

Review Article

The Evolution of the Combined Technique (FUT + FUE): How to Achieve the Maximum Amount of Grafts and Better Results for Advanced Baldness

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Abstract

The number of grafts that can be achieved in one surgery by the main harvesting techniques, FUE and FUT, has a limit. For the surgical treatment of advanced baldness (Norwood V, VI) usually more than one procedure is needed to transplant the amount of hair necessary for the coverage of the bald area. This article discusses the combination of FUT and FUE to achieve more grafts and offer the possibility of cover more areas with higher density in one procedure.

ABBREVIATIONS

FUT: Follicular Unit Transplantation; FUE: Follicular Unit Extraction; SDA: Save Donor Area; NW: Norwood

INTRODUCTION

For many years, FUT (Follicular Unit Transplantation) or strip harvesting was the main technique in baldness treatment [1,2]. In 2002, FUE (Follicular Unit Extraction) came into hair restoration scenario [3]. For some years, some doctors refused to accept that FUE could produce results as good as FUT. With time, with the evolution of FUE technique and its proved good results [4], this technique became more popular, but for many years hair restoration surgeons performed one technique or the other, separately (referencias de FUE ou FUT).

Strip harvesting is limited by scalp elasticity, and FUE by scalp density. This way, both have limits in the number of grafts achieved in one session and are insufficient to treat advanced baldness (e.g. Norwood V and VI). Not satisfied with the results with these techniques for advanced baldness, the author started to combine both harvesting methods in the same procedure [5]. The author started to combine a small number of FUE at the end of his strip procedures, until he decided to combine FUT and FUE procedures in a safe way [6]. Reviewing the literature, there was one publication about combining both harvesting method, but with the purpose of studying the reduction in tension on the linear closure [7], and the combination of harvesting methods, in different ways, was also presented by True [8].

The aim of this article is to describe the Combined Technique for advanced baldness treatment, its development and evolution.

SURGICAL TECHNIQUE

Indications

The combination of FUT and FUE is recommended to achieve more grafts in one single surgery. It is indicated in the following situations:

- a) Advanced degrees of baldness including the crown area (Norwood IV, V, VA and VI);
- b) Patients with secondary procedures and/or poor donor supply;
- c) Some selected patients Norwood VI that understand the limits of the procedure (high anterior hair line, protruding temporal resection and often not having the crown area treated).

Demarcation

The planning of the surgery is done before shaving the hair, so the surgeon can observe the anatomical and aesthetic parameters. Also, the safe donor area (SDA), where the hair will not fall during patient's life, is also demarcated before shaving. So the surgeon can better analyze the thinning peripheral hair between permanent and non-permanent zone (Figures 1A,1B).

Then the hair is completely shaved. Now the surgeon draws: the strip to be removed, an area that will be preserved for future procedures (that will be later explained in this article), and the FUE harvesting area inside this SDA (Figure 1C).

Anesthesia

The author routine is to perform the procedure under local anesthesia associated with venous sedation performed by an anesthesiologist.

The anesthetic solutions is:

Ropivacaine 7,5mg/mL ____ 20mL

Lidocaine 20mg/mL ____ 20mL

Saline solution 9mg/mL ____ 160mL

Epinephrine 1mg/mL ____ 1mL (1:200.000)

A coronal ring block with this solution is infiltrated in the anterior hairline and anterior zone and below the FUE harvesting area. Scalp ballooning in the superior recipient area and in the donor area is done with saline solution without epinephrin. If necessary, the anesthetic solutions can be re-applied, usually on the second part of the surgery (FUE harvesting and implantation) always observing the toxic doses.

Strip harvesting and placement

Surgery is initiated by the strip harvesting. The patient is in dorsal decubitus, with the head turned to the opposite side of the surgeon, the first half of the strip is then removed and sutured. Trichophytic closure is performed in two layers (internal absorbable suture and external mono nylon 5-0 running suture). The head is turned to the other side and the other half of the strip is removed. It is very important to avoid tension in the closure.

All grafts provided by the strip are placed. The author's routine is stick-and-place, but pre-made incisions or other strategies can be used according to the surgeon's preference.

FUE harvesting and the untouched strip concept

After all strip follicular units are implanted, FUE harvesting is then performed along all SDA. FUE leaves scars that are almost

unnoticeable but they exist, there will be hundreds of them leaving alterations in the donor area such as: fibrosis, less hair density and anatomical alterations of the surrounding hair [6]. As the combined technique is used for advanced baldness and, in these cases, more than one procedure is needed, the author preserves an area without surgical intervention; nor undermining neither FUE harvesting. An area of 1 to 1.5 cm, just below the strip suture (when the suture is placed high on the donor area) or just above the suture (when the suture is placed low on the donor area) is demarcated and preserved as described. This area will preserve its anatomical and histologic characteristics for a future strip procedure and is called *The Untouched Strip* [6].

The author's routine is to use motorized sharp punches (0.8 to 0.9 mm) to perform FUE extractions. Manual sharp time of harvesting was significantly higher, in the author's hands, and not used during long surgeries as combinations. Blunt punches or robotic FUE were not used. The method to harvest FUE can be done by any technique the surgeon is used to. The principle is always the same: to have more grafts and to preserve donor areas for future procedures without over-harvest by any method.

FUE grafts are then implanted to improve density, to go further to the crown area, where the surgeon decides it is the best position.

Post operative

The post-operative aspect can be observed in the Figure (1D). The recovery time is similar to isolated surgical techniques. The swelling period is higher (one or two days more), because the surgeon infiltrates more solution (at the beginning and after FUE harvest). As the hair is shaved, the suture is visible for at least 15 to 20 days, while the surrounding hair grows. Shock loss, mainly in temporal areas was observed in a reduced number of cases.

RESULTS

Examples of these procedures can be observed in the Figures (1 and 2).



Figure 1 (A) – Demarcation of the anterior hairline, before shaving. (B) – Demarcation of the bald area and limits of the SDA, before shaving. (C) – Demarcation of the donor area after shaving: the strip to be removed, the Untouched Strip that will be preserved for a future Strip procedure, and the FUE harvesting area inside the SDA. (D) – Post-operative aspect. (E) – Pre-operative view. (F) – Result after one year and 5,571 FUs transplanted (G) – Good quality scar.



Figure 2 Male patient, 37years, Norwood Class V, 5,019 grafts transplanted. (A) – Demarcation of the anterior hairline, before shaving. (B) – Demarcation of the bald area and limits of the SDA, before shaving. (C) – Demarcation of the donor area after shaving: the strip to be removed, the Untouched Strip that will be preserved for a future Strip procedure, and the FUE harvesting area inside the SDA. (D) – Post-operative aspect. (E) – Pre-operative view.



Figure 3 Combined Technique With Minimal Shaving “Executive Untouched Strip”. (A) – Donor area with selective shaving - only strip e FUE areas, preserving the surrounding hair long. 1st post-operative day (B) – Shaved areas covered by the surrounding hair.

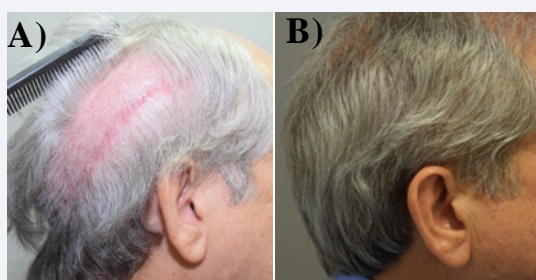


Figure 4 Donor area delayed regrowth – (A) 1 month post-operative (B) – Complete recovery - 4 months.

DISCUSSION

The combined technique was a paradigm breakage in hair restoration field. With the higher number of grafts achieved by the combination a larger area could be covered with higher density and consequently better results. Some difficult cases, such as, patients with multiple previous surgeries and depleted

donor area, or patients Norwood class VII in which the procedure was counter-indicated had a surgical option.

The clinical success of the Combined Technique is due to the higher number of grafts achieved in each surgery. This number varies from 40 to 100%, when compared to FUT, depending on the type of procedure (primary cases, secondary cases) and patient donor area characteristics and needs (elasticity, density and baldness degree).

One limitation is the need of shaving the head and post-operative appearance (Figure 1D).

For patients that cannot shave the head, there is the option of the combined technique with minimal shaving, in which the only hair shaved is strictly the FUE area. The surrounded hair is kept on its natural length allowing a more discrete post-operative look (Figure 3). This approach is called *The Combined Technique with Minimal Shaving* or *The Executive Untouched Strip* [9,10].

The only complication the author faced was higher incidence of delayed regrowth in the donor area, specially on the temporal areas, probably shock loss as a consequence of trauma addition from both procedures. All cases solved spontaneously within four months (Figure 4).

The main advantage of the combination is allowing the surgeon not to go up to the limit of each harvesting method, reducing the incidence of complications such as wide strip scar and FUE see through [10].

The combined technique was well accepted and considered by many surgeons as the future of hair transplantation for advanced baldness and have been adopted by a larger number of hair restoration surgeons in the last years [11-18] attesting its improved results and safety.

The Combined technique is a safe option to achieve better results for the surgical treatment of advanced baldness.

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