and in special situations**

Venkataram mysore

Body Hair transplantation(BHT): Body hair transplantation is generally done only when scalp hair is exhausted. Again this is a technique receiving a lot of hype and exaggeration on internet sites, and many patients ask for it hoping not to disturb their scalp hair.

Body hair is not the preferred source when scalp hair is visible for the following reasons:

a) Body hair has to be extracted singly and hence is slow- takes 2-4 days for a 2000 graft session.
b) Body hair occurs mostly as single hair units and hence gives less density.
c) Body hair diameter is less and so gives less volume.
d) Long term behavior of body hair is still not known as the technique is new.
e) Body hair may grow long when transplanted on to scalp, but not as long and as thick as scalp hair- so it is inferior to scalp hair
f) Lastly and most importantly, Body hair transplantation is possible only for patients who have good body hair on chest.
g) BHT is associated with tiny scars on chest.

Hence, BHT is performed only when scalp donor is exhausted.Its biggest advantage is it supplies very large no of hairs

4.Long hair transplantation: The normal length of grafted hair is 0.5 cm.Some patients(such as film actors) want long hairs after transplantation, to look natural- this is called long hair transplantation in which hairs are left long , 2-4 cms. However, it is technically more difficult to do and therefore costs more .*Further, it should be remembered that whether hairs are transplanted long or short, they will fall off in the second week.*

5. Transplantation in special situations:

i)Transplantation in between existing hairs: Many patients develop diffuse thinning , with out complete loss of hairs, with gaps in between hairs. Transplantation can be done for them also. The following special conditions apply:

a) Any graft needs minimum space to survive. So grafting can only be done in places where such gaps are available due to loss of hairs(loss of density)
b) Other gaps are due to decrease in diameter of hairs; here, transplantation is not possible and drugs are needed .If we transplant grafts too close to existing hairs there will be severe loss of hairs called SHOCK LOSS, WHICH SHOULD BE AVOIDED.
c) **In other words, in all such patients , while transplantation can be done, it is only in combination with drugs.SO the final results not only depends on transplantation, but also how well drugs work**.If drugs are stopped or they don't work well(which happens in 15% of patients), then there are fresh areas of thinning.
d) Therefore in all such patients, **it is always preferable to administer drugs for 4-6 months to decide how well drugs work before doing transplantation.**

e) Lastly, grafting amidst long existing hairs is more difficult and time consuming .It is therefore helpful to trim the hairs short for better visualization of gaps. If this is not acceptable to patients, then transplantation can be done by using special techniques, which however costs more.

ii)Vertex transplantation: Vertex (back of head) is generally a difficult area-this area is large, circular in shape, and therefore hairs emerge in a radiating pattern, like spokes of a wheel. It also has whorls.Therefore it needs a large no. of grafts and these have to be arranged in different directions.This takes more time, and is time consuming. More importantly, because the baldness is circular, in future, it could expand in a centrefugal pattern- hair transplantation in the central circular area could result in a situation in future wherein, grafted hairs remain in the centre and new area of bald ness is seen all around it.This will look odd.

For these reasons, it is always the policy worldwide not to operate vortex area early, always try drugs first in this area, and operate in the front of the head first.

iii)Transplantation in young people: Young people below 23 years pf age present a special situation. Hairloss in them is still evolving, and in early stages, but they are very upset about it, and often find it difficult to accept it. They need drugs to prevent loss of existing hairs for atleast 10 years- which is difficult to do and they generally can not be relied upon to take drugs for such prolonged years. However, if transplantation is done at this stage, while it will make them happy temporarily, but they will very soon lose hairs over rest of the scalp and come back for a second transplant with in 2-3 years. **So it is generally advisable to delay the first transplant till 25-26 years of age, unless they have significant established baldness .However, this does not apply to special situations such as large areas of baldness, occupations in visual media, very disturbed patients etc**

iv)Hair transplantation in other areas-eye brow, moustache,beard, eye lashes: Hair transplantation can be done, not only for baldness over scalp, but also over other areas such as eyebrows, eyelashes, moustache, beard, etc. These need special considerations as they are mobile areas. They are also more expensive.

v)Transplantation in women:It can also be done in women, which is however is more challenging. This should be discussed in person with the doctor.

1. In women, there are multiple causes for hairloss. These should be investigated treated before transplantation.
2. In women, hairloss is more diffuse and widespread, so a proper discussion about which area should be transplanted is necessary.

3. Women have long hairs and do not accept trimming of hairs. Hence transplantation should be done amidst these hairs. This is more time consuming.
4. Since women, wants hairs to be long, results take almost 1 ½ years, to grow to required length.
5. Finally, women have exaggerated expectations about their appearance. For these reasons a detailed discussion with the doctor is necessary.

Chapter 9

Instructions before Hair transplant

Rajesh Rajput

Always seek full information about the procedure from your doctor.

1. Inform your doctor of any known allergies, previous surgeries and any other medications you are following.
2. Blood pressure, diabetes, epilepsy medicines, can be continued. Take morning dose on the day of the procedure.
3. Stop Aspirin, anticoagulants, & hair growth medicines 5 days before the procedure.
4. Stop Minoxidil, Mintop, Tugain, Rogain 5 days before the procedure.
5. Stop Smoking one week prior and three weeks after the procedure.
6. Do not ware T – shirts, pullovers, on the day of the hair transplant.
7. Have light food before coming to the hospital- do not come on empty stomach
8. Do not trim your hair. Keep 2-3 inch long hair on the back to cover the donor area for FUT.
9. Shaving of the head is required for FUE .
10. ompletely grey hair may be dyed one day before the procedure.
11. You may come alone to the procedure.However, if you wish to bring your friend/relative, you are welcome
12. You can not drive while going back after surgery. Pl. arrange a vehicle for transport

Lab Tests to be done before the Hair transplant – CBC, Blood Sugar – random, HIV, HCV, HbSAg, Bleeding time /Clotting Time.

Other medical tests may be added as per your pre-existing medical conditions and fitness certificate may be requested from your treating physician. Procedure is under local anesthesia.

Chapter 10 Post- Operative Care in Hair transplantation

Dr Aman Dua

Immediately Post-Op

- You may feel minimal discomfort, but it will be minimal and wont keep you awake all night.
- A spray bottle with Normal Saline solution is supplied to you on discharge.
- You will need to spray the transplanted area every hour for the first 12 hours. When doing this put some towels around your shoulders.
- Mild pain relieving drugs have been prescribed, whch are neededfor first 3-4 days.
- Please spray gently to moisten the transplanted area.
- Do not touch the transplanted hair.
- Drink plenty of water during this time and eat a healthy diet. Avoid spicy food, smoking and drinking alcohol

Day1toDay3

- On day 1 (day after the surgery) to day 3, you should spray every 2-4 hours during your waking hours and sleep as normal at night
- You may use Saline/Mineralwater once the Normal Saline solution provided is finished
- Spraying prevents any scab formation on the transplanted area and on the donor area. The transplanted grafts also need to be kept hydrated throughout this period, this is essential for their survival
    - Important: Massage your forehead with both hands using 4 fingers starting from middle of forehead and going backwards toward ears. Make sure you do not rub the implanted grafts. You should continue this for 5 days. This will prevent swelling .
    - Most importantly do not keep your head in forward bending position to avoid swelling.

Day4 to Day14

- Please continue to spray the transplanted area as earlier.
- On day 5, you can have a shower without using hands. Just pour water on top of your head using a mug.
- Allow your hair to dry naturally, do not towel dry or blow-dry your hair
- For only Strip technique: Your stitches will need to be removed on day 7 post-operatively. It is advisable to return to Clinic to have these removed…continue to apply antibiotic cream in donor area. In case the surgeon has used dissolvable sutures, they disappear by themselves inn 203 weeks time
- On day 7, we will do the cleaning of the transplanted area if you are in the town. The scabs will be removed at this time.
- On day 10, you can start washing the transplanted area using your hands.
- .
- It is advisable to start using prescribed lotion like Minoxidil after day 7 days to enhance the growth, this should be used at morning & evening on the transplanted area and this can be used or continuously post operatively.

Day 14 & after

FUT or Strip Surgery

- It is recommended to avoid strenuous physical activity 3 weeks post operatively; you should avoid gym work, swimming, cycling, tennis, golf, any heavy lifting, and strenuous hill walking for 3 weeks after the surgery. This is to avoid any stretching of the scar in the case of strip surgery.
- When you return to physical activity you should start off lightly and build up slowly to your previous activity levels.

- Normal activity can be resumed after 4 days and strenuous after 2 weeks.
- You can get a haircut or color your hair after 3 weeks once the transplanted hair fall off.

Complications that may occur following surgery

- Swelling: This is infrequent but could occur usually about 48-72 hours after the surgery. You may notice some swelling in the forehead, which may travel down towards the eyebrows. This will resolve itself, without intervention, usually 3-4 days after it begins. Lying down flat on bed with a thin pillow covered with towel will help. Even if some swelling occurs, there is no need to panic or come for a physical check up as you have already been prescribed a medicine to take care of the swelling.
- Some fluid may ooze out from the donor area.
- Minor oozing: there may be slightoozing of red tinged liquid after the surgery from the donor; if any bleeding occurs, don't panic; just apply form pressure with some gauze for at least one minute or as long as it takes to settle
- Numbness/ tingling sensation in the recipient area sometimes occurs, which will resolve without intervention. It can last from weeks to months
- Infection: There is a very slight risk of infection as with any surgery. This is prevented by a course of antibiotics. You should return to the clinic if you feel there are any signs of infection such as localized redness, pain or pus oozing.

General Instructions

- It is important to note that the transplanted hair will be fully embedded after day 7; that is why you can resume your normal activities at this stage
- The transplanted hair will begin to fall out, usually 2 to 4 weeks after the surgery-
- . You will start to see the hair grow at 3 to 4 months after the surgery, this hair will be very fine and minute at first.
- At 6 months around 40% the hair will have appeared, however they won't be fully grown, it will take up to 9 months for a full growth to occur.

- Shedding of the existing hair can also sometimes occur post operatively. This is quite rare and if it occurs it is temporary and will always re-grow in 3-4 months.

Note on going on holidays post operatively

- It is possible to go on holidays after the surgery, it is important not to get sunburn on the scalp, as this will damage the skin. Do not swim in swimming pools with chlorine in the first 14 days as the chemicals may damage the grafts
- After day 14 you can swim in swimming pools and apply sun lotion to the scalp and wear a hat if needed. It is advised to always wear a cap in the sun from 3rd day onwards. If you are in the sun prior to day 21, you must sit under an umbrella and avoid sitting in direct sun light for long periods.

Chapter 11 **NonSurgical Hair Restoration**

Ashok reddy

What are the non surgical methods of Hair Restoration?

1. Medications….Oral and Topical application on the scalp area of thinning hair. Hair can not be grown in a totally bald area where the roots are dead and gone. The medications are effective as long as they are used and the baldness recurs once the medicines are stopped. Pl. Refer to the chapter on drugs in hair restoration

2. Low Level Laser Therapy This has been advertised with exaggeration in print media , but is not fully proven to be effective. It can at be best considered as a second choice option for those who experience side effects of medications or in those in whom medicines do not work .

3. Mesotherapy……Injections of Micronutrients , vitamins etc in to scalp thorough a mesogun have also been advertised heavily on press, but have no conclusive evidence of hair regrowth.

4. Platelet Rich plasma: This is an extract of activated platelet cells . Platelet are the cells in our blood which secrete growth factors which promote wound healing . These growth factors have been shown to stimulate hairgrowth also. Hence studies are being conducted to establish their role in hair growth. While there is no conclusive proof of its efficacy, this treatment has potential. At present, it is considered an experimental treatment as an additional or second option after drugs.

5. Microneedling or dermaroller is an instrument with needles on a rolling drum which is used on scalp . It makes tiny holes in skin as it roles along. The microinjury caused is thought to stimulate stem cells. It can also be used to enhance the absorption of drugs. At present, this is also considered a second choice treatment.

4. Tissue Engineering……. The research is in the pipe line for the last 20 years and still remains a dream. If successful, there will never be dearth of donor hair.Pl. read the chapter on stem cells

Hair Pieces and Extensions.

Q. a). What are the indications for non surgical methods of Hair Restoration?

1. Limited Donor Hair where Transplantation can cover only the Frontal 1/3rd and mid scalp. One can plan for a hair piece for the crown area.

2. Very poor donor hair quality and quantity where surgery is not advised for even covering the frontal 1/3rd of the scalp.

3. If the Patient has morbid fear of surgery.

4. As a temporary measure after Chemo therapy.

5. Alopecia Totalis

6. Disfiguring extensive Scarring Alopecias.

7. Patients who want unlimited density and fullness which is not possible for covering large bald areas due to surgical limitations.

8. Women who have extensive Female Pattern Baldness with very poor donor hair

b). What is “Hair addition” or “Hair replacement”?

It is an external hair bearing device added to the scalp to give more fuller head of hair. Human hair shafts matching the colour and texture of the person are used. Synthetic fibres which look like hairs can also be used.

c). How are these devices marketed?

The marketers of Hair devices do not use the term “Wig” or “Hair piece” since it can be a big put off for potential clients. They smartly use fancy and sophisticated names like “Hair Replacements”, “Hair Weaving”, “ Hair bonding” , “Silicon Gumming” ,“Hair Prosthesis”, “Hair Fusion” “ Hair Fixing” and “Hair Extensions”. d. What are the side effects of these devices?

1. Un-natural look.

2.Traction alopecia: In Hair weaving clips are used to hold the hair piece and at that site of clip,hair is lost permanently.

3.Skin Allergy and irritation causing redness and itching.
4. Chronic conditions like Eczema.
5. Dandruff
6. Limited life span. Loss of Texture and colour due to wearing out with time can occur in a couple of years which needs replacement with a new piece .

Q.If a person has been been using a hair piece for the past few months and wants to perform transplantation can be performednow?

Yes. It can be done

Chapter 12 **Position Statement on Stem cells- Association of Hair Restoration Surgeons India**

Sandeep Sattur

The association has received several queries about stem cells in the management of hairloss and also about several advertisements which have appeared in the press about the use of stem cell. This position statement is issued in public interest and states the opinion of experts in the field.

AHRS does not support the claims of Stem cells, hair multiplication, hair cloning, hair doubling and Dermal Papilla - DP Cell Culture in the clinical managment of hairloss or baldness. The association advises the public not to be mislead and beware of misleading advertisements and false claims made in the media.

From the existing evidence and current stage of stem cells research, hair cloning and hair multiplication cannot be accepted to work as successful treatments for hair loss. Any physician wishing to practice such treatment should do so as a clinical trial or experimental treatment, after clearance from ethical committee and governmental authorities like ICMR, Indian Council of Medical research. **The association strongly disproves of advertisements claiming successful Hair Growth with Stem cells, hair multiplication, hair cloning, hair doubling and Dermal Papilla - DP Cell Culture and cautions public not to be believe such misleading claims.** The technique is incorrectly addressed as hair cloning, it is more of laboratory engineered cell growth or cell based therapy.

Some clinics/centres are fraudulently using preliminary data obtained from studies in mice to indicate the success in humans. Such results have never been reproduced in humans till date. The belief created, that these methods will similarly work in humans, is not true. The behaviour of cells cultured in the laboratory by artificial stimulation of growth is not predictable. The danger of uncontrolled growth and tumour/cancer formation cannot be ruled out.The same applies to claims of utility of plant stem cells in management of hairloss.

Till date there is no published report which has demonstrated formation of new follicles in human bald skin . Most of the clinical trials in humans have shown that injection of stem cells into the scalp led to some thickening of existing vellus hairs. But these results are similar to what is achieved with routine medical treatments. Even if some stimulation of growth is achieved, the effect lasts only for half to one hair cycle and multiple treatments will be needed to maintain the benefits. Therefore, at this point in time the expense of cell based therapies does not justify the doubtful experimental benefits.

Chapter 13 Dos and Dont for hair transplant patients
Venkataram Mysore

1) Have reasonable expectations- remember that donor hair is limited, so unlimited hair transplant is not possible

2) Discuss your options with your hair transplant surgeon. To understand what can be achieved and what can not be achieved.

3) Understand that most patients need combination approaches; drugs, hair transplantation. Remember ; hairloss is a continuous process where as Hair transplantation is an one day event. Hair transplant corrects the baldness which has happened- it cant prevent hair loss in future.

4) Drugs are useful therefore to prevent future hairloss. However, none of the drugs are a cure for baldness-THERE IS NO CURE FOR BALDNESS- DO NOT EXPECT THIS.

5) Do not be excessively worried about side effects by reading individual opinions – the drugs available have been in use for decades. Discuss with your doctor about these side effects. Read authoritative websites such as ishrs.org or FDA in USA or ahrsindia.org.

6) Do not resort to unsubstantiated treatments with out seeking proof;eg. Apple stem cells, mesotherapy with injections. Remember; if hairs could be grown easily, there would be no bald men in the world.

7) Dont be mislead by advertisements which exaggerated content; some examples include " unlimited hairs" " scarless transplant"

8) Dont be too confused about FUT and FUE- after these are only methods for donor hair harvesting; REMEMBER- you are doing HT to get results in front or the bald area. What is important is to first determine which method gives you best results to cover the front area. Discuss the options with the doctor and with his assessment opt for the best method.

9) Take care of grafts properly after the HT. Adhere to the instructions

10) Do not be too anxious about the growth of hairs after HT-the hairs take time for growth- don't asses it by days or weeks. Be patient

11) Any issues or side effects, consult your doctor . Do not jump in to conclusions. Remember – most hair transplants are with out side effects-even if they occur they are minor.

12) Always have a plan for future. Hair loss is not to be treated in one session or one visit. It needs planning, understanding and execution

Back Cover

Association of Hair Restoration Surgeons(India) is a premier organization dedicated to the field of hair restoration
surgery. Founded in 2008, by premier hair restoration surgery experts, it aims to further the progress in the field and enhance awareness among public and create opportunities for academic enhancement for its members. It organizes Haircon every year, which is the major conference on hair restoration. It has nearly 200 members.