2nd Edition

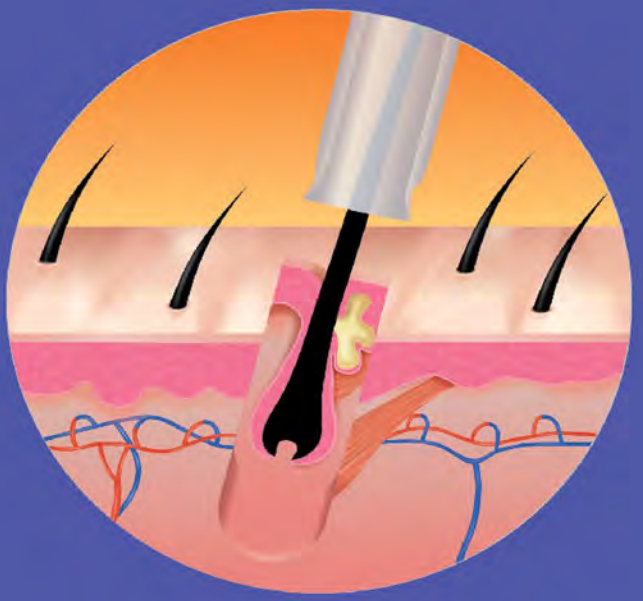
Volume 4 | Part 2

2nd Edition

Volume 4 | Part 1

HAIR TRANSPLANT 360

FOLLICULAR UNIT EXCISION (FUE)



EDITORS

KENNETH L WILLIAMS JR

SAMUEL M LAM

JAYPEE

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FUE Megasession

Marie Schambach

JAYPEE BROTHERS

CHAPTER OVERVIEW

The most important aim of any patient undergoing a hair-restoration surgery is to cover all the bald area regardless of the grade of alopecia one may have. So depending on the area to be covered, we may need more grafts to achieve this endeavor.

A follicular unit excision (FUE) megasession surgery is a technique that has been named after achieving a certain number of grafts per surgical day. In my opinion, the terms megasession, gigasession, or similar terms referring to a large number of grafts excised, extracted, and placed are a marketing strategy to offer options to an advanced-grade bald population. Megasessions or gigasessions should be addressed more on the superficial balding area to be covered in one pass rather than the number of grafts extracted.

Regardless of the number of grafts, it is even more important to recognize the limits of extraction to avoid the several complications that overharvesting could bring to your patients.

Time is of the essence, not only to guarantee graft survival but also to provide comfort for the patient and the staff working with you. I would consider the need for a megasession if more than 75 cm^2 must be covered in 1 surgical day (on average, that would mean more than 3,000 grafts). In my experience, a 4,000-graft FUE surgery can be performed in 8 hours by a total staff of three individuals (one surgeon, one technician, and one anesthesiologist), if and only if every step is performed on a timely schedule, overlapping tasks in your operating room (OR), and working harmoniously amongst each other like musicians playing a symphony.

The total of 8 surgical hours can be divided into different steps: during the first hour, patient preparation and OR preparation is done; the second and third hours are used for excision and extraction, respectively; the fourth hour is used for lunch of all staff and OR preparation for placing; fifth, sixth, seventh, and half of the eighth hour are reserved for placing; and, finally in the last half hour, all clean-up is completed.

BACKGROUND

The definition and description of the size of a hair-restoration procedure in terms of how many grafts are transplanted in a single session have changed over the past decades with both linear-strip excision (LSE) and follicular unit excision (FUE). The size of the grafts harvested in a single case has changed dramatically from the late 1980s when Limmer introduced elliptical excision with stereomicroscopic graft dissection. In this historical evolution, the size of LSE hair-restoration cases was considered large with any case over 1,000–1,500 grafts per day, and that number has now been expanded to well over 5,000 grafts harvested.

What is considered a megasession today in FUE likewise has gone through an evolution. In 2002, the size of the FUE case was small. Early FUE pioneers described their first cases commonly harvesting fewer than 500 grafts in a single session. The first reference in the medical literature describing large FUE sessions was in 2004.[1] For the novice surgeon, this reference is a must read to understand the historical evolution of FUE large sessions. In this early period of FUE, a megasession was first described and arbitrarily defined as 1,500 grafts harvested in a single session. Historically, the referenced article and surgeon performing the large FUE procedures was Dr Ken Anderson, who described his first FUE cases consisting of up to 1,901 grafts that were harvested over 12 hours. To put this number into perspective, during this early period of FUE a case of over 1,000 grafts was extremely uncommon.

Some hair surgeons advanced the notion that more than 3,000 grafts and up to 4,000 grafts could be excised in a single surgical day. In the FUE community today, the consensus is that the typical FUE session averages between 1,500 and 2,000 grafts harvested in a single session. In some cases, a 2-day consecutive case may harvest up to 3,000 grafts. Whether the harvested grafts are obtained in 1 or 2 days, in my opinion, regardless of what terminology we use, the most important concept should focus on whether the risks of overharvesting overweigh the advantages of transplanting large numbers of follicles in a single session. In my chapter, I define a megasession as 3,000 or more harvested and transplanted grafts.

I do want to explicitly remark on the lack of importance that the mathematical number of grafts extracted actually means, since it is the number of follicles and the caliber of the hair that can define the capacity of coverage and not a particular number of grafts alone. To easily understand this concept, I would like to explain it further with the following example. If one harvests 4,000 follicular units (FUs) containing only one hair per graft, we would have 4,000 single follicles to achieve a certain density or coverage in the recipient site. If we excise 2,500 grafts (fewer grafts) but with an average of 2.5 hairs per follicle, we would have a total of 6,250 follicles for greater density or coverage (**Fig. 1**).

In considering an FUE megasession, it is important to strategize prior to performing the surgery to reduce surgical time by achieving certain scheduling goals during the surgery, which will be discussed in this chapter step by step. The human resources to perform this task are fundamental; in my experience, a megasession can actually be achieved with one technician, one anesthesiologist, and one hair-restoration surgeon. I use an anesthesiologist on our surgical team because we perform a deep level of sedation for the entire procedure. I believe that this level of sedation offers more comfort to the patient and at the same time decreases the time for the steps during surgery.

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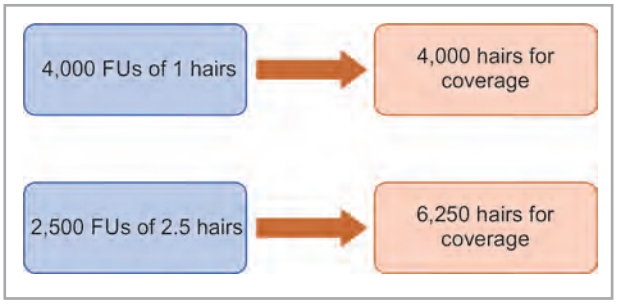

FIGURE 1

Comparison of a number of grafts with hairs-per-graft ratio and availability for coverage. Mathematically speaking, if a 4,000 follicular unit excision is done and each graft has one hair, actual availability would be 4,000 hairs to achieve certain coverage for a certain area. However, if 2,500 follicular units are excised, each with 2.5 hairs on average, there would be a total of 6,250 hairs for more coverage in the same area

TABLE 1

Schambach's experience of average number of grafts needed for completely restoring the Norwood grades of androgenetic alopecia.

AGA Norwood grade	*Average FUs needed*
III	1,200–1,500
III anterior	1,500–2,000
III vertex	1,200–1,500
IV	1,500–2,200
IV anterior	1,800–2,500
IV vertex	1,500–2,200
V	2,200–3,500
V anterior	2,500–4,000
V vertex	2,200–3,500
VI	3,500–6,000
VII	5,000–8,000
(AGA: androgenetic alopecia; FU: follicular unit)	

PREOPERATIVE CONSIDERATIONS

Patient Selection

In order to decide on whether to perform a megasession, one must choose the right candidate for such a procedure. The first parameter one should verify is the number of grafts needed to provide adequate coverage for a specific Norwood grade for a particular patient. This can be done mathematically by the coverage value, by the hair mass index, or by experience to determine the average grafts needed per area.

In my own experience, **Table 1** depicts the average number of grafts needed to completely restore the Norwood grades of androgenetic alopecia.

By understanding the need of grafts for the patient's balding grade and by calculating specifically the maximum donor capacity that is available for the patient, the surgeon can counsel the patient about the best course of action to achieve the ideal results in a safe manner.

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Patient Consultation

When performing an FUE megasession, we must brief our patients regarding the length of the procedure and the fact that he or she will be under deep sedation. Since the patient is under sedation, all consents and decision making as to the surgical plan must be established prior in the preoperative setting. The potential risks and complications during surgery must be outlined in the preoperative consultation. It is reasonable and important to present to the patient all reasonable, potential scenarios that could arise. For example, preoperative conversations with the patient may include scenarios whereby the FUE procedure cannot be performed and the harvest method converted to LSE, an unforeseen cardiac event requires cancellation of the surgery, or if the quantity of grafts simply cannot be obtained.

All surgeons must effectively communicate that the patient will require a considerable amount of time in certain prolonged static or fixed positions during harvesting, recipient-site design, and graft placement. When patients have certain musculoskeletal disorders, FUE may cause discomfort to a point where either a shorter surgery should be performed or other remedies, such as extra pillows or specific positions, to relieve pressure on painful points should be administered. It is also prudent to consider the use of compression stockings in any patient that has preexisting embolic or thrombotic conditions and risk factors.[2]

It is important during the consultation that the patient knows and agrees to all future postoperative-care instructions and modifications of daily routines. It is also important to explain the natural course of hair growth postoperatively and when the cosmetic results should be expected. Naturally, in the informed consent that the patient should sign prior to receiving any sedation, all the possible complications need to be documented.

It may not seem important, but thorough communication with a patient of what is to be expected on the day of surgery will relieve unnecessary anxiety. Finally, it is important that the patient wears comfortable clothing for the surgery and a button-down shirt that can be easily removed without the risk of dislodging any newly transplanted grafts.

Preoperative Indications

As with any regular surgical procedure, the surgeon and anesthesiologist must be aware of all medications because of potential drug interactions with anesthesia and tumescent solutions.[2] It may be important to avoid certain medications up to 2 weeks before surgery. Other routine precautions include the following:[3-5]

- No aspirin or nonsteroidal anti-inflammatory drugs (NSAIDs) 7 days prior to surgery
- If on blood thinners, the patient must inform and contact the physician who prescribed them and get a certification with instructions to proceed.
- No alcohol or smoking at least 3 days before surgery
- No herbal derivatives or multivitamins including Vitamin E or B the week before surgery, as these supplements could increase the risk of bleeding
- Advise the patient to drink plenty of water the day before surgery.
- Most surgeons advise their patients to stop using minoxidil at least 2–3 days prior to surgery to minimize skin irritation and to reduce a theoretical risk of increased intraoperative bleeding secondary to vasodilation. Similarly, the surgeons prefer to reinitiate minoxidil administration between 2 and 14 days after surgery. This allows the epithelium time to heal and minimizes the potential for theoretical damage to the transplanted grafts from the propylene glycol-based vehicle in which some minoxidil is administered. In contrast, finasteride use is uninterrupted in the pre- and postsurgical periods.[6,7]

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- No alcohol or recreational drugs 3 days before surgery, as these may affect the patient's sensibility to sedative medications used during surgery.
- No smoking at least 24 hours before surgery and 3 days after surgery. Smoking can delay the healing process and favor infection and can decrease ultimately the graft survival.
- On the day of surgery, the patient should bathe and shampoo the hair as usual. Further, the patient should avoid any hairstyling or camouflaging products. Needless to say, if the patient arrives to the office with hair products, the technicians must wash hair before surgery.
- If performing a megasession with sedation, the patient must not have anything by mouth (not even water) for at least 8 hours before surgery.
- Since sedative medications will be administered, patients should know that they cannot drive back home.

Informed Consent

It is always important, as it is the same for regular procedures, to sign an informed consent explaining the length of the procedure and all possible complications that can arise. Usually, we send the informed consent digitally for the patient to read and understand before the day of the surgery in case there is any reason the patient wants to cancel ahead of time and not the day of the surgery.

Patient Preoperative Evaluation

It is important to choose wisely which patient would or would not benefit from a megasession. The patient may be grateful too if we can offer other options like dividing the surgery into 2 or 3 days.

Young patients without preexisting medical conditions should be screened with a minimum of hematology, creatinine, glucose, prothrombin time (PT), and partial thromboplastin time (PTT). If the patient is over 45 years old or has a preexisting condition, along with previous laboratory work, additional diagnostic screening should include an electrocardiogram (EKG), chest X-ray, and a surgical authorization letter from a treating doctor with additional recommendations for monitoring and treating during sedation if applicable.

OPERATIVE CONSIDERATIONS

When performing megasessions, we try to maintain a timeline or schedule, not only to reduce graft time out of body but also for comfort for the patient and the staff (**Video 28.1**).

Video 28.1 *FUE Megasessions* (Marie Schambach)

Schambach shows how she performs FUE megasessions.



The timeline of the surgery should follow the steps outlined in **Figure 2**: first hour for patient preparation and operating-room (OR) preparation; second and third hour for excision and extraction; fourth hour for lunch and OR preparation for graft placement; fifth, sixth, seventh, and half of the eighth hour for graft placement; and the last half hour for cleaning and patient discharge.

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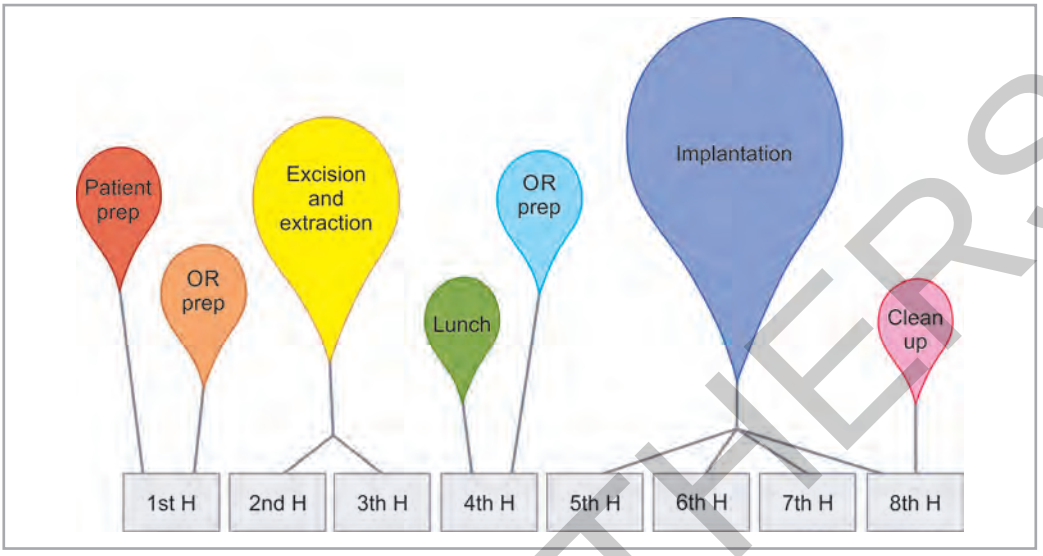

FIGURE 2
For a 4,000-graft follicular unit excision megasession, the timeline is suggested as follows: first hour for patient preparation and OR preparation; second and third hour for excision and extraction; fourth hour for lunch and OR preparation for graft placement; fifth, sixth, seventh, and half of the eighth hour for graft placement; and the last half hour for cleaning and patient discharge

This timeline can offer an efficient surgery with enough grafts to achieve the most coverage possible. In an advanced, experienced office, 4,000 FUs can be excised and placed in a total of 8 hours, assuring that the time out of body for the grafts is reduced to less than 6 hours.

I have found that the following tenets should be adhered to so as to provide a safer, more efficient, and more enjoyable surgical experience:

- Minimize delays by overlapping the staff's tasks.
- Good-quality materials are needed to protect the grafts, which should be readily accessible.
- Proper sedation is fundamental to avoid patient movements and to perform faster infiltration of local anesthesia.
- Make sure you have good equipment, as it will simplify your surgery.
- Good staff training is the most difficult task but can be the most rewarding.
- Staff positioning is fundamental and should be both efficient and comfortable.
- Follow safety first and always.

Patient Preparation—30 Minutes

During the first step, the technician usually sets up the OR, making sure that everything is found at an easily accessible distance for the hand to grasp. The anesthesiologist sets up the sedation and anesthesia station. The surgeon has several functions: verify that the written consent is signed, answer any final questions from the patient, give the written postoperative-care instructions, shave the head, draw and plan the surgical design, and take all proper preoperative photographs (**Fig. 3**). It is important to understand that overlapping tasks can reduce operative time significantly.

Operating-room Preparation—30 Minutes

In this step, the technician positions the patient in the prone position, places all the monitoring devices, assists the anesthesiologist in drawing the blood and preparing the

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FIGURE 3
Example of surgical planning before surgery

platelet-rich plasma (PRP), liposomal adenosine triphosphate (ATPv), ACell Matristem Matrix (AMM) (ACell Inc., Columbia, Maryland, USA), or any chosen one as a holding solution.[8] In my practice, since grafts are usually less than 6 hours out of the body, we prefer to use PRP as our holding solution due to the ease of obtaining it and the reduced cost. Another reason we use PRP is the difficulty of obtaining other holding solutions such as ATPv and AMM in my country. The companies in charge of the production of such solutions do not export nor register these products locally with health agencies in my very small country, making it impossible to legally purchase and to use these products.

The anesthesiologist sets an intravenous (IV) line and draws the blood for PRP and then starts IV sedation using midazolam. Proper sedation is fundamental and time saving, and the safest way to achieve adequate sedation is having an anesthesiologist on your team. There are several reasons for performing IV sedation: increase patient's comfort and reduce anxiety, perform a faster local or regional anesthetic block, reduce voluntary muscle movements including "patient's curiosity movements", have the freedom to speak to your team without stressing your patient, and have the ability to do what you need to do and what music you want to listen to in order to have a harmonious and calm surgery. All of these seemingly small differences can save up to an hour of surgical time and will improve the quality of the work of your staff by offering a calm environment not to mention make the experience more pleasant and comfortable for the patient. For a more detailed discussion of IV and local anesthetic techniques, I refer you to Dr Lam's coverage of the subject in Chapter 14.

The surgeon dresses the surgical area, cleans antiseptically the area, and infiltrates the local anesthesia. For long procedures like megasessions, local anesthesia must have a fast onset but be long acting. A good regional block of the supraorbital and temporal afferent nerves can be achieved with 0.5 mL of 2% lidocaine with 1:100,000 epinephrine mixed with 0.5 mL of 0.25% bupivacaine with 1:100,000 epinephrine, and this 1:1 combination is infiltrated into each regional nerve.[9,10] This type of regional block lasts up to 8 hours avoiding the need to repeat doses and minimizes the risk of developing anesthetic tachyphylaxis.

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FIGURE 4

Choose wisely your working equipment and materials and always have spare ones sterilized, as you never know when one piece can stop working properly or is dropped and damaged by one of the staff

The surgeon must beware of the toxicity of bupivacaine and always remember to aspirate before injecting while performing a regional block, as 1 mL of bupivacaine injected intravenously can cause an irreversible myocardial block.

After proper anesthesia, the surgeon may start the graft harvesting and begin to determine the ideal harvesting parameters, proper punch size, and correct angle or direction of the advancing punch. It is important to choose good-quality materials wisely for your surgery, especially when performing FUE megasessions (**Fig. 4**) and to always maintain redundant backup devices, materials, and supplies in case of device failure, inappropriateness of a device for a particular patient, or consumption of more materials than originally conceived.

Excision and Extraction—2 Hours

Once the OR is set, we must verify which FUE instrumentation, punch size, or technique allows me to score and dissect the grafts the fastest without sacrificing the quality of the grafts. We work with two devices specifically, and yet my favorite for megasessions is the Trivellini system.[11]

Skin is composed of distinct layers, and the FU is attached to each layer of the skin through various adhesions within each layer. These adhesions must be broken when the

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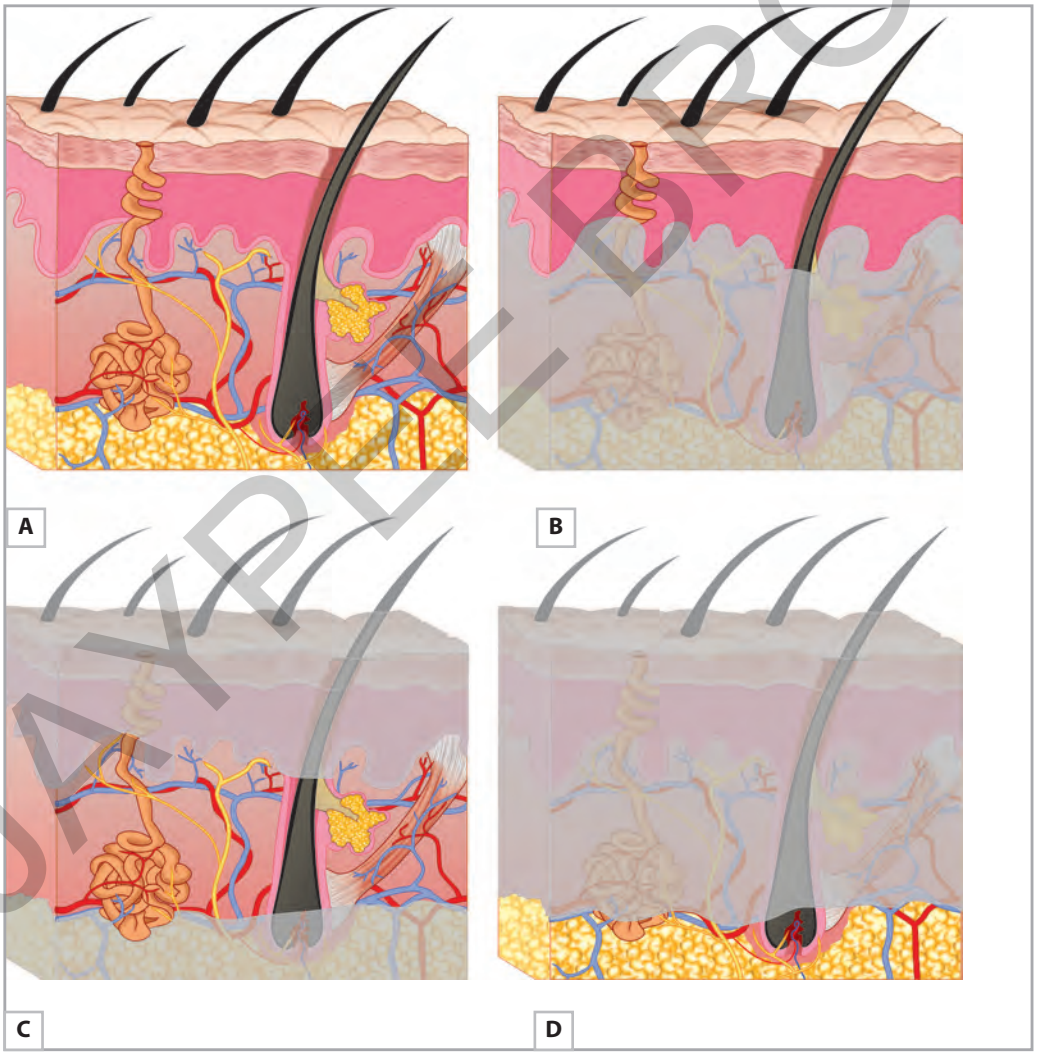
punch passes through the skin. The characteristics of these layers affecting the FUE vary and are as follows: (1) the epidermal layer where we find a very hard epithelium due to the kind and amount of keratin along with an impermeable, strong basal membrane, (2) the upper papillary dermis and lower reticular dermis that are very delicate due to the type of reticular connective tissue with the arrector-pili muscle, sebaceous gland, and bulge residing in this layer, and (3) finally, the subdermis which is composed of fat tissue protecting the dermal papilla.[12] The ideal type of scoring excision for the epidermis should be a very sharp cut (which can be achieved by a sharp punch with a fast, rotational motion), but then followed by a *very* soft dissection for the dermis to a determined depth in order to cut the arrector-pili muscle without harming the other previously mentioned critical structures in this layer, which can be assisted by a reduction in the rotational velocity. Finally, to dislodge the dermal papilla along with some of the surrounding fat, a gentle push of the punch toward a little more depth without an aggressive movement can accomplish this task. By undertaking these three sequential movements for each excision, the surgeon should be able to excise and extract a complete healthy graft with sufficient surrounding tissue to ensure a proper final yield (**Figs. 5A** to **D**). The Trivellini device provides the capability of



FIGURES 5A TO D

The characteristics of each skin layer affect how a graft should be excised. (A) Anatomy of the skin. (B) The epidermis is the most superficial layer with a very hard epithelium due to the amount of keratin along with an impermeable strong basal membrane. The type of excision in this layer should be sharp and fast. (C) The dermis is a soft layer due to the type of reticular connective tissue within it and contains many vital structures including the arrector-pili muscle, sebaceous gland, and bulge area. The excision should be soft and delicate to a determined depth to avoid transecting important organelles of the follicular unit. (D) The subdermis is composed of fat tissue protecting the dermal papilla, and excision should be near motionless, just enough to dislodge the anchoring system, yet to maintain sufficient surrounding tissue so as to ensure a proper final yield

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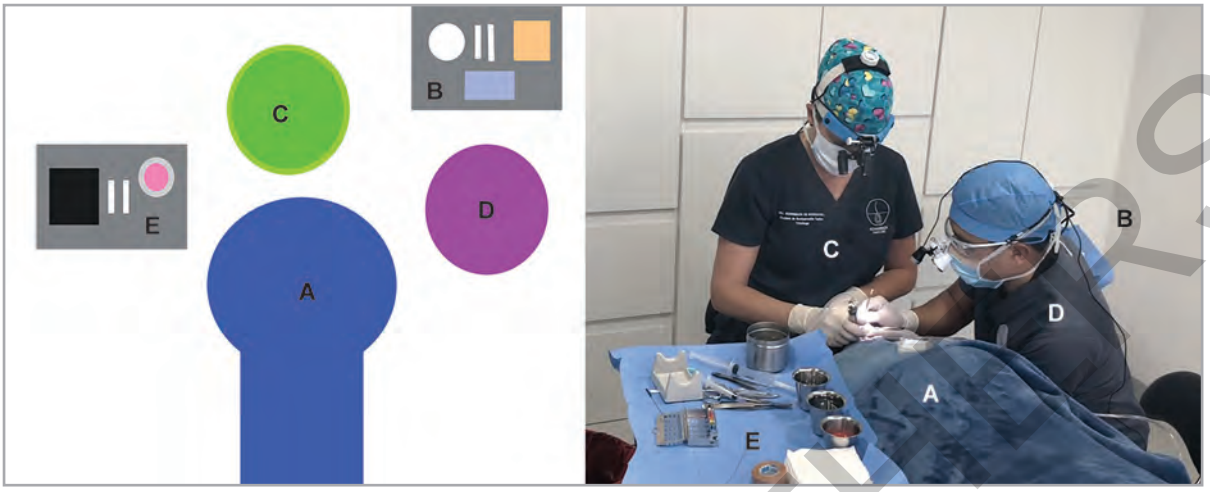

FIGURES 6A TO E

(A) Patient position. (B) Mayo tray for the technician (D) at a hand's distance with everything needed to collect, classify, and hold grafts. (C) Surgeon positioned at a comfortable height and distance from the surgical working area to perform excisions. (D) Technician positioned at a comfortable height and distance from the surgical working area to perform extractions. (E) Mayo tray for the surgeon (C) at a hand's distance with everything needed to excise grafts

dividing one excision into different stages and to program the type of motion for each stage, which I believe reduces the chance of partially transecting grafts. The Trivellini system also benefits from not needing a pedal to initiate the rotation of the punch, which additively saves considerable time and obviates the mental strain of needing to coordinate hand-eye-foot motion as well. I truly find this device exceptionally well suited for megasessions.

The OR positioning of the patient during graft harvesting and extraction should be efficient, having at hand distance not only the FUE device but all instruments needed. We suggest each participant have the Mayo tray at a distance and height comfortable to reach whatever is needed by hand for the procedure (**Figs. 6A** to **E**).

During this phase, the surgeon performs the scoring and graft dissection or excisions with the device that is most ideal and efficient. The staff typically extracts the grafts; more specifically, the technician extracts the grafts just behind the surgeon's excisions. The technician stops every hour to classify, count, and save the grafts in the order of their excision. The staff then documents the graft count or communicates to the anesthesiologist the number of grafts, the hairs per graft, and the number of transected grafts. The anesthesiologist during this section of the surgery maintains sedation, monitors the patient, takes notes of the counted grafts (either in a Microsoft Excel worksheet or in the app *Graft Calculator* developed by Dr Koray Erdogan) (**Figs. 7** and **8**), and, occasionally, upon the surgeon's special request, takes photographs or videos.

Break—30 Minutes

Usually, at this moment, all staff take turns for lunch. First, the surgeon should have lunch, which should be fast yet relaxing. As it is a long procedure, sufficient time should be allocated to rest to maintain one's vitality and mental acuity. While the physician is having lunch, the technician finishes counting and sorting grafts; afterward, she turns the patient onto the prone position with the help of the anesthesiologist, who will continue to monitor the patient. As the surgeon returns to the operating room, the technician

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FIGURE 7
Graft Calculator app for tablet developed by Dr Koray Erdogan. Multiple data points of information are available per surgery, per patient, per surgeon, and per technician

and the anesthesiologist head for a fast lunch while the surgeon prepares and dresses the surgical area and gets ready for the second part of the surgery. As both technician and anesthesiologist return to the OR, the surgeon is ready for local anesthesia while the anesthesiologist deepens the patient's sedation to reduce any discomfort. The patient does not get lunch since he or she is sedated for the whole procedure.

Since it is a longer surgery, I strongly suggest use of regional-nerve blocks with the technique previously outlined in this chapter.[9] The specific anesthetic solution of a 1:1 mixture of lidocaine with bupivacaine ensures that the numbness of the surgical area will start as soon as 1–2 minutes after administration and can persist up to 8–12 hours.

Graft or Recipient Placement—3 Hours

There are several aspects of the graft-placement part of the procedure that can optimize time and allow the surgeon to perform megasessions. First of all, it is vital to have good and fast technicians for loading implanters and for placing grafts. Good staff training is the most difficult task but the most rewarding. Usually, one or two technicians should be enough to accomplish these tasks. If the grafts are to be placed into premade recipient sites, the surgeon should be able to finish recipient sites promptly and let the technicians place as fast as possible. Placing can be done directly with jeweler's forceps or with any other type of device currently found in the market (Keep implanters, Rainbow implanters, Mohebi implanters, blunt Lion implanters, etc.).[13] If the surgeon's preferred technique is by using sharp implanters without premade sites, then one of the most important factors is fluid synchronicity. The surgeon's and technicians' hands should move in a concerted and coordinated manner so as to enhance efficiency and to minimize inadvertent injury when passing the sharp-implanter device back and forth.

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Clinica: SCHAMBACH HAIR CLINIC

EXTRAXN	1140											TOTAL UF	TOTAL HC
UF 1 HC	3	4	4	18	24	21	29	26	17	16		162	162
UF 2 HC	21	19	41	46	91	84	96	111	72	82		663	1326
UF 3 HC	5	31	13	10	13	14	16	32	11	29		174	522
UF 4 HC	7	12						1				20	80
TRANS	2	1	3	5	3	2	5	2	3			26	65
												1045	2155
EXTRAXN	960											TOTAL UF	TOTAL HC
UF 1 HC	16	16	12	18	6	6	15	14	9	48		160	160
UF 2 HC	46	65	45	46	37	52	50	53	81	189		664	1328
UF 3 HC		9	15	3	6	9	18	15	18	34		127	381
UF 4 HC	7	8	9	1	1				1			27	108
TRANS	2	2	3	2	2	4	3	4	3	8		33	82.5
												1011	2059.5
EXTRAXN	1150											TOTAL UF	TOTAL HC
UF 1 HC	15	26	24	30	22	8	2	9	16	8		160	160
UF 2 HC	34	72	92	85	92	28	17	19	31	39		509	1018
UF 3 HC	29	16	18	18	12	17	23	10	27	37		207	621
UF 4 HC		31	4	8	3							46	184
TRANS	3	5	4	4	6	8	5	8	5	15	5	68	170
												990	2153
EXTRAXN	750											TOTAL UF	TOTAL HC
UF 1 HC	9	18	21	4	13	5	28	26	32	5		161	161
UF 2 HC	32	50	48	31	25	28	54	68	85	3		424	848
UF 3 HC	12	12	11	13	12	8	17	31	26	32		174	522
UF 4 HC	18	1	27	31	25	32	21	4	3			162	648
UF 5 HC												0	0
										TOTAL		921	2179

Fecha:	23-Apr-20	TOTAL UFs	3967	LOST	33
Paciente:	[redacted]	TOTAL HCs	8546.5	TR	127
Procedimiento:	Fue	UFs/HCs	2.15	%TR	3.175
Responsable:	KEVIN, DENMA	EXTRACCION	4000	% LOST	0.825

FIGURE 8

Graft-counter Excel table that I designed to keep track of my own surgeries. Extractions are divided into columns by every half hour, and the table provides information on total follicular units, total hairs, a ratio of hairs per follicular unit, excised grafts, lost grafts, transected grafts, transected ratio, and lost ratio

Staff positioning is fundamental and should be efficient and comfortable.

Usually, technicians sit at the surgeon's dominant side with a Mayo tray in between them. On this Mayo tray, there should be the following items: graft-storage holding solution, flat ice-pack trays for loading implanters, various-sized implanters, a tray with an uneven surface to ensure that loaded implanters are kept in order, and enough space for the surgeon to replace empty implanters (**Fig. 9**).

There are four OR arrangements to speed up placing grafts, whether there is only one surgeon and one technician, one surgeon and two technicians, one surgeon and three technicians, or two surgeons and two technicians.

- One surgeon and one technician (**Figs. 10A** to **D**) are arranged as follows: surgeon at the desired surgical position, Mayo tray on the surgeon's dominant side at a distance and height comfortable enough to easily grasp implanters, and the technician on the other side of the Mayo stand in a comfortable position to load implanters.

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HAIR TRANSPLANT 360
FOLLICULAR UNIT EXCISION (FUE)

With the advent of hybrid-punch technology in 2017 for follicular unit excision (FUE), the first edition of this book became outdated and required a major revision. This book doubles the scope of the prior edition from 25 chapters in a single book now to 60 chapters in two hardcover volumes. The first volume of this second edition updates and expands on the prior edition's sections and is divided into the following: Basics, Operative Fundamentals, Practice Considerations, and Devices. The second volume is entirely new and is sectioned into Concepts, Techniques, Adjunctive Measures; Regional & Ethnic; Complications & Repair; and How I Do It & Special Topics. The intent of this work is to provide practical, up-to-date, and comprehensive knowledge as it relates to FUE that does not exist in any other book on the subject. Consistent with those objectives *Follicular Unit Excision (2nd Ed.)* incorporates over 100 videos, almost all full length, with over 17 hours (approx.) that cover a range of subjects showcasing operative technique, interviews, video lectures, etc. – all of which are easily accessed via a QR code embedded in each chapter. In addition, in the inside covers, there is a QR code that will link you to updated and additional bonus videos for the reader. The editors wish the reader will find this engaging format to be richly educational so as to improve his or her own surgical practice for the betterment of the patient.

Samuel M Lam is a facial plastic and hair surgeon from Dallas, Texas, who was the 2021 president of the American Board of Hair Restoration Surgery (ABHRS) and has served the International Society of Hair Restoration Surgery (ISHRS) in many capacities. He has authored over 250 scientific articles and is the creator of this *Hair Transplant 360* book series along with other medical textbooks on facial plastic surgery. He is also the founder and director of the *Hair Transplant 360* course in St. Louis, Missouri, for well over a decade now.

Kenneth L Williams Jr is a hair surgeon in Orange County, California, who was the 2021 treasurer of the ABHRS and has also served the ISHRS in many ways. He is the co-editor of the first edition of this textbook alongside Dr Lam.

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