The first hair transplant assessment scale: parameters for good hair transplantation

Muhammad Ahmad, MD, ABHRS
Aesthetic Plastic Surgery & FUE Hair Transplant Institute, Islamabad, Pakistan

There have been significant advances in the field of hair restoration over the last two decades. A good hair transplant is not only about the quantity of transplanted hair, but also expresses the talent of the performing physician through its appearance. At present, there is no standard criteria which can be applied to differentiate a "good" hair transplant from a "bad" one. To develop a standardized hair transplant assessment scale. Various parameters have been incorporated to develop a standardization in the postoperative hair transplant outcome. Several variables have been incorporated which contribute towards an aesthetically pleasing hair transplant. A good hair transplant is not just determined by one or two factors. Rather, multiple parameters govern the outcome of a hair transplant. The parameters provide an easy method to standardize the outcome of hair transplant surgery.

Keywords: hair; hair assessment scale; hair loss; hair transplantation

Introduction

About 50% to 60% of the male population is affected by some degree of baldness during their life span [1]. There have been significant advances in the field of hair restoration over the last two decades. The old “punch grafts,” which were once considered state of the art, are now totally obsolete. Additionally, media campaigns pertaining to hair transplants have raised the awareness and acceptance levels for the procedure among patients.

A good hair transplant is not only about the quantity of transplanted hair, but also expresses the talent of the performing physician through its appearance. At present, there is no standard criteria which can be applied to differentiate a “good” hair transplant from a “bad” one. This is due to the vast diversity in results and lack of uniformly defined standardized terms pertaining to hair transplants. There are several variables that contribute to an aesthetically pleasing hair transplant.

The author thus attempted to develop a standardized hair transplant assessment scale and a patient-reported outcome (PRO) instrument. It encompasses all hair transplant methods, including strip surgery, follicular unit extraction (FUE), punch grafts, and the slit technique.

Proposed scale

The scale basically consists of certain features which are considered to be vital to a hair transplant procedure (Table 1). These include the factors related to planning, execution, and the postoperative outcome. The scale has five components. Each component is further divided into sub-components, which are graded based on the presence or absence of these features. These components are easy to be assessed, and they form PRO measures.
Consents were taken from all patients and even their facial identities are well hidden.

The various components are described below:

Anterior hairline: It is the single most important feature of a hair transplant procedure. It determines the naturalness of the surgical procedure and includes various sub-features.

1. Location: the location of the anterior hairline is crucial. It demonstrates the surgical experience and understanding of the performing surgeon. A ‘low’ hairline, where the distance from the hairline to the nasion is less than that of the nasion to the nasal tip, appears unnatural at an older age. Whereas a ‘mature’ hairline, where the distance from the hairline to the nasion is the same or greater than that of the nasion to the nasal tip, appears aesthetically pleasing. The “rule of thirds” and the “rule of fifths” serve as handy guidelines (Fig. 1) [2]. If the patient wants it lower, it can always be re-adjusted. This is because it is easier to lower the hairline even more than 1 cm but is quite challenging to raise the hairline even by half centimeter if it is too ‘low.’ A low hairline in a younger patient results in poor cosmesis at a later age and should be discouraged.

2. Straight-line effect: an ideal anterior hairline is not a ‘straight-line,’ but rather has alternate ‘peaks’ which are irregularly patterned and provide softness to the cosmetic appearance (Fig. 2) [3].

3. All single hair: all the hair in the anterior hairline are single-haired follicular units (FUs). The presence of multi-haired FUs appears unnatural. A zone of transition density is pres-
4. Unnatural hair angles: the angles of the hair in the anterior hairline is a crucial factor that determines the naturalness of the result. The angles should be as acute as possible. Obtuse-angled hair will give an unnatural appearance to the hairline (Fig. 4). The hair growing at acute edges also have an added advantage of augmenting others when combed on the sides or backwards. Additionally, they increase the effect of the hair’s density.

5. Pitting: pitting occurs when the epithelium of the grafts is below the level of the epithelium of the surrounding skin while placing the grafts in the slits. It is purely a technical error. To prevent it, the slits should be made shallow or the skin should be removed from the grafts before placing them. Pitting, if present in the anterior hairline, results in a significantly unnatural appearance.

6. Corn-row appearance: natural hair grow in random patterns. The appearance of ‘corn-rows’ indicates an unnatural appearance. However, if the effect occurs due to larger hair grafts (3 hair or more), it becomes challenging to correct the situation [5].

7. Pimples/cyst/infection: the presence of cysts/pimples/infection indicates technical issues, particularly related to the preparation and placement of grafts (Fig. 5). They can be retention cysts or may result from ingrown hair.

Fronto-temporal angle: various factors determine the naturalness of the transplant in the fronto-temporal angle.

Fig. 2. Straight anterior hairline that lacks any micro and macro irregularities, with all the hair forming a line.

Fig. 3. Multi-haired plugs in the anterior hairline that give it an unnatural appearance.

Fig. 4. Unnatural hair angles with hair arising at obtuse angles.

Fig. 5. Signs of infection, cyst, pustule, etc.
1. Shape: any obliteration of this angle results in an artificial appearance. The obliteration is normally seen in females. In males, it is triangular in shape and is formed by the conjunction of the anterior hairline and the temporal hair. A roundish or oval shape increases the dimensions of the forehead and results in a broader-looking forehead (Fig. 4, 6).

2. Hair angles: the direction of hair is extremely critical. Three kinds of hair angles are significant here (Fig. 1). The superior part (the upper limit of the V) has hair directed anteriorly. The lower part (the lower limb of the V) has hair directed downwards that curls towards the eyebrows (Fig. 7). The junction of both limbs (the center of the V) has hair in both directions that gradually changes from one to the other.

Mid-scalp: the points to be considered include:
1. Hair angles: the hair’s angles should correspond to the surrounding hair. There is a gradual increase in the angle as these progress posteriorly. Any abrupt change in hair angles results in abnormalities that are eye-catching even from a distance.
2. Multi-haired plugs: the presence of multi-haired plugs (greater than 4–5 hair) may appear as an appreciable deformity at first sight.
3. Pitting: pitting presents a technical drawback that is often overlooked. It has a very unpleasant appearance.
4. Pimples/cysts/infection: the presence of cysts/pimples/infection indicates technical issues, particularly related to the preparation and placement of grafts (Fig. 5). They can be retention cysts or may result from ingrown hair.
5. Scarring: any visible scarring in the transplanted area is considered not up to par, especially in subsequent sessions. They can cause poor hair growth.
6. Whorl: this natural feature must always be preserved during hair restoration. The presence of the scalp whorl creates a feeling of naturalness, whereas its absence makes the restored hair appear artificial.
7. Occipital hairline: the posterior part of the mid-scalp should also contain hair in an irregular pattern like the anterior hairline. A straight line would appear artificial (Fig. 8) [6].

Donor area: the donor area is not given enough consideration. Various factors affect the quality of the donor area in strip or FUE surgery.
1. Donor scar: the width of the donor scar is crucial for both the patient and the surgeon. A wide donor scar should be...
avoided. There are multiple factors which result in a wide donor scar. A scar of about 1 to 2 mm should be aimed for in strip surgery (Fig. 9, 10). In FUE, the scar should be less than 1 mm [7].

2. Position: the position of the scar is also important. The area of maximum density is around the superior nuchal line (Fig. 11). Any scar above this line is likely to be visible during the process of hair loss, whereas any scar below it is likely to stretch [7].

3. Mobility: the scar should be mobile enough not to hinder movement. The mobility of the scar also predicts the outcome of the surgical transplant.

Temporal areas: dealing with this area is one of the challenging aspects of a hair transplant procedure.

1. Single hair in hairline: the anterior 2–3 rows of the transplanted temporal area must contain single-haired FU exclusively. Only soft hair should be used.

2. Multi-hair plugs: any presence of multi-haired plugs makes the result appear unnatural.

3. Hair angles: the hair angles should be as acute as possible. These angles must blend with the surrounding hair (if present) in a way that does not present any visible difference. A curved blade helps to recreate the curve required to achieve this natural angle [8].

4. Pitting: pitting in the temporal area generates an unnatural appearance, which is almost impossible to correct later on. The grafts need to be placed carefully.

Discussion

There has been an increase in the use of PRO instruments results to measure the overall quality of life postoperatively [9]. These include FACE-Q, BREAST-Q, SCAR-Q, among others [10]. The current study has attempted to develop and standardize the outcome instruments. The parameters mentioned are critical with respect to hair transplants and are considered to distinguish a good hair transplant result from a bad one. The cosmesis of the final outcome is critical. The anterior hairline remains the most important feature. It includes the location, design, orientation of the hair, and individual hair characteristics. A natural hairline is irregularly irregular, consisting of both micro and macro irregularities. The hair angles are also critical. Ideally, all the hair possess acute exit angles. Any change to the exit angle makes the result appear unnatural. The tell-tale signs like pitting, infection, cysts, etc., result in poor cosmesis. In addition, the temporal hair and fronto-temporal angle are crucial.
parameters. Any hair transplant that obliterates the v-shaped fronto-temporal angle appears artificial. The direction of hair is also quite important in these two areas and must be very flat. The hair at fronto-temporal points have two different diverging angles (Fig. 7). Any roundness here widens the forehead, and inadequately recreating the temporal hair makes it look as if the patient is wearing a hairpiece. The occipital hairline was a recently introduced concept [6]. A straight occipital hairline results in poor cosmesis. The donor scars of the strip surgery are important for planning the next surgery. Any scar above the superior nuchal line and external occipital protuberance results in a fine scar, whereas any scar below it widens and stretches [7]. Similarly, the FUE scars also influence future planning. Large FUE scars appear as white dots and result in poor cosmesis when the hair is short.

Therefore, a good hair transplant is not just determined by one or two factors. Rather, multiple parameters govern the outcome of a hair transplant. The aforementioned parameters provide an easy method to standardize the outcome of hair transplant surgery.

**Conflicts of interest**

The author has nothing to disclose.

---

**References**

1. Unger WP, Shapiro R. Hair transplantation. 4th ed. New York: Marcel Dekker; 2004.
2. Farkas LG, Hreczko TA, Kolar JC, Munro IR. Vertical and horizontal proportions of the face in young adult North American Caucasians: revision of neoclassical canons. Plast Reconstr Surg 1985;75:328-38.
3. Epstein JS. Revision surgical hair restoration: repair of undesirable results. Plast Reconstr Surg 1999;104:222-32.
4. Ahmad M, Ahmad N. Rejuvenating bad hair transplants. J Pak Assoc Dermatol 2010;20:35-8.
5. Rose PT. Another way to look at donor harvesting effects with FUE. Hair Transpl Forum Int 2016;26:254-5.
6. Ahmad M, Humayun Mohmand M. Occipital hairline: a forgotten area. J Cosmet Dermatol 2019;18:1422-3.
7. Ahmad M. Measurements of tension on wound edges after strip harvest surgery. J Cosmet Dermatol 2019;18:897-901.
8. Ahmad M. Temporal peaks restoration: a new innovation. Arch Aesthetic Plast Surg 2016;22:107-9.
9. Klassen AF, Cano SJ, Schwitzer JA, Baker SB, Carruthers A, Carruthers J, et al. Development and psychometric validation of the FACE-Q skin, lips, and facial rhytids appearance scales and adverse effects checklists for cosmetic procedures. JAMA Dermatol 2016;152:443-51.
10. Klassen AF, Cano S, Pusic AL. FACE-Q [Internet]. Lyon: Mapi Research Trust; c2010 [cited 2020 Jan 4]. Available from: https://eprovide.mapi-trust.org/instruments/face-q.