FUE Megasessions—Evolution of a Technique

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The ability to perform the hair restoration process in just a few sessions has long been an elusive goal for patients seeking treatment for their hair loss. This goal was eventually achieved with extensive micrografting and then with the more refined technique of follicular unit transplantation. The natural evolution is to be able to accomplish this task with Follicular Unit Extraction. This (rate has arrived!

The purpose of this writing is to identify the specific organizational and technical skills required for FUE. Megasessions, describe its advantages over other FUE techniques, and to discuss some of the long-term implications of FUE, particularly with respect to the effects of FUE on the donor scalp.

The Fox Test

In spite of significant improvements in techniques over the past several years, we still believe that each patient is different enough, with respect to the ease of extraction, that testing prior to the actual FUE procedure is warranted. This may not be necessary when creating triangular alopecia, restoring eyebrows, adding hair to donor scars, or in other cases where there is a limited demand for hair. However, in situations where the long-term demand for hair is large, performing a Fox Test is important for long-term planning. We particularly stress “long-term” for this information is probably more important in treating early recession in a person in their late 20s, than it is for the Norwood Class 6 patient in his late 50s.

In the latter case, if extraction proves to be difficult, (i.e., the grafts shrunken or fragment on extraction), the yield may be lower than expected or the procedure may take longer than anticipated. In the worse case, a strip incision can be used to achieve the desired number of follicular units. However, in the younger person who plans on wearing his hair very short on the sides, having to abort FUE is a disaster, since this patient may have opted out of the hair restoration process altogether if he had known in advance he was a poor candidate for the procedure.

To make matters more complicated, Fox Testing (Follicular Unit Extraction) is not black and white. It varies from patient to patient and can decrease in the same patient over time (as the same areas are accessed more than once). We use a subjective scale of 1 to 5 for the assessment, assigning a score of 1 (now accounting for over 90% of patients) when intact follicular units literally pop out of the scalp or when there is only occasional extraction of individual hairs in the unit. For Fox grade 2 patients, extraction may be relatively easy in the first session, but in subsequent procedures (when the donor area is slightly scarred) it becomes more problematic and the yield starts to decline. In these patients, the long-term yield can be compromised and planning extremely difficult. With Fox grade 3–5 patients, where large numbers of grafts are needed, the yield is too low for the FUE procedure to be successful. Here the decision not to use FUE is straightforward. Unfortunately, the physician cannot make this decision without prior knowledge of the Fox results. As a consequence, the patient may have inadvertently been started on a course of treatment that cannot be completed.

Factors in Transitioning from 500–600 Graft Cases Into FUE Megasessions

For this discussion, we arbitrarily define an FUE Megasession as a single session of 1,500 or more FUE grafts, cognizant of the fact that traditional transplant sessions were first called “megasessions” when they exceeded 1,000 grafts. The bar of course was soon raised to 1,500 and then 2,000 grafts as skills improved, with sessions greater than 2,500 now being routine in some clinics. The key to successful FUE Megasessions is the economy of movement during the extraction process. At the “micro” level, this demands:

- Excellent lighting.
- Adequate magnification for the surgeon and staff.
- Determining the angle of the hair below the surface of the skin. In almost all instances, the angle of the emergent hair is more acute than the angle of follicle in the dermis. The incision must obviously anticipate this and be oriented in the direction of the follicle rather than the visible hair.
- Using a single, short twisting motion of the punch (<180°) with the hand perfectly steady. We find that clockwise rotation (for the right-handed person) generally provides more stability than twisting to the other direction. A back-and-forth motion causes unnecessary traction and is incompatible with successful FUE, as is a 360° rotation of the punch. In some cases of Fox grade 1 cases, direct pressure alone (without any twisting) may be sufficient to extract the grafts.
- Sharp punches. These are critical to minimize the amount of twisting needed to cut into the dermis. In addition, they allow the surgeon to feel the “release” as the punch progresses from tougher dermis into the subcutaneous tissue.
- Punch size of 0.9–1.0mm in diameter. This size is large enough to encompass the width of the follicular unit yet small enough to minimize wound size and scarring.

At the team organization level, this entails:

- Batching the incision (and dissection when necessary) phase of the procedure and separating it from the actual extraction phase. This is a critical aspect in the organization of the procedure. Batching greatly speeds up the process, but doesn’t
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provide immediate feedback to the surgeon with respect to transection. It is important, particularly at the beginning of the session, to examine every graft as it is incised and extracted to ensure that adjustments can be made with respect to angling and the punch. This is also important as new areas of the scalp are accessed. It is important to note that hair does not always exit from the donor site in exactly the same direction, even with adjacent follicular units. The need for constant adjustment of the hair angle is critical to an efficient extraction. In cases where the angle is consistent and easy to determine, a surgeon can easily bunch up to 50, or more, grafts at a time. However, in more difficult cases, or in more difficult areas of the scalp, checking for transection should be done every few grafts throughout the duration of the procedure. This must also be done if the grafts have any tendency to fall into the fat. These grafts can be extracted by putting pressure on the surrounding skin, or by using jewelry forces to pull them out, and prevented by making the initial incision more superficial. With harvesting, however, there is no way to keep track of the grafts that may have inadvertently entered the subcutaneous space.

In cases where the angle is difficult to determine, a surgeon can

Case Studies

Patient 1. The patient is a 35-year-old male. His goal was to complete the restoration of thinning in a single session and his donor area was determined to have it done with strip harvesting. He had average hair weight with good body and white in color. His donor density was 2 hairs/mm² and his Fox Test was classified as 1.

This case is important for a number of technical reasons. The almost clear white hair is very difficult to see, so we dyed his hair black the morning of the surgery. The FOX procedure is very intense so we made sure that there were no interruptions for the day to disturb our concentration. The staff consisted of one surgeon (KWA) and three medical assistants. The procedure took 12 hours to extract and plant 1,901 follicular unit grafts. The grafts were trimmed of excess skin and hair counts were performed. The grafts were sorted in Petri dishes of cold Ringer’s solution and refrigerated at 4°C. All of the grafts were removed by the doctor with 91.5% yield of intact units. (Photos 1–3.)

Patient 2. This patient had two FUE procedures 1 and 2 years earlier totaling 1,195 grafts. The FUE procedures left small pinhole scars that were hard to see with the hair as a normal length (photo 4). As the hair was clipped very short or shaved (photos 4 and 5), the scars were visible. Obviously these scars will impact future extraction. In our fairly extensive experience, the scarring shown here is typical for the FUE procedure.

Photo 1: Donor area for FUE grafts one day post-op

Photo 2: Normal recipient area of approximately 5,000 FUs

Photo 3: Crown recipient area approximately 900 FUs

Photo 4: View of FUE donor site one year after surgery (1,000 grafts in two sessions)

Photo 5: Hair clipped view of FUE donor site one year after surgery (1,000 grafts in two sessions)

Photo 6: Painted donor site of FUE donor site one year after surgery (1,000 grafts in two sessions)
Other issues:
- Microscopic evaluation and, when needed, trimming of the grafts to excess tissue. This is particularly important at the frontal hairline to ensure that the follicular units used in this location are only single-hair grafts.
- Sorting and recording the follicular unit grafts by the numbers of hairs they contain. This is important so that there will be enough grafts to create a natural hairline or other areas that require single-hair grafts. There is a tendency to remove only the largest units, resulting in too few 1-hair follicular unit grafts. By giving the physician feedback, smaller units can be extracted to fill this need.
- Tumescent is critical, but it is most effective when injected superficially into the dermis. Normal saline should be injected into the dermal layer in small areas at a time, as the saline diffuses away quickly and the tumescent effect is rapidly lost. Tumescent into the subcutaneous space offers little benefit.

Advantages of Performing an FUE Megasection Over Staged FUE Sessions:

Various schedules for performing FUE have been devised. These include daily, weekly, and monthly sessions. Daily sessions have the advantage of using post-op edema as a form of built-in tumesence, and segregating the sessions for patients that travel a distance for the procedure. Weekly sessions have an advantage over monthly sessions in that the latter makes identification of recipient grafts difficult.

However, FUE Megasections have advantages over both. The single session avoids the post-op crusting (and associated bacterial buildup) from daily sessions that can alter the visual field and it allows for easier placement of recipient grafts, since all the follicular units are “at hand” when making judgments as to the density and distribution of grafts. In addition, anesthesia does not have to be placed into an edematous recipient area filled with 1-day-old grafts that are temporarily anchored, nor do additional sessions have to be made. Most importantly, the patient does not have to suffer the inconvenience of daily trips to the operating room. In the future, is it hoped that extraction and implantation can be carried out simultaneously, significantly decreasing the duration of the procedure.

Donor Scarring
Because the main advantage of FUE is the elimination of a linear donor incision, it is ironic that donor scarring is the major limitation to successful FUE.

Although the individual scars of FUE are small, the cumulative scarring from hundreds to thousands of open wounds, left to heal by secondary intention, is significantly greater than from a linear incision. The small white donor scars may not be visible through normal length hair but it is disfiguring to represent that scarring doesn’t exist. The time white scars, can, be seen if the scalp is clipped or shaved, a style that is increasingly common today.

The major consequence of this scarring is the decreased yield in future FUE sessions. Successful FUE depends upon scatter as well as visual cues, and scarring in the donor area significantly diminishes the sensitivity of the former.

The scars in a previously harvested donor area make it significantly more difficult to extract intact follicular units without traction. The scarring process alters the angle of the follicles, as well as the feel of the dermis. This can be appreciated both in the vicinity of a linear scar, as well as in the area of previously extracted grafts.

Just as traditional megasections were an improvement over small hair transplant sessions, FUE Megasections offer many advantages over small FUE sessions. However, even with FUE Megasections, the need to go back to the same area for additional grafts in future sessions is not eliminated. The difficulty in extracting intact follicular unit grafts from previously harvested areas may result in decreased overall yield, making subsequent FUE sessions less predictable than the first and significantly less robust than traditional strip excision for FUT. This limitation must be discussed with patients and be considered before the first follicular unit extraction session is undertaken.

REFERENCES