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FORUM

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IN THIS ISSUE

Histological Analysis for the Cause of Kinky Hair after Hair Transplantation

Preview Long Hair Transplantation with Donor Harvesting Using the Follicular Unit Excision Technique



Follicular Unit Excision-Linear Ellipse (FUE-LE): A New Way to Add the Linear Ellipse Donor Harvesting Method to Any FUE Practice

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ABSTRACT

Many hair restoration practices offer exclusively the Follicular Unit Excision (FUE) method of donor harvesting, excluding the linear ellipse (LE), or "strip," procedure. In speaking with new surgeons joining the field of hair restoration surgery, the most common reasons for not offering the "older" linear ellipse method of donor harvesting are the linear scar, lack of patient demand, and lack of staff trained to perform graft dissection. However, experienced surgeons who perform both donor harvesting methods understand the merits of each, aware that with appropriate patient education and selection both methods can provide excellent cosmesis for recipient and donor areas, in addition to optimizing a good long-term surgical plan to preserve future donor area harvesting if or as needed. Furthermore, patients with or destined to develop advanced pattern hair loss often have a sufficiently larger recipient area compared to the safe donor area making a single method of donor harvesting likely to limit coverage. These patients are best served by a combination of both methods to achieve the greatest number of follicular units (FUs) harvested with the least visible donor deficit. For this reason, identifying a way for FUE-only clinics to easily add the LE procedure to their practice would be advantageous for patient care. To that end, I present here the technique of using FUE to harvest all follicular units from inside a pre-marked area of a planned linear ellipse—a novel technique called Follicular Unit Excision-Linear Ellipse (FUE-LE).

Keywords: follicular unit excision (FUE), linear ellipse (LE)

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THE FUE-LE PROCEDURE

The FUE-LE procedure is a five-step donor harvesting procedure as follows:

Step 1: Identify the safe donor area (SDA) and, based on the number of planned grafts and density of the SDA, demarcate a zone for excision (Figure 1). For example, a planned procedure of 1,500 grafts with a density of 75 FU/cm^2 requires 20cm^2 donor area (75 × 20 = 1,500). In this situation, this can be achieved with a 1cm-wide area that is 20cm long, or 1.2cm wide and approximately 17cm long, etc.

Step 2: Excise all FUs inside the area of demarcation (Figure 2) using the preferred FUE machine. The demarcation area can be adjusted if the FUE yield is more or less than expected. Importantly, since the excision holes will be removed, punch scar size is not an issue, therefore, it may be advantageous to use a 1mm or larger punch to ensure minimal transection and additional perifollicular tissue around the grafts.

Step 3: Perform a full-thickness ellipse of scalp skin and subcutaneous tissue along the demarcation lines. This excision is carefully performed along the lines to limit

FIGURE 1. Demarcated zone of planned FUE.



FIGURE 2. FUE inside zone of demarcation.



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President's Message

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It's amazing that the ISHRS World Congress is in its 30th year. How time has passed so quickly.

It seems like it was only yesterday that we had reached 25 years in Prague. But like many things, we have been lost in the time warp of the pandemic and essentially missed out on the last two years.

For the 30th anniversary, we are doing a few new things such as special *Forum* editions with guest editors starting with Editor Emeriti Brad Wolf and Russell Knudsen. We thank immediate past co-editors Aditya Gupta and Jeffrey Epstein for their dedication and contributions. This issue continues their "Notable Articles Project" column, and we hope to fill each issue this year with articles significant to the history of our society and our field.

Let's hope the third time is lucky and our meeting in Panama City can take place in person. Sara Wasserbauer is already working tirelessly to make it a spectacular and fun meeting. In addition, the annual meeting committee has been confirmed and is on its way to putting together a great educational program. Please help out by sending in your abstracts as soon as submissions open.

Additionally, members old and new have been assigned to other committees working on various projects like the CME webinars, which have already started. I thank Ratchathorn Panchaprateep, our new CME chair, for accepting this very important task. You will note that the January webinar was longer than last year. This is so that those who need to claim ACCME accredited points can obtain more teaching hours; so, if you missed the in-person session, please go to the members section on the website and watch the recording to claim your CME points.

Now, a Bit of History…

On April 29, 1993, the International Society of Hair Restoration Surgeons was incorporated as a non-profit society. On the Articles of Incorporation are listed the first Board of Directors: Dow Stough, O'Tar Norwood, Paul Straub, Dominic Brandy, Daniel Rousso, William Rassman, Patrick Quinlan, Sheldon Kabaker, and Robert Leonard. The first meeting was in May 1993 in Dallas, Texas. This meeting was so successful that in the 1993-94 subscription year there were 270 physicians and 63 surgical assistants who joined (representing 26 countries), and the following year there were more than 680. One year later, the name was changed to the International Society of Hair Restoration Surgery because many in the field did not have a surgical background. By 1998, there were many projects that were being set up, such as a website, and Victoria Ceh was brought in as Executive Director. Over the years, she has added to her administrative team to do all the hard work behind the scenes for our many projects and committees. I congratulate them all wholeheartedly on fantastic jobs in making this society the leading educational group in the world with 1,000 members from 69 countries (the non-US group now makes up 70% of the membership).

The history of the *Forum* precedes the ISHRS when ISHRS co-founder O'Tar Norwood started a 4-page newsletter: "This publication launches a new concept in communication within the hair transplant community. The goals of the *Forum* will be the timely exchange of ideas and the rapid appreciation of new developments and changing trends. In addition, it will be interesting to learn more about this divergent group of doctors who perform hair transplant surgery." (O'Tar Norwood, September 1990).

The third issue was twice as long owing to the publication of the first *Forum* article authored by Manny Marriot (USA) about mini and micrografts vs standard grafts (4mm punch grafts) and a discussion on recipient slits vs holes. By the fourth issue, the journal became subscription only. The best way to remove linear strips was one of the topics debated and included a diagram "A Pictorial Review of Donor Site Design and Closure 1978 to 1991" (*Forum*, Vol 1 Number 4, p. 2). Interestingly somewhere near the beginning of this historical evolution is Dr. Hill's technique using two continuous rows of 4mm punches and then removing the strip and suturing closed. Compare this to Dr. Keene's article using micro punches to do the same. Interestingly, Dr. Norwood commented: "I do not believe at this time that the knife will replace the punch, but I believe it will have a place. I look forward to reader response on this important issue."

For the May/June 1992 issue, the journal's name was changed to *Hair Transplant Forum International*. It was not until 1995 that the *Forum* became the official publication of the ISHRS due to its generous donation to the society by Dr. Norwood. Today, we have moved more and more towards a traditional journal with stricter editing of articles especially now that we have the Open Access facility in place.

Finally, each president gets the privilege of setting up Ad Hoc Committees. This year I have set up a working group called Women in ISHRS with the possible goal: To enable women hair transplant surgeons to develop their individual potential as professionals and promote an environment within the ISHRS that fosters inclusion, respect, and success. I am only the third woman president yet there are 185 women members (representing 20% of the total), so realistically there should be a woman in this role about every five years. I am not a feminist but a women's advocate; therefore, I would like to help more women attain leadership roles. ■

Guest Co-Editors' Messages



Russell Knudsen, MBBS, FISHRS | *Sydney, Australia* | drknudsen@knudsen.com.au

Welcome to the first *Forum* of 2022. If we look at the current state of the art and practice of hair transplantation, the relentless progression of FUE to dominance as ***the*** harvesting technique continues unabated. Wisely, Dr. Sharon Keene has written a cogent, thoughtful presentation of a way to blend the advantages of both FUE and strip harvesting to FUE-only practices. Interestingly, Dr. Keene's presentation mimics the original development of strip harvesting that began with closely spaced punch grafting by Dr. Ian Morrison in the UK in 1978. This was only possible because of the development of super sharp carbon steel punches that were developed by the legendary Dr. Richard Shiell in Melbourne, Australia, in 1975. All hair transplant physicians should carefully consider the idea of blending FUE and linear excisions as there are some patients where this will provide the best donor harvesting outcome.

Dr. Bill Parsley discusses problems with implanting unusual grafts and sagely advises that if you, the physician, can't perform the implantation process and personally deal with difficult intra-operative problems, then please do NOT enter the field. Optimal results depend upon the PHYSICIAN'S skill level, not just that of the assistants.

Dr. Bob Haber also discusses planting problems, especially popping, and references the reprinted "notable" article by Dr. Damkerng Pathomvanich published in the *Forum* in 2011.

An interesting paper by Dr. Sooho Park histologically examines "kinky" grafted hairs and proposes subcutaneous scar tissue as a probable causative mechanism. He proposes reducing post-operative inflammation as a possible solution.

In short, there is an abundance of helpful information in this issue to help us make better choices and develop better outcomes in our patients. ■



Bradley R. Wolf, MD, FISHRS | *Cincinnati, Ohio, USA* | htwolf@wolfhair.com

It's an honor to be asked to contribute as guest co-editor for the first edition of 2022, during the 30th anniversary of the ISHRS, and 32nd year of the *Forum*. The year the journal was first published, 1990, was a watershed year for our specialty and for me personally. I and many of my colleagues began practicing hair restoration surgery in or around that year due to major changes occurring in the field beginning in the late 1980s. Four-millimeter-diameter grafts ("plugs"), the predominant graft size since the early 1960s, offered the miracle of hair growth in hairless scalp but at the price of an unnatural result. In the 1980s, smaller grafts were introduced that were becoming mainstream in 1990. Minigrafts and quartered grafts (4mm-diameter graft cut into four equal pieces) created more natural results. Soon after was the transition from removing 4mm-diameter grafts from the donor individually and randomly to confining the donor removal to a limited area either of contiguous 4mm punches or as one or more strips. These changes led to more natural results, which created a larger market for transplants and the demand for more specialists in the field.

Many of the current senior surgeons entered the field due to these advances. I saw my first hair transplant surgery in 1990 and still remember the excitement I felt when I realized that I could do the surgery better than the doctor I was observing. It was an epiphany I will not forget! Hair restoration rescued me from the 10 years I spent practicing Emergency Medicine. Having attended the first ISHRS meeting in Dallas in 1993, and being a member since then, I've essentially been raised in the specialty, by the ISHRS, and have learned to be a contributing member of a great medical society. I feel so fortunate to have a "job" that I look forward to coming to work at each day and that provides me with the opportunity to have a positive effect on patients' lives.

Also in the 1990s was the introduction of the microscope to dissect strips into follicular units. This heralded the adoption of high magnification for the entire procedure, which became necessary to perform FUE. Magnification allowed us to use smaller instruments to make smaller incisions for smaller grafts and improved results.

And out of these developments, Dr. O'Tar Norwood saw the need for a way to disseminate and discuss this information among surgeons who shared an interest in the betterment of the field, and the *Forum*—the first newsletter directed to the hair transplant community—was launched. Today, it continues to inform and educate us and advance our specialty through dialogue and the sharing of ideas. And noting the rapidly growing interest in the field as the *Forum*'s page count increased, Dr. Norwood went on to be a founding member of the ISHRS, this great international society comprised of a varied and independent group of physicians, many of whom have become close friends over the past 30 years. I believe we are in good hands, and I look forward to taking part in the continued evolution of our specialty. ■

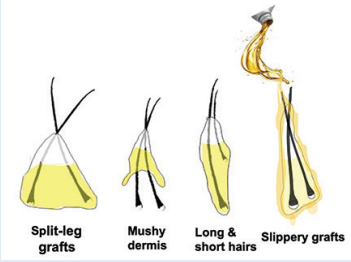


Notes from the Editor Emeritus, 2002–2004

William M. Parsley, MD, FISHRS | *Louisville, Kentucky, USA* | parsleyw@bellsouth.net

After being inactive for more than 3 years now, I was worried about what I have to offer in such a fast-moving field. However, we have issues that continue to affect us for which we don't always have a clear solution, and I will address a few and present ideas on how to deal with them. (Figure 1)

FIGURE 1



Certain types of grafts present a dilemma as to the best way to place them with the least trauma, but trauma in placing these grafts is difficult to avoid. Implanters, when they work well, have advantages over forceps; but some of us have not been able to master the use of these instruments and so will only be mentioned when appropriate. First are split-leg grafts that have a "tepee" look with a wide base. The distance between the bulbs make them vulnerable to becoming "J"-hairs, where the hair shaft folds on itself with the bulb heading back to the skin surface. Sometimes, the planter is surprised to see the bulb coming back out above the skin when placing a graft. The folded "J"-hair may end up deformed and may not survive. To address this problem, the recipient incision needs to be made a little larger and deeper, and the forceps need to either widely grasp the subcutaneous tissue (SQ) at the base of the grafts to pull the bulbs close together or plant the follicles separately. Regardless, it will slow down the procedure and require some patience. Implanters would be helpful here if they can be loaded properly. Trauma risk: Moderate.

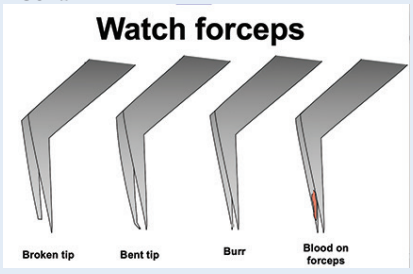
Second are grafts with mushy dermis described years ago by Dr. Dow Stough. These grafts have very flimsy dermis and fat that separates from the lower half of the graft, making the graft look like it is wearing a skirt. There is not a choice to avoid grasping the naked lower hair shaft with the forceps. The shafts need to be grasped (very gently) and placed separately or pinched together and planted together. "J"-hairs are common and implanters should have a distinct advantage over forceps. Trauma risk: Very High.

Third, long and short follicles (peg-legs) present placement problems. Placing the legs into the site separately is often needed to avoid "J"-hairs. This is a problem that can sometimes be detected before surgery by closely examining the donor area. If the follicles have numerous fine hairs mixed with thicker hairs, then you may have these grafts. The fine hairs are miniaturized hairs. If found, a course of finasteride and minoxidil should be given in advance. If no response, then consider not doing the transplant or only limited transplantation. These miniaturized grafts will neither give adequate coverage nor will they survive long. Trauma risk: Moderate to High.

Last, are slippery grafts. These grafts feel oily and thrombin attachments seem reduced. Popping risk can be extreme and make your day miserable. Sometimes, popping occurs spontaneously, without even touching the grafts. Plant one graft and 5-6 previously planted grafts come out. The problem seems to improve as the procedure progresses. We are not sure whether it just comes from the grafts or from the recipient site, or maybe from both. Solutions include voluminous spraying of the scalp, multiple rinsing of the grafts, gently pressing the grafts between gauze pads before planting, and moving about the scalp while placing and coming back later. Some feel William E medium helps, but keep in mind that it is not approved. Fortunately, these cases are not very common (1-6% of cases). Trauma risk to grafts: High. Risk to doctors: Very High.

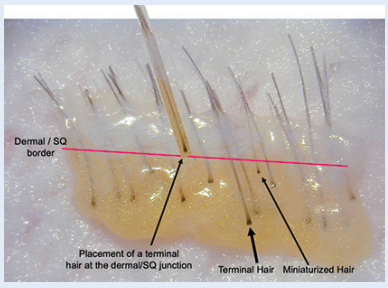
With all these grafts, popping is a problem, but sometimes popping can occur when the grafts seem fine. In these cases, look closely at your placing forceps. They are small and need close examination. Sometimes a small piece of a tip breaks off and won't allow grafts to be grasped. The same occurs if the tip is slightly bent. In either case, replace the forceps. Also, a bur can occur on the tip. You can try to file it down, but usually it is better to replace it. Lastly, examine the tip for blood. Blood is sticky and can pull out the just placed graft. Wipe it clean. (Figure 2)

FIGURE 2



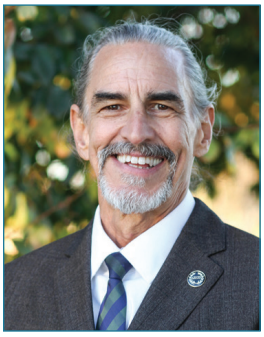
Whenever popping is a problem, the first thing to consider is making deeper sites. A terminal hair nearly always extends into the subcutaneous (fat) tissue. Unless someone is mainly planning to be planting miniaturized follicles, why would the depth of the sites stop in the mid dermis? Subcutaneous tissue is relatively avascular, and penetrance into it does minimal damage; plus, it swells easily with the injection of tumescent solution allowing incisions that avoid damage to the deep cutaneous plexus. Below is a graphic showing a terminal follicle being placed in the dermis. As you can see, the upper follicle including the bulge region is above the surface of the skin. Trying to push it into this shallow site will probably result in popping or a "J"-hair with poor survival. Even the miniaturized hair (right side) has its bulb in the SQ. (Figure 3)

FIGURE 3



Finally, be careful when harvesting fine hair for the temples and frontal hairline. Many will pick off finer hairs in the occipital region. The problem is that finer

BOTTOM PAGE 6



How I Do It

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Here, Dr. Shady El-Maghraby shares his method for extending the life of his FUE punches while also altering their functional application. Sharing our ideas with one another makes us clinically stronger as a collective group in the ISHRS. Please feel free to email me your ideas.

How I Make My Regular Punch Flared

Shady El-Maghraby, MD, MSc, FISHRS | *Cairo, Egypt* | shady@maghraby.net

Flared or flat punches were introduced to FUE harvesting a few years ago as safe tools for FUE graft excision, with the intention of minimizing rates of transection (Figure 1). In 2014, I switched from a manual to a motorized FUE system, and I prefer using semi-sharp punches due to their lower rate of transection over the sharp punches (in my hands). I have also found semi-sharp punches provide better skin incising results than blunt punches, which lessens the occurrence of buried grafts.

When using semi-sharp punches, I have found they become quite blunted after 1 or 2 cases and, as such, they fail to incise the epidermis as efficiently and completely as when they are new. Because of this, I started re-sharpening these punches by inserting the tip of a needle inside the regular punch and angling against the internal edge of the punch while placing the motorized rotation of the dulled punch on high speed. I have found that this manipulation will sharpen the punch and make its tip flared outwards (Figure 2).

With this new flared design, the cutting edge of the punch now is directed outwards, and it will cut the skin around the follicular unit as the graft slides safely inside the smooth lumen of the punch (Figure 3).

This maneuver can be done to a regular sharp or a blunt punch as preferred. I prefer using flared sharp and semi-sharp punches. Of course, after flaring a regular punch, you should expect its outer diameter will slightly increase and it will be bigger than its original size. Some new and high-end FUE machines use flared punches in oscillation mode, or mixed rotation, oscillation, and vibration modes. In my practice, I only use rotation mode with these flared punches.

You can watch the video at https://youtu.be/WtTBxzYG9Z4 to see how to flare the regular punch and do a safe FUE extraction while extending the life and functionality of dulled punches. ■

FIGURE 1. Standard and flared punch.

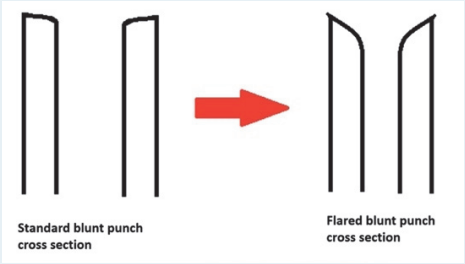


FIGURE 2. Re-sharpening punch by inserting the tip of a needle inside the regular punch and angling against the internal edge of the punch while placing the motorized rotation of the dulled punch on high speed.

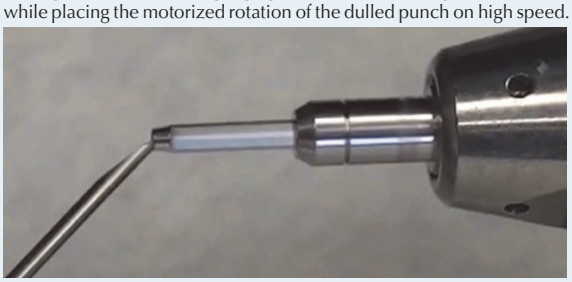
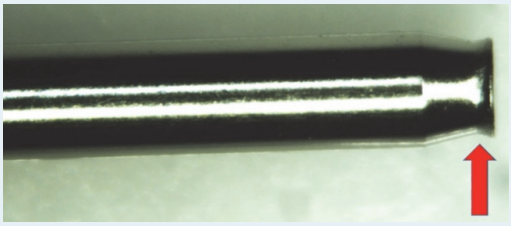


FIGURE 3. In the flared design, the cutting edge of the punch now is directed outwards.



Note: All images courtesy of James Harris, MD.

➤ CONTINUED FROM PAGE 5

occipital hairs are usually fine due to miniaturization and will not survive long unless rescued by minoxidil and finasteride. Better to look at the anterior parietal zone or posterior temple where terminal hairs can be fine. The lower occipital zone can be considered if it has no retrograde hair loss but visible scars can be created. Only use with caution.

Last, do not preform transplantation unless you (yourself) know the procedure and the science. Do not count on assistants to know what to do when problems or unusual situations arise. If you can't extract the grafts, don't do the procedure. If you don't how to keep the grafts viable, don't do the procedure. If you can't place grafts, don't do the procedure. If you don't know hair anatomy, don't do the procedure. If you don't have a working knowledge of hair disorders, don't do the procedure. If you don't attend any meetings, don't do the procedure. With the ISHRS, there are plenty of colleagues willing to help and direct you, but we want committed doctors.



Unfortunately, these issues will occur in your practice, however, developing a plan to deal with them in advance will help reduce any frustrations. ■

CONTINUED FROM PAGE 1

FIGURE 3. Full-thickness excision of the demarcated area of FUE.



FIGURE 4. Suture of the ellipse, followed by limited excision density above the suture line, illustrating the combined donor harvesting method.



"border hair," and the ellipse is now largely devoid of follicular units (Figure 3).

Step 4: Approximate the open ellipse wound, using a single- or two-layer closure, which may include a trichophytic edge (Figure 4).

Step 5: Examine the ellipse to harvest any "border" or retained follicular units contained in the final ellipse excision process.

Advantages of FUE-LE technique

There are three primary advantages of the FUE-LE technique:

1. FUE-only clinics can immediately offer the linear ellipse donor harvesting method without significant financial outlay for graft dissection equipment or the need to train a large team of graft dissection staff.
2. All patients with advanced pattern hair loss have a long-term, limited SDA, and FUE alone cannot remove as many grafts as a combined donor harvesting approach provides without risking the appearance of donor thinning and donor depletion. Adding FUE-LE allows concentrated removal of hair in the SDA, and it can be combined with FUE to allow a lower excision density for a combined harvesting approach to achieve comparable or greater graft harvest and recipient density while maintaining a level of cosmetic residual donor area density.
3. Offering both FUE and LE methods of donor harvesting satisfies the physician's responsibility to provide unbiased informed consent for hair transplantation surgery. When physicians or clinics do not offer both methods of donor harvesting, it is difficult to provide comprehensive and unbiased information regarding a surgical technique they do not or cannot perform themselves.

CONCLUSION

The FUE-LE donor harvesting method introduces a simple surgical technique to transition any FUE-only clinic into one that provides both donor harvesting methods without requiring added staff or equipment. The addition of FUE-LE removes the barriers to use of the linear ellipse method of donor harvesting for any FUE-only clinic and allows them to offer the full range of donor harvesting options that can benefit all patients—but especially those destined for advanced pattern hair loss—while also satisfying the legal requirement for unbiased patient education and informed consent.

Editor's note: A more in-depth discussion about the patient characteristics or circumstances in which one donor harvesting method may be advantageous over the other, or where a combined approach is the optimal choice, can be found in Dr. Keene's chapter (19), "Transitioning an FUE-Only Clinic to Include LE," in the soon to be released textbook update, *Hair Transplant 360: Follicular Unit Excision (FUE)*, Volume 4 (2nd Ed.) (Lam SM, Williams JR KL, eds. Jaypee Brothers Medical Publishers: New Delhi, India, 2022). ■



Histological Analysis for the Cause of Kinky Hair after Hair Transplantation*

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*This study was presented at 29th World Congress of International Society of Hair Restoration Surgery and won a CSI prize for Methodology.

ABSTRACT

Introduction: Studies on kinky hair after hair transplantation are rare although kinky hair happens frequently. Commonly referred to in the literature as "post-transplant kinkiness," we decided to investigate what causes kinky hair using a histologic approach.

Method: A patient, who had a hair transplant at another clinic three years previously, came to our clinic with a complaint of low density of transplanted area. Reduction foreheadplasty was done to reduce the height of her forehead as well as to get rid of low-density parts. We collected some of the severe kinky hairs upon the removal of transplanted areas and observed them at the microscopic level.

Results: We noted fibrotic tissues alongside the kinky hair's follicle. In addition, distortion of the bulb was observed with the presence of fibrotic tissue at the subcutaneous layer.

Discussion: We usually mention scarring in terms of kinky hair after transplantation. Scars in the subcutaneous layer probably cause kinky hair rather than scars in the dermis. Fibrotic tissue that forms in the subcutaneous layer presses on transplanted hair follicles and causes deformity of follicles. Growing follicles after the telogen phase are likely to be deformed by encountering scar tissue when they grow downward to enter the anagen phase. The resulting deformed bulb causes the kinky hair. Therefore, reducing tissue damage during transplantation is very important. Inflammation aggravates scar formation, so it might be helpful to lessen the factors that lead to inflammation such as infection and bleeding.

Conclusion: Perifollicular scarring after hair transplantation causes hair follicle deformity and results in the hairs growing as kinky hair. Therefore, reducing scarring in the transplant recipient area is essential for the prevention of kinky hair.

Keywords: fibrotic tissue, kinky hair

INTRODUCTION

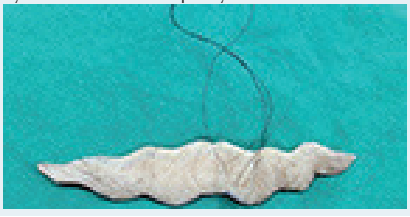
Kinky hairs, also referred to in the literature as "post-transplant kinkiness," are a troublesome complication after hair transplantation. The hair can grow into a kinky hair after implantation, even if donor hair is in normal condition. Typically, the kinky hair will revert back to its natural character after 1-2 years.[1] It is difficult to reassure the patient that this complication will resolve itself over time. And though infrequent, some hairs will remain kinky, creating a difficult problem to solve.

There are few studies to identify the reason for kinky hairs, and only a handful of hypotheses have been discussed such as 1) the follicle transplanted as crooked/J-shaped, 2) the follicle was damaged in the process of extraction, isolation, and/or transplantation, 3) or there were scars on scalp.[2-3] An obvious cause of kinky hair has not been identified at present, so we set out to find the answer histologically.

Method

A 69-year-old female patient came to our clinic to lower her hairline. She received hair transplantation at another clinic three years ago, but the density of the transplanted area was very low. She wanted to try reduction foreheadplasty since her first attempt was not gratifying. Elasticity of her scalp was excellent, and we were able to remove 2cm in width including parts of the transplanted area (Figure 1). We observed kinky hairs and surrounding tissues under the microscope after H&E staining.

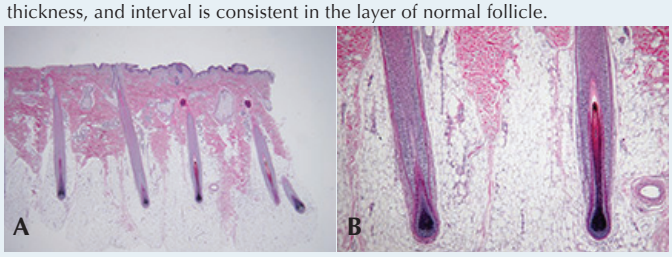
FIGURE 1. Resection of 2cm-wide section of skin by reduction foreheadplasty at the hairline border.



Within the transplanted area, we observed three kinky hairs and one normal transplanted hair. We studied normal tissue for a control group as well.

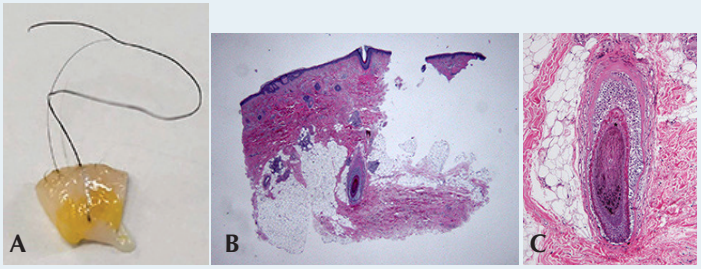
Control group: Follicles are surrounded by lipocyte only (Figure 2A), and all layers that cover papilla have similar shape and thickness (Figure 2B).

FIGURE 2. *A:* Normal hair follicle and surrounding tissue in control group. Only adipocytes are observed around the bulb at the subcutaneous layer. *B:* Shape, thickness, and interval is consistent in the layer of normal follicle.



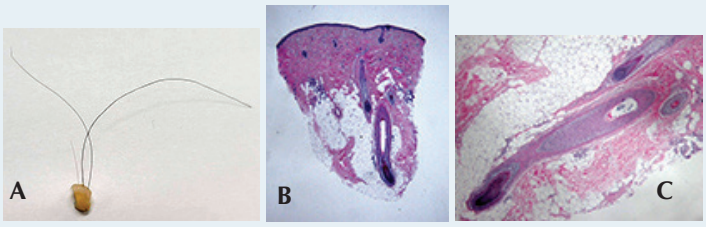
Experimental group 1: The follicle shows wavy and kinky characters (Figure 3A). Fibrotic tissues are seen at the subcutaneous layer where the bulb of transplanted hair is present (Figure 3B). We enlarged and observed papilla (Figure 3C). Intervals of cuticle, inner root sheath (IRS), outer root sheath (ORS), and hyaline membrane are irregular due to deformation of bulb by fibrotic tissue.

FIGURE 3. *A:* Wavy and kinky shaped hair. Scar is observed in white color. *B:* Scar tissue is pressing bulb. *C:* Follicle is deformed in shape. Thickness and interval at the layers are irregular. It shows the cuticle of hair before separating from the cuticle of IRS (star). The cuticles of hair that are separated above here will not be consistent in thickness and shape, which will cause kinky hair.



Experimental group 2: There are three hairs in Figure 4A: mild kinky hair (center), thin/non-kinky hair (right), and vellus hair, which might have been present before hair transplantation (left). Thin/non-kinky hair seems to enter into anagen phase after passing through telogen phase and fibrotic tissue is not seen around the hair follicle (Figure 4B). On the other hand, fibrotic tissue is found around the follicle and the bulb is deformed in kinky hairs (Figure 4C).

FIGURE 4. *A:* There is kinky transplanted hair in the middle and vellus hair and non-kinky thin transplanted hair on both sides. *B:* Bulb of kinky hair is crooked, but scar tissue is not found in surroundings. Early anagen phase vellus hair; hair follicle is enclosed by adipose tissue (left); cross-section of undeformed thin hair (right). *C:* Scar that was not observed in 4B is pressing the hair follicle and causing deformity.



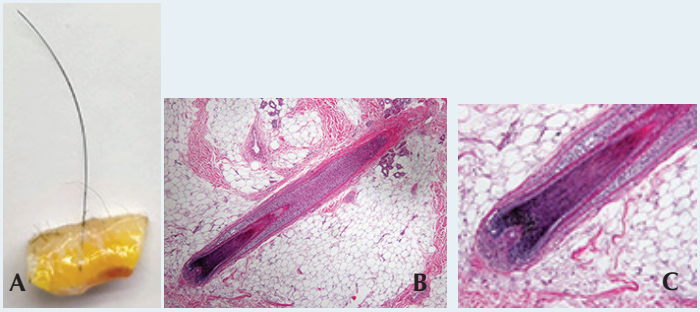
Experimental group 3: The hair follicle is not so wavy but is severe kinky (Figure 5A). The bulb is deformed and transition part to isthmus is distorted (Figure 5B).

FIGURE 5. *A:* Severe kinky hair, though it is not J-graft. *B:* Severely pressed and distorted hair follicle; inflammatory cells are seen.



Experimental group 4: In this sample, there is transplanted hair but nearly no kinkiness in it (Figure 6A). Slight fibrosis is seen around the follicles, but the bulb is well-surrounded by adipose tissue (Figure 6B). The follicle maintains its shape without deformity since space between the bulb and scar tissue is secure.

FIGURE 6. *A:* Transplanted but non-kinky hair. *B:* Hair follicle is surrounded by adipose tissue and it is in intact shape. *C:* Scar tissue is found at the lower part of the bulb. the follicle is not deformed because of the slight gap between bulb's end and scar tissue.



DISCUSSION

There are patients who complain of kinky hair after hair transplantation. Kinky hair irritates patients because of its different luster and textures in comparison to existing hairs.[1] Usually, kinky hairs resolve within 1 to 2 years, but there are cases where the hairs remain kinky. Although complaints regarding design and density after transplantation can be solved easily, as of yet there is no easy fix for kinky hairs. The only thing both doctor and patient can do is just wait and hope for it to get better, which is tough for both of them.

Studies to clarify the reason of kinky hair are very rare. There are some studies that examined kinky hair with an electron microscope, but they didn't fully explain the fundamental cause. Kinky hair seen on electron microscope didn't have normal cuticular scales and thickness of cuticle layer was not very even.[4-6]

If the follicle is deformed at the bulb level where the cuticle of the IRS and the cuticle of hair have not been separated, each layer will also have to be deformed when they separate from each other (Figure 3C). This explains the irregular-shaped hair cuticle observed with electron microscope and the cause of kinky hair.

There are a few hypotheses for what causes kinky hair. The first is J-graft; hair follicles that are J-shaped when transplanted will grow as kinky hairs. Since Africans have J-shaped hair follicles, this hypothesis may sound reasonable. However, only one or two severely curled kinky hairs may fit into this hypothesis because in the typical case of kinky hair, the hairs will be found in the entire transplanted region. In this study, we did not find any J-grafts in any hair follicles.

Another possibility is the hair follicles are damaged during the process of extraction, separation, and insertion of the graft. Impaired bulbs or sheaths of hair follicles may cause the hair to grow abnormally. However, the kinky hair should improve over time as the damaged portions recover. Also, it should recover after the telogen phase. Similar to the J-graft hypothesis, this does not fully explain the reason kinky hair affects the entire area.[3,4]

The last hypothesis deals with scars. We can discuss scars at the dermis and subcutaneous levels, respectively: 1) excessive pressure to hair from the transplanted follicle when the hair penetrates the scar in dermis may cause kinky hair, and 2) the scar at the subcutaneous level can cause deformation of hair follicle and make hair kinky.[3]

According to our study, a subcutaneous scar seems a more probable cause of kinky hair. In normal hair follicles,

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the bulb is only surrounded by adipocytes. However, the bulb of kinky hair after transplantation is surrounded by fibrotic tissue, and the bulb is deformed due to the scars.

Hairs grown from deformed follicles develop irregular cuticles and sprout in a kinky way. In most cases, these kinky characteristics disappear after one or two years following transplantation as the fibrotic tissues reduce and soften over time and the pressure on the bulb diminishes. However, severe scar tissue won't reduce or soften over time, so the remaining fibrotic tissue in the subcutaneous layer will cause kinky hair.

If the cause of kinky hair is subcutaneous scarring, minimizing scarring is the key to prevention. Reducing tissue damage may be the best way to reduce scars; such things as meticulous placing, monitoring condition of transplanting tools, and the like, may have decisive effect.[7]

Bulging tissues with tumescence can be helpful to reduce hypodermal scars. Abbasi presented the way to reduce edema after surgery by mixing triamcinolone and epinephrine with tumescence.[8] An objective of Abbasi's study was to discuss how to reduce edema by using the anti-inflammatory characteristics of steroid. Inflammation is closely related to scar formation, so using a steroid in tumescence can potentially help to prevent scar formation.

Various components of blood can cause inflammation within tissues in the case of hemorrhage. Therefore, minimizing hemorrhage is essential to reduce scar formation. Expanding tissues with tumescent solution can help us to evade large vessels in a profound area, and epinephrine will contract peripheral blood vessels to lessen hemorrhage.[9,10]

Reducing bacterial infection would be helpful, too. Even in aseptic conditions, hair transplantation wouldn't cause serious trouble upon infection because of abundant blood flow in the scalp area. However, bacterial invasion within the tissue may cause inflammation, and this will affect scar formation.[9,10]

Although we do our best to prevent it, when kinky hairs occur, one strategy is to reduce the fibrous tissue in the subcutaneous layer. To do this, simply massage the transplanted area. The effect is to reduce and soften scar tissue so the deformed hair follicles can possibly recover.[11] Steroid injection (which is widely used in hypertrophic scars or keloids) of the scar lesion also can be used.[7,12] However, scars that cause kinky hair are often in a nonvisible area, and injecting within the specific location of the lesion is difficult.

A steroid injection may cause atrophy of fat tissue. Therefore, alternative injections that will not cause atrophy but will facilitate degradation of scar can be considered; some studies have shown that intralesional injection of calcium channel blockers or antibiotics can reduce scarring.[13,14]

Autologous fat grafting in the subcutaneous region of the transplanted area is another option.[15] It could provide a cushion in between scar tissue and the hair follicle to prevent kinky hair and improve the scar condition. There are studies that have also improved hair loss with cell-enriched fat graft, so if you can avoid hair follicle damage caused by the cannula in the process of fat transplantation, it seems like a good method to try.

CONCLUSION

According to our microscopic observation, the presence of a subcutaneous scar is likely to result in deformed follicles and cause kinky hair. Preventing scar formation is the most effective way to avoid kinky hair and reducing the scar around hair follicles will help us to treat kinky hair.

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Preview Long Hair Transplantation with Donor Harvesting Using the Follicular Unit Excision Technique

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*Disclosure: Dr. Trivellini is owner of Trivellini Tech and has a financial interest in the device described.

ABSTRACT

Hair transplant surgery has significantly evolved in recent years with the advent of donor harvesting using the follicular unit excision (FUE) technique. The ultimate goal of any donor harvesting technique is to achieve undetectable surgeries, including in the immediate post-operative period.

Our goal was to develop a method that ensures that patients who choose hair transplantation using the FUE technique could also benefit from preview long hair transplantation (PLHT), a technique in which the donor hair does not need to be cut short or shaved and the grafts are placed in the recipient site with long hair. Although this is also possible with the strip excision technique, known as FUT, the resultant linear scar may be visible if the patient chooses to wear the donor hair short.

The concept is to maintain the same FUE dynamics used when trimming the donor hair. To carry this out, a new punch was developed that works with a function specifically created for long hair FUE in a multiphasic device (Trivellini Device). The results are highly encouraging even though the operative time is slightly longer than that required to perform FUE surgery with the donor area trimmed or shaved. However, with adequate training and improved tools, this surgery may become the first option for patients choosing hair transplant surgery.

Preview long hair transplantation (PLHT) is a technique where the key point is the aesthetic vision or preview of the end result is presented before the surgeon's eyes at the time of surgery, and not the previously calculated mathematical hair density. With this approach to surgery, we are rationally using only the follicular units necessary to achieve a result that meets or exceeds the patient's expectation while preserving grafts in the donor area for possible future surgeries.

Keywords: FUE device, long hair function, long hair punch, non-shaved technique, preview long hair, wound healing

INTRODUCTION

Using the follicular unit excision (FUE) technique to harvest grafts from the donor region, there are two options: one with short hair and the other with long hair.

Short Hair FUE

When performing FUE on a shaved donor area, we are performing the classic FUE technique with short hair. There are several ways to do this:

1. Shave the patient's scalp, including donor and recipient areas, so that the visible hair on the transplanted grafts will be short.
2. Shave two or three horizontal strips in the donor region, leaving intermediate areas of intact hair between them. This permits the patient to cover the shaved area with "curtains" of hair cascading inferiorly following surgery. With this technique, the donor area is hidden and does not appear shaved in the post-operative period, however, the recipient area will receive grafts with short hair.
3. Using the same principle as above, shave the donor area following an irregular pattern, such as spots, which will ultimately provide the same vision that the strip technique affords.
4. Use a small scissors to trim very short only random, individual follicular units (FUs) between the long hairs of the donor area. The grafts obtained will be transplanted into the recipient area creating the same vision of the patient as in the options described above, the transplantation of grafts containing very short hair without preview.

Although the above techniques that avoid totally shaving the donor area (#2-#4) can be completely successful, they have two main drawbacks: 1) they considerably increase the operative time, especially #4, in which an assistant has to prepare the patient the day before by trimming the follicular units individually, and 2) the excision/extraction is not always homogeneous, leaving the donor area potentially exposed to overharvesting in some areas, which results in a problem if the patient chooses to wear the donor very short and/or if additional surgeries are necessary in the future.

Long Hair FUE

The technique by which we do not cut the hair of the donor area and work on this region intact is long hair FUE. Using this technique, we can obtain different FUs depending on the punch we use for the excision:

A. Using a sharp punch, we can cut the hairs of the FU as we excise the grafts. The result will be visually the same as above in that the grafts with short hair will be transplanted. An advantage is that the extraction is much more homogeneous; a disadvantage is that the punch loses its edge and sharpness quickly, which makes the excisions difficult.
B. Using a punch with a lateral opening and adequate movements, we can obtain FUs with long hair in a technique referred to as preview long hair FUE (PLHT). Using this method, in the immediate post-operative period following the transplant, the donor area will appear almost unscathed with a homogeneous distribution. Meanwhile, the recipient area will not bear the traditional stigma of surgery, because the long hairs will cover most of the crusts or scabs that generally form in the post-operative period. Importantly, the immediate post-operative results will give the surgeon

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and patient a "preview" of the final results (which are typically 12 months of graft growth).

At this point, we can place the grafts obtained with long hair using two different techniques: 1) we can make premade incisions and place the FUs with forceps or dull implanters (without edge), or 2) we can use the stick-and-place method using forceps or sharp implanters.

If we choose the first option, it will not appear as if the patient had an operation (thus avoiding the stigma), and it is very likely he/she will have good density in the recipient area. The challenge is that we will not know if we are wasting follicles using this method. If we perform the stick-and-place method, we will be able to implant FUs where we believe they are necessary—without having an established pattern—thus adding the minimum amount of grafts where needed until we obtain the desired hair mass sufficient to create a pleasant aesthetic look that both the patient and the physician will like.

It is worth mentioning that this objective can also be achieved by first using the premade incisions, like an apprentice who creates the background in a painting before the artist paints the foreground. This could be done by any doctor on the team, and final adjustments can be made using the stick-and-place technique.

BACKGROUND

Hair transplant surgery using long hair taken from an excised donor strip was originally described by Bouhanna in 1989.[1-2] Gandelman also described the use of long hair for eyelash and eyebrow hair transplantation (1973, 1995-2004)[3-5], as did Suddleson (2008).[6]

In 2006, Pitchon developed the use of the donor strip excision technique for obtaining FUs with long hair.[7] About this time, the first author (RT) began to work on the preview long hair technique using FUE.

In 2012, at the 20th Annual Scientific Meeting of the ISHRS in the Bahamas, the first lecture describing excision with long hair FUE was presented by the first author (RT).[8] To achieve this, a group of hairs of FUs were put together using powerful hairspray. Next, the hair was cut to 2 or 3cm in length. Taking advantage of the fact that the excision device had suction, when the tip of the punch was brought to the tip of the hairs, they were attracted to the interior of the punch, and it only remained to go down until the punch contacted the skin and the excision began.

As the preparation and the entire process was long and tedious, the author (RT) decided to suspend the project. In 2014, Erdogan began making long hair extractions using a punch with a slot or groove using the manual punch technique.[9]

There are many punches for manual and motorized FUE,[10] and many patient variables, but the dynamics of the extraction with long hair completed with the manual technique is very different compared to the motorized technique. In the manual technique, it is exclusively done with a sharp punch with a slot where the hair can exit the radius of the cutting edge leaving the hair out. The disadvantage of this is that you must introduce the hairs in the slot, which slows the process. Bleeding and long hair are not a good combination. When you are working with a sharp punch and visibility is decreased by bleeding the result will be a higher transection rate. In addition, the groove generates increased static friction at the lateral point of the groove, which can alter the rotation plane and raise the transection rate. Boaventura (2016) used a slot punch, similar to Erdogan's, working with a motorized device.[11]

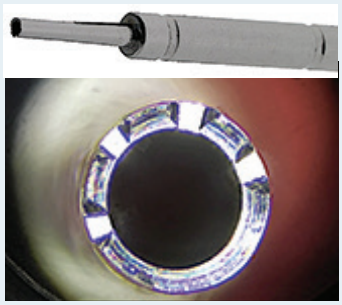
At this point, we went back to the idea of harvesting long hair with FUE, but we decided to maintain the same dynamics, the same technique, as we do with short hair and take advantage of suction as an additional force.

PREPARATORY CONSIDERATIONS

Hair is resilient: it can support a load of 100 grams without breaking. Scientists from the University of California at San Diego determined that human hairs are comparable in hardness to steel wire and other alloys, capable of withstanding a pressure of up to 270 megapascals, or 2,660 atmospheres, which is of the same order of magnitude.

Because the hair is so resistant to pressure, we saw that we could pass a punch on top of it and avoid the need for the slot, so a punch was developed with which we could maintain the same dynamics in the excision as we could with short hair. This provided the basis to create a 0.95mm diameter punch, with a thick wall and an internal bevel, that has three-fourths of the free edge dull with four openings of 0.025 microns each (Figure 1). This punch geometry is synchronized with the multiphasic extraction equipment; it has a specific function for long hair excision that triggers a cascade of automatic movements in each excision (Figure 2).

FIGURE 1. The long hair punch *(top)*. Close up shows external diameter of .95mm, internal diameter of 0.75mm, and 3/4 of the free edge is dull and has four 0.25mm openings that will attract the hair on the surface of the scalp.



The operator must first synchronize the position of the punch with the long hair icon located on the computer screen. The punch has a mark that corresponds to the center of the sharp part of the edge; that part of the punch must be located at 12 o'clock with respect to the handpiece at the beginning of each excision cycle. To achieve this, the handpiece has a magnetic angular sensor that interprets the position in the punch when stopped, then calculates the angle and transmits it to the equipment, which analyzes the signal and issues an order so the line marked in the punch returns to the 12 o'clock position to start the next excision.

FIGURE 2. The Trivellini device.



This position corresponds to the skin located above the position of the follicles that are crushed by the blunt part between 3 and 9 o'clock, leaving the strands of the hairs through the small holes located in that sector of the punch that will go to pull hairs out of the way onto the surface of the scalp when programmed movements start.

The sequence of movements has a direct relationship with the geometry of the punch, so that when we start the sequence, the punch moves on its axis 180 degrees to the right and returns to its starting position. From there, it moves 180

degrees to the left and returns to the starting position again. This sequence is repeated about 6 times per 200 milliseconds and has two purposes. The first is to ensure that the sharpest part of the punch travels 360 degrees of the circumference completely cutting the epidermis and some layers of the superficial dermis. Second, the blunt part draws the hairs between its indentations, pushing them into the cut made by the edge.

PATIENT SELECTION

Currently, more patients request hair transplant surgery with the FUE technique to avoid a linear scar. This is reinforced by the ISHRS's 2020 member survey, which found the FUE technique is more popular than strip excision surgery with hair restoration surgeons.[12] We feel the FUE technique is at a great disadvantage with respect to the strip excision technique when the donor area must be shaved prior to surgery.

When we offer FUE to our patients while giving them the option to or not to shave their head, most will choose not to shave their head. We found these patients also make the decision to undergo surgery sooner, since the technique favors the immediate reintegration into their recreational, social, work, or professional activities. The long hair will hide the scabs and redness in the recipient area and in the donor area the hair will cover the wound healing process left by the removed units. However, there is also another group of patients who don't want to be seen with new and longer hair immediately after the surgery and prefer the gradual hair growth offered by the traditional short hair FUE technique.

There are a large number of patients who, due to their work activity or social exposure, cannot be seen in public with their heads shaved. In these cases, if we do not have the tools to perform surgery with long hair, we may lose the patient. FUE surgery with long hair is also the ideal choice when it comes to addressing female hair loss.

A specific indication of this surgery is for those who have a social event shortly after surgery and want to see the results of their hair transplantation hair immediately. Another group that benefits from this technique include those who have already undergone one or more donor strip excision surgeries with notable linear donor scars they do not want to expose by shaving the donor area for additional grafts.

To perform the surgery with more control of the donor hair, it is necessary for it to be the appropriate length. If the patient's hair is less than 3cm long, it is difficult to keep the hair separated with the non-dominant hand, because it escapes between the fingers. However, hair longer than 8-10cm requires that the assistants perform much more extensive movements with their hands, such as the case of surgeries on women.

PRE-OPERATIVE STAGE

Prior to surgery, we wash the patient's head as we usually do, but in cases where we keep long hair, we use a generous amount of conditioning cream rinse during the last step of the wash. As conditioners traditionally have a pH of around 4.5, the surface of the hair is sealed making it smoother, softer, and easy to detangle. This is very important, especially when implanting the grafts, where trying to detangle the hairs can have a disastrous result. On the other hand, when the punch passes over the smooth hair, it does not "catch" on the keratin plates, which makes the hair more resistant to transection. After drying the hair, a non-erasable marker is used to mark the entire perimeter of the area where we are going to perform the excision and extraction of the follicular units. There is no other preparation.

INTRA-OPERATIVE CONSIDERATIONS

The most appropriate position for the doctor is to stand at the side of or behind the patient's head, depending on whether the patient is lying down or sitting. That is the only way to locate the handpiece between the surgeon's direct vision and the hair on the chosen follicular unit. In this way, it is possible to have a three-dimensional view of the exit angle of the hair.

When the surgeon sits at the bedside of the patient, as most do, the direction of hair exit can be seen perfectly, but in that position the surgeon cannot accurately distinguish the angle of exit, so there will be a higher transection rate. Since excision with long hair may take almost twice as long as with short hair, it is convenient to anesthetize only half the donor area, especially if the surgeon is just learning the technique. This is to avoid the risk of the anesthesia wearing off and potential lidocaine toxicity, especially when working exclusively with local anesthesia without any sedation.

It is essential that the hairs of the follicular unit that are going to be excised do not undergo any traction, as this would cause the alteration of the exit angle of the hairs, canceling the only guide we have at the time of engagement. To get a clear vision of the area where we will do the excision, we separate a group of hairs with the fingers of the non-dominant hand upwards and work on the follicular units located immediately below the line formed when separating the hairs upwards (Figure 3). In this way, we manage to split about 20 units, and then with the punch itself, we comb the hairs upwards and continue. We begin excision in the right temporal region, following an excision pattern of approximately 1cm wide and always starting from the upper limit moving inferiorly in each area. After three passes from top to bottom, the assistant begins removing the units without hindering the person excising.

FIGURE 3. Getting a clear vision of the target by separating the follicles using the non-dominant hand.



The device has a Long Hair function, specially developed to help with the extraction of grafts with long hair of any size, but to achieve this, it is necessary to have the right punch and the help of suction.

A notable feature of the extraction equipment is that it has the only straight handpiece on the market with suction that assists in extraction. When we work with long hair, having suction is essential since the bleeding that occurs when making the incisions in the scalp greatly hinders the field of vision; bleeding can add even more time to the surgery. We can suction the blood as we approach the surface of the scalp with the punch and have a perfect view of the follicular unit we want to excise.

EXCISION

There are many punch options and devices.[13-16] The surgeon should be familiar with them to choose the best for each patient based on hair characteristics such as diameter, curl, wavy or straight hair, etc.

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Once we identify the follicular unit that will be excised, we slide the tip of the punch over the top face of the unit's hairs, following its direction. Upon reaching the surface of the scalp, we press the punch, the front part of the free edge of the punch making direct contact with the skin. The other half of the circumference keeps the hairs of the unit pressed between the scalp and punch.

As noted above, the punch has a mark on the front that coincides with the sharpest part, this part should always be toward the front of the punch, at 12 o'clock. It is the part that rests directly on the skin, but we do not have to worry about seeing the mark since once set, the appropriate position has been programmed in the equipment. After each sequence of movements has finished, the punch returns to the preset position automatically. In this way, the surgeon can cut the skin with the sharpest part of the punch while the other part of the punch that presents the four indentations drags the hairs trapped in it keeping them away from the edge. The movement that the punch makes at this stage of the excision corresponds to about six cycles of oscillations of 360 degrees. Starting from a given point, the punch makes a movement of 180 degrees to the right side, returns to the starting point, and moves 180 degrees counterclockwise. This takes 100 milliseconds, during which time the front of the punch cuts through the epidermis and the first layers of the superficial dermis while the back of the punch pushes the hairs into the incision.

Once this sequence of oscillating movements is completed, the punch begins to perform asynchronous oscillation movements between 90 and 720 degrees for 200 milliseconds. This movement will generate mechanical vibration that will reduce the friction between the internal wall of the punch and the tissue. At this level, the sharpest part of the punch passes over the hairs but no longer cuts them; instead, it pushes them to the depth of the fatty tissue where the tissue density is low. On certain occasions, this causes the unit to be buried, but, unlike when working with short hair, this does not become a buried graft. We only have to apply traction to the hair to pull the unit out of the hole bringing the unit back to the surface. Then, this movement gives way to the vibration of the punch, which allows the punch to go deeper into the tissue. The forward movement that we bring to the handpiece must be slow enough to allow the punch to use the selected time to go through the different layers of the skin.

Just behind the excision, our assistant removes the follicular units. This is the most complicated part if we do not have adequate visibility. To carry out this maneuver, it is imperative to use straight tweezers, so as not to grab hair from adjacent, non-targeted follicular units, as this will prevent extraction.

By allowing the time for the punch movements and to reach a suitable depth, the assistant does not need more than a forceps to remove the unit (Figure 4). One of the most advisable options when one is learning the technique is that the excision is immediately followed by removal of the graft by the assistant. This has the advantage of acting as quality control by the surgeon and the assistant does not lose sight of the excised unit. The surgical time does increase, since the surgeon must wait for the unit to be removed before continuing the excisions but learning the technique correctly is important.

FIGURE 4. Using straight tweezers for the removal of long hair units.



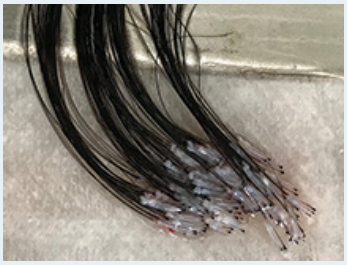
As our assistant removes the grafts, we can see the residual coverage that remains when we pass through the donor area. This is a very safe way to avoid overharvesting as it allows us to reach the limit if the case requires it, such as some corrective surgeries for patients who have already undergone previous surgeries.

The longer the hair is, unlike what we saw in the excision, the more difficult the manipulation of the grafts becomes because the assistant must make more extensive movements with the hand. This consumes more time than usual, especially in women or patients who have hair up to 30cm long.

To avoid this, a receptacle, or holder, was developed that allows us to minimize the extraction time by facilitating organization and storage of the grafts. The receptacle is a stainless-steel cylinder 3cm long and 0.5cm diameter with a watertight lid at one end and a body window; its interior is covered with silicone that, at the window level, has multiple cross sections and a longitudinal one in the middle of the window. The interior of the receptacle is filled with physiological saline or Lactated Ringer's solution.

Once the graft has been removed with the forceps, it should only move 2cm to the receptacle window. The forceps are inserted while holding the follicular unit, and the internal grooves inside the receptacle will prevent the units from coming out when removing the forceps. This leaves the graft inside the receptacle while the hairs are on the outside. Approximately 200 or more units can be placed inside before we change the receptacle. Another assistant uncorks or uncovers the receptacle and with the help of a straight forceps, removes the bundle of long hair follicular units from the interior. (Figure 5)

FIGURE 5. The long hair grafts on Telfa pad ready to be placed.



IMPLANTATION

Donor harvesting using the FUE method differs from strip excision surgery in the way the units are removed, but it also differs in the way we must manipulate the units during the implantation phase. Careful handling of the unit is essential for good growth of the transplanted hair.

Generally, the grafts extracted with any FUE technique have less tissue around the bulb and are therefore more sensitive to dehydration and iatrogenic trauma due to graft manipulation.[17-18] The recipient site can be approached in two ways:

1. Premade incisions, in which incisions are made by a qualified physician, before or after extraction, followed by implantation of the grafts, which is usually done with forceps or with the use of implanters, and typically placed by trained technicians.
2. The stick-and-place technique in any of its varieties, which would seem to be more suitable to deal with FUE grafts. When we face the challenge of implanting grafts with long hair, we must bear in mind that if we

want to preview long hair, we will have to perform most of the implantation using the stick-and-place technique.

This phase of the surgery is where the surgeon can and should harness all of his creativity, since he will sculpt the recipient area with volumes of hair, not with density of hair.[19]

If we use implanters, we must know that these are not the best option when the hair is very long and thin, since many times the hair is trapped between the body of the implanter and the fingers. Implanters are the tool of choice when the hair is not very long or when it is thick or wavy, since it is easy to load and does not stick to the body of the implanter. In cases of long and fine hair, it is convenient to use stick-and-place with a needle and forceps.

The depth and angle as well as distance between the incisions are of crucial importance when we implant any grafts. When implanting grafts with short hair, we will be trying to estimate what the patient's hair will look like in the future. When we implant long hair, we can see the definitive result and optimize the supply of grafts from the donor area.

POST-OPERATIVE CONSIDERATIONS AND MANAGEMENT

Once the surgery is finished, we discharge the patient with the recipient area in a turban. We prefer not to risk that the patient, while sleeping, may feel some discomfort the first night and run his hand over his head with the long hairs recently implanted.

The next day, the patient returns to the office and we remove the turban, washing the head using a neutral shampoo. We do not pass the hand over the head, but rather use a foam beard brush. We rinse and repeat the shampoo and then apply cream rinse conditioner, rinse again, and blow dry the hair with warm air. The patient leaves the clinic with newly combed long hair and post-operative instructions including how the scalp should be washed.

Immediately after placing the grafts in the recipient area, the wound healing process starts. This process takes 12-15 months to complete.[20-22]

The long hair is shed in 2 to 4 weeks and regrowth can be noticed 2-3 months later. The follow-up visits are critical for the patient's evaluation and progress and for answering any questions. The final results can be observed 12-15 months after the surgery as in the cases that follow.

Case 1: A 27-year-old male patient with a significant family history of hair loss began losing hair in his early 20s. He was very concerned about losing his hair at a young age. Preview long hair transplant was performed in which 1,270 grafts were placed in the hairline and in the front (Figure 6).

FIGURE 6. Case 1 results.



Case 2: A 38-year-old male with hair loss for several years and no medical treatment underwent surgery with the preview long hair technique using 3,400 hair grafts in the hairline, frontal, and mid-scalp (Figure 7).

FIGURE 7. Case 2 results.



CONCLUSION

Surgery with long hair is a challenge that the hair transplant surgeon will ultimately have to face, in the same way that donor harvesting using the FUE technique became slowly adopted as patients discovered that they could have excellent results with this technique. Understandably, cases of donor harvesting with the donor strip surgery technique have been dramatically reduced. Also, we need to advise our FUE patients that the donor area may have small, white, punctiform scars following any FUE surgery.

On one hand, if we give patients the choice between having to shave their head or not, many will choose PLHT. On the other hand, we do have patients who don't want to be seen with long hair in the recipient area and who prefer short hair FUE covered by existing hair (if it is possible). The PLHT surgery is a challenge for most surgeons, but the challenge is even greater when we face the surgery using the FUE technique.

One of the main problems physicians who want to start using PLHT face is that the system that was developed is difficult to understand and it takes them a long time to benefit from the equipment.

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Faculty:

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Hair's the Question

Sara Wasserbauer, MD, FISHRS | *Walnut Creek, California, USA* |
drwasserbauer@californiahairsurgeon.com

*The questions presented by the author are not taken from the ABHRS item pool and accordingly will not be found on the ABHRS Certifying Examination.

One of the nice things about being a "hair doctor" is that there is so much to learn. Surgeons who started our society are still around to tell us how little information there used to be, and today the amount of research is explosive. The conclusion we can all agree on is that the human hair follicle is an incredibly complex "mini-organ." After reading the "Neuroendocrinology of the Hair Follicle" series, it is quite possible that only Ralf Paus understands it completely, and even HE has questions! So, if you even get single question correct on this quiz without review, give yourself full credit.

Neuroendocrinology of the Human Hair Follicle: Part 3

1. The only peptide hormone that has ever been found to be a robust stimulator of human hair growth *ex vivo* in Ralf Paus's assays is which of the following?
   A. Connective tissue growth factor (CTGF)
   B. Thyrotropin Releasing Hormone (TRH)
   C. Dihydrotestosterone (DHT)
   D. Estrogen (E)

2. In experimentally wounded, organ-cultured human skin, T4 prolongs hair follicle anagen (van Beek et al. 2008), and it also promotes which of the following?
   A. Re-epithelialization (definitely) and possibly angiogenesis
   B. Hemostasis and remodeling
   C. Angiogenesis (definitely) and possibly re-epithelialization
   D. Fibroblast proliferation

3. Given the biological similarities between wound healing, anagen development, and active hair growth (Ansell et al. 2011, Jimenez et al. 2015), all hair growth–promoting agents automatically are reasonable candidate
   A. vitiligo therapies.
   B. wound healing promoters.
   C. post-surgical anti-scar agents.
   D. telogen Effluvium reversal agents.

4. If you were to ask Ralf Paus, which of the following would he consider a possibility?
   A. Hair follicle "immune privilege" reactivation in an autoimmune hair disorder
   B. Indefinite maintenance of a hair follicle in the anagen (growth) phase
   C. Laser hair removal of non-pigmented (white) hair shafts
   D. Reactivation of melanogenesis in a white hair follicle

5. Which of the following neuroendocrine agents would Ralf Paus say would be the most likely to result in a halt of the greying process and even reactivate pigmentation in a white human scalp hair follicle?
   A. Estrogen (E)
   B. Dihydrotestosterone (DHT)
   C. Thyrotropin releasing hormone (TRH)
   D. Connective tissue growth factor (CTGF)

6. Hair follicle pigmentation is difficult to study because of which of the following?
   A. Simply observing the hair follicle *ex vivo* can result in immediate termination of melanogenesis.
   B. Pigmentation is associated with the anagen phase, so anything that prolongs the anagen phase would increase melanin synthesis.
   C. Pigmentation is associated with the catagen phase, so anything that prolongs the catagen phase would increase melanin synthesis.
   D. Pigments are different between and among individual hair follicles due to their variable genetics.

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Answers

1. **B.** TRH, which stimulates TSH and thus has a major effect on thyroid regulatory function, also seems to *stimulate human hair growth* AND promote wound healing. We are talking about scalp hair here, by the way (not body hair which paradoxically can be stimulated by DHT in some circumstances).
2. **A.** It has been clear for years that the downstream, endpoint peptides like T3 and T4 promote hair growth, but Dr. Paus is showing us that the additional effects of these neuroendocrine actors, AND their upstream parent hormones, are many and varied.
3. **B.** This question was taken directly from Ralf Paus's text in Part 3, and he is also quick to state that *"this maxim is not widely appreciated in either the wound healing or hair research communities."*
4. **D.** According to Dr. Paus: *"[I]t is important to note that a few HF melanocytes survive even in white HFs much longer than is often assumed (Arck et al. 2006, Fernandez-Flores et al. 2019, Paus 2011) and can be at least partially reactivated for a prolonged period of time (Penzi et al. 2017, Dasanu et al. 2013, Cheret et al. 2020, O'Sullivan et al. 2020)."*
5. **C.** Once again, the peptide that stimulates TSH (which then stimulates production of T3 and T4!) likely also has a direct effect on hair follicles in addition to its indirect modulation of hair through the action of thyroid hormones. This is not yet proven, but read on to the next question for why…
6. **B.** Catagen STOPS melanogenesis not "observation," so A and C are incorrect. D is correct, but it is not the reason pigmentation is difficult to study in human hair follicles. Paus states: *"An important challenge one always faces when making HF pigmentation-related observations is that one needs to carefully distinguish between a) apparent pigmentary effects of a test agent that, in reality, only reflect a change in HF cycling (e.g., prolonged anagen duration leading to prolonged melanin synthesis versus premature catagen induction, which is associated with immediate termination of melanogenesis [Slominski et al. 1994]) and b) genuine, hair cycle-independent pigmentation-stimulatory effects that act on the HFPU and promote its activities and melanin production within a single anagen phase."*

Reference

Questions and answers based on the following reference:
Paus R. HAIR SCIENCE MINI-SERIES: Neuroendocrinology of the human hair follicle episode 3: a "hairy" excursion into the hypothalamic-pituitary-thyroid axis. *Hair Transplant Forum Int'l.* 2021;31(3):93-100. ■



ISHRS Position Statement on Prosthetic Hair Fibers

Prosthetic hair fibers are also known as "artificial hair fibers" and "synthetic hair fibers."

Prosthetic hair fibers are used as an aesthetic solution for hair loss patients. In 1983, the United States Federal Drug Administration (U.S. FDA) banned prosthetic hair fibers:

> *"… The FDA found there was no public health benefit to this device. This device presented a substantial deception to patients or users about the benefits of the device. The prosthetic hair fibers did not stimulate hair growth nor conceal baldness, but could actually cause serious infections, illness, and injuries from their implantation. We believed that the labeling and advertising materials directly or implied misrepresented the device as safe, effective, and causing little or no discomfort, among other misleading claims."*
>
> *Citation: Medical Device Bans | FDA. Content current as of: April 6, 2020. Available from:* ***https://www.fda.gov/medical-devices/medical-device-safety/medical-device-bans***

The ISHRS aligns with the U.S. FDA position on this matter.

Adopted by the ISHRS Board of Governors, Dec. 11, 2021

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The Notable Articles Project

President's note: This column was a very worthy suggestion by former editors Aditya Gupta and Jeff Epstein for the 30th year of the Forum journal in 2020. It is a fitting and noteworthy section to add again for the ISHRS 30th World Congress year. The articles and discussions that appear here are those that have enduring learning and may be just as relevant today as they were in the past or will prove to be in the future. This article was chosen based on a recent discussion on this topic on a group message. Dr. Bob Haber described his frustrating day trying to place 1,500 grafts that took him three times as long because of slippery grafts!

Invited Commentary

Robert S. Haber, MD, FISHRS | *Cleveland, Ohio, USA* | Bobhaber2@gmail.com

We've all had the experience. We plant three grafts, and when we plant the fourth, the first three pop out. We try larger sites, and we try smaller sites, but the grafts keep slipping out as if they have been coated with petroleum jelly. In a recent 1,500 grafts case of mine, I estimate that each graft was placed three times, and of course this raises the specter of repetitive planting injury and eventual poor growth.

Our holding solution was Plasmalyte-A with ATP. Nothing unusual. And there was no mucous-like substance surrounding the grafts or cloudiness appreciated. And there was minimal bleeding associated with these slippery grafts, they just did not want to stay in place.

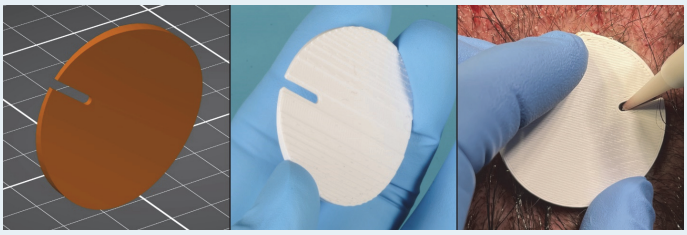
Popping and slippery grafts are not the same phenomenon. Popping occurs to at least a slight degree in most cases, often associated with bleeding, dense packing, and presumably related in some way to grafts not ideally matched to the recipient site. Often, 1,000 or more sites are made in advance, and even if multiple size sites are created, there will occasionally be a graft skinnier or chubbier than average, and these are at greater risk of popping out of a site that's a bit too small or too large.

Slippery grafts are devilish, defying all attempts at placing, and slide out, sometimes in slow motion, regardless of the care taken in matching graft with recipient site. And while the term slippery grafts also refers to how the grafts behave to the sliverer and graft trimmers, in this case, there was no apparent variation from normal noted by anyone on the team other than the placer. In addition, there was no difference in graft behavior between stick-and-place and placing into premade sites.

I did not recall at the time the well-written article by Dr. Pathomvanich's team reviewing this exasperating phenomenon, but after reading it again in preparation for this commentary, I did not find a solution within its pages. In 2011, most of us used forceps for implantation, and their principle attempt at a solution was to modify the forceps. Today, I use implanters exclusively for both FUT and FUE, so gripping the grafts is not an issue. My staff had no difficulty loading the implanters, and the grafts did not appear unusual to them. Like most implanter users, I employ a variety of "tricks" to address the challenges of placing, such as varying from fully inserting the implanter to just introducing the beveled portion, but neither of these approaches helped. And I also used forceps to insert some grafts, with no difference in outcome. Thankfully, as most implanter users know, there is so little graft trauma associated with implanter use, that when a graft does pop out, it looks pristine. Thus, even though most grafts were implanted more than once, my hope is that they suffered less than if forceps had been used.

I'm a 3D printing aficionado, and I recently designed and printed a slotted disk that I call the Popper-Stopper (Figure 1.) This disk applies counter pressure to the zone around the graft to be placed, and while it certainly helps in cases of "regular" popping, it was of little help on this day. As soon as the disk was removed, several grafts levitated.

FIGURE 1. Popper-Stopper: 3D design *(left)*, printed device *(middle)*, device in use *(right)*. Disc provides counter pressure to area surrounding graft being planted, decreasing risk of popping.



Generally, it is understood that lateral forces created during inserting a graft are what causes popping, but in my recent case grafts as far as 2cm from the site of insertion sprang from their resting place as I gingerly inserted a graft. It's hard to imagine lateral forces extending that far.

I teach my staff that each graft is like a newborn baby, and if we worked in a maternity ward, each baby from the first in the morning to the last at night would deserve the same care and attention, no matter how weary we felt. And so I took over all the placing myself and successfully planted the case, patiently returning grafts to the loading table as needed, and gently trying again, applying gentle counter pressure with gauze or the Popper-Stopper until the graft finally stayed in place.

Thankfully, severe cases of slippery grafts are extremely rare, but that also makes it difficult to study and develop a successful strategy. I cannot give the reader a solution to this phenomenon, other than to slow down, cherish each graft, remain patient, and know that at some point the day will be done. ■

How to manage intra-operative slippery grafts

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Introduction

Hair transplant procedures can last many hours, starting from the preoperative assessment, hairline placement, careful donor harvesting, slivering, graft cutting, and, finally, insertion. In the era of mega sessions and giga sessions, a procedure can last 8-11 hours. Most hair transplant physicians feel that the speed and duration of surgery is determined by the speed of inserting the grafts.

During a procedure, the hair surgeon might encounter slippery grafts. These grafts are not only difficult and time-consuming to manage while slivering and graft cutting, but they can also slow down the insertion process markedly—sometimes by close to 50%. Slippery grafts often "slip off" when held with the jeweler's forceps (Figures 1 and 2). Other commonly associated problems, for example, popping, may frustrate both the surgeon and the team technicians.[1,2]

Because assistants tend to use more than the usual force on forceps, repeated graft handling and rough handling may decrease the percentage of graft survival because of H or X factors.[3] We studied 35 such cases in the past three years at our clinic in which we observed this finding. In the literature there is discussion about slippery grafts,[1,2] but, to the best of our knowledge, this may be the first article reporting a review on these cases.



Figure 1. Thin layer of mucus sludge (black arrows).



Figure 2. Original photograph digitally enhanced to make the "slipping mucus or sludge" more evident.

Objective

Our objective was to review the features common among patients with slippery grafts and to propose a couple of modified jeweler's forceps that may help in such cases.

Material and Methods

A prospective and retrospective study was performed for all the cases of slippery grafts at DHT Clinic, Bangkok, Thailand since 2008. From April 2010 prospectively, all patients with the finding of slippery grafts were carefully assessed for possible pre-operative and intra-operative findings and clues. The retrospective search was performed for all the new surgery cases from January 2008 to December 2009. A total of 1,014 new patients' hair surgery records were searched: 308 cases in 2008; 417 cases in 2009; and 289 cases in 2010. All cases with this intra-operative finding were segregated for data analysis and clinical and intra-operative findings were recorded. We incidentally found the record of 4 more patients in whom surgeries were being performed in the years 2005 (1 patient), 2006 (2 patients), and 2007 (1 patient). We also included them in the study data.

Following are the findings recorded for the assessment:

- Demographic data (Surgery date, age, sex, and race)
- Clinical examination (Alopecia classification and skin type, texture, and color)
- Intra-operative findings:
- Slippery feel while donor harvesting, slivering, and graft cutting
- Oily coating over the normal saline in slivering tray and graft holding cups (Figure 3)
- Turbidity of the saline fluid (Figure 3)
- Mucus consistency of the saline of graft holding trays (Figures 3, 4, and 5)
- Difficulty while insertion
- Popping of grafts (Figure 10)
- Assistants' remarks
- Extra time spent compared to the average for the same size session
- Immediate and next day post-operative findings
- Post-surgery follow-up at 1 year



Figure 3. Turbid oily coating layer on the surface of the normal saline in slivering tray and graft holding cup.



Figure 4. Grafts after repeated rinsing with normal saline.



Figure 5. Hair grafts slip off when held with conventional jeweler's forceps after rinsing.

We modified the routine jeweler's graft holding forceps into two different designs. The first design (Figure 6) has a ½mm diameter notch on both the edges of the forceps ½mm away from the distal tip of the forceps for holding the graft. The second design (Figure 7) has very fine serrations on both of the graft-holding edges of the jeweler's forceps. Lastly, we also studied the extra fine pointed tip forceps either straight or right angled. These forceps were used in 6 of the prospective cases; benefits and limitations with these forceps in comparison to the regular forceps along with assistants' satisfaction were also recorded.

The record of both the prospective and retrospective patients was put together and analyzed, and the results were prepared.

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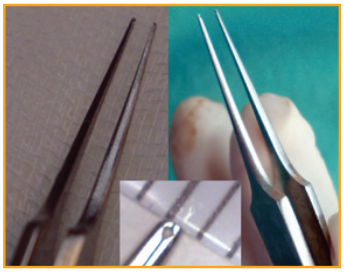


Figure 6. First design of the modified fine jeweler's forceps. A notch is made at both of the inner edges, with a 1-hair space when approximated, 1mm from the distal tip of the forceps. 10× magnification of the tip of the forceps in the center of the photograph behind the 1mm scale.

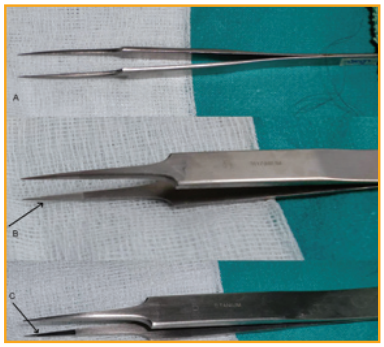


Figure 7. Second design of modified jeweler's forceps. A: Very fine serrations over the graft holding edges of the forceps. B: Photograph in routine lighting. C: Photograph in slow flash lighting to enhance the serrations for better contrast and differentiation.

Results

A total of 35 patients were found to have slippery grafts in the 3-year duration. Seven patients in 2008, 11 patients in 2009, 1 patient in both 2005 and 2007, and 2 patients in 2006 were assessed retrospectively. Thirteen patients were assessed prospectively from January 2010 through November 2010. Annual incidence was 2.27% in 2008, 2.63% in 2009, and 4.49% in 2010.

The study included 32 males and 3 females ranging in age from 23 to 48 years. The cases were from a wide range of races: Asian (6 patients), Oriental (15 patients), Caucasian (10 patients), African (1 patient), and Middle Eastern (3 patients).

On examination, skin color was yellow in 15 patients, white in 10, brown in 9, and black in 1. Skin type was "normal" in 12 patients, "oily" in 19, "oily with severe flaking" in 3, "signs of seborrhic dermatitis" in 1, and "dry skin" in 1 (African). These patients had various patterns of androgenetic alopecia: Norwood II (4 patients), Norwood III (11 patients), Norwood IV (11 patients), Norwood V (3 patients), Norwood VI (2 patients), and Ludwig pattern (2 patients), and 2 male patients were planned for female pattern hairline design.

Intra-operative findings were also recorded. The slippery feel of the tissue and oily layer coating over the normal saline surface was observed in 32 of 35 patients. The mucus-like consistency of the normal saline of graft holding trays was observed in 35 of 35 patients, and among 33 of 35 patients, it persisted even after repeated rinsing. The turbidity of saline was seen among 14 of 34 patients. Difficult insertion was observed in 32 of 35 patients, and among 3 of 35 patients insertion was average. Graft popping was observed in 30 of 35 patients, and among 7 patients was also observed the next post-operative day (Figure 10). Two patients also lost grafts (2 and 6 grafts) due to popping. The extra time spent during the surgery compared to the routine session of the same number of grafts varied from 0 to 3.25 hours. More time was spent on patients with very difficult insertion and severe popping during surgery.

The assistants evaluated the case for ease while holding and inserting the grafts with minimal trauma. The data suggests that they felt disappointment in 16 of 35 cases, average in 13 of 35 cases, and comfort in 6 of 13 prospective cases in which the modified forceps were used. Popping of grafts, however, remains the major problem among all patients.

At 1-year post-surgery follow-up, good hair growth was observed in 9 of 35 patients (13 patients did not attend follow-up after the surgery and 13 are yet to attend their 1-year assessment).

Modified Placing Forceps

The first design was found to be effective in holding the grafts securely, without crushing them. The insertion was faster than normal and the assistants were more satisfied. The downside was that after insertion the assistants had to be very careful that the graft did not come out because of the notch grasping the graft. They had to either use the two-hand technique and support the graft with another forceps while taking the notched forceps out of the slit, or they had to use gauze to press on the graft before removing the forceps. However, once the inserter was familiar with the forceps, the insertion was markedly improved (Figure 8).

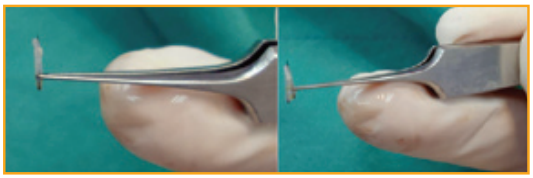


Figure 8. Hair grafts held securely with the first modified jeweler's forceps design. Left: 1-hair graft; Right: 2-hair graft.

With the second design, the graft holding was better than with the regular pointed jeweler's forceps, but in comparison to the first design, it was less secure and slightly more force was used for holding the grafts. Other inserters seemed to stick with extra fine pointed tip forceps (Figure 9).

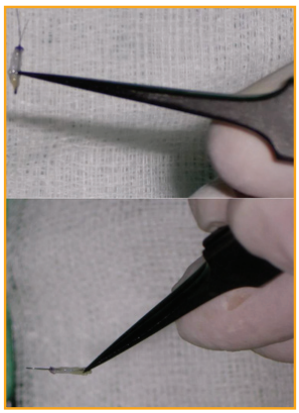


Figure 9. Hair graft held with the second modified jeweler's forceps design. Top: 2-hair graft; Bottom: 1-hair graft.

The amount of graft handling and pressure in these cases was much less in comparison to the use of regular jeweler's forceps, but the problem of graft popping was the same as with the use of standard forceps.

Discussion

Tissue is described as "slippery" when it has an oily, viscous substance floating in graft-holding normal saline.[2] This substance makes the grafts very difficult to control with standard jeweler's forceps. Repeated rinsing of grafts may cause mechanical injury and each graft has to have a slight pressure held over it longer than usual until it "settles in" and stays in place.[3]

In our study we observed the incidence of this problem varying from 2.27-4.49%, which indicates the need for emphasis on this problem during hair surgery.

Unger et al. mention the observation of "beading" of blood on nylon, non-absorbable sutures during closure of the donor site as an important indicator.[1] The author also mentions this is due

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Managing slippery grafts

from page 39

to oil, a relatively dense liquid, whose resultant cohesive forces manifest themselves as "beading" when placed on a flat surface and is "slippery" to touch.[1]

We have routinely observed that many cases with very oily scalp and severe dandruff have no signs of slippery grafts during surgery. So, even though we observed that most of the patients in our study have oily scalp, this appears not to be a very consistent finding.

Most of our surgery cases come for follow-up at 1 year by personal visit or email communication. In our study, none of the follow-up cases showed poor growth (9 of 35 patients); however, a large number of cases (13 of 35) did not return for follow up at 1 year, and we are not sure if these cases did not follow up because of their busy schedules or because they were disappointed with their surgery results due to poor growth. Thus, the percentage of growth among the cases is yet to be assessed.

Unger et al. also propose communication between surgeon and technicians, which could influence the surgery plan and trigger subtle adjustments in graft tissue handling and recipient site creation.[1] They further propose to create smaller sites to maximize the lateral force of friction on each graft within the recipient site and to effectively lodge it securely within the site and to minimize the popping up of grafts and repeated handling[1] (Figure 10).

Both of the modified designs of the jeweler's forceps were found to be effective in holding grafts more securely and with minimal trauma to the graft. The extra fine point forceps also worked well in very experienced hands.

Stock storage solutions such as Hypothermasol, Custodiol, and Moser's solution, which limit dehydration, have been found to make grafts more slippery. This results in technical difficulty during planting and prolonged hair transplant sessions, thus limiting their clinical usage.[4]



Figure 10. Graft popping up at the recipient site.

The patients should always be counseled for less than the expected results of the surgery.[1] We feel a lot of research is still required to assess the biochemical basis of this condition and why the mucus returns even after repeated rinsing with normal saline. This could help in early identification of these cases.

Conclusion

Hair transplant surgery in patients with slippery grafts should be limited to small sessions with no dense packing. Careful handling may reduce the chances of poor yield. More research is required to find the cause of this mucoid liquid and to identify these patients prior to the surgery session.

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1. Unger, R.H., and C.K. Wesley. Technical insights from a former hair restoration surgery technician. *Dermatologic Surg.* 2010; 36(5):679-682.
2. Tafoya, P. Popping: why it occurs and how to prevent it. *Hair Transplant Forum Int'l.* 2007; 17(1):37.
3. Martinick, J.H. Cyberspace Chat: H or X factor. *Hair Transplant Forum Int'l.* 2004; 14(5):167.
4. Krugluger, W., et al. Developing new graft holding solutions: *in vitro* evaluation of bioactive molecules identifies vitamin B12 as micro-graft stabilizing substance. *Hair Transplant Forum Int'l.* 2007; 17(1):9.◆





ISHRS 2022 CME WEBINAR SERIES

Live and On Demand

Available for CME credit, the ISHRS 2022 CME Webinar Series will cover topics of interest to those in the field of hair restoration surgery. Webinars may include presentations selected from the 2021 World Congress, new presentations, panel discussions, and live discussions between participants and faculty.

Watch on demand at your convenience through December 31, 2022.
The current webinar schedule, registration information, and additional details may be found at the following link:

https://ishrs.org/2022-cme-webinars/

UPCOMING WEBINARS

Consultation & Evaluation
Saturday/February 12
9:00AM Central Time

Aesthetics, Extractions, and Placements
Saturday/June 11
9:00AM Central Time

Anesthesia Complications
Wednesday/April 13
9:00AM Central Time

Hair Transplant in Special Areas and Conditions
Wednesday/September 7
6:00PM Central Time

AVAILABLE ON DEMAND

Complications in Hair Restoration Surgery
Moderator: Shady El-Maghraby
Co-Moderator: Anil Garg
(Jan. 12, 2022)

REGISTRATION FEES PER WEBINAR

- Physician Attendee of ISHRS 2021 World Congress, $0 USD
- ISHRS Physician Member, Non-Attendee of ISHRS 2021 World Congress, $50.00 USD
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SNEAK PEEK...

The ISHRS will soon release three new on-demand online educational opportunities:

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Hear from the Assistants

Marwan Noureldin, MSc | *Cairo, Egypt* | marwannoureldin@hotmail.com

If you would like to nominate an assistant from your practice to be interviewed for this column, please email me.

Andrea Antelo, APRN, FNP-BC; Lidia Diaz, APRN, FNP-BC; Jacqueline Sed

I am incredibly delighted to have spoken with not just one but three of Dr. Jeffrey Epstein's assistants. Jacqueline Sed, a scrub and hair technician, Andrea Antelo, APRN, FNP-BC, Nurse Practitioner, and Lidia Diaz, APRN, FNP-BC, Nurse Practitioner.

Having well-trained assistants is crucial for each surgery and will help a lot as long as everyone is singing from the same hymn sheet, as Andrea notes about their practice: *"We have two board-certified nurse practitioners and registered nurses. To assist the Nurse Practitioners during the FUE work, we have several expertly trained hair technicians with an average of 13 years of experience. All our 14 team members have undergone extensive training courses and received certificates of completion. Continuing education, attendance in webinars, quality control meetings, and training of new hires are measures we take to ensure that we are providing the best care possible."*



"The number one rule is always quality over quantity."
—Jacqueline Sed

With a busy office like Dr. Epstein's, it is interesting to know the types of procedures they perform, so Jacqueline filled me in: *"We perform multiple procedures. For many years, most of the procedures performed in our office were via strip. There will be around 3 to 4 assistants sitting with a microscope dissecting the strip into slivers. Then, the slivers will be dissected into follicular unit grafts. Nowadays, the practice is largely FUE-based. We have gone from a manual FUE punch with a 1.0mm diameter, which accomplished the procedure but took a toll on the [operator's] hands, to a handheld FUE machine. In some cases, Dr. Epstein will recommend a hybrid approach in which a small strip will be removed and the procedure will be complemented with FUE grafts. This way, a smaller incision is made on the patient's scalp. Finally, Dr. Epstein regularly performs hairline lowering/forehead reduction surgeries. These procedures deliver dramatic and instant results, where he can lower a hairline by, on average, an inch in a single procedure. Around 15% of these surgery patients wind up returning a few months later for hair grafting if they are concerned about any visibility of the hairline fine line scar or for more rounding out."*



"This goes beyond just restoring the patient's hair; it is about restoring the patient's confidence."
—Lidia Diaz *(left)*

"High staff morale leads to pride in their work."
—Andrea Antelo *(right)*

Next, Jacqueline explained a typical FUE procedure in their office: *"With a 2,200 FUE graft case, it really depends on if the procedure is a fully shaved, partially shaved, or no shave. Fully shaved and partially shaved, the extraction portion can take up to 3 hours while the patient is on their belly. Once the patient is lying on his back, the anaesthesia plus PRP [platelet-rich plasma] injections are completed. The planting process then starts. For the past five years, we have implemented the KEEP Implanter pens. There are two planters, and each has an assistant who will load the grafts into the KEEP implanters and pass them to the planter placing the grafts in the recipient site incision that Dr. Epstein has made. A small number of grafts are placed on the assistant's hand, and the grafts are kept moist at all times. For 2,200 grafts, fully shaved FUE, the entire procedure will take about six to seven hours."*

Next, Andrea took the opportunity to talk about how they ensure that the patient has a positive and comfortable experience all through the procedure: *"Every patient, whether having a procedure or in for medical consultation, not only meets with Dr. Epstein but also with a Nurse Practitioner. We have focused on the medical management of patients with the doctors. We also created the Women's Center for Hair Loss, supervised by Dr. Gorana [Kuka Epstein], and this has been a wonderful component of our practice where we get to manage our hair loss patients medically."*

Andrea added: *"I think it is important to listen to and validate their concerns. Hair loss is a very personal and, at times, emotional thing for both men and women alike. So making sure they feel heard and understood is the first step. After this, give realistic expectations and remain ethical in your practice. It's difficult because you have to be a forward thinker and think about the patient's happiness now, in 2 years, in 5-10 years. Taking into account the degree of hair loss, age of the patient, donor supply, and risk assessment for future hair loss is what makes a good surgeon great."*

I asked Lidia about the mistakes or errors in patient care that she thinks doctors should be most careful not to commit: *"A mistake that can be made in patient care is not meeting patient expectations for their desired hair goals—in the patient's eyes. That is why transparency and communication is the best approach between the doctor and the patient. Effective communication prevents setting unrealistic expec-*

➤ BOTTOM PAGE 27



Literature Review

Nicole E. Rogers, MD, FISHRS | *Metairie, Louisiana, USA* | nicolerogers11@yahoo.com

Update on Robotically Assisted Recipient Site Creation

Citation: Kanayama K, et al. Robotically assisted recipient site preparation in hair restoration surgery: surgical safety and clinical outcomes in 31 consecutive patients. *J Dermatol Surg.* 2021; 47:1365-1370 (with commentary by Dr. Marc Avram, page 1370).

Robotic technology has dramatically advanced the FUE harvesting process and reduced operator fatigue since its introduction in 2011. For years, many have anticipated the next step in automation: creating recipient sites to be followed by graft placement. Our Japanese colleagues in plastic and reconstructive surgery recently published their work assessing the surgical safety and clinical outcome of patients who underwent robotic recipient site creation during hair transplant surgery using the ARTAS® version 8x (Restoration Robotics, San Jose, CA). Their study retrospectively reviewed 31 male patients (with a mean age of 38.7 ± 9.5 years) who underwent hair surgery between April 2017 and February 2019. A disposable kit using a solid core 18-gauge needle was used for recipient site creation.

In order for the device to work, the hair in the patient's recipient area had to be trimmed to a length of 1mm. The area was anesthetized as usual, and then a fiducial platform was adhered to the desired incision area, and the robot was directed to read the fiducial markings. The operator could use a remote control for site creation by adjusting the puncture angle, depth, direction, and density during the procedure. For the hairline and frontal region, sites were created with a density of 30-35 grafts/cm^2; in the midscalp, they were created at a density of 20-25 grafts/cm^2. Additional sites were created by hand along the temporal hairline and frontotemporal angle. Grafts were then placed by hand, and patients were followed up at 1, 7, and 28 days and up to 1 year and assessed for various complications. Their cosmetic outcome was also graded on a scale of 1-5 (very poor, poor, average, good, excellent) by three blinded certified plastic surgeons.

The most common complication was post-operative crusting (54.8%), which usually resolved within 10 days post-op, pruritus (12.9%), asymmetry (6.5%), folliculitis (6.5%), and shock loss (6.5%). No patients had a cobblestone appearance, cysts, infection, keloid, skin necrosis, or paresthesia in the recipient areas. Six cases (19.4%) were judged as excellent, 21 (71%) as good, 3 (9.7%) as average, and no cases were judged as poor or very poor. Subjectively, 11 patients (35.5%) were very satisfied, 15 (48.4%) were satisfied, 3 (9.7%) were neutral, 2 (6.5%) were unsatisfied, and none were very unsatisfied.

Comment: Many of the complications reported in this study (crusting, pruritus, folliculitis) can be seen even with manual recipient site creation. The results overall seem to be acceptable and may pave the way for ongoing development of robotic applications. However, the authors mention several limitations: 1) a single size needle used for recipient site creation (18g) when most grafts vary in size, 2) pre-existing grey hairs in the recipient area must be dyed in order to be recognizable to the robot, 3) the time and effort required to create and place the fiducial grids seems to outweigh the benefit of automatic site creation. They also question whether the need to trim the recipient area hairs to less than 1mm will be acceptable to most patients who prefer to keep the hair longer in order to camouflage. In his commentary, Dr. Marc Avram also points out the limitation in that the device still cannot make sites in the vertex or temporal scalp. Overall, this development is an amazing technology as is the creation of robot-assisted graft harvesting. However, it still seems to require some manual component. Thus, our jobs as hair surgeons does not appear to be outmoded quite yet! ■

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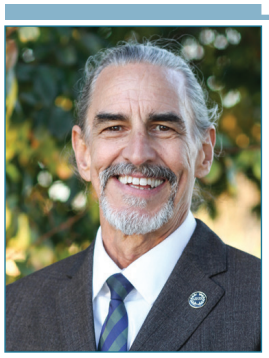
tations for patients to decrease the likelihood of a dissatisfied patient."

I then asked Andrea how to get everyone on board to do the right things: *"This is where the role of a mid-level provider is so important. Having licensed professionals like myself in the cases allows for quality control and hair technicians to feel supported and have a resource who understands the importance of these things. We also hold staff meetings where we might highlight an important topic such as graft moisture and review with staff the importance of and the why of it all."*

We then moved to a crucial aspect that assistants witness during the surgery when the doctor is not around, usually at the implantation process. Lidia offered: *"I believe some patients express their fears or anxiety about their procedure a little more candidly when Dr. Epstein is not present. This is something I always make Dr. Epstein aware of because it is important for our patients to feel comfortable. It is vital for our patients to feel they have made the right decision, and having Dr. Epstein provide further reassurance is always essential."*

Andrea added: *"When the staff loves what they do, feel supported and even have patients come back for an additional procedure, requesting their same team, it motivates staff to ensure the highest standards."*

Before ending the meeting, Jacquline had the last say: *"It is crucial also to have someone providing comfort to the patient, by giving the patient their hand as a bedside companion while the numbing process is being completed."* ■



ABHRS President's Corner

Timothy Carman, MD, FISHRS | *La Jolla, California, USA* | tcarmanmd@mac.com

Over this last month, following the wonderful experience of re-connecting with trusted friends and colleagues at the 2021 ISHRS annual meeting, and, upon celebrating the 25th Year Anniversary of the ABHRS, the magnitude of the challenges faced and overcome by both these organizations in the last two years really hit home with me.

I became aware of how truly important our collective efforts as physicians, surgical technicians, administrators, educators, mentors, knowledge seekers, and "experts in our field" have become in this day and age for patients requiring accurate diagnosis and treatment of hair loss and scalp-related disorders. If there has ever been a time when information sought by hair loss patients was confusing, if not downright contradictory, it is now.

In that connection, I have come to realize the immense potential in the continued cooperation between the ISHRS and ABHRS, mutually and formally outlined this past year, in providing patients with an anchor from which to glean accurate and clinically sound medical guidance provided by physicians dedicated to the highest level of quality outcomes in the medical and surgical management of individuals affected by hair loss.

As a certifying body, the ABHRS appreciates the importance of recognizing the educational goals of the ISHRS and its Global Council of Hair Restoration Surgery Societies, as the physicians who make up these societies exhibit the personal and professional dedication and motivation to maintain their clinical competency, character traits that describe the best candidates for ABHRS certification. The goal of ISHRS-sponsored educational opportunities present in their online webinars, workshops, and annual congress is to bring together the strongest minds in the field to observe and learn the latest safe and effective diagnostic and treatment modalities for the expressed benefit of patients seeking care. The complementary goal of the ABHRS is to certify those most highly competent surgeons through its rigorous screening process, focused on the assessment of consistent ethical and intellectual judgment and experience in the clinical management of hair loss patients, followed by NBOME-sponsored, psychometrically sound written and oral examinations.

Against a changing landscape of patient-directed information presented on practitioners' websites, social media pages, marketing platforms, and multiple forums, the ABHRS will continue its efforts to strengthen its screening process to ensure the safety, competency and ethical sensibilities of surgeons applying for Diplomate status, as we continue to maintain our focus on providing patients with absolute value in the recognition of the ABHRS affiliation. We continue to consistently update and supplement our NBOME question data bank to reflect standard of care practices based in sound academic references and currently modeled clinical standards. We also source material advanced by leaders in the field of hair restoration surgery as reflected in their lectures and journal publications.

On a more personal note, I would like to take this opportunity to recognize the absolutely "insane" (as he would put it) effort and care Sam Lam put into this past year as ABHRS president. He has certainly created big shoes to fill, and I will do my best to honor his legacy. I am grateful he will be close this next year as Immediate Past President (IPP)! And speaking of IPP, I would also like to warmly thank the thoughtful, intelligent counsel IPP Sara Wasserbauer brought to our EC and BOD developments over this last year. I have her on speed-dial (no one remembers what that is…), so she is close as well!

I am honored to have the continued support and counsel of Konstantinos Anastassakis as my Vice President and Ken Williams as Secretary. Both have brought insight and clarity to our Executive Committee this past year. I wish to congratulate and welcome Steve Gabel as incoming ABHRS Treasurer. I have firsthand knowledge of the commitment and dedication he exacted over the past two years as Chairman of the written exam committee, and I look forward to his input at the EC level.

Also, I would like to congratulate and welcome Chris D'Souza and Georgios Zontos to the ABHRS Board of Directors. We are grateful to have these talented and hard-working surgeons on board as the ABHRS evolves with this most challenging period in human history!

Last, but not least, I wish to recognize and thank Emily Valerius, ABHRS Director of Operations, for her countless hours of organization and preparation, without which our ideas and plans would not materialize.

Onward into 2022! ■

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Message from the ISHRS 2022 World Congress Program Chair

Sara Wasserbauer, MD, FISHRS | *Walnut Creek, California, USA* |
drwasserbauer@californiahairsurgeon.com

"There is only one pretty child in the world and every mother has it."
—Chinese proverb

I always wanted to be the chair of a World Congress meeting, thinking that *my* World Congress—like my "child"—would be the "best ever" and "prettiest" World Congress.

I also thought it must be tough to be the chair of a World Congress. But now that I am two months into this process, I have to say… I thought right. Accepting this position is an enormous honor, but if you want to appear to be successful and competent—paradoxically—it is a terrible decision. This is because you must

1. follow the ever-more-outstanding performance of the last meeting chair (in this case Lisbon's amazing Dr. Marie Schambach!),
2. organize ALL the moving parts of this ever-changing and dynamic industry, AND—worst of all—
3. **keep speakers on time…!**

Turns out after talking to many previous World Congress chairs, this job is going to be even tougher than I imagined, particularly that last bit about keeping speakers on time, because we all like to give our opinions and offer our experiences. Brain science tells us that we lose the attention of our audience at about 7 minutes, and that both repetition and interaction help us learn. **Repetition and interaction…**



I carry with me the weight of World Congresses past—literally.

To that end, there will be significant question and answer time (interaction) in Panama so we can learn deeply and share knowledge. In addition, please note the following:

- **If you are a speaker**, be prepared for a new presentation structure and **organize your thoughts for a concise presentation format**.
- **If you are good at cutting people off mid-sentence**, please email me at drsara@californiahairsurgeon.com, because **I am recruiting effective moderators** for the sessions.
- **If you are inventive and resourceful, start writing up your idea or pearl** for our "Best Innovation" contest (final title of this contest to be determined).

We also hope to heavily utilize the audience response system (interaction) and duplicate exciting focused session content (repetition) so that attendees don't have to choose among excellence.

So prepare your high-quality studies, new insights, and artistic or technical hair transplant skills for the "best ever" World Congress of the ISHRS. Abstract submission will open soon with preferred slots for content concerning innovations, well-designed studies, injectable therapies, and latest treatments and techniques (linear, FUE, hybrid, etc.). Make your plans to attend the "prettiest" World Congress ever—because it promises to be one "mother" of a meeting. ■



CALL FOR ABSTRACTS Opening Soon

The Call for Abstracts for the 30th World Congress of the ISHRS will open soon.

Abstract submission deadline: March 16, 2022

Detailed information will be posted at https://30thannual.org/.

ISHRS Europe & S.I.Tri.
present

2022 World Live Surgery Workshop: Florence
26 May 2022













As part of its increasing collaborative efforts with Global Council societies, the ISHRS via its ISHRS Europe Council is pleased to partner with the Italian Society for Hair Science and Restoration (S.I.Tri.) on this full-day live surgery workshop taking place in beautiful Florence, Italy. Engage in dialogue and discussion as local and international guest faculty will demonstrate the newest techniques and share surgical pearls. Inscription includes lunch, coffee breaks, and cocktails in the evening. Exhibit and sponsorship opportunities are available. There is limited attendance, so plan to register early!

For convenience of guests, the 2022 WLSW Florence takes place one day prior to the **44th Congress of S.I.Tri, scheduled for 27-29 May 2022** in Florence-Chianti, Italy. In addition, there is an optional post-congress cycling tour.

Plan your 2022 calendar now for a wonderful time with your friends of ISHRS & S.I.Tri.! We look forward to welcoming you.

Calendar

MAY 2022 - JUNE 2022

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				26 WLSW	27 S.I.Tri. Congress	28 S.I.Tri. Congress
29 S.I.Tri. Congress	30 Cycle Tuscany	31 Cycle Tuscany	1 Cycle Tuscany	2 Cycle Tuscany	3 Cycle Tuscany	

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- https://www.sitri.it/

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2022 Qualifying Meetings for Member Educational Maintenance Requirement

As a reminder, there is an educational maintenance requirement for the membership categories "**Member**" and "**Fellow Member**." This does not apply to membership categories Associate Member, Resident Member, Emeritus Member, or Surgical Assistant Member.

Educational Maintenance Requirements

ISHRS Member and ISHRS Fellow Member membership categories must attend one ISHRS-approved meeting every 3 years, otherwise that member will be changed to Associate Member. The impacted member may revert back to their previous category after attendance at an ISHRS-approved meeting.

2022 Qualifying Meetings

March 18-20, 2022 & April 23, 2022 Virtual
ISRHR Regional Workshop: Cowgirl Hair Loss: Art & Perfection, Female Hair Loss
Virtual
https://www.cowgirlhairloss.com

July 22-23, 2022
13th Annual Hair Transplant 360 Cadaver Workshop
St. Louis, Missouri, USA
https://www.slu.edu/medicine/medical-education/continuing-medical-education/pase

October 27-29, 2022
30th World Congress of the ISHRS
Panama City, Panama
www.30thannual.org



The qualifying meetings are also listed at
https://ishrs.org/physicians/list-ishrs-approved-meetings-meet-additional-minimum-educational-requirement/

AtoZ has acquired the HARRIS instrument product line.

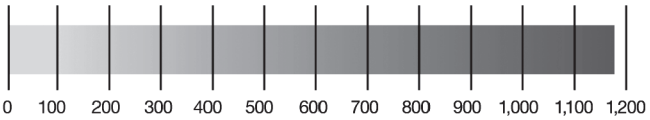
A to Z

Harris S.A.F.E. FUE Punches



THE ADVANTAGES:
- Approved for up to 40,000 grafts with one punch
- New 6 mm depth for all follicle lengths
- HEX vibration separates follicle from skin
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- Reusable punch
- Flush port
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- Available to FOX Negative® patients

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* In a clinical study by Dr. Harris in over 150 patients and more than 100,000 harvested grafts. General user transection rates may differ.
** Depending on follicular unit configuration and skin characteristics graft dissection rates up to 1200 grafts/hour are possible. Numbers based upon Jim A. Harris, MD extraction rates

Classified Ads

Wanted: Hair Transplant Physician, Full Time

Anderson Center for Hair® (AndersonCenterForHair.com) in Atlanta, USA, is looking to hire a full-time physician/surgeon. Expert on-the-job training available. FUE and FUT surgical procedures are performed. ARTAS® and NeoGraft® Systems available. Full-time staff of experienced hair restoration technicians. Friendly working environment in a 10,000 square foot center dedicated to hair restoration surgery. Industry-leading salary and comprehensive benefits. Required: US citizen, permanent resident, or EAD.

Please contact jobs@andersonhsc.com.

Seeking Hair Restoration Physician and Technicians

Our company is seeking an experienced Hair Restoration Surgeon and technicians for our two new offices in Dallas and Houston, Texas. One physician/team per office. We specialize in FUE manual extraction and provide everything from space, supplies and management to each team. Opportunity to make $500,000+ year as a physician. Relocation packages available.

Please send résumé to Tu.Tran@advancedhair.com.

Seeking Hair Transplant Physician

New Hair Transplant clinics opening across UK, Ireland, and Europe. We are seeking a Lead Doctor & Clinical Director Role, with a view to a partnership in the business for the right person. Based in Dublin, Ireland, initially. Amazing salary package and opportunity for an entrepreneurial minded surgeon.

Please send CV and details to hello@growclub.ie.

Seeking Hair Transplant Technician

Looking for an experienced FUT and FUE full-time hair transplant technician to join established practice in sunny Miami, Florida. No need to travel, benefits include health, vision, dental insurance, and paid PTO.

Inquiries please send your résumé and references to mjkoul2022@gmail.com.

For Sale: ARTAS IX

2020 Artas IX for sale. Like New. Used on less than 15 patients. Selling for less than half of the original price for $149,000.

Contact Dr. Kane by cell/text at 713-302-1377 or email at walterkane@hotmail.com.

For Sale: hairtransplant.com/HT Practice

For the first time in history, what we consider to be the best domain name in the hair transplant industry is available for sale. If you are a franchise or going to be a chain store, this is your only chance to own this website. Our clinic has owned this name from the beginning of the internet. Our patients remember this name and communicate with us, so it attaches to a large clientele base.

We are in Orange County, California, conveniently located near the freeway and one mile from the airport. FUT exclusive clinic can be used as a second office to separate existing FUE clinics or to add FUE service. Please check our website, hairtransplant.com.

For more information about buying the practice and domain name, send an email to s3229999@gmail.com.

Calendar of Hair Restoration Surgery Events

http://www.ishrs.org/content/upcoming-events

DATES	EVENT/VENUE	SPONSORING ORGANIZATION(S)	CONTACT/INFORMATION
FEB 12, 2022 9AM Central Time/ Chicago	CME Webinar: Consultation & Evaluation	International Society of Hair Restoration Surgery	https://ishrs.org/2022-cme-webinars/
* **MAR 18-20/ APR 23, 2022**	ISHRS Regional Workshop: Cowgirl Hair Loss Workshop—Art & Perfection, Female Hair Loss *Held Virtually*	International Society of Hair Restoration Surgery Hosted by Carlos J. Puig, DO, FISHRS http://www.cowgirlhairloss.com/	cpuig@hairdoctexas.com
APR 13, 2022 9AM Central Time/ Chicago	CME Webinar: Anesthesia Complications	International Society of Hair Restoration Surgery	https://ishrs.org/2022-cme-webinars/
MAY 26, 2022	2022 World Live Surgery Workshop: Florence *Florence, Chianti, Italy*	International Society of Hair Restoration Surgery (ISHRS) Europe & Italian Society for Hair Science and Restoration (S.I.Tri.) https://eventi.sitri.it/en/event/live-surgery-workshop/	segreteria@sitri.it info@ishrs.org
MAY 27-29, 2022	44th Congress of S.I.Tri. *Florence, Chianti, Italy*	Italian Society for Hair Science and Restoration (S.I.Tri.) http://www.sitri.it	segreteria@sitri.it https://eventi.sitri.it/en/
JUN 11, 2022 9AM Central Time/ Chicago	CME Webinar: Aesthetics, Extractions, and Placements	International Society of Hair Restoration Surgery	https://ishrs.org/2022-cme-webinars/
* **JUL 22-23, 2022**	13th Annual Hair Transplant 360 Cadaver Workshop *St. Louis, Missouri, USA*	Saint Louis University School of Medicine, Practical Anatomy & Surgical Education In collaboration with the International Society of Hair Restoration Surgery https://tinyurl.com/2p93d65c	pa@slu.edu
SEP 7, 2022 6PM Central Time/ Chicago	CME Webinar: Hair Transplants in Special Areas and Conditions	International Society of Hair Restoration Surgery	https://ishrs.org/2022-cme-webinars/
OCT 24-25, 2022	Ancillary Meeting to the ISHRS World Congress: SILATC & AMETREC Congress and Live Surgery Workshop *Panama City, Panama*	Ibero Latin American Society of Hair Transplantation (Sociedad Iberolatinoamericana de Trasplante de Cabello- SILATC) & Mexican Association of Trichology and Hair Transplantation (Asociación Mexicana de Tricología y Restauración Capilar-AMETREC) http://silatc.org/ www.ametrec.org	Lt Col Ret David Perez-Meza, MD, FISHRS, and Luis Nader, MD silatcametrec2022@gmail.com
* **OCT 27-29, 2022**	30th World Congress of the ISHRS *Panama City, Panama*	International Society of Hair Restoration Surgery www.ishrs.org	www.30thannual.org

* Meetings that qualify for the ISHRS member educational maintenance requirement

REMINDER

ISHRS full **Members** and **Fellow Members** are required to attend 1 ISHRS-approved meeting every 3 years to maintain their member category.

ISHRS WORLD CONGRESS SCHEDULE

30TH WORLD CONGRESS	31ST WORLD CONGRESS
October 27-29, 2022	Dates to Be Determined, 2023
Panama City	Panama	New Delhi	India

2021–22 Board of Governors

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2021–22 Chairs of Committees

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Surgical Assistants Committee | Laureen Gorham, RN, Co-Chair and Laura Krys, Co-Chair
Ad Hoc Committee on Preceptorships | Anil K. Garg, MBBS, MS, MCh, FISHRS
FUT Guidelines Task Force | Robin Unger, MD
Women in ISHRS Task Force | Aman Dua, MBBS, MD, FISHRS

Global Council of Hair Restoration Surgery Societies

Membership proudly includes:
American Board of Hair Restoration Surgery
American Society of Hair Restoration Surgery
Arab Association of Hair Transplantation
Argentine Society of Hair Recovery
Asian Association of Hair Restoration Surgeons
Association of Hair Restoration Surgeons-India
Australasian Society of Hair Restoration Surgery
Brazilian Society of Hair Restoration Surgery
British Association of Hair Restoration Surgery
China Association of Hair Restoration Surgery
French Society of Hair Restoration Surgery
German Society of Hair Restoration
Hair Restoration Society of Pakistan
Hellenic Academy of Hair Restoration Surgery
Ibero Latin American Society of Hair Transplantation
International Society of Hair Restoration Surgery
Italian Society for Hair Science and Restoration
Japanese Society of Clinical Hair Restoration
Korean Society of Hair Restoration Surgery
Mexican Association of Trichology and Hair Transplantation
Paraguayan Society of Hair Restoration Surgery
Polish Society of Hair Restoration Surgery
Swiss Society for Hair Restoration Surgery
Thai Society of Hair Restoration Surgeons

Editorial Guidelines for Submission and Acceptance of Articles for the *Forum* Publication

1. Articles should be written with the intent of sharing scientific information with the purpose of advancing the art and science of hair restoration and improving patient outcomes.
2. If results are presented, the medical regimen or surgical techniques that were used to obtain the results should be disclosed in detail. If intra-operative or immediate post-operative photos are presented, please submit photos that show results (at least 6 months after surgery) of the procedure being presented.
3. Articles submitted with the sole purpose of promotion or marketing will not be accepted.
4. Authors should acknowledge all funding sources that supported their work as well as any relevant corporate affiliation.
5. Trademarked names should not be used to refer to devices or techniques, when possible.
6. Although we encourage submission of articles that may only contain the author's opinion for the purpose of stimulating thought, the editors may present such articles to colleagues with experience in the area in question for the purpose of obtaining further opinions to be published alongside the original article. Occasionally, a manuscript might be sent to an external reviewer who will judge the manuscript in a blind fashion to make recommendations about its acceptance, further revision, or rejection.
7. Once the manuscript is accepted, it will be published as soon as possible, depending on space availability.
8. All manuscripts should be submitted to **forumeditors@ishrs.org**.
9. An Author Authorization and Release form must be individually completed by every author listed on the byline and the Word document (not a fax) submitted at the time of article submission. The form can be obtained in the Members Only section of the ISHRS website at **www.ishrs.org**. This release is meant to be signed electronically directly in the Word document. Simply open on your computer, fill in the highlighted fields, and return the Word document with your submission.
10. All figures and tables should be sized down to no greater than 6 inches in width and sent as separate attachments to your email.

11-17. For the complete list of instructions and downloadable checklist, go to: **https://ishrs.org/wp-content/uploads/2020/06/ISHRS_Forum_ArticleSubmission_checklist_Fillable.pdf**.

Submission deadlines:
February 5 for March/April 2022 issue
April 5 for May/June 2022 issue
June 5 for July/August 2022 issue

Classified Advertising Guidelines for Submission

To place a Classified Ad in the *Forum*, email cduckler@ishrs.org. In your email, include the text of what you'd like your ad to read. You should include specifics in the ad, such as what you offer, the qualities you're looking for, and how to respond to you.

Classified Ads cost $100 per insertion for up to 75 words. You will be invoiced for each issue in which your ad runs. The *Forum* Advertising Rate Card can be found at the following link:

https://ishrs.org/media/advertising-and-sponsorship/

Submit your Classified Ad to:
cduckler@ishrs.org

Third time's a charm! Join us for our (hopefully) virus-free 30th World Congress in the beautiful country of Panama.

The International Society of Hair Restoration's annual world congress is the most important meeting in the specialty, bringing together the top minds from around the world.

Please mark your calendars and plan to attend. You may want to book a pre- or post-trip in this magnificent part of the world.



ISHRS
30TH WORLD CONGRESS
PANAMA

OCTOBER 27-29, 2022 · WESTIN PLAYA BONITA · PANAMA CITY

SAVE THE DATE

30THANNUAL.ORG



PANAMA FUN FACTS

Panama was the first country outside the United States in which Coca Cola was sold.
Coca Cola was first sold in Panama in 1906.

Panama is the only place in the world where you can see the sun rise on the Pacific and set on the Atlantic.

The first European city on the Pacific Ocean side of the Americas was built in Panama.
On August 15, 1516, Pedro Arias Davila founded the city of Nuestra Señora de la Asuncion in Panama.

The emergence of the Isthmus of Panama contributed to human evolution. Homo sapiens exist because of the change in climate patterns caused by the emergence of the Isthmus of Panama. Without Panama, humans would still live on trees!

The inventor of "Murphy's Law" was born in Panama.
Edward Murphy Jr., best known for the Murphy's law, which is said to state that "anything that can go wrong will go wrong", was born in the Panama Canal Zone in 1918.

The lowest toll ever paid to transit the Panama Canal was 36 cents (equivalent to $5.13 in 2017), by American Richard Halliburton who swam across the isthmus in 1928.

Source: https://www.embassyofpanama.org/fun-facts

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