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FIGURE 1. Sharp needle

HAIR TRANSPLANT FORUM INTERNATIONAL

IN THIS ISSUE

Training Module in Hair Restoration Surgery: A Simple Method for Beginning Physicians and Assistants

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Audience Response System Review— Las Vegas



As the ISHRS celebrates its 25th anniversary, those who were there at the start share their memories pages 73–75. Graft Placement Using the Dull Needle Implanter (DNI) Technique

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INTRODUCTION

Graft implanters were described by Choi in 1992.¹ The instrument was designed to be used with sharp needles (Figure 1), which allows simultaneous site making and placement of FUs, accelerating the implantation process.

Since only the surgeon was allowed to do these incisions, and thus delegation of placement was not possible, this instrument was not incorporated by most teams worldwide.

With the popularization of the follicular unit extraction (FUE) technique, in which the FUs are even more delicate, the advantage of implanters has become more appreciated for its atraumatic placing of the grafts. In the FUE technique, typically the surgeon has the responsibility and the job of harvesting all the FUs. But in combination with a one-step sharp implanter, this can lead to work overload and consequent fatigue for the surgeon. The dull needle implanter (DNI) technique allows a gentle placing of the grafts and permits delegation of placing to the technicians.² The site creation is done by the surgeon and dull graft placing is less traumatic.

It is common for a team to have great resistance to change from a routine that's been in place for years or even decades, such as is the case of using forceps for placement of grafts. It is up to the team leader to show the benefits of change, especially if we are talking about FUs harvested using the FUE technique. In order to make the transition a success for the technicians, it is essential that the physician understands all the advantages of the technique and how to teach the use of implanters.

THE DULL NEEDLE IMPLANTER

Although the use of implanters in premade sites was mentioned and eventually used by some colleagues,^{3,4} its advantages have never been described in detail. In 2016, I published an article in the *Forum* describing nine advantages of the DNI (dull needle implanter) technique.² To these, Dr. Vance Elliot, who commented on the article, added two others. Dr. Robert True, in his Co-editor's Message lead-in to the article, noted the technique "could very well become the preferred method for placing FUE grafts."

The basic difference between the traditional sharp needle implanter and the dull needle implanter is that it is impossible for the latter to pierce the skin. This allows delegating the placement after the creation of pre-

made recipient sites. Because there are currently no implanters

sold with premade dull needles, it is necessary to modify them in an artisanal way.

Diagram of an implanter

Figure 2 shows the parts of an OKT implanter and, in red and blue, the different names used by other companies. FIGURE 2. OKT implanter





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President's Message



Ken Washenik, MD, PhD, FISHRS | Beverly Hills, California, USA | washenik@bosley.com

Dear Colleagues,

Last month, I had the great pleasure of attending HAIRCON 2017 in Ludhiana, India. The meeting, with its "Redefining Limits" theme, was hosted by Kapil and Aman

Dua for the Association of Hair Restoration Surgery–India. It was truly a tremendous success in all aspects. While there, I couldn't help but marvel at yet another impressive educational offering by one of our Global Council colleagues. As we begin our Silver Jubilee year in earnest, I am in awe of the growth in educational content offered or sponsored by the ISHRS and the esteemed member societies of the ISHRS Global Council. Our society has continued to grow at a considerable rate adding over 600 new members over the past 5 years, with approximately 70% of our membership coming from countries other than the United States. The Global Council of the ISHRS now consists of 20 member societies.



In the lead up to the "big one" in Prague and Polanica Zdrój, rich educational offerings, usually with a live surgery component, are being offered by the ISHRS (Orlando Live Surgery Workshop) or members of the Global Council



(Asian Association and Italian, Korean, and Paraguayan societies) almost monthly. Education is firmly entrenched as one of the three pillars of the ISHRS alongside Research and Collegiality. The best example of the ISHRS focus on excellence in education is our continued achievement of Accreditation with Commendation from the Accreditation Council for Continuing Medical Education. I encourage you to use our calendar of educational events in every issue of the *Forum* or visit http:// www.ishrs.org/content/upcoming-events.

On another note, at our recent meeting of the Global Council at the World Congress in Las Vegas, the Global Council member societies expressed a strong sense of unity and passion in the fight against the unlicensed practice of medicine and surgery in hair restoration, worldwide. In addition to the ongoing multi-front battles by our members against this dangerous and divisive precedent, we recently circulated a request to deny as faculty any speaker who is a known advocate of the unlicensed practice of medicine or is an integral part of an organization that is sympathetic or supportive of the unlicensed practice. As you might expect, we have received enthusiastic support of this initiative.

One of the most popular offerings of the ISHRS is our biennial Practice Census Survey. Every two years, we query our membership on a wide variety of hair restoration issues. Shortly, you will be receiving the 2017 ISHRS Practice Census web-based survey. We encourage you to please set aside time to complete this important survey. When more of our members participate, the more reliable the data will be, so, yes, each member makes a difference.

Lastly, I encourage all members to raise your hands and become active in the ISHRS. We know that you have a lot to offer, and the success of our society depends on volun-

teerism. Please go to www.ISHRS. org and review the different committees and educational opportunities available for participation by clicking on the "Physicians: Join Our Community" icon.

You are definitely welcome.

PHYSICIANS: JOIN OUR COMMUNITY

Interested in learning about the benefits of being a part of the ISHRS community?

FIND OUT MORE



Co-editors' Messages



Andreas M. Finner, MD Berlin, Germany forumeditors@ishrs.org

While summer is ending in the southern hemisphere, we are enjoying the first signs of spring in the north. Small flowers appear out of the melting snow, followed by colorful tulips. It is a miracle of

nature just like the growth of hair. But while tulip bulbs are quite robust, hair roots are very sensitive. Great care must be taken when we transplant them.

The use of implanters may be potentially helpful to reduce damage to the follicle. Dull needle implanters eliminate some disadvantages of the stick-and-place technique with sharp implanters. The article by Mauro Speranzini nicely explains how to make sharp implanters dull, and it gives a lot of advice regarding loading and placing as well as sterilizing the instruments. Hopefully, new devices will facilitate these steps. In a comment, my fellow co-editor Bradley Wolf questions the general advantage of implanters. Studies regarding the benefits of dull needle implanters compared to manual placing should be performed in different graft types (FUE, FUT, thick or thin hair diameter). What is your experience?

The interesting study by Dell Castillejos on donor hair density in Asian men can provide a good reference for a preoperative assessment. The maximum yield of grafts also depends on the (suspected) size of the safe donor area, the harvesting method, the FU composition, scalp and hair color, donor hair caliber, curliness, and desired length. It is difficult to predict the point when over-harvesting and thinning will occur. No ultimate formula is available. It still requires a lot of experience to estimate the donor hair supply and predict the cosmetic effect of a procedure in the recipient area. In many cases, it may be wiser to do (several) limited procedures, especially in younger, early-stage patients. What do you think?

Anil Garg describes the way he teaches his assistants using different simple materials. These are certainly helpful tips; I am just wondering where to get that goat skin.

Sara Wasserbauer practices some calculations with us. I always like to look at the donor hair on a video screen together with my patients as we measure density, so they know what we are talking about. But we should educate our patients that it's not just how many grafts, but also how and where we place them. Hair restoration is a three-dimensional work of art.

Last, but not least, we have a Cyberspace Chat from Robin Unger, a Literature Review from Jeff Donovan, and an instructive case of an impossible FUE patient from Marco Barusco.

Please send any type of contribution you may have to forumeditors@ishrs.org. ■



Bradley R. Wolf, MD, FISHRS *Cincinnati, Ohio, USA* forumeditors@ishrs.org

The ISHRS celebrates its 25th anniversary this year. To commemorate this silver jubilee, as well as the first ISHRS conference in Dallas (April 30–May 2, 1993), we will be publishing items in the 2017 issues of the *Forum*. Dow Stough

and Dan Rousso, two of the course directors of that conference, and 1993 ISHRS Board of Directors members Russell Knudsen and Bob Leonard have been gracious enough to recount that first meeting and the events leading up to it. Richard Shiell, who was at all the formative meetings in Dallas, has also been very generous to share his time and amazing memory. As a relative novice, having a little more than two years' experience, I attended that conference. I recall my head spinning after many lectures, especially those on reductions, flaps, and scalp lifts, thinking how is that done! I do remember the line dancing lessons and trying to use the steps (two) at the gala dance. I hope the younger members of our society find the history of our society interesting. If you would like to share your memories of Dallas 1993 or thoughts on the effect of the ISHRS on our field during the last 25 years, please contact us at forumeditors@ishrs.org.

Mauro Speranzini continues to educate us about implanters and their use into premade incisions. The FUE Advancement Committee (FUEAC) is currently conducting an IRB-approved study, "Comparison of the Quality and Survival of Grafts Placed with Implanter and Forceps." The FUEAC invites all ISHRS members who are interested in becoming involved in studies and advancing the science and knowledge base of FUE to contact Dr. James Harris, chair of the FUEAC, at harrisfueac@hsccolorado.com. I look forward to the FUEAC study results.

Prague, the site of our 25th anniversary conference in October, is a wonderful and magical city. It was the cultural center of Europe in the 14th century and is rich in history, architecture, art, and music. Charles University was founded in Prague before America was "discovered" by Columbus! From the Baroque churches of the 17th and 18th centuries, the museum of artist Alphonse Mucha and grave of composer Antonin Dvorak, to the Art Nouveau buildings of the 19th and 20th centuries, there is much to be seen. I would encourage all those attending the conference to either come early or stay after the conference to explore this fascinating city.

In this issue we welcome the Argentine Society, the AARC, to our Global Council. Congratulations to Bruno Szy-ferman and the founding members. Hopefully your society can connect the physicians in Argentina, the way the ISHRS has united physicians throughout the world for the past 25 years.

Notes from the Editor Emeritus, 1996–98



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What a whacko world of late! It seems to be deconstructing all around us. How involved is hair transplantation surgery in this phenomenon? From my perspective, it too is deconstructing from a medical specialty with its innate,

centuries-old set of ethics into a practice that focuses upon outcomes that serve business interests, both those of the equipment manufacturers as well as those at the practitioner's level. This is where the ISHRS plays a crucial role. But where to start? How about defining the problems and

then looking at solutions and roles that the ISHRS has played or could play?

So much of the dialogue that goes on today seems to be about surgical details of follicular unit extraction (FUE) and these details seem to overlook and to accept as "no problem" some underlying I am proud of my association with the ISHRS for its trying to maintain its original mission of teaching and the free exchange of ideas while realizing a need to keep ourselves focused on the ethics of medicine.

issues so that I am forced to ask, "What does FUE have in common with climate change denial?"

The bottom line answer to this question, in my humble opinion, is that each requires the adherent to focus on science and opinion that supports his/her position while overlooking science and the associated questions raised that run counter to the belief. Many issues, as you will see below, require only simple common sense, and it seems that they should be maximally utilized along with, if not before, trying to achieve the same goals of more hair growth by applying advanced levels of science such as using ACell, ATP, PRP, stem cells, bimatoprost, lasers, etc.

Some issues include:

- · Best technique of harvesting donor for optimal yield
- Graft quality and transection
- Vascular damage

And other issues such as:

- Patient informed consent
- Can a surgeon give all his patients the procedure needed without offering both strip harvesting and FUT?

BEST TECHNIQUE OF HARVESTING FOR OPTIMAL YIELD

Back in the nineties, Dr. Jim Arnold, one of the pioneers of our specialty, gave a presentation at the ISHRS scientific assembly calling the strip harvest a "mini reduction of alopecic scalp." He stated the obvious, but not previously described (which was a style of his), that taking a strip of hair from the donor included taking out the interfollicular alopecic skin as well as the follicle. What was placed back in the recipient area was only the hair without the bald interfollicular skin, hence the "scalp reduction." (This benefit has to be tempered by the fact that the strip generates a scar and once the "virgin laxity" is removed, the partial stretchback that Dr. Michael Beehner has described with scalp reduction of about 40% will subtract from the Arnold benefit.) This principle, as it applies to the FUE harvesting of donor hair, means that with FUE, only hair is removed from the donor leaving behind the bald interfollicular skin that would have been removed with the strip harvest. This seems strongly to imply that there will be a more rapid depletion of donor hair if its end point is the minimum density that allows (a poorly defined) styling flexibility.

> Optimal yield is also stunted, according to my unapologetically simplistic thinking, by limitations imposed by the density step-off that will occur between the whole width of a maximum harvest of the "safe zone" and the adjacent "unsafe zone." The solution

is either grafting a tapering, submaximal density within the "safe zone" or into the adjacent "unsafe" areas as has been described as an approach by FUE advocates who cite that only a low percentage of patients will suffer the embarrassing consequences of scar exposure with progressive balding in the future. I suppose this is acceptable as long as the patient is adequately informed. With patient consent, I would put this latter approach in the category with transplanting a 19-year-old's vertex or giving him a Norwood II hairline; his desperation, typical of a young person, makes the wisdom of his consent questionable.

GRAFT QUALITY AND TRANSECTIONS

I refer you to the Unger and Shapiro text for numerous studies that need to be refuted before being comfortable with the skinny or transected grafts that FUE can produce. How has the FUE adherent become so comfortable with these studies that show decreased or miniaturized growth? I am not aware that studies refuting these concerns have been performed. Additionally, the transection rates that are tolerated with FUE are percentages that sank the multi-bladed knife harvest years ago. It seems objectivity is being applied inconsistently. The limitations imposed by the hair mass offered by the safe donor have always been a major limitation to our ability to treat alopecia. Are patients fully aware of this likely "follicular holocaust" that can occur with FUE?

This concern aside, the inherent individual variation in graft quality that results in, for example, skeletonized grafts or high transection rates, begs the question of whether a hair transplant surgeon can practice ethically without also offering strip excision or, at least, having consent signed that the procedure will not proceed if such problems arise. (How much transection during FUE is acceptable if strip excision transection approaches zero?)

VASCULAR DAMAGE

The total incising with a 2,000-graft case is approximately 50cm for a 24cm strip versus about 569cm for 2,000 FUEs with a 0.9mm punch. Admittedly, the depth of the punch varies significantly with different FUE techniques (some could be deeper than a strip; some, less) so that it is hard to know how to compare FUE with strip excision. But what a huge difference in total wounding and who knows what the impact is on donor vasculature after multiple procedures magnify this difference yet further. Does the ischemia produced with this wounding decrease donor density yet further? Nobody knows.

Over the years, I have repeatedly asked various ISHRS Board members why the ISHRS doesn't stand for certain standards of quality from its members. Not unreasonably at the time, the response was that the ISHRS's purpose is education and that adopting standards of performance would alienate and create internal dissent that would adversely impact the exchange of ideas. This seems true, yet now is a time when one hears of businessmen running mills in countries overseas and, even in the United States, businessmen are allegedly setting up mills with multiple operating rooms and 20 or more technicians and poor medical supervision. If the businesses selling the FUE machines were to police themselves and the gualifications of their clients, there would be no problem. After all, one of the business models charges on a per graft basis and, therefore, has to stay in touch with its clients. However, such rarely seems to be the policy of the business culture, and that brings us once again to the importance of the ISHRS to stand as the institution representing the physician-patient relationship and what the related ethics should be. So, clearly, times are different from the founding of our society. Perhaps the ISHRS should also sanction the medical device companies who don't mind selling their weapons indiscriminately as well and not permit them to sell at our meetings.

I am proud of my association with the ISHRS for its trying to maintain its original mission of teaching and the free exchange of ideas while realizing a need to keep ourselves focused on the ethics of medicine. For the former, I congratulate their open-mindedness in trying to objectify FUE with various, multicenter studies with their FUE Advancement Committee on which sit many of the most sophisticated practitioners of the procedure. For the latter, establishing standards of ethics, I congratulate them for having come up with, and having as a requirement for membership, standards for ethical marketing and having members agree that unqualified personnel will not be performing the procedure in their practices. They should promote these superior qualities of their members more forcefully to the various social media centers that advocate for and communicate with large numbers of the balding population as these policies reflect high underlying principles.

Finally, how do we agree that a physician has shown sufficient commitment to being a quality HT surgeon when he or she opens up for business down the road? All of us at some point struggled with this issue in our own pursuit and options available varied considerably. Fellowships are not realistically going to provide a solution both for the number of physicians that could be produced as well as the real-world considerations of traveling away from one's base to an unpaid position elsewhere. It would seem that the ISHRS's offerings of its Basic Course, Advanced Course, an FUE course, and perhaps a hairline course, which would require attending several meetings, could indicate an intent, and formalizing this as a policy (with qualifications) would be a welcoming gesture to newcomers, the practitioners of tomorrow.

I should mention, in closing, that there are many technicians who have more ability and concern for the patient than most doctors, and I am indebted for what they have taught me. You know who you are. Nevertheless, to protect patients from the greed of some business-minded entrepreneurs, keeping this surgical procedure tightly under the auspices of a degreed medical practitioner is important, in my humble opinion, for reasons stated above. Unfortunately, a medical degree is far from a perfect filter for protecting the patient's well-being and this is where the ISHRS should step up to be an institution that stands for such quality, and I applaud its efforts to this point. Keep on striving for the high ground!



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Controversies

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The Explosion of PRP

In the last issue of the *Forum*, Dr. Nicole Roger's Literature Review column (2017; 27(1):21) examined two contrasting papers regarding

the success or failure of platelet-rich plasma (PRP) as an ancillary medical treatment: one for female androgenetic alopecia (failure to produce hair thickening) and the other as an ancillary intraoperative treatment of male balding (success in accelerating post-op growth in the recipient area). This highlights the confusing state of affairs regarding the proper place of PRP in our arsenal of treatment options.

Let's face it, PRP is not a new mode of treatment. I have personally heard lectures on this topic for at least eight years with most speakers hesitating to assign growth-promoting properties to it whilst happily stating its wound healing effects. This doesn't invalidate its potential because one of the main problems we have is lack of standardisation in such areas as type of centrifuge used, technique of preparation, concentration of platelets achieved, activation or non-activation and use of additives. In addition, where might it be most effective? A medical option for early thinning or an intraoperative ancillary treatment as described in the review of the Garg article (Garg, S. Outcome of intra-operative platelet-rich plasma during follicular unit extraction of hair transplant. A prospective randomized study in 40 patients. *J Cutan Aesthetic Surg.* 2016; 9:157-164)?

The explosion of the use of PRP reminds me of the original explosion of devices related to low level laser therapy (LLLT). In my opinion, once again the marketers (device manufacturers in particular, as well as physicians or non-physicians) have talked up the therapeutic potential well before credible scientific proof has been presented. It represents, like LLLT, a significant challenge because it enables the huge number of non-medical "hair loss clinics" around the world an opportunity to provide a "cutting edge" technology not requiring the presence, or even involvement, of a physician.

Within our ISHRS fraternity there are many who will not yet provide PRP (including me) who await a better standardised protocol with credible clinical proof of concept. Many others already offer this, and we certainly have mostly anecdotal reports of improved outcomes. I encourage the physicians who offer PRP to continue to carefully study the effects with some type of metric to accurately assess results (e.g., HairCheck device). We also need more physicians to present their findings at meetings or to submit articles to publish in the *Forum*.

The difficult question arises though of how, or whether, to charge for this treatment as an ancillary "add on" to our current medical treatment protocol or to our surgical protocol. Some physicians seem to offer a "shopping list" of ancillary treatments, such as PRP and ACell, and patients get to choose what they want added to their surgery with each of these ancillary treatments individually charged as an extra. That is certainly a reasonable approach if the physician carefully explains the rationale for use and the current level of evidence so patients can make informed decisions.

The whole matter is obviously complicated by the explosion of internet marketing of ancillary treatments with many patients desperate for anything that might improve their hair coverage. Nonetheless, the poor reputation of the "hair loss industry" was earned by the unfettered offering of multitudes of unproven remedies. We need to be careful that physician hair loss clinics do not go down the same path. It is worth remembering you can only lose your credibility once.



CONTINUED FROM FRONT PAGE

How to turn a sharp needle into a cannula

For this, we use 600- or 400-gram sandpaper, but smaller (coarser) weights can also be used. Another option is a sandstone. The process takes less than one minute (Video 1). The needle loses the ability to pierce and acts as a cannula. After proper washing and sterilization, it can be reused indefinitely (Figure 3, left and center).



Note: Simply mentioning the reuse of a needle causes astonishment and fear of the risk of transmission of infectious diseases. In reality, sanding the needle (piercing-cutting instrument) transforms it into a cannula (non-cutting steel tube). The use of a cannula is a traditional practice in plastic surgery, both in filling procedures and in endoscopic surgeries. Likewise, sterilization care should be equally rigorous (see "How to Clean the Implanter" below).

That said, if the physician still does not feel comfortable with reusing dull needles, the same benefits of the technique can be accomplished with disposable ones. To do this, simply sand them exclusively for a single procedure and throw them away at the end of the operation. Sanding can be done prior to the surgery, followed by sterilization. It can also be done during surgery, with new sterile needles if a piece of sterile sandpaper or sandstone is available.

HOW TO MODIFY THE DULL NEEDLE FOR EASY LOADING

Implanters were designed to be loaded by pulling the FU by the shaft through the needle channel. For this, the channel is wide enough just for the passage of the hair (Video 2).

Another way to load the implanter is by pulling the epidermis through the channel (Video 5). This allows the surgeon to verify that the implanter has been loaded correctly, with the concave portion facing forward. If it is not in the correct position, it is possible to rotate

the implanter until it can be withdrawn with the FU in the ideal position. The out-of-channel epidermis also helps prevent the FU from being introduced too deeply, burying it below the skin level. To facilitate the passage of the epidermis through the channel, we described a modification that makes loading faster and less traumatic. Although the

Lion implanter has a wider channel than other brands, it is advisable to widen it mechanically, too. Two different tools can be used:

- 1. A very fine tipped diamond drill widens only the top of the channel at the proximal edge of the bevel (Video 1).
- 2. The second, more efficient way broadens the channel more extensively. With 5× magnification loupe, we use a 2mm-thick diamond disc.

The sanding of the needle tip and the widening of the channel needs to be performed only once (Figure 3, right). This cannula can then be reused during hundreds of surgeries. After it is modified, it is not necessary to change it unless it gets damaged by accidental falling.

IMPLANTER CHOICE

1. Diameters

Implanters are sold with sharp needles (Figure 1). For each needle size, there is a specific deployer. Each manufacturer has criteria to differentiate one size from the other, usually with specific colors in some parts of the instrument or with inscriptions or drawings (Figure 4).

FIGURE 4. left to right: Hwang; KNU; Lion; OKT; Rainbow; Smart; Keep; Shiao



It is advisable to have several different diameters available, because the size of the FUs varies from case to case. In follicular unit strip dissection (FUT), there is usually greater variation in size than in FUE, where the grafts sizes are more uniform.

The table below lists available sizes from different brands.

Implanter Company				Sizes (mm)							
Hwang	Hwang	0.60	0.70	0.80	0.90	1.00	1.10	1.20			
KNU	Medisol	0.60		0.80		1.00		1.20			
Lion	Hans Biomed	0.64		0.80		1.00					
окт	Chois Instruments	0.64		0.80	0.90	1.00	1.15	1.25			
Rainbow	Seson Medical	0.60	0.70	0.80	0.90	1.00	1.10	1.20			
Smart	J&C Corp.	0.65		0.80		1.00			1.30	1.50	1.80
Кеер				0.80	0.90						
Shiao	Shiao Implanters				0.90		1.10				

2. Implanter durability

In the traditional use of sharpened needle implanters, the ability to repeatedly pierce the skin is critical, however, in the DNI technique, this is irrelevant; any brand of implanter can be used.

3. Lightness, ease of handling, assembly, and cleaning

The ideal implanter is one that is light, will not slip between the fingers, and has parts that glide smoothly. It should not be too thin or too thick. Ideally, it should allow a grip similar to that of a good pen. The ideal implanter should have as few parts as possible. Quick assembly and disassembly make it easier to prepare for the next surgery.

For cleaning, consider the following:

- There are devices for sterilization with ethylene oxide for use in offices. When they are not available, it is necessary to send them to specialized companies, making it difficult to use them daily because of the delay and the need to have a greater number of implanters.
- Immersion in bactericidal solutions for sterilization is of questionable efficiency and is prohibited in some countries.
- Autoclaving is efficient, quick, and easy to access in any office. Its major drawback is that it can affect the life of the implanter. It is essential to follow the autoclave manual and choose the correct cycle for plastic materials (implanter body) and a longer one for metal parts (spring, staff, and needle).

The ideal implanter should remain intact even after hundreds of autoclaving cycles. The Lion implanter is made of tough, non-deforming plastic material, holding up after repeated autoclaving cycles. On the other hand, both the needle and the staff have both steel and plastic parts, which come apart and need to be glued from time to time (see below, "How to Fix Implanters"). In contrast the OKT (Chois Instruments) implanter needle and staff remain intact after hundreds of autoclaving cycles. Although the body in the older models bent in the first sterilizations (see below, "How to Fix Implanters"), the latest generation is stronger and better supports the autoclaving process.

4. Visual and tactile references that make it easy to identify the position of the needle channel

The ease of locating the position of the needle channel is important because the time between grasping the implanter and placing should be short. In the Lion implanter, the clip permits positioning the pen both by touch and visualization. In the OKT implanter, the position of the channel must be determined solely by visualization. Some brands have no signs and only direct channel viewing is done (Figure 4).

HOW TO STORE AND CLASSIFY FUs

In order to avoid too much time out of the body, we routinely harvest only a few hundred FUs to sort and store them. They are kept chilled at a temperature of 4° Celsius. Each team has a routine. We have developed a Graft Organizer Board (Figure 5) with the following characteristics (Video 3):

- Board of plastic material suitable for autoclaving. There are four lines of slots. Each line has 15 slots and each slot stores 10 grafts, totaling 150 FUs per line. The board stores up to 600 FUs.
- As the FUs are harvested from the donor area, they are inspected under the microscope. They are stored in the slots in groups of 10 FUs. Grafts are classified as 1-, 2-,



and 3-hair grafts. Transected hairs are trimmed away and excess skin is removed in singles. In specific slots, we put FUs with the same number of hairs.

Three main advantages of organizing grafts in this board include the following:

- 1. Grafts are parallel, which facilitates graft removal, placement on the glove, and loading of the implanters.
- 2. A number greater than 10 could expose the FUs to excessive dryness. A number less than 10 would increase the interruptions to get more FUs from the board. A fixed number creates a routine and speeds up the process.
- 3. Just looking at the board and counting the number of slots filled with FUs allow you to know the exact number of remaining grafts. This same count would take several minutes if the FUs were scattered in the petri dish.

(Note: The Graft Organizer Board is made in Brazil by Rhosse Instrumentos e Equipamentos Cirúrgicos LTDA, www.rhosse.com.br. The author has no conflict of interest.)

HOW TO CHOOSE THE DIAMETER OF THE IMPLANTER NEEDLE

The smallest possible diameter should be chosen. In this way, unnecessary trauma is avoided in the recipient area and the highest possible density is achieved. The choice is made by testing different diameters, case by case. In FUE harvesting, there is a greater uniformity in size, making the choice easier:

- 0.64mm implanter/premade sites of 0.5mm (coronal or sagittal).⁵ General application: singles in the hairline, with partial removal of the epidermis. We prefer coronal incisions, but it can also be used in sagittal. In eyebrow transplantation, the incisions are necessarily coronal.
- 0.8mm implanter/premade sites of 0.7mm. General application: beard transplantation. The punches used for harvesting the FUs are usually 0.7-0.8mm in diameter. When we transplant beard hairs into the face, we prefer coronal incisions, since they allow very sharp angle incisions. For beard hair transplanted into the scalp, both coronal and sagittal incisions can be used.
- 0.9mm implanter/premade sites of 0.75-0.8mm. General application: scalp transplantation. The punches used for harvesting the FUs are usually 0.9-1mm in diameter. They can be used in both coronal and sagittal incisions.

- *1mm implanter/premade sites of 0.80 or 0.85mm.* General application: for coarse hair and FUs with many shafts. The punches used for harvesting the FUs are usually 1-1.1mm in diameter. They can be used in both coronal and sagittal incisions.
- 1.15mm implanter/premade sites of 0.90 or 0.95mm. General application: coarse hair and FUs with many shafts. The punches used for harvesting the FUs are usually 1-1.1mm in diameter. They can be used in both coronal and sagittal incisions.

HOW TO ADJUST THE NEEDLE LENGTH



In every surgery, it is necessary to adjust the length of the needle according to the length (average) of the graft (Figure 6). With a short needle, the graft does not fit, and with a needle that is too long, the trauma is increased (Video 4) while increasing the chance of burying the FUs. The consequence of this is the formation of cysts in the postoperative period and poor growth.

The same adjustment is made in all implanters. Each brand has its own mechanism to adjust the length. This is usually done by rotating the parts. Among the implanters tested (Hwang, KNU, Lion, OKT, Rainbow, Smart), only the OKT additionally allows an

adjustment in the length of the body. Other manufacturers have fixed body length.

LOADING THE IMPLANTER

The Graft Organizer Board stands on the table. Two technicians are usually in charge of loading the implanters. According to preference, they can stand or sit (Figure 7). If the





placement is faster than the loading, a third technician should be added (Video 6).

Although many do this with the naked eye, it is recommended that you use loupes with a magnification of 2.5-4.5×. There is often an initial resistance to using this equip-

ment. Proper education will show the benefits of better visualization. Our preference is 4.5× loupe and LED light.

Straight forceps are used to load the implanters. With this forceps, the operator grasps 10 FUs of each slot and places them on the glove of the left hand (for right-handed tech-

nician) (Figure 8). Each technician loads 10 to 20 FUs per minute. Thus, no graft is out of the storage solution for more than 1 minute. A partition separates the loaded implanters from the unloaded ones.

A right-handed technician places the FUs on the glove with the concave side (sebaceous gland side) facing up or left (up or right for a left-handed technician).

FIGURE 8. Loading the implanter with forceps



Grafts are grasped by the dermis, above the sebaceous gland, and should be carried with the concavity facing outwards and convexity inward. The epidermis is kept out of the channel and the follicle should be positioned at the level the channel starts, to prevent it from leaving at the time of implantation (Figure 9).

If the identification of the concave and convex sides is difficult (very straight hair), the visualization of the sebaceous gland defines the concave side. In the same way, FIGURE 9. The sebaceous gland is visible. Epidermis is kept out of the channel.



the epidermis is visible on the convex side (Video 5). This differentiation is crucial for correct loading and placement with the FU correctly directed.⁶

HOW TO GET IMPLANTERS

The placer can pick up the loaded implanters directly from the instrument table (Dr. José Lorenzo's technique) or a third technician can be used (Figure 7), which mediates the doctor's delivery to the instrument table and vice versa (Dr. Jae Hyun Park's technique).⁸ In this case, the technician removes the empty implanter from the placer's hand and places it back on the table while using the other hand to deliver the loaded implanter (Video 6).⁹ With this routine, it is possible to place 15 FUs (most difficult cases) to 28 FUs per minute (easy cases). Whatever the technique, the loaded implanter should always be placed on the table in the same position.

HOW TO PLACE FUs

In the DNI technique, the incisions are premade with needles or chisel blades (our preference). Premade sites are defined by the size, density, direction, angle, and depth.^{10,11}

It is the responsibility of the placer to rotate the graft so the hair grows in the correct direction. For this, it is crucial that the implanter loading is done correctly (Video 5):

• **Coronal incisions:** With the bevel facing down, the needle is inserted into the site. When the epidermis of the FU is at the level of the epidermis of the scalp (or discretely above this), we press the plunger to inject the graft. Simultaneously, the implanter is pulled out. (See Figure 10.)

FIGURE 10. Graft is placed into a coronal incision.



• Sagittal incisions: If the right-handed surgeon stands behind or on the patient's side, the needle bevel is inserted into the premade site parallel to it (with the channel facing left). At this point, we check if the implanter has loaded correctly. While inserting the needle into the site, we rotate the implanter 90 degrees clockwise to position the bevel forwards and downwards and thus prevent the bulb from leaving the implanter. With the concavity forward, we push the staff until the epidermis is at or slightly above the epidermis of the scalp. When the implanter is pulled out, we check if the FU was placed in the correct depth. Any adjustment can be made with the tip of the needle and in some cases with forceps. If the



implanter is improperly loaded, after entering the site as described above, the needle must be rotated until the FU is in the right position. If the convexity is facing the channel (180-degree error), instead of turning the needle 90 degrees forward, we turn it in the opposite direction (counter-clockwise). (See Figure 11.)

HOW TO CLEAN THE IMPLANTER

At the end of the surgery, the implanters are completely dissembled and placed in a germicidal solution (Video 7). Caution should be taken so that parts of different implanters are not mixed. Some parts are not compatible depending on the size of the needles. They are left in solution for some minutes or until the following day for better penetration of the liquid. The parts are brushed individually. Special attention is given to the needles. The staff itself is used to unclog the inside of the needle, thereby removing blood or tissue debris. We also use a 10cc syringe to inject the solution into the needle for further cleaning.

After rinsing under running water, the parts are placed in the ultrasonic washer for the time recommended by the manual. Although unnecessary, we repeat the ultrasonic cleaning cycle to ensure further cleaning of the material.

The parts are again washed in running water and dried one by one with a cloth. We complete the drying with an air compressor. We set up the implanter without the needle, spring, and staff. Because they contain metal parts, we sterilize them separately using a longer cycle and at a higher temperature.

HOW TO STERILIZE THE IMPLANTER

The sterilization can be done with ethylene oxide, autoclave, or cold sterilization solutions (Video 8). Acceptable forms depend on the health legislation of each country. In our clinic, we use autoclaving for ease, speed, and safety. The major drawback of autoclaving is the risk of compromising the implanter functioning. We set up the implanter without the needle, staff, and spring. We sterilize the plastic

parts with the corresponding cycle according to the autoclave manual. The steel parts (needle, staff, and spring) are sterilized in the longer cycle along with other metal instruments (Figure 12).

The plastic bodies of the implanter are placed in a multiperforated box with a silicone surface that avoids direct contact with steel parts, which could heat up and render the instrument unusable (Figure 13).



FIGURE 13. Implanters in box with silicone surface to be sterilized.



HOW TO FIX IMPLANTERS

The heat from the autoclave can deform the implanters and lead to the detachment of some parts. The following describes the required maintenance on two different brands of implanters.

Lion implanter. The implanter itself resists autoclaving without deforming. But both the needle and the body have steel and plastic parts. After a few cycles, these parts fall off and need to be glued with "Superbonder." It is essential to glue the parts together by comparing them with the intact originals so that they are perfect. Attention should be paid to the position of the needle channel relative to the plastic part. After a few additional cycles of autoclaving, there may

be another detachment and it can be necessary to repeat the bonding (Video 9).

OKT implanter: Its advantage lies in the fact that both the needle and the body are non-detachable, maintenance-free steel parts. The old implanter deformed with the heat and it used to be necessary to sand some parts. The latest generation is heat resistant, requiring no maintenance (Video 10).

HOW TO ASSEMBLE AND DISASSEMBLE IMPLANTERS

The videos below show how to assemble implanters from different companies:

https://youtu.be/oUPcqjXUVRM KNU implanter (Medisol)

https://youtu.be/8TxruXXILs8 Rainbow Hair Implanter (Seson Medical) https://youtu.be/4xyu6A47KjY Lion implanter (Hansbiomed) https://youtu.be/WgI1GB9rpB4 and https://youtu.be/VHRS340YGsQ

Hwang implanter

VIDEO LIST

Video 1: "Modifying an implanter needle" https://1drv.ms/v/s!Ag3YBmWGIji_gatwNDY6jU85-VkFNA Video 2: "Loading the implanter" https://1drv.ms/v/s!Ag3YBmWGIji_gatvXf37nnN0Jq_A0w Video 3: "Graft Organizer Board" https://1drv.ms/v/s!Ag3YBmWGIji_gatyNaQE3PQFAsqMuA Video 4: "How to adjust the length of the needle" https://1drv.ms/v/s!Ag3YBmWGIji_gatx6pGRfVf9TKPgVQ Video 5: "How to load implanters and how to place grafts into coronal and sagittal incisions" https://1drv.ms/v/s!Ag3YBmWGIji_gat0-K7aLssJJbAORw Video 6: "Team layout in the operating room" https://1drv.ms/v/s!Ag3YBmWGIji_gatzGyLdfPy8JLMwZg Video 7: "How to Clean the Implanter" https://1drv.ms/v/s!Ag3YBmWGIji_gat3grPNE19_zZwIEQ Video 8: "How to sterilize the implanter" https://1drv.ms/v/s!Ag3YBmWGIji_gat2ip6H2-i2FAWORw Video 9: "How to repair the needle after autoclaving" https://1drv.ms/v/s!Ag3YBmWGlji_gat1LT3A8ql-TCWwnA Video 10: "How to fix a bended implanter" https://1drv.ms/v/s!Ag3YBmWGIji_gat4-3QxCU0Ocj0dyg

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Editor's note from Dr. Wolf:

Implanters have been given new life when dulled and used to place FUE grafts into premade incisions. While the concept is alluring, there have been no studies that prove their superiority by comparing growth in side-by-side (forceps vs. implanter) clinical trials. A rosy picture is painted by their adherents. Dr. Antonio Ruston, in a recent Cyberspace Chat, wrote: "Implanters cause less trauma than forceps—this is a fact."¹ Until proven, I disagree. It depends on the situation and experience of the placer. In this same column, Dr. Speranzini noted that by using an implanter, he can place a 4-hair graft into a coronal incision as small as 0.75mm in width.² While this may be possible, I have seen unsightly compression when grafts are forced into incisions made too small.

Ahmad et al. have concerns about using implanters, including trimming grafts closely so they can be placed into implanters whose diameters are as small as 0.60mm.³ Studies have shown chubbier grafts have a better survival rate. They are also concerned about the potential desiccation of "skinny" grafts and the risk of trauma to grafts during loading, placement, and twisting to adjust their angle of exit after placement.

In the same chat, Dr. Speranzini stated: "Placing the grafts is just a technical task."2 I take exception to this statement having personally placed millions of FUT and FUE grafts using forceps and consider graft placing a rate-limiting step in the surgical process. Placing is as important as donor harvesting. Implanters may make placing faster and more delegatable, but whoever does it and whatever method or tool is used, placing is a craft that takes experience to be performed at the highest levels. I assess every follicle in every graft with 4.5× magnification and place the highest quality grafts in areas of highest cosmetic priority (differential graft placement). Some grafts are rejected, others are placed in areas of lesser importance. When using implanters, this inspection can't be done. Grafts are blindly placed into implanters and then into the scalp. I've tried implanters, but for the above reasons, not extensively.

Dr. Speranzini's above article is an excellent "how to" for those contemplating the use of implanters. I look forward to a healthy debate in the future. It is important to determine not the fastest or easiest path, but the one that produces the highest quality results for our patients.

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Training Module in Hair Restoration Surgery: A Simple Method for Beginning Physicians and Assistants

Anil Kumar Garg, MS, MCh, Seema Garg MBBS, MSc I Indore, India I anilgarg61@yahoo.com

Demand for hair transplant surgery is increasing. Hair transplant centres are popping up all over the world. There are very few training centres and fellowship programs across the world to fill the need for training of assistants and technicians.

This author has developed an effective, user friendly, economical model that can be used to learn and practice all steps of hair transplantation. Materials required for this training model are readily available and include such items as foam, money plant leaf (a thick leaf), simple stitching black thread, needles, and wooden spatulas (tongue depressors). In addition, for the second stage of this model, you will need goat skin and a helmet.

MICROSURGERY POSITION

The process of hair transplantation is microsurgery. Therefore, all basic principles of microsurgery should be followed, such as proper magnification, proper position of the surgeon/assistant, use of high-quality instruments, and proper hand movements (Figure 1).

FIGURE 1. Top photos show the microsurgery position; bottom photos show how forearm should rest on dissection table.



The surgeon or assistant should be positioned so that all body joints are in a functional position. The feet should rest on the floor with leg to thigh at a 90° angle, the spine should be straight and supported, the forearm should rest on the dissection table, and all movement should be at the wrist. This position allows the surgeon or assistant to

work for a longer period; incorrect or poor posture invites early fatigue and can affect performance and efficiency.

PAPER MODEL Training of movements at the

Training of movements at the wrist

The microsurgery position allows the surgeon to move only at the wrist. Follicle dissection requires movements at the wrist in a forward/backward direction, while slivering and implantation require a downward/upward movement. No side-to-side movements are required during the hair transplant process. To learn and practice, start by drawing a straight line on paper and be sure to have magnification, preferably 6× magnification.

Next, make small rectangle/square boxes on paper. While

maintaining the microsurgery position, ask an assistant to make straight parallel equidistance lines in the boxes (Figure 2). The assistant can practice without magnification to start, and then can practice under magnification. The assistant should complete 15 sheets under magnification.

FIGURE 2. Making straight equidistance parallel lines (*left*) and the final practice sheet (*right*).



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FOAM MODEL Strip harvesting

This next model is meant to train how to hold a scalpel, which part of the blade is needed in strip harvesting, and how to raise a strip while dissecting in one plane of tissue (Figure 3).

The material you will need includes an 8×10cm-long, 2- to 3cm-thick high-density foam piece, a wooden platform, a marking pen, a scalpel, and toothed forceps.

To begin, fix foam on the wooden platform or any table. Mark the strip area with skin marking pen. Hold the scalpel in dominant hand in pen holding position. Keeping the sharp edge of the scalpel almost parallel to surface of foam, make a partial-thickness cut over the marking. The depth of incision should be the same all around; this is only possible when you apply equal pressure over the scalpel. The direction of the incision should be slightly oblique, because hair direction in the scalp is oblique, so it is important to follow the direction of the hair follicle.

Next, use the toothed forceps to hold one end of the strip. Pull up

the strip and cut underneath with the scalpel, taking care to cut in the same plane, and harvest a uniform thickness of the foam strip. Practice this multiple times; try to achieve uniform thickness and stay in the same plane of the foam.

FIGURE 3. The steps of strip harvesting: (*top to bottom*) foam with marking; scalpel in pen holding position; incision; strip harvesting; harvested strip. Harvested strip should be of uniform thickness.



Slivering

After strip harvesting, slivering is the next step. This is divided into two steps. First, the scalpel is moved in an up and down direction while making thin slices in the foam. Slivering is practiced on a foam strip woven with thread. Black thread with a knot symbolizes the graft. During this action, the thread should not be cut.

To practice slivering, you will need a 2- to 3-cm-thick piece of foam, black stitching thread, sewing needles, and skin marker.

To start, cut small pieces of foam 1cm thick, 2cm wide, and 7-10cm long. Using the skin marker, make multiple straight parallel lines 2-3mm apart on the surface of the foam. Now this foam piece is like a sliver and marked lines are rows of hair follicles (Figure 4). Affix this foam sliver to a wooden spatula using needles. Start slivering with a finetoothed forceps in the non-dominant hand and a scalpel in

FIGURE 4. Foam strip (*top*) shows markings for rows of hair; foam sliver (*bottom*) markings indicate rows of hair.



FIGURE 5. Thread woven foam strip (top and middle) and foam sliver (bottom).



dominant hand. Using the forceps, catch the upper edge of foam sliver and cut in between two lines straight from the top surface of the foam to the bottom. While the scalpel is cutting, pull the foam sliver outside and slightly upward so there is increased gap between two rows. Finally, cut very thin, equal, and uniform slices of foam.

Next, use the black stitching thread to symbolize a hair follicle, with a single knot of thread as an indicator of a hair bulb. Using a needle, sew multiple threads in rows on a foam strip, with a knot on the underside; leave small, free ends of threads on the other side as shown in the figure. Now start slivering, as explained in step one, taking care to not cut the thread and its knot.

LEAF MODEL Follicle dissection

For this step, you will need a thick plant leaf, such as the leaf of a money plant

(Epipremnum Aureum). These leafs are thick and the texture is similar to normal skin. In addition, you will also need a lead pen (simple writing pen), scalpel, forceps, and magnification.

Method

Take a 2cm× 5cm piece of thick leaf and make markings of 10mm-long parallel lines in the centre of the leaf. These lines are symbols of follicles. Start follicle dissection under the

microscope or magnification that you or your assistant is going to use (Figure 6). The assistant should make cuts in between two lines and make small pieces of leaf having a line in the centre of each piece. The line represents the hair and hair bulb, and the



leaf part is peri-follicle tissue. During this step, also practice coordination of the scalpel and forceps. Any indentation of

the forceps over the leaf surface is a warning that the grip of the forceps should be softer so as to avoid crushing the follicle. The assistant should at least cut 100 plant slivers (Figure 7).



Implantation

Both the stick-and-place and slit methods of implantation can be practiced using the thick plant leaf, a wooden spatula, a slit making knife, needles, black thread, and diluted adhesive solution (e.g., Fevicol solution, which is a synthetic resin adhesive).

To begin, take multiple pieces of leaf of equal length and widths and put them one over the other so you have a multiple-layer-thick leaf bed. Next, affix them to a wooden spatula. The number of leaves depends on the thickness of the single leaf. To be similar to scalp, use approximately an 8- to 10mm-thick layer of leaf bed. Now, make the follicle using black thread. Immerse a black thread in diluted solution of adhesive solution and dry it. This will make the thread stiff and you can cut it into multiple 8mm-long pieces.

Your thread follicles are ready to implant. Make multiple slits in the leaf bed (leaf scalp) using either a needle or slit knife blade. For implantation, you can use two forceps or one forceps and one needle. Dilate the slit using one forceps and implant thread pieces into it. This is the slit method (Figures 8 and 9).

To do the stick-and-place technique, insert the needle in the leaf model of scalp 3-4mm deep and implant thread by sliding it in the bevel portion of the needle (Figures 10 and 11).

FIGURE 8. Preparing thread follicles and leaf scalp. Multiple leaf strips are put over each other to make it as thick as scalp.



FIGURE 9. Premade slit and implantation of thread follicles in premade slits using two forceps. Slits were made using a needle.



FIGURE 10. Stick-and-place technique used for implantation of thread follicles on "leaf scalp" using needle and forceps.



FIGURE 11. Final appearance



GOAT MODEL

Goat skin is a very versatile model upon which to practice before starting on human skin. It is readily available and inexpensive. Practicing on goat skin gives you the feel of human skin but will save a lot of human follicles. The goat follicles are shorter and have higher density than human follicles, but this is actually an advantage when practicing. Human follicles are most precious. Damage to follicles causes permanent loss of those follicles, which are limited and not reproducible. So practice, practice, practice to achieve zero transection of human follicles.

Material

Use fresh black goat skin: 2cm×10cm (Figure 12). To prepare the goat skin for slivering practice, clean the skin with tap water, shave it, and then clean it again with tap water.

FIGURE 12. Fresh goat skin, side view (*top*); shaved and mounted over wooden spatula for slivering (*bottom*).



Slivering of goat skin strip

After affixing the goat skin strip to wooden spatula, slivering is done under magnification, just like as in the foam model (Figure 13). Goat skin gives you the feeling of human skin. The only difference is that goat skin is denser and has follicles of a shorter length. Extra fat should be trimmed.

FIGURE 13. Slivering of goat skin under stereomicroscope.



Follicle dissection of goat sliver

Goat slivers should be dissected under a microscope with 6× magnification (Figure 14). You should take all precautions and practice as if you are dissecting human follicles. De-epithelisation, trimming, and irrigation are all steps that should be well FIGURE 14. Follicle dissection of goat sliver under stereomicroscope.



practiced. Now, these follicles are ready for implantation on the leaf model of scalp.

IMPLANTATION OF GOAT FOLLICLES

To implant goat follicles, you need the goat follicles, leafs, adhesive tape, and a helmet.

Method

Mount 5-6 layers of leaf on the front side of the helmet, which provides a similar curve and surface as that of human scalp, except that it is little larger. You can also use another model of a human head. Start implanting the goat follicles either by the slit method or stickand-place method (Figure 15).

SUMMARY

This is a very versatile, user

ensure optimum results for the patient.

friendly, economical model to learn all steps of hair transplantation. The author has used this model to train all his team members. It typically takes two hours per day for three to four weeks to train a technician. Basic knowledge of the hair transplant procedure, the follicle, and the importance of graft hydration, ischemia, temperature, and delicacy of the follicle should also be reviewed. It is important that the assistants realise how important their job is, and that they be properly trained and paid for their work. After all, hair transplantation involves teamwork and every step should be practiced to

FIGURE 15. Leaf is mounted on helmet (*left*); goat follicles are implanted (*right*).





Assessment of Follicular Unit Density in Asian Men with Androgenetic Alopecia

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ABSTRACT

An important issue in hair transplantation is donor density. Success of surgery is largely dependent on this factor. Donor density is not only determined by the number of grafts, but also by the number of hairs per graft and by the quality or caliber of each hair. This greatly affects the results of hair transplantation.

Our study of 70 men undergoing hair transplantation revealed that East and Southeast Asians had an average of 61.1 FU/cm² (111.2 hairs/cm²); of these, 1-hair grafts accounted for 32.5%, 2-hair grafts for 54.2%, and 3-hair grafts for 13.2%, but no 4-hair grafts were noted. Miniaturized hairs for this population had an average of 7.8 hairs/cm² (7%). A small proportion of West Asians revealed an average density of 63.6 FU/cm² (126.8 hairs/cm²); of these, 1-hair grafts accounted for 20.7%, 2-hair grafts for 59%, 3-hair grafts for 19.3% and 4-hair grafts for 0.8%. Miniaturized hairs for West Asians were highest at 17.8 hairs/cm² (14%). Likewise, a small number of South Asians were also noted to have an average density of 63.5 FU/cm² (126.8 hairs/cm²). The proportion of 1-hair grafts was 19%; 2-hair grafts, 61.2%; 3-hair grafts, 19.16%; and 4-hair grafts, 0.5%. Miniaturized hairs were noted at 10.9 hairs/cm² (8.5%).

BACKGROUND

Hair density, together with hair diameter, has a tremendous impact on the cosmetic outcome of hair transplantation surgery.¹ The success of the procedure not only lies on the skill of the attending surgeon and his or her team, but is likewise dependent on the amount of follicular unit (FU) grafts that can be harvested from the safe donor zone of each patient. Every donor region has specific characteristics that allow the hair restoration surgeon to customize the unique design for each individual.¹ This study aimed to provide information on the average FU density in the donor area among Asian men with androgenetic alopecia to guide hair transplant surgeons in mapping out their surgical approach.

For purposes of this study, we broke down Asian men into the following groups:

- **East Asians:** China, Hongkong, Japan, Korea, Taiwan **Southeast Asians:** Brunei, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand
- **South Asians:** India, Afghanistan, Bangladesh, Pakistan, Sri Lanka

West Asians: Georgia, Iran, Iraq, Turkey, UAE

OBJECTIVE

Our objective was to assess the average number of FU grafts in the donor area of Asian men with androgenetic alopecia. Specifically, we intended to do the following:

• To delineate the amount of 1-hair, 2-hair, 3-hair, and

4-hair grafts on the donor area of Asian androgenetic patients.

- To evaluate the FU groupings in five crucial points of the scalp in Asian androgenetic patients.
- To get the number of hairs per reference point, as well as the average amount of hair per cm² for each Asian subgroup.
- To assess the proportion of miniaturized hair per cm².

METHODOLOGY

A preoperative review was carried out on all Asian men with androgenetic alopecia who underwent FUT hair transplantation surgery at DHT Clinic. The study was conducted among patients with virgin scalp who had their first hair transplantation.

There were 70 patients studied who ranged in age from 24 to 65 years old. East and Southeast Asians comprised the bulk of the patient pool, which included Thais, Singaporeans, Hong Kong Nationals, Chinese, Taiwanese, Japanese, Cambodians, and Malaysians. A total of 50 patients were gathered in this group. However, a subgroup of South Asians (Indians, 10 patients) and West Asians (Middle Easterners,

10 patients) were isolated because of inherent differences in hair densities compared to the first group.

During the harvesting procedure, a 2- to 3cmwide area of the donor site was shaved from ear to ear. Five specific areas served as reference points for the study:¹

- Midsagittal plane of the occipital protuberance—designated in this study as the "Central Occiput" (Figure 1)
- 3cm superior to the reflection of the helix on a line drawn superiorly from the external auditory meatus designated as the left and right temporal area, respectively (Figure 2)
- A point halfway along points 1 and 2 over the ipsilateral mastoid, approximately 7-7.5cm from each

FIGURE 1. Midsagittal plane of the occipital protuberance—central occiput



FIGURE 2. Temporal and mastoid areas



FIGURE 3. Videomicroscope captures the field of each reference point.



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FIGURE 5. Donor photos are taken.



FIGURE 6. Hair density count



FIGURE 7. Miniaturized hairs



point—designated as the left and right parietal area, respectively (Figure 2)

A video microscope was used to capture the field of each reference point (Figure 3). The area was measured at 25mm² (Figure 4). Values were multiplied by 4 to get the exact measurement of 1cm². Each photograph was stored in the computer and labeled accordingly (Figure 5).

The investigator then counted the FUs within the box and recorded the number of 1-, 2-, and 3-hair follicular groupings for the five reference points (left temporal, left parietal, central occipital, right parietal, right temporal) (Figure 6).

Follicular units whose hair shafts were exactly lying on the box margins but whose roots lied outside the lines were excluded. Results were then tallied and the average numbers were computed according to the number of 1-, 2-, 3-, and 4-hair FU/cm² on the left temporal, left parietal, central occipital, right parietal, and right temporal. Hair density (number of hairs) was also computed, as well as miniaturized hairs/cm² (Figures 6 and 7).

RESULTS

1. Average density count East and Southeast Asians: The average density of East

and Southeast Asian patients

was 61.1 FU/cm². The density count for East and Southeast Asians ranged from 50-83 FU/cm². Table 1 shows the FU density for each reference point.

TABLE 1. FU Density in East and Southeast Asians

Left	Left	Central	Right	Right	Average
temporal	parietal	occipital	parietal	temporal	Density
57.5 FU/cm ²	61.6 FU/cm ²	65.6 FU/cm ²	63.6 FU/cm ²	57.2 FU/cm ²	61.1 FU/cm ²

West Asians (Middle East): The West Asian (Middle East) subgroup had an average of 63.6 FU/cm². Density ranged from 52-86 FU/cm². Table 2 shows the breakdown.

TABLE	2.	FU	Density	in	West	Asians
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Left	Left	Central	Right	Right	Average
temporal	parietal	occipital	parietal	temporal	Density
59.6 FU/cm ²	67.6 FU/cm ²	72.4 FU/cm ²	62.4 FU/cm ²	56.4 FU/cm ²	63.6 FU/cm

South Asians (Indians): South Asians (Indian) had a result similar to the West Asian patients, with an average density of 63.5 FU/cm². Density ranged from 50-74 FU/cm². Densities for each reference point are shown in Table 3.

TABLE 3. FU Density for Each Reference Point in South Asians (Indians)

Left	Left	Central	Right	Right	Average
temporal	parietal	occipital	parietal	temporal	Density
57.2 FU/cm ²	65.2 FU/cm ²	70.8 FU/cm ²	63.6 FU/cm ²	60.8 FU/cm ²	63.5 FU/cm ²

2. Density count per reference point

The average of each follicular unit for 1-, 2-, 3-, and 4-hair FUs was computed and multiplied by 4 since the video microscope was calibrated only at 25 mm². Hence, to get the number of FU/cm², each FU was multiplied four-fold.

East and Southeast Asians: Analysis for East and Southeast Asians revealed that 2-hair grafts predominated at a density of 54.2%, with the central occipital area having the greatest density. Its amount decreases as it approaches the lateral sides of the donor area. One-hair grafts seemed to be least over the temporal areas but were still higher compared to 3-hair grafts. The greatest number of 3-hair grafts was still in the central occipital area and followed the trend of 2-hair grafts, decreasing in amount as it approached the parietal and temporal areas. The breakdown is shown in Table 4.

Reference Point	1-hair FU/cm ²	2-hair FU/cm ²	3-hair FU/cm ²	4-hair FU/cm ²
Left temporal	$4.9 \times 4 = 19.6$	7.6 × 4 = 30.4	$1.8 \times 4 = 7.2$	0
Left parietal	$5.4 \times 4 = 23.6$	$8.5 \times 4 = 34$	$1.6 \times 4 = 6.4$	0
Central occipital	$4.1 \times 4 = 16.4$	9.4 × 4 = 37.6	$2.8 \times 4 = 11.2$	0
Right parietal	$5.2 \times 4 = 20.8$	8.6 × 4 = 34.4	$2.3 \times 4 = 9.2$	0
Right temporal	4.9 × 4 = 19.6	7.6 × 4 = 30.4	$1.7 \times 4 = 6.8$	0
Average no. FU/cm ²	20	33.3	7.93	0
Percentage	32.5%	54.2%	13.2%	0%

West Asians (Middle East): Evaluation of FUs in West Asians (Middle Easterners) yielded a higher amount of 2-hair grafts at 42 FU/cm², comprising 59% of the total density, and was noted to be concentrated at the central occipital area, and this did not differ much over the left and right lateral sides. Distribution of 1-hair and 3-hair grafts did not differ much in location, being almost the same throughout the entire donor area. Interestingly, the central occipital region had the greatest number of 4-hair grafts. The breakdown is shown in Table 5.

Reference Point	1-hair FU	2-hair FU	3-hair FU	4-hair FU
Left temporal	$2.3 \times 4 = 9.2$	8.9 × 4 = 35.6	$2.7 \times 4 = 10.8$	$0.2 \times 4 = 0.8$
Left parietal	$3.6 \times 4 = 14.4$	$10.3 \times 4 = 41.2$	$2.9 \times 4 = 11.6$	$0.11 \times 4 = 0.4$
Central occipital	$3.8 \times 4 = 15.2$	$10.5 \times 4 = 42$	$3.7 \times 4 = 14.8$	$0.2 \times 4 = 0.8$
Right parietal	$3.6 \times 4 = 14.4$	8.7 × 4 = 34.8	$3.3 \times 4 = 13.2$	$0.11 \times 4 = 0.4$
Right temporal	3.1 × 4 = 12.4	8.3 × 4 = 33.2	$2.7 \times 4 = 10.8$	$0.1 \times 4 = 0.4$
Average no. FU/cm ²	13.12	37.36	12.24	0.56
Percentage	20.7%	59%	19.3%	0.8%

South Asians (Indians): Likewise, the breakdown of follicular groups in South Asians (Indians) reflected the same trend of 2-hair FU grafts highest over the central occipital region (44.4 FU/cm²); it then declined as it reached both lateral sides. One-hair grafts were more or less evenly distributed over the donor sites, but were notably less at the central occiput (9.2 FU/cm²). Three-hair FU grafts were also noted to be most dense at the center at 17.2 FU/cm². Four-hair FU grafts were noted to be most dense at the left parietal area. The breakdown is in Table 6.

Reference Point	1-hair FU	2-hair FU	3-hair FU	4-hair FU
Left temporal	$2.3 \times 4 = 9.2$	8.9 × 4 = 35.6	$2.7 \times 4 = 10.8$	$0.2 \times 4 = 0.8$
Left parietal	$3.6 \times 4 = 14.4$	$10.3 \times 4 = 41.2$	$2.9 \times 4 = 11.6$	$0.11 \times 4 = 0.4$
Central occipital	$3.8 \times 4 = 15.2$	$10.5 \times 4 = 42$	$3.7 \times 4 = 14.8$	$0.2 \times 4 = 0.8$
Right parietal	$3.6 \times 4 = 14.4$	8.7 × 4 = 34.8	$3.3 \times 4 = 13.2$	$0.11 \times 4 = 0.4$
Right temporal	3.1 × 4 = 12.4	8.3 × 4 = 33.2	$2.7 \times 4 = 10.8$	$0.1 \times 4 = 0.4$
Average no. FU/cm ²	13.12	37.36	12.24	0.56
Percentage	20.7%	59%	19.3%	0.8%

3. Number of hairs/cm²

East and Southeast Asians: Assessment of the number of hairs for East and Southeast Asians revealed an average of 111.2 hairs/cm², with the central occipital region having the highest density at 125.2 hairs/cm² (see Table 7).

TABLE 7. Number of Hairs	per	Reference	Point	in
East and Southeast Asians	-			

Reference Point	Total no. hairs/cm ²
Left temporal	102 hairs/cm ²
Left parietal	110.8 hairs/cm ²
Central occipital	125.2 hairs/ cm ²
Right parietal	117.2 hairs/ cm ²
Right temporal	100.8 hairs/cm ²
Average no. hairs	111.2 hairs/cm ²

TABLE 8. Number of Hairs per Reference Point in West Asians

Reference Point	Total no. hairs/cm ²
Left temporal	116 hairs/cm ²
Left parietal	133.2 hairs/cm ²
Central occipital	146.8 hairs/cm ²
Right parietal	125.2 hairs/cm ²
Right temporal	112.8 hairs/cm ²
Average no. hairs	126.8 hairs/cm ²

Table 9. Number of Hairs per Reference Point in South Asian

Reference Point	Total no. hairs/cm ²
Left temporal	116 hairs/cm ²
Left parietal	133.2 hairs/cm ²
Central occipital	146.8 hairs/cm ²
Right parietal	125.2 hairs/cm ²
Right temporal	112.8 hairs/cm ²
Average no. hairs	126.8 hairs/cm ²

West Asians (Middle East): Evaluation of the number of hairs/cm² among West Asians revealed an average of 126.8 hairs/cm². The highest hair density was on the central occipital region at 146.8 hairs, which gradually decreased as it approached both lateral sides. The left side revealed a slightly higher hair density than the right (see Table 8).

South Asians (Indians): Computation for the average number of hairs for South Asians surprisingly revealed the same value as that of west Asians at 126.8 hairs/cm². The occipital area is again the

densest at 149.6 hairs/cm², decreasing laterally towards both sides (see Table 9).

4. Miniaturized hairs

Analysis of miniaturized hairs in East and Southeast Asians revealed an average of 7.8 hairs/cm², amounting to 7% of the total number of hairs (Table 10). The amount of these vellus hairs was most noted over both temporal aspects of the scalp. West Asians revealed the greatest number of miniaturized hairs at 17.8 hairs/cm², comprising 14%. Similarly, the amount of these baby hairs was most noted on both temporal areas. South Asians came in second for the greatest number of miniaturized hairs at 10.9 hairs/cm² (8.5%) (see Table 10). The same trend was observed in that the temporal areas had the greatest number of vellus hairs.

TABLE 10. Average Miniatu	rized Hairs for Asians
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0			
	East and Southeast Asians	West Asians	South Asians
Average no. of miniaturized hairs/ cm ²	7.8 hairs/cm ²	17.8 hairs/cm ²	10.9 hairs/cm ²
Percentage (with reference to total no. of hairs)	7.0%	14%	8.5%
Total no. of hairs	111.2/cm ²	126.8/cm ²	126.8/cm ²

DISCUSSION

There are a finite number of FUs containing permanent hairs in any patient, thus limiting the amount of donor hair reserves available for harvesting in hair restoration surgery.²

The incidence of pattern hair loss in men varies from population to population based on genetic background. The highest prevalence is reported in Caucasians.³ The frequency in the Asian population is noted to be lower than that of Europeans.³

This reported incidence is somehow compensated in Caucasians, having more FU counts than Asians.⁴ Avram, et al. noted that the average FU density in the donor scalp of Caucasians ranged from 70-100 FU/cm², and the average hair density is around 260 ± 30 hairs/cm².⁵ Likewise, Jimenez reported that the occipital donor scalp has follicular units ranging from 65-85/cm² with a hair density of 124-200 hairs/cm².⁶ For the Asian population, however, Tsilosani reported a density of 74 FU/cm² for the donor area among Central and Eastern Asians.⁷ Moreover, using a video screen with computer camera, an average density of 67.81 FU/cm², with a predominance of 2-hair FUs, was reported by Tsai, et al. (2002) among the Chinese population.⁸ Some authors, however, did not mention the device used in taking the hair density.

Our study among the Asian population, consisting mainly of East and Southeast Asians with a subgroup of West and South Asians, revealed a much lower density count in the donor area. One factor that could account for this could be the wide age bracket of our sample population. Though a majority of our patients are in the age bracket of 30-40 years old, a considerable number are in the 50-60 year age bracket, lowering the average number of FUs in the donor area.

Another factor could be in the counting of the grafts. In this review, hair grafts within the 25mm box area but whose roots were seen outside of the line were not counted. This could account for a lower graft count.

Androgenetic alopecia and senescent alopecia represent two major factors affecting the hair density of men.⁹ In androgenetic alopecia, hormonal influences lead to changes in hair follicle size and cycling, leading to diminution of the hair follicles. On the other hand, in senescent alopecia, follicular drop out and thinning occurs as a result of apoptosis and oxidative stress responses brought about by the aging process.⁹ All of these factors can lead to decreased overall density of the hair.

The values in counting the follicular units vary depending on the instrument used. This study used the video microscope,¹¹ which was calibrated to map out an area of 25mm², or a quarter of a square centimeter. Thus, it is necessary to multiply the values by 4 to get the measurement of 1cm². The instrument provided a clearer view of the follicles and its roots, making the counting more accurate.

Men require a density count of at least 40 FU/cm² in the donor area to be considered for hair transplantation.⁴ Fortunately, most Asians meet this requirement, albeit having a lower density than their Caucasian counterparts.

East and Southeast Asians had the lowest density count at 61.1 FU/cm², with the occipital region being the densest. Two-hair grafts dominated the count, amounting to 54.2%, followed by 1-hair grafts at 32.5% and 3-hair grafts at 13.2%. No 4-hair grafts were noted. This Asian subgroup also had a total of 111.2 hairs/cm², with the lowest amount of miniaturized hairs at 7.8 hair/cm² (7%).

The small study population of South (Indians) and West (Middle Easterners) follow suit at 63.5 FU/cm² and 63.6 FU/cm², respectively. Both Asian subgroups have fewer 1-hair in comparison to 3-hair grafts. Though the FU count for both Asian subgroups was almost identical, West Asians appeared to have fuller hair because of more 3- and 4-hair grafts.

Surprisingly, both West and South Asians yielded the same number of hairs/cm² (126.8 hairs/cm²), though in varying proportions. It is also worthwhile to note that West Asians had the largest amount of miniaturized hairs at 17.8 hairs/cm² (14%), compared to South Asians, who had only 10.9 miniaturized hairs/cm² (8.5%).

All Asian subgroups showed that miniaturized hairs are densest over both temporal areas, and most of these vellus hairs are attached to a follicular grouping rather than being a standalone 1-hair graft. The result of this observation may give hair transplant surgeons a clue that the temple areas of most Asians may be more unstable than the occipital region, thus giving us a warning to be more careful if harvesting over these areas.

All groups showed a predominance of 2-hair grafts over the occipital region, with decreasing counts as it goes lateral in both sides. This finding supports Devroye's claim that hair density is lowest in areas closest to the ear and highest in the occipital region.¹

In predicting the patient's long-term hair loss progression, Bernstein and Rassman pointed out that there are three important factors to consider: first is a recognizable hair loss pattern in a family member that matches the patient's own hair loss chronology, second is the personal history when the hair loss started and the present rate of hair loss, and third is the degree of miniaturization of both donor and recipient site.¹⁰

According to Bernstein and Rassman, miniaturization is the progressive diminution of the shaft size reflected in both diameter and length, due to genetically determined effects of aging and/or androgenic hormones on the terminal follicle.^{10,11} In simpler terms, miniaturized hairs have thinner hair shafts or hair caliber and may be shorter in length in comparison to the rest of the existing hairs of the patient.

Articles in the *Forum* have likewise stressed the importance of early miniaturization over the donor area, as this could give a warning sign that the donor area is not stable and the patient may not be a good candidate for transplant.¹¹ Similarly, when miniaturization is noted in a teenager, the possibility of developing DUPA is extremely high.¹¹

Lam has likewise provided a practical guideline on how to predict outcome of hair transplantation results based on the degree of miniaturized hairs:¹³

- Up to 5% miniaturized hairs-excellent results
- 5-10% of miniaturized hair—good results
- 10-15% of miniaturized hair-sufficient results
- More than 15% of miniaturized hair-poor results

According to Lam, a normal scalp has approximately 91-95% of terminal hair and 9% of miniaturized hair.¹³ The average percentage of miniaturized hairs for all Asian subgroups in this study did not exceed the "red flag" limit

of 15%, hence, it is suffice to say that Asians on average are good candidates for hair transplantation.

This study can be helpful to hair restoration surgeons working with Asian patients. If the surgeon does a preoperative measurement, the result can be compared to the average patient. If short of a modern gadget to determine a patient's hair density, these data can provide a rough estimation on the donor densities of different Asian ethnicities, thus aiding surgeons in mapping out realistic treatment plans for their patients.

CONCLUSION

Our study found the following:

- East and Southeast Asians have an average density of 61.1 FU/cm². Although the number of South and West Asians were small in this study, this review revealed that South Asians have a higher average density of 63.5 FU/cm², and West Asians had the most density at 63.6 FU/cm².
- The central occipital area for all subgroups has the densest amount of FU grafts. The density is lowest in areas close to the ear.
- Two-hair follicular groupings predominate in all subgroups. However, 3-hair grafts appear to be more in South and West Asians, while East and Southeast Asians have more of the 1-hair grafts. There were no 4-hair grafts noted in East and Southeast Asians and more on West and South Asians.
- The average number of hairs for East and Southeast Asians was 111.2 hairs/cm² with 7.2% miniaturized hairs (7.8 hair/cm²). Surprisingly, West and South Asians had the same value at 126.8 hairs/cm². West Asians had the most number of miniaturized hairs at 14% (17.8 hairs/cm²), and South Asians came in second at 8.5% (10.9 hairs) miniaturized hairs/cm².
- The central occipital region still had the highest hair density for the three subgroups, tapering as it reached the temporal area.
- Miniaturized hairs were densest over the temporal areas in all Asian subgroups.

(Detailed data sheets can be obtained by emailing the author.)

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Literature Review



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Is the future of scarless surgery on the horizon?

Plikus, M.V. et al. Regeneration of fat cells from myofibroblasts during wound healing. Science. 2017; 355(6326):748-751.

To date, the basic teaching of wound healing and surgery has been simple: any time an incision is made deep enough into the skin, a scar will form. Scar formation, in part, is due to the action of cells known as myofibroblasts.

It had been previously thought that myofibroblasts were incapable of becoming any other cell type. New research in mice, however, showed that myofibroblasts can be encour-

Are higher doses of minoxidil effective in female non-responders?

McCoy, J., et al. Minoxidil dose response study in female pattern hair loss patients determined to be non-responders to 5% topical minoxidil. *J Biol Regul Homeost Agents*. 2016(Oct-Dec); 30 (4):1153-1155.

Minoxidil is FDA approved at a concentration of 5%. Studies in individuals with FPHL have shown that minoxidil helps 30-40% of women. The minoxidil sulfotransferase assay may help predict individuals who might not respond to minoxidil.

A study was undertaken to determine if FPHL subjects with low minoxidil sulfotransferase activity who were non-re-

FPHL: Associations with Cardiovascular Risk and Aging

Noordam, R., et al. Both low circulating insulin-like growth factor-1 and high-density lipoprotein cholesterol are associated with hair loss in middle-aged women. *Br J Dermatol.* 2016(Oct); 175(4):728-734.

The pathogenesis of female pattern hair loss (FPHL) remains incompletely understood. In general, FPHL is believed to have both overlapping and distinct mechanisms from classic male pattern balding.

Noordam and colleagues set out to investigate the associations between markers of cardiovascular disease risk (namely serum lipid levels and hypertension) and aging (namely 25-hydroxy-vitamin D and insulin-like growth factor [IGF]) with hair loss in a group of 322 middle-aged women. aged to become another cell type during wound healing, and the possibility of a scar could therefore be bypassed.

That other cell type is an adipocyte. The research showed that hair follicles in healing wounds secrete a protein known as bone morphogenic protein, or BMP. BMP could in turn trigger myofibroblasts to become adipocytes. Remarkably, wound healing with adipocytes was shown to progress in a scarless manner.

Comment: This study is significant and represents a potential "paradigm shift" in the way we think about scars. The potential exists to help wounds heal without scar formation. More studies are needed to determine how to routinely make this happen in human skin.

sponders to 5% topical minoxidil would benefit from a novel 15% topical minoxidil solution. By 12 weeks, 60% of subjects achieved a clinically significant response based on target area hair counts as well as significant improvement in global photographic assessment. None of the subjects using 15% minoxidil experienced significant hemodynamic changes or any other adverse events.

Comment: This is among the first studies to demonstrate a potential benefit of higher dosage of minoxidil in FPHL subjects who fail to respond to 5% minoxidil. The long-term side effects, general risks, and benefits of higher doses of minoxidil require further study.

Lower levels of HDL cholesterol and lower levels of IGF-1 were independently associated with more advanced FPHL. Interestingly, neither HDL cholesterol nor IGF-1 was associated with baldness in men, indicating that these are unique risk factors for hair loss in women.

The association between IGF-1 and hair loss raises new questions as to whether FPHL is associated with greater risks for skin aging and perhaps general aging and longevity in general. The authors had shown earlier that high levels of IGF-1 were associated with a lower degree of skin wrinkling and a lower degree of skin pigmentation—markers of skin aging.

Comment: This is the first study to link IGF-1 with FPHL and to show that advanced FPHL is associated with additional biomarkers of aging and longevity.

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Complications and Difficult Cases

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The Curious Case of the Impossible FUE

This is a patient I saw in my practice a few months ago. I believe that it provides a

great educational/discussion opportunity for us, as FUE procedures have become more and more popular among

CASE PRESENTATION

A 59-year-old healthy male presented for consultation at my office looking for a hair transplant procedure to help him reshape his anterior hairline and add more density to his midscalp. He had no concerns with the crown, as he has had a bald spot there for many years and did not care about it.

During the consultation, an extensive history of present illness, review of systems, review of past surgical procedures and complications, and review of family history were performed. They all failed to elicit any problems or potential red flags. The patient had been in excellent health, was not on prescription medications, and had never had any surgical procedures, large or small. There was no mention of increased bruising or other bleeding abnormalities. His family history was positive for idiopathic hypertension (father/mother) and cardiovascular disease (father), but he had been recently evaluated by his primary care physician during his annual physical exam and everything was normal. He noted he maintained a healthy diet, worked as a construction contractor, and exercised regularly.

The patient described noticing his AGA first in the crown, during his 30s, with progressive, but slow, evolution. Over the past few years, he had noticed that his anterior hairline started to recede, and the hair in his midscalp and bridge areas had become thinner. This was typical for his paternal side of the family, with his father and paternal grandfather having the same pattern of loss. He stated that the current state of his hair loss had not changed in the past 10 years since he started using minoxidil on a regular basis. He never used finasteride, and prefers not to take any prescription medication.

FIGURE 1. Top view



tion medication. Examination did not reveal any physical abnormalities. Clinical exam was normal. Scalp exam revealed a Norwood V distribution of male pattern hair loss, with anterior hairline recession, miniaturization on the midscalp, and bridge and crown loss (Figures 1 and 2). His skin exam was normal, experienced and neophyte hair transplant surgeons alike. The main point of this case report is to call attention to the fact that we must always be on the lookout for rare clinical presentations, and be humble enough to know when to abort the procedure to prevent more harm to the patient.

with no lesions or other abnormalities found. His donor scalp showed medium-caliber hair, mostly gray, with a density of 80 follicular units (FUs) per square centimeter of scalp in his occipital area and 65-70 FU/cm² over the temples and parietal areas. Scalp was somewhat hyperelastic, with a Mayer/Pauls measurement of approximately 25% elasticity (Figure 3).

EVALUATION & PLAN

After evaluating his hair loss, it was decided that the patient would benefit from a hair transplant procedure of 1,800-2,000 grafts to re-create a conservative hairline and to increase density in his midscalp (Figure 4). Since he was not concerned with the crown, that area would not be addressed surgically. Medical therapy was discussed, including continuing with minoxidil, adding finasteride (which he refused to do), low level



FIGURE 3. Donor area



FIGURE 4. Planned hairline



laser therapy, and platelet-rich plasma (PRP).

Both strip and FUE were discussed for donor harvesting, and the patient preferred the FUE technique, so that he could continue to keep his hair short after the surgery. The procedure was scheduled and the patient went through our routine preoperative protocol.

SURGICAL INTERVENTION

On the day of the procedure, a pre-op consultation was done and the patient signed all forms, including informed consent for the FUE procedure that was planned. We reviewed and marked the areas to be treated (Figure 4). After administration of oral sedation and infiltration of the donor zone with lidocaine and epinephrine, we prepared to start extracting the follicular units.

My personal routine involves administering tumescence to the donor area that is to be harvested. After careful exam of a patient's hair caliber and density, I select the FUE punch that I think will be more adequate, changing if necessary. In this case, due to the gray hairs, I opted to start with a dull punch of an internal diameter of 0.9mm. I normally have an arsenal of different punches, including dull and sharp ones from various manufacturers, and of various sizes (ranging from 0.8-1.0mm of internal diameter). It is not uncommon for me to try different punches on the same patient, until I find the one that provides the best grafts for the patient's scalp characteristics.

But this case was to be different ...

With the dull punch, I noticed that the punch would not engage properly. As it spun on the skin, the skin would wrap around the punch, causing the graft to cap. Even with counter-traction on the skin and with different rotation speeds, the results were the same. I then tried a dull punch with the hexagonal geometry, and had the same problem. I tried to gently sharpen the dull punch—which normally helps me in difficult skins—to no avail. When not capped, the punch would grab the graft and remove it, causing me to have to stop to unclog the punch often. Different diameter punches caused no difference. Many of the grafts were capped, buried, or transected (all told, an average of 60-70% of them had one or more of these problems).

My next option was the sharp punches. With the sharp punches (I tried various types and diameters), the skin would not wrap around the punch as much, but the pressure of the punch on the skin would cause it to cut right through the hair, causing complete transection. When a good cylindrical cut was obtained, as soon as the top was grasped by the forceps to remove it, the top of the graft would break off.

I tried different angles of attack, different rotation speeds, different rotational direction (clockwise, counter-clockwise and oscillating), sharp punches, dull punches, and different diameter punches; nothing made much difference. Between complete transection, partial transection, burying, and capping, over 70% of the grafts had problems (Figure 5). I do not have an ARTAS[®] device, but I doubt that it would have mattered. Bleeding was also a bit more pronounced than what I normally see.

FIGURE 5. Grafts



After 3 hours, I had only made about 200 incisions in different areas of the scalp (Figure 6). I then decided to abort the procedure. I felt that I was causing a lot of potential trauma to the



patient's scalp, for little to no return. Since the patient had explicitly mentioned that he did not want a strip procedure, we simply stopped everything and waited until he woke up from sedation. Once the patient was back to normal, the situation was explained to him, his money returned in full, and the few grafts we could harvest successfully were placed in his midscalp, in between his existing hairs.

The patient had an uneventful post-op recovery and no abnormal scarring was seen. As of this writing, it is too early to gauge the growth of the few grafts we harvested.

CONCLUSION

This patient was very intriguing to me. I had never heard of anyone mentioning a case such as this, and I had never experienced this situation in any of the many FUE surgeries I have performed. Sure, some FUE procedures are more difficult than others, but nothing like this patient.

So, I set out to do a literature review on the possible skin conditions that could cause this problem. In my mind, I kept thinking of Ehlers-Danlos Syndrome, but this patient did not have any of the classical signs and symptoms of it (overly flexible joints, easy bruising, family history, blood vessel abnormalities, etc.). The only sign he presented was a slightly increased skin flexibility, as demonstrated by the Mayer-Pauls measurements of the donor area before surgery.

But with a more detailed literature review, I remembered that Ehlers-Danlos Syndrome has 6 main types, each with its own set of clinical presentations.¹⁻³ One of them, known as Type 6, or Dermatosparaxis, displays only a few skin abnormalities. Per the literature, this type is very rare and these individuals may go their entire lives without knowing they have a problem. In these patients, the only features may be overly elastic, fragile skin, and a tendency for bruising. Scars are not atrophic in these patients, and healing is usually not impaired.

The patient has refused to have genetic testing done for Ehlers-Danlos Syndrome, although a skin biopsy is not completely out of the realm of possibility for him. In retrospect, I should have kept a few of the grafts and sent them for pathology examination.

So, as of the writing of this article, I do not have a formal confirmation of this diagnosis. Only a clinical suspicion. Should I obtain a definitive diagnosis, I will publish it.

Overall, I thought this is an interesting case because it brings to light the fact that sometimes we face rare, unforeseen situations. Had I done a strip procedure on this patient, more than likely I would have faced scarring problems; maybe even poor growth of the grafts. So, it was a blessing in disguise that the patient was adamant about doing an FUE procedure.

In the end, our goal is to provide the patient with a safe procedure and great results. Sometimes, however, this is not possible no matter what we do.

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- Wesley, J.R., H. Mahour, and M.M. Woolley. Multiple surgical problems in two patients with Ehlers-Danlos Syndrome. *Surgery*. 1980(Mar); 87(3):319-324.
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Robin Unger, MD | New York, New York, USA | drrobinunger@yahoo.com

Postoperative Care and Evaluation

The latest discussion that I thought was worth sharing was a discussion regarding the postoperative care of patients and techniques to reduce infection or

complications. Different surgical techniques often warrant a change in thinking about the postoperative period to optimize healing. Off-line, during a discussion with Marcelo Pitchon regarding postoperative care of long hair transplantation, I realized this is yet another technique that could in-



Ray Konior asked:

Is anyone using ACell[®] or other stimulatory/regenerative products on FUE extraction sites? If so, have you seen anything beneficial as compared to a control side?

Any thoughts on PRP as a means of improving the donor area?

Finally, what thoughts does the group have regarding dressing the donor area, i.e., open (dry) versus moist (occluded)? I wonder what potential insult the exposed cellular population within the extraction sites may be experiencing from an open (dry) regimen.

Jerry Cooley gave a very thoughtful response:

I have used ACell in my FUE extraction sites for almost seven years. The initial small studies I did and presented showed that ACell enhances angiogenesis, inhibits fibrosis, and increases the chance of follicle regeneration if follicle components are present (i.e., transections). Unlike John Cole, I haven't seen any evidence that anything will promote regeneration in an FUE site where the entire FU is cleanly removed without transection.

Generally, I just inject ACell suspension, and usually PRP too, after FUE harvesting is done. You would think that it might just shoot out of the FUE holes, but that doesn't happen. The ACell suspension is about 100mg/10cc Plasmalyte; I'll use about 7cc for the top of the head (recipient sites and miniaturizing areas) and 3cc for the FUE sites. I believe that there is a palpable difference in ACell vs. non-ACell treated donor. I routinely see patients who have had FUE at other clinics (even the best) where I can palpate the donor and feel the fibrosis. When I see my FUE cases back, the donor feels like virgin scalp. I have no financial interest in ACell.

You only inject 0.05cc every couple square centimeter or so. It diffuses and spreads out.

In answer to your second question, I am in the "wet" healing camp. We place some gauze over the FUE sites, then saran wrap, then a loose coban (self-adherent wrap made of a porous, non-woven polyester material). They spray ATP on the top, grafted area, and around the superior border of

fluence post-surgical care. He uses no bandage, has patients spray the recipient area with distilled or mineral water, and the liquid travels down the hair to the scalp. The recipient area is almost undetectable within a few days or less.

Some doctors describe their protocols to reduce the chance of infection, others the possibility of producing scars that have a more normal texture, and others their approach to potentially help with regeneration. This also evolved into a discussion of how to objectively evaluate the results of any protocol.



the donor wrap, letting it trickle down. After the first 24-48 hours, they take it off and spray it but leave it open.

Robin Unger responded with thoughts on PRP:

I am just finalizing my PRP IRB (study submitted to an institutional review board). It has been a long time in progress, partially because I still hadn't decided upon a good objective evaluation. I think I have a good approach: I have partnered with a dermatologist who works at Mt. Sinai and will perform OCT (Optical Coherence Tomography) to evaluate, at various time points, hair counts/caliber/vessel formation/ dermal and epidermal thickness, etc. Hope this will provide some answers regarding PRP! In addition, perhaps OCT will prove to be a new tool for assessing the various characteristics of growth and evaluating parameters in hair studies.

Jerry Cooley replied to additional questions regarding best practices to prevent contamination in surgery:

We have always put antibacterial preservative in our ATP spray. While sterilizing the bottle or rinsing it with alcohol are good ideas to ensure a clean spray bottle, you still put the ATP into it through non-sterile means. We add 5 drops of Grapefruit Seed Extract (GSE) to the ATP/saline mix; all of this is made up fresh after the surgery to give to the patient.

If you are thinking about adding something else to the ATP spray, I recommend checking with Bill Ehringer (Energy Delivery Sytems) because you have to be very careful not to put in something that disrupts the lipid vesicles.

I gave up the routine use of post-op antibiotics a while ago. I have not seen any increase in infections, thankfully. Also, I've gotten rid of using mupirocin ointment on the sutures (so messy) and switched to an antibacterial spray containing Microcyn® (hypochlorous acid hydrogel). This is a pretty cool compound as it has broad antimicrobial coverage and is much nicer for the patient to use on FUT and FUE donor than ointment, in my opinion. Microcyn is in an approved dermatologic product called Alevicyn® (sodium chloride, sodium sulfate, monobasic sodium phosphate, hypochlorous acid, water), which comes as a spray or gel. It

has antipruritic qualities as well. So, if you prefer prescribing something, you can prescribe Alevicyn. We order the Microcyn in large quantities and dispense it ourselves for the patient. So far so good, but I suppose it will take a full year to be sure this has been a good decision.

Jerry Cooley added further comment on the GSE: I had read in the past about changing formulations of GSE; however, I've used it for several years and haven't noticed any variation and it seems to work. It is used at extremely diluted concentrations here. It is also packaged in skin creams and nasal sprays, so I don't think there's anything to worry about. I'm sure I've used it in over a thousand patients by now, and have not seen any problems.

Regarding the science, you can search on pub med, but see the following abstract:

Heggers, J.P., et al. The effectiveness of processed grapefruit-seed extract as an antibacterial agent: II. Mechanism of action and *in vitro* toxicity. *J Altern Complement Med*. 2002(Jun); 8(3):333-40. https://www.ncbi.nlm.nih.gov/ pubmed/12165190,12165191/

Bob Haber added his questions and input regarding donor area care and decontamination of spray bottles:

What's the science behind grapefruit seed extract? It doesn't appear to be a medical product, and the reviews mention the formula changing. That would make me nervous about adding it to the ATP and applying it to an open wound.

For the donor, I now just recommend petroleum jelly. Still messy, but no antibiotics, which the AAD recommends against in the absence of actual infection. Here is the protocol for decontamination of spray bottles:

- 1. Fill bottles to the rim with 70% alcohol, replace top and spray several times to get the alcohol in the spray head.
- 2. Let stand with alcohol for 30 minutes.
- 3. Pour out the alcohol and rinse out with sterile water to clean the bottle and purge the spray head. (Rinse with sterile water twice to ensure all the alcohol has been removed)
- 4. Let bottles air dry on a towel, then replace spray heads and put into baggie labeled "Decontaminated."

Bob True responded:

Thanks, Jerry, for the clarification. We use Microcyn preand intraoperatively. It has such a great kill rate and is not cytotoxic—it can even be used inside wounds. I use Aquaphor[®] on the extraction sites in the first 4-5 days and like the way it minimizes crust formation.

James Vogel added:

Not sure I remember the product you are referring to, but I currently use bacitracin ointment–laden gauze on the stitched donor incision or applied directly to the FUE sites as an occlusion overnight. In the morning, the donor areas are all treated open with daily washing and bacitracin applications used until wounds are healed. Lately, I have been giving doxycycline p.o. for a week to reduce folliculitis and redness, which was plaguing me for a while. I am also using ketoconazole shampoo post-op for the first month.

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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.

Grab your calculators! Hair transplant can be a game of numbers, and knowing the relation-

ships between the numbers of grafts you can transplant and the goals of the patient can save pain and heartache.



Calculations in Hair Transplant Surgery: Part I

1. You have excised a strip of 24cm with an average width of 1.2cm. Given an average density of 70 FU/cm², how many grafts do you anticipate being able to transplant?

Α.	1,600-1,900	C. 2,200-2,500
_		_

- B. 1,900-2,200 D. 2,500+ grafts
- 2. Assuming a transplant density of 35 FU/cm², how many square centimeters do you anticipate being able to cover for this patient?
 - A. 45-54 cm² C. 62-71 cm²
 - B. 54-62 cm² D. 71+ cm²
- With a skin marker, you place two dots 5cm apart on your patient's shaved donor area. Using your thumbs, you push the skin together and re-measure the distance between the dots. The distance is now 3.5cm. What is this patient's elasticity according to the Mayer-Pauls Elasticity Scale? (HINT: The formula is [50mm xmm/50mm] × 100.)
 A. 10% C. 25%
 - A. 10% B. 15%
 - D. 30%



Questions 4 and 5 relate to this photo (with much thanks to former ISHRS president Dr. Jennifer Martinick and Dr. Paco Jimenez for chairing the Top 10 Clinical Pearls Workshop in Kuala Lumpur).

- 4. If you have a string 40cm long and you tie the ends together, approximately how many square centimeters will be covered inside its boundaries no matter which shape you make it?
 - A. 40cm² C. 200cm²
 - B. 100cm² D. 400cm²
- 5. If you use this same string to show a patient how much area you can cover on his or her head, and assume you plan to transplant 25 FU/cm², approximately how many FU grafts will fit inside the string's boundaries no matter what shape you make it?
 - A. 250 FU grafts C. 2,500 FU grafts
 - B. 1,250 FU grafts D. 4,000 FU grafts

6. You are preparing to perform an FUE surgery on a 34-year-old patient with Stage IV Norwood male pattern hair loss. His safe donor area is 8cm high and 20cm wide with 90 FU/cm². Assuming you harvest 15% of the available FU grafts with no transections, what is your expected yield?

NOTE: Even if you predominantly perform either FUE or lin-

ear excision in your practice, YOU CAN STILL DO THESE CAL-

CULATIONS—so there are no excuses! Therefore, get out your

calculators (or do it in your head the way Drs. Brad Wolf and

- A. 1,206 grafts
- B. 2,160 grafts
- C. 3,060-4,600 grafts
- D. 14,400 grafts
- 7. A very bald man comes to your clinic hoping to fill in the whole top of his head (300cm²) with grafts. He has done his research and does not expect 70 FU/cm², but IS hoping that 40 FU/cm² can be accomplished. His safe donor area is 8cm high, 20cm wide, and his density is 90 FU/cm² (20% elasticity). Roughly, how many grafts can safely be obtained from his safe scalp donor area only using the FUE and linear "strip" methods?
 - A. 1,000 from FUE and 10,000 from linear
 - B. 3,000 from FUE and 1,000 from linear
 - C. 4,320 from FUE (30% of available FUs) and 2,160 from linear (1.2cm × 20cm strip)
 - D. 2,160 from FUE (15% of available FUs) and 2,160 from linear (1.2cm × 20cm strip)
- 8. For the patient in the previous question, assuming a baseline density of 25 FU grafts/cm² is the absolute minimum density goal, how do you counsel this patient?
 - A. We have a surgery date open this week as long as you pay in cash.
 - B. We may only be able to partially meet your goals, and it may take more than one surgery.
 - C. You goals are completely unrealistic and there is no hope for you.
 - D. I don't know. I am just skipping to read the answer...

Answers

- 1. **B.** This is a simple area × density calculation: $24\text{cm} \times 1.2\text{cm} \times 70 \text{ FU/cm}^2$ The cm² cancel and you are left with the number of FUs = 2,016.
- 2. B. The formula is:
 2,016 FUs ÷ 35 FU/cm²
 The FU cancel and you are left with the number of cm² = 57.6.
- 3. **D.** You should be able to do this one in your sleep. If you perform either technique (FUE or linear) but have not been taught the basics of the Mayer-Pauls elasticity scale, do yourself a favor and look it up. For linear "strip" harvests, it gives you guidelines about the dimensions of a strip you can take, and if you do FUE, it helps you anticipate the degree to which the skin will be stable for extraction. The technique takes a few seconds, and you will have invaluable data on each of your patients that will help you make the right decisions for your surgical technique: Mayer, M.L., and T. Pauls. Scalp Elasticity Scale. *Hair Transplant Forum Int'l.* 2005; 15(4):42-45.
- 4. **B.** Imagine the string is in a square shape and 10cm long on each side. Then the formula for the area of a square is simply $10 \text{ cm} \times 10 \text{ cm} = 100 \text{ cm}^2$. This is a particularly useful technique for showing patients a visual representation of the concept of coverage.

- 5. **C.** 25 FU/cm² × 100cm² = 2,500 FUs. Again, this is a particularly useful technique for showing patients a visual representation of the concept of coverage. Just get the correct length of string and tie it into a circle. Voila!
- B. I threw a few red herrings in to confuse people, because I didn't want readers to get bored. Here's the calculation:
 8cm × 20cm × 90 FU/cm² = 14.400 FUs

15% of 14,400 = 2,160 FUs

7. **D.** This answer is surprising even to me! Here's the calculation:

For FUE: $(8cm \times 20cm) \times 15\% = 2,160$

For linear: $(20 \text{ cm} \times 1.2 \text{ cm}) \times 90 \text{ FU/cm}^2 = 2,160$

Since 4,320 grafts (30%) from a safe donor area would likely leave a sparse appearance, C is incorrect. A and B are random numbers plucked from the air, and are not based on any calculation that I know of. One last point is that, when discussing graft densities with a patient like this, it may be useful to ignore their graft density goal number initially, and just calculate what is possible. Then show your patient the numbers.

8. **B.** If the patient has 300 cm^2 of area that he wants to cover, and he is hoping for 25 FU/cm², the calculation is: $300 \text{ cm}^2 \times 25 \text{ FU/cm}^2 = 7,500 \text{ FU grafts}$

Although 7,500 grafts may be achievable, it is more likely over more than one surgery in order to minimize risk and maximize healing. Readers who answered D get an extra point just for being honest.

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The ISHRS Is Turning 25: A Look Back to Where It All Began

Happy 25th ISHRS!

Dow B. Stough, MD I Hot Springs, Arkansas, USA

The timing was perfect. It was a matter of leadership and sufficient interest to draw like-minded individuals from around the world. The first international society gathering was held April 30–May 2, 1993, in Dallas, Texas. The excitement was palpable, as many of those present recognized the start of something "big." Dr. O'Tar Norwood and I joined forces to assemble the program, and I felt strongly that the content of a written program

was key for this meeting's success. The meeting directors were Drs. Sheldon Kabaker, O'Tar Norwood, Daniel Rousso, and me. Not all were thrilled with our idea. Other, larger societies had certainly benefited from including hair transplant surgeons in past meetings—how dare we form our own, unique society!

The meeting was a resounding success! Over 300 individuals—a mixture of specialists, cowboys, technicians, and yahoos—traveled from around the globe to attend the event, and they embraced this new society wholeheartedly. The experience of organizing and executing that first meeting was akin to herding cats, but we were up to the task!

At that initial gathering, \$260,000 was generously donated towards the formation of the International Society of Hair Restoration Surgery. Perhaps an even more telling appraisal of that first meeting is the fact that most of the attendees remain ardent supporters to this day. Of course, some surgeons and technicians have moved on or passed on, but on the whole, we remain a close-knit group dedicated to a single goal: the advancement of our field. Certainly, the past 25 years have not been without challenges-changing techniques and the clash of personalities, to name a few. Separatist movements based on these small differences are inevitable and have occurred. However, through it all, we are strong and will continue to remain so in the future. The heartbeat of the ISHRS continues to be its members and their constant dedication to excellence and the advancement of this field.



The accolades of the past 25 years rest among our attendees, our Board of Directors, our meeting organizers, our past presidents, and the original vision of the 300 individuals who gathered on April 30, 1993. We must not forget Victoria Ceh, who has continued to pilot the ship, and we thank her for her hard work, skill, and dedication.

NER JUBILEE

The ISHRS: Its Evolution and Foundation

Richard C. Shiell, MBBS *Melbourne, Australia*

Hair transplant meetings had been occurring every year or two since the first meeting, organized by D. Bluford Stough III, was held in Hot Spring, Arkansas, in 1974. The meetings were generally sponsored by the American Society of Dermatologic Surgery, American Academy of Aesthetic and Restorative Surgery, the American Academy of Facial Plastic and Reconstructive Surgery, or the American Hair Loss Council. They were primarily for Board affiliated members, and although experienced outsiders were tolerated, they had no vote in proceedings, such as the election of office bearers or the selection of sites for future meetings.

In October 1992, a private hair transplant meeting was sponsored in Rio de Janeiro by plastic surgeon Dr. Wagner de Morares with an invited international faculty from all branches of the profession. Hair surgeons arrived from the United States, Canada, Mexico, Australia, the United Kingdom, Austria, Germany, and several South American countries. There was simultaneous translation from English into Portuguese, live surgery in three operating rooms, and a wonderful social program.

Many attendees had already been thinking of the need for an international society. The previous month, September 1992, a three-day scientific meeting was proposed for April-May 1993 by Drs. Dowling Stough, Sheldon Kabaker, O'Tar Norwood, and Daniel Rousso. It was an idea whose time had come and was very well attended by surgeons from the United States and Canada, Australia, Japan, South Korea, Pakistan, Thailand, Brazil, France, Austria, and Germany. They came from a mixed background, primarily dermatologists, plastic surgeons, and otolaryngologists, but also anaestheolo-

> PAGE 74

gists, cardiologists, a psychiatrist, a urologist, and a goodly proportion of family physicians.

On the preceding afternoon, April, 29, 1993, a group of some 20 invited hair transplant surgeons met in a board room at the Grand Kempinski Hotel in Dallas, Texas. During a two-hour meet-



(*L to R*) Standing: Bob Limmer, Sajjad Khan, Martin Unger, Tom Rosanelli, Mario Marzola, Patrick Quinlan, Dow Stough, Russell Knudsen, O'Tar Norwood, Michael Meshkin, Catello Balsamo, Robert Leonard, Paul Straub, Sheldon Kabaker. *Kneeling:* Daniel Rousso, Richard Shiell (photo from *Hair Transplant Forum Int'l*, 1993; 3(3):11.)

ing, a decision was made to form a society that would first be known as the "International Society of Hair Surgeons." Membership was to be open to all registered medical practitioners with an interest in hair transplantation. The aim of the society was to be the education of its members. A committee of American and international surgeons was elected and set about the task of drafting a constitution, bylaws, and a schedule of future meetings.

With Dr. Dowling Stough as our new president and Dr. Paul Straub as vice president, we opened the scheduled three-day scientific meeting the next morning. Within a few weeks, the committee had changed the society's name to the International Society of Hair Restoration Surgery (ISHRS), and our next meeting was set for September 1994 in Toronto, Ontario, Canada.

With the Annual Meetings of the ISHRS, the irregular meetings of the other organizations became fewer and eventually ceased altogether by the late 1990s.

Bringing Back Happy Memories—ISHRS 25

Daniel E. Rousso, MD, FISHRS | Birmingham, Alabama, USA

When Bradley Wolf recently contacted me to ask if I would write something commemorating the 25th anniversary of the ISHRS, my first thought was disbelief. I couldn't believe that it has been 25 years since we started this organization. Even though I have been getting excited about the meeting in Prague, it didn't really sink in that it has been a quarter of a century since the inception of the ISHRS. When I think back on that very first meeting in 1993, it brings back happy memories.

Prior to the ISHRS, most of the education in hair restoration surgery was conducted by the American Academy of Facial Plastic and Reconstructive Surgery (AAFPRS). Historically, the AAFPRS held six "major" courses on various topics, one of those topics being hair restoration surgery. Some of the meetings were held annually and some were held every other year. The hair restoration surgery meeting was typically held every other year, because at that time, there

was not enough interest in hair restoration surgery to support an annual meeting. In 1990, I was fortunate to be able to host one of those AAFPRSsponsored hair restoration surgery meetings in Birmingham, Alabama. I remember the fine details of the meeting in Birmingham because my

son, Craig, was born on the second day of that meeting! My children were always trying to upstage things!

The meeting was relatively successful—the attendance was about 150 people. Two years after that meeting, in 1992, Drs. Toby Mayer and Richard Fleming hosted the next AAFPRSsponsored hair restoration meeting in Beverly Hills, California. (I was slated to again host the next AAFPRS hair meeting in Birmingham in 1994.) At that 1992 meeting in Beverly Hills, it became very obvious that there was a change in the interest level in hair restoration surgery compared to prior years. There were over 400 people at this meeting, and there was quite a buzz about the field of hair restoration surgery. Things were changing. You could just feel it.

Sometime after that meeting, I got a phone call from Dr. Dow Stough. He and Dr. O'Tar Norwood had been thinking about starting a new, independent society dedicated exclusively to hair restoration surgery. He wanted me to help him organize the first meeting of this new society. Because I had organized and run the hair meeting in Birmingham in 1990, he wanted me to help him organize a meeting of this new society to be held in Dallas, Texas, in 1993. Of course, I was concerned about another competing hair meeting, but I was very excited about the idea of this new society, and wanted to help Dow and O'Tar as much as possible. We enlisted the help of Dr. Shelly Kabaker and, with that, we were off and running. I remember a lot of discussion about deciding the name of this new society and deliberating about its leadership. After a great deal of discussion, the initial name for the new society was the International Society of Hair Surgeons (ISHS). The new officers were: Dr. Dow Stough, President; Dr. Paul Straub, Vice President; Dr. O'Tar Norwood, Secretary, and Dr. Robert Leonard, Treasurer. The initial Board of Directors included: Drs. Dow Stough, O'Tar Norwood, Paul Straub, Dominic Brandy, Daniel Rousso, James Vogel, Patrick Quinlan, Sheldon Kabaker, Robert Leonard, Russell Knudsen, and Marc Pomerantz.

Of course, we eventually changed the name of our society. I ultimately was the director of another AAFPRSsponsored hair meeting in Birmingham in 1994. While that meeting was very successful, the writing was on the wall. The ISHRS had been born and would continue to dominate as the preeminent organization for teaching and representing hair restoration surgeons worldwide. I am proud to have been part of that initial meeting and to have continued to play a part in the growth and success of the ISHRS these past 25 years. It was my honor to serve as president of the ISHRS from 1999–2000. I have made friendships in all corners of the world because of my association with the ISHRS. This organization has been like my family and I look forward to many more years to come!

THE ROAD TO DALLAS 1993

Russell Knudsen, MBBS, FISHRS | Sydney, Australia

In September 1992, Dr. Dow Stough wrote an open letter in Dr. O'Tar Norwood's *Hair Transplant Forum International* newsletter calling for expressions of interest in forming an international society for hair transplant physicians. As president of the Australasian Society of Hair Transplant Surgeons, I wrote to Dow to express our support for the idea and our desire to be involved.

I was subsequently invited to the meeting of an organizing committee that was held immediately prior to the scientific meeting in Dallas in March 1993. The result of the meeting was the formation of the Founding Board of Governors of what was to become known as the International Society of Hair Restoration Surgery—the ISHRS—and I was privileged to be one of the 11 Board members. The meeting was a tremendous success and was, at the time, the biggest meeting ever held of hair transplant surgeons from around the world. Previously, the biggest meetings were the triennial World Congresses, the last of which also occurred in Dallas in 1990. The ISHRS was formed to present high-quality annual congresses and has continued to successfully do so to this day. Looking back at the program, it is very interesting to contrast the topics with today's meetings. There were a lot of lectures dealing with such topics as scalp lifting, scalp flaps, minigrafting, and laser hair transplantation—all long gone to the dustbin of history. There was a call to arms from Dr. Bob Limmer to do the ENTIRE grafting by follicular units!

There was a single lecture devoted to assessment of the donor area and NO lectures about donor harvesting! What a contrast to today where nearly 50% of our program deals with donor harvesting (almost exclusively dealing with technical details regarding FUE). The meeting also had an outstanding social program where we were taught to do the Texas Two Step, lessons that I still recall today.

Remarkably, given the competing meetings that had previously each jealously guarded their own turf, we managed to largely avoid political missteps and within a couple of years we were able to harmoniously get almost every major transplant surgeon to join the ISHRS and to attend the meetings regularly. That harmony has carried through to today, because the ISHRS has studiously avoided being hierarchical and has continuously promoted collegiality amongst members from any and all specialty backgrounds.



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Regional Society Profile

Argentine Association of Hair Recovery (AARC)

Bruno A. Szyferman, MD | Capital Federal, Argentina | info@aarc.org.ar





1. What is the name of your association? The name is Argentine Association of Hair Recovery (AARC).

2. When was it founded? The AARC was founded on December 1, 2008, by Dr. Bruno Szyferman. Our goal is to unite concepts and professionals, and share experiences among colleagues.

Dr. Bruno A. Szyferman

3. Who were the founding members?

It was Dr. Bruno Szyferman, its founding president, together with Drs. Serén Juan Manuel, Scoles Gonzalo, Karduner Isaias, Gilberg Gustavo, Rolfi Paola, Romero Marcela, and Aimasso Sandra.

4. Do you have regular meetings, conferences, workshops? We have held workshops, and also have held 3 congresses, which had large numbers of participants both national and international.

5. Who are the office holders?

The AARC currently consists of Secretary Romina Luengo, Dr. Szyferman Bruno, Dr. Calero Mariano, and Dr. Serén Juan Manuel in the academic part and Dr. Romina Bentolila in the Legal Affairs section.

6. How many hair professionals are there in your country and how many are members of your society?

It is estimated that there are around 100 professionals who dedicate themselves exclusively and daily to hair transplantation and about 30 professionals who do it occasionally. Of these, about 30 doctors are members of the AARC.

7. Please list those who are members of the ISHRS.

Drs. Bruno Szyferman and Perisset Martin are members of the ISHRS. There are more Argentine members who belong to the ISHRS but who were not interested in being part of the AARC.

8. Is there a medical-political problem in your country?

There are no medical-political problems in my country. There is, however, unfair competition and lack of union between the companies offering hair transplant in my country.

9. Is advertising allowed and are there different rules for medical advertising?

Advertising is allowed and there is no clear regulation on the subject.

10. Has the general public embraced hair restoration or is it still in its infancy?

In my country, it is a practice well known and popularized, but I think that much is still to be grown.

- 11. Are most hair doctors busy? No, not everyone is busy.
- 12. Is the surgery mostly FUT or FUE?

Historically, many more FUT surgeries were performed, but over the past 3 to 4 years the ratio has been reversed and nowadays FUE is practiced more.

- 13. Are robots used? Only one company uses a robot.
- 14. Is anyone researching cell-based therapies?

There is a company that investigates cell therapies but it is not related to transplantation and hair treatments. It is a company of biologists who perform cellular therapies.

15. Where is the field of hair restoration headed in your country?

In the city of Buenos Aires, which is the capital of the country, it seems more practices are performing hair restoration surgery.

16. When and where will the next meeting be scheduled? The next scheduled meeting is estimated to be in Buenos Aires in November 2017.

17. What would you say are the strengths of your society?

It is a society open to everyone, non-profit, and with a team that strives for professionals to learn this specialty so that they can then provide excellent treatment to their patients.

18. What can the ISHRS do to help you?

The ISHRS could assist in the exchange of research programs and promotion of different courses and congresses related to the specialty.



Fiorella Bini Franco Buttafarro Gaetano Agostinacchio Marco Toscani Michele Roberto Paolo Gigli Piero Tesauro Roberto D'Ovidio

Vincenzo Gambino

CONTACTS:

e-mail: segreteria@sitri.it - info@sitri.it - vincenzogambino@vincenzogambino.com

The event's program will be available on-line on the website: http://eventi.sitri.it/ - www.sitri.it



Message from the ISHRS 2017 World Congress Program Chair

Jean Devroye, MD, FISHRS | Brussels, Belgium | prague2017ishrs@gmail.com

Time flies and the 2017 World Live Surgery Workshop and World Congress are coming soon!

As you know, the World Con-

gress will take place in Prague from October 4th till October 7th, 2017, while the World Live

Surgery Workshop (LSW) will take place in Polanica Zdrój, Poland, on October 1st and 2nd.

2017 WORLD LSW CONGRESS SCHEDULE

Saturday/September 30 – Arrivals in Prague, transfers from Prague (Czech Republic) to Polanica Zdrój, (Poland) by bus or sign up for Pre-Trip Poland (Sept. 27-30, start in Krakow and end in Polanica Zdrój)—Basic Lectures Part I in late afternoon

Sunday/October 1 - LSW Day 1

Monday/October 2 – LSW Day 2

Tuesday/October 3 – Transfer day from Polanica Zdrój to Prague

Wednesday/October 4 – Pre-Congress Courses (Basics Course, Advanced/Board Review, Surgical Assistants Core Skills Workshop, and Surgical Assistants Program, etc.)

Thursday/October 5 – First main day of general sessions, evening Welcome Reception

Friday/October 6 – Second main day of general sessions, evening M&M Conference

Saturday/October 7 – Third main day of general sessions and adjourn; evening Gala off site at the Municipal House

The abstract submission will be closed soon, and they are very promising for the quality of the next Congress. Moreover, a decision has already been made on the topics that will be debated. There will be, among others, the past, the present, and the future of cell therapy. A large session of "How I do It" videos will also be organized. Particular attention will be paid to the posters. Some of the submitted topics will very likely be converted into posters. This year there will be a session for poster authors to defend their topic, and comments on the best ones will also be made during the general session.

Last year, the portion reserved for mini-courses for beginners or intermediate levels, workshops, lunch symposia, and discussion table topics was such a huge success that this next meeting will continue in this direction.

Among the featured invited guest speakers, already confirmed is Dr. Dominique Van Neste, who will present a very interesting topic regarding the difficulty to judge the evolution of a hairy zone, and Dr. Tom Dawson, who will approach a new type of medical treatment to liven up miniaturized hair.

New techniques, such as PRP, injection of A-cells, and the use of oral minoxidil or finasteride in solution, will also be described.

As the FUE session will be largely developed in Polanica Zdrój at the World Live Surgery Workshop on the days preceding the Congress, the FUE session will essentially consist in a summary of the best moments and tips given during the workshop.

For FUE lovers, I warmly recommend you to reserve your seat for the LSW in Polanica Zdrój on October 1st and 2nd.

For assistants, remember we have a detailed Surgical Assistants Program, and this year's chair is the wonderful Emina Vance.

I am delighted that you will all gather here in this wonderful city of Prague to attend the big mass of hair transplantation, marked with a sharing and conviviality spirit. And I am especially delighted to see that year after year, the search for quality continues to be the main purpose of our organisation.

QUALITY and INNOVATION



The photos show the beautiful and iconic astronomical clock of Prague dating to 1410. It is the oldest, functioning astronomical clock in the world. It is a symbol of QUALITY.

As in the clock, the World Congress will look at concepts and techniques ingenious and tried-andtrue—in a new and detailed

way. Our emphasis is on INNOVATION, building on past experiences and finding and sharing new perspective and techniques while keeping the timeless, unchanging "truth."





Message from the ISHRS 2017 World Live Surgery Workshop Chair

Arthur Tykocinski, MD, FISHRS | São Paulo, Brazil | arthur@cabelo.med.br

Isn't it frustrating when you see so many different FUE devices, and you have no idea which one is "tailored" for you? They may be heavy, vibrate, be noisy, or not fit in your

hand! What about a test drive? Wouldn't that be great?

You don't have to wait any longer. At **FUE Immersion WLSW**, exhibits will not only be at the conference center, but also at the hospital. There, you can test and try the different instruments being used by experienced surgeons, and take advantage of the personal, "hands-on experience" at the exhibit tables.

You can find the right set-up for you: from manual to motorised, analog to digital, hand-controlled to foot-controlled, portable, double handpiece, and more. You can examine and try all kinds of punches: sharp, dull, hybrid, serrated, with depth limit and new releases. Once grafts are removed, they must be placed. Implanters will also be highlighted at the workshop. This workshop is not just lecture. There will be dialogue and debates, demonstration surgeries covering different techniques, and you will be able to try different models at the exhibit tables. Try them all: load, release, and change needles.

The complete exhibit covers a wide range of products tailored for FUE. The only bad news is that it won't be enough space for all interested members. I know, it's terrible, but sadly we had to restrict the number of attendees in order to ensure *maximum quality* and the *best possible learning experience*.

Sign up here for the **"priority waiting list"**: **http://25than-nual.com/25thannual/world-live-surgery-workshop**/.

A good friend should give good advice!





Message from the 2017 Surgical Assistants Program Chair

Emina Vance | Plano, Texas, USA | emina@hairtx.com

We are excited to share that our Surgical Assistants Program and Surgical Assistants Core Skills Workshop have been redesigned to offer the highest educational value

for novice and experienced surgical assistants and their employing physicians.

The Surgical Assistants Core Skills Workshop will provide basic knowledge and help develop the essential skills for newcomers. The workshop will include lectures on hair anatomy and physiology, offer the basics of hair transplantation, and explore in-depth the techniques of graft preparation and placement. After the comprehensive lectures, students will be guided through several stations where they will have the opportunity for hands-on practice and to closely work with highly experienced faculty.

This year, the Surgical Assistants Program will take place in the afternoon. We have made this adjustment to accommodate for late evening or early morning arrivals. The focus of the lectures is also shifting from basic to advanced topics. In addition, we are adding extra time to cover a variety of topics that will cater toward more experienced assistants.

Every year I learn something new at the meeting, and I bring back many pearls that help improve our practice. I hope that these changes will inspire and encourage more physicians to bring their surgical assistants—novice and experienced—to the meeting. See you in Prague!

Audience Response System Review—Las Vegas

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

It is time for my annual review of the ARS data generated from the Annual Meeting, with data from the Las Vegas 2016 ISHRS World Congress adding to data from prior years. This past year, I was given the job of ARS coordinator with the intention of standardizing the questions that are asked every year, and of eliminating duplicate questions from well-meaning moderators who had no advance knowledge of questions being asked elsewhere during the program. The ARS data can be very valuable, but if used carelessly, precious time during the meeting is wasted. I therefore standardized a series of demographic and practice questions that have been asked since 2011, so that moving forward, more accurate trends can be identified.

Looking first at practice location, we can see in Figure 1 that the United States remains the location most represented at our meetings. However, this dominance decreased from 40% in 2011 to only 30% in Las Vegas in 2016. Meanwhile, attendance from Mexico and Central and South America jumped during this time from just 8% to 20%, with the remainder of the world remaining fairly stable. The Mexico and Central and South America region represents a substantial portion of the globe, and if meeting attendance is indicative of the expertise and popularity of hair restoration, then I think it's healthy to see this region achieve representation equal to Europe and Asia.



Meeting locations: 2011, Alaska; 2012 Bahamas; 2013, San Francisco; 2014, Kuala Lumpur; 2015, Chicago; 2016, Las Vegas

Figure 2 reveals that, for the first time ever, the percentage of Dermatologists at the meeting dropped below that of Plastic Surgeons and Surgeons, and just barely above that of General/Family Medicine specialists attending. In fact, only 6 percentage points separate Dermatology from "Other." What has happened to explain this trend? Our understanding of the biology and physiology of hair, of structure and function, of disease processes and treatments, not to mention the fundamentals of hair surgery, all came from the field of dermatology. I personally hope this trend reverses.

Figure 3 shows the trend in experience over the years. The data is difficult to interpret. There is a clear increase in the percentage of attendees with less than two years' experience. These represent newcomers to the field. There is also





an increase in all the experience categories over 21 years, representing our older physicians. But other than the 11-15 year category, all other categories have declined. These are our younger but experienced practitioners, so the trends are to me confusing.

Figure 4 reveals surgical caseload volume and shows that over 20% of attendees could be called "dabblers," performing fewer than one procedure per week, while less than 15% of attendees run "high-volume" practices performing two or more daily procedures. The remainder mostly perform one procedure daily, and many likely do not limit their practice exclusively to hair restoration.

The ARS data for Figure 5 included a data point not asked before. In prior years, attendees performing HT exclusively were bundled with those devoting at least 75% of their





practice to hair. I thought it would be worthwhile to identify the former group. The data do indeed reveal that over 30%, which is a significant number, are purely hair surgeons. Interestingly, this year there were more "dabblers" than serious surgeons who have mixed practices. I look forward to seeing these data in the future.



Figure 6 revealed that in 2011, 36% of attendees performed strip surgery exclusively. This number is now down to 13%, reflecting both the growing demand for as well as improved instrumentation for FUE. Attendees were evenly divided between those who perform mostly FUE versus those who perform mostly strip. And for the first time, we determined that 26% of attendees perform FUE exclusively.

Importantly, ARS data also revealed that 75% of attendees believe that FUE and strip surgery will happily coexist in the future. And notably, while 78% felt that combining



strip procedures with FUE produce the most donor grafts, 25% of surgeons will harvest over 30% of FUE grafts from outside the "safe zone," and another 50% will harvest 10-30% outside the safe zone. That means that at least 75% of FUE surgeons regularly harvest outside the safe zone. For comparison, in 2015, 68% of attendees stated that they did not violate the safe zone. It remains to be seen if this shift will ultimately hurt our field.

Finally, only 20% of attendees are currently using implanters to place grafts, although this question did not distinguish between strip and FUE procedures. I suspect that this number will rise significantly in future years.

I will continue to work with the Program Chair and moderators to help make the ARS a valuable tool during the meeting. It is very helpful to get immediate feedback regarding one's practice approach and how it compares to those of colleagues.





ISHRS Annual Giving Fund 2016 Year-End Report

Dear Colleagues:

I am proud to report that after 10 years the ISHRS Annual Giving Fund is still successfully raising funds to support worthwhile projects and initiatives. Each who donated has helped the ISHRS to realize its goals and provide valuable member benefits and support to the AGF and Operation Restore mission to make such transforming gifts.

2016

To recap, while the ISHRS Annual Giving Fund did not meet its 2016 fundraising goal of \$40,000, I want to personally thank all who contributed so generously this year making it possible for us to raise \$33,350. Each of you has helped the ISHRS achieve many of its philanthropic and educational goals.

The proceeds from the year's Annual Giving Fund were used to support several projects and initiatives. Here is an example of what your gifts helped fund in 2016:

- **Operation Restore Pro Bono Program:** Since its inception in 2004, Operation Restore has provided \$653,400 of free hair transplant services and expenses for ninety (90) patients suffering from hair loss due to disease or trauma. The program helps cover patients' travel expenses related to their procedures. \$6,700 in funding helped support our pro bono program.
- Cicatricial Alopecia Research: \$10,050 in funding helped to support patients around the world suffering from scarring, inflammatory, permanent hair loss, via funding research. In addition, your contributions helped patients gain access to support groups, patient-doctor conferences, and other valuable information.
- **Communications & Public Education**, which includes website improvements and SEO: \$6,700 in funding went toward the ISHRS website including SEO and other improvements.
- **Support of Educational Offerings:** \$10,000 in funding helped create educational programs including regional workshops and online learning.

2017 GOALS

In 2017, we again hope to reach our \$40,000 fundraising goal. We will be reaching out to old and new members asking them to carry the torch. It is my hope that many of you will be inspired by the important work that past donations have funded. Your 2016 donation will help continue to fund the Operation Restore Pro Bono Program, hair research, and additional public education via our www.ISHRS.org website.

PLEASE CONSIDER DONATING. For those who have not yet contributed, it is easy to support the ISHRS's Annual Giving Fund. If you choose to donate for 2017 or to make another multi-year pledge, please complete the online donation form by going to: http://www.ishrs.org/content/ishrs-annual-giving-fund.

Or, if you prefer, you can contact Kimberly Miller at the ISHRS headquarters office at agf@ishrs.org with your credit card information, amount of donation, and number of pledge years. New donors will receive a lapel pin, and we ask you to wear it proudly at ISHRS meetings. Those who make a 2017 charitable contribution to the AGF at the Trustee or Leadership Circle levels will receive two complimentary tickets to the Gala in their Annual World Congress registration packets and will be acknowledged during the Gala Dinner Dance.

Your generosity in giving makes a concrete statement that you support the ISHRS and its initiatives. Thank you for your consideration of a gift to the Annual Giving Fund. All gifts are tax-deductible within provisions of your national income tax laws. Should you need additional information, please contact the ISHRS headquarters at 1-630-262-5399.

Most sincerely,

John D.N. Gillespie, MD, FISHRS, Chair ISHRS Annual Giving Fund

Thank You to Our Donors

2016 Donors

The ISHRS gratefully acknowledges the generosity of the following individuals who have made donations to the Annual Giving Fund:

Trustee Circle: \$2,000

Mark Bishara, MD Mark S. DiStefano Sr., MD, FISHRS Vincenzo Gambino, MD, FISHRS John D.N. Gillespie, MD, FISHRS Ken Washenik, MD, PhD, FISHRS Sara Wasserbauer, MD, FISHRS Kuniyoshi Yagyu, MD, FISHRS

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Contributor's Circle: \$250 Ricardo Mejia, MD

Donations: <\$250

David Magwenjere, MBBS Osman T. Oguzoglu, MD



March/April 2017

Classified Ads

Seeking Hair Transplant Physician and Technicians

Anderson Center for Hair in Atlanta, Georgia is looking for a full-time hair restoration physician, and full-time technicians. We are a state-of-the-art, brand-new boutique center. We perform one procedure per day, with emphasis on quality, ethics, and natural results...not quantity. On-the-job training available for physicians. Technicians will require experience, with references required. Outstanding, friendly working environment, salary, benefits, insurance, 401k, vision, dental, etc.

Please email your résumé to: jobs@andersonhsc.com.

Seeking Hair Transplant Physician

We are an established hair restoration clinic and we are looking to expand our practice. Currently we are looking for a hair restoration physician/surgeon in the Virginia/Washington, DC area. Must be experienced in FUT and FUE procedures. Please contact us at sebastiang0325@gmail.com for further information.

Seeking Hair Transplant Surgeon Los Angeles—Immediate Opening—Top Pay

Busy Los Angeles hair transplant practice is looking for an experienced hair transplant surgeon to join. Please contact jobs@calihairloss.com or 1-888-930-0554.

Seeking Hair Transplant Surgeon

Searching for a Hair Transplant Surgeon to assist our patients in the Fort Myers/Naples, Florida area. Must specialize in the FUE and FUT methods, be licensed to practice in Florida and willing to travel to our clinic 1-2 weeks per month.

Compensation: Dependent on experience.

Please call 855-855-4310 or email info@htof.us.

Hair Transplant Clinic/Business for Sale

Hair transplant clinic located in central New Jersey for sale. Clinic has been established for over 20 years; specializes in hair transplant only. Will train new buyer.

Phone: 1-908-380-5080 or email: tango5678@me.com.

ARTAS® System for Sale

Brand-new, state-of-the-art ARTAS robotic hair transplantation system for sale. ARTAS System includes: ARTAS hair studio, ARTAS robotic system, ARTAS chair, software, controls and training program for the first 10 classes. The selling price is \$280,000.00 US, however, we are willing to negotiate and accept reasonable offers.

Please call Dr. AL-Saadon at 226-402-1084 or email dr_kalsaadon@outlook.com.

FUE Physician Assistant Wanted — \$150K - \$250K+ YR

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RESTORE HAIR, specializing in FUE, has been endorsed by numerous celebrities and athletes over the past two years. We are immediately in search of a skilled, trained FUE harvester to work in our Chicago office. Our compensation structure and benefits package is extremely competitive in the industry. We will cover relocation costs if not located in Chicagoland area.

Requirements: Physician Assistant, DO, or MD. Proficient at handheld (non-robotic) FUE harvesting, and must be interested in a permanent/ long term engagement.

www.RestoreHair.com

Please send resume and cover letter to: HR@restorehair.com

Calendar of Hair Restoration Surgery Events

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

DATES	EVENT/VENUE	SPONSORING ORGANIZATION(S)	CONTACT INFORMATION
MAR 31-APR 2	5th Annual Scientific Meeting in Hair Restoration & Live Surgery Workshop Bangkok, Thailand	Asian Association of Hair Restoration Surgeons (AAHRS) www.aahrs.asia	5thaahrs@gmail.com
* APR 26-29, 2017	ISHRS Orlando Live Surgery Workshop Orlando, Florida, USA	International Society of Hair Restoration Surgery www.ishrs.org	hvalariem@leavittmgt.com 1-321-594-5530
MAY 9-12, 2017	University Diploma of Scalp Pathology and Surgery <i>Paris, France</i>	University of Paris VI Coordinators: P. Bouhanna, MD and M. Divaris, MD www.hair-surgery-diploma-paris.com	Dr. Pierre Bouhanna, Course Director sylvie.gaillard@upmc.fr
MAY 18-21, 2017	FUE Europe Ankara, Turkey	FUE Europe www.fue-europe.org www.fueeurope2017.com	Dr. John Cole, Program Chair john@íorhair.com Dr. Ozgur Oztan, Director drozgur@hlc.com.tr
MAY 20-21, 2017	7th Annual Scientific Meeting of KSHRS Seoul, Korea	Korean Society of Hair Restoration Surgery (KSHRS) www.kshrs.org	kshrs@naver.com
MAY 27-28, 2017	Society for Hair Science/ ISHR International Scientific Meeting <i>Venice, Italy</i>	Italian Society for Hair Science Hosted by Andrea Marliani, MD http://eventi.sitri.it/en/	segreteria@sitri.it vincenzogambino@vincenzogambino.com
JULY 20-22, 2017	3rd Latin American Hair Transplant Workshop FUE Workshop 2017 <i>Asuncion, Paraguay</i>	Paraguayan Society of Hair Restoration Surgery (SPACREC) and Paraguayan Society of Plastic & Reconstructive Surgery (SPACPRE)	http://workshop-latc.com/
• OCT 1-2, 2017	ISHRS World Live Surgery Workshop Polanica Zdrój, Poland	International Society of Hair Restoration Surgery www.25thannual.org	info@ishrs.org
OCT 4-7, 2017	25th World Congress of the ISHRS Prague, Czech Republic	International Society of Hair Restoration Surgery www.25thannual.org	info@ishrs.org
OCT 20-22, 2017	ISHRS Advanced FUE Workshop L.A. Los Angeles, California, USA	International Society of Hair Restoration Surgery	drumar@dru.com
OCT 31-NOV 3, 2017	10th World Congress for Hair Research (WCHR2017) Kyoto, Japan	The Society for Hair Science Research–Japan http://www.congre.co.jp/wchr2017/	wchr2017@congre.co.jp
* NOV 16-19, 2017	Hair Transplant 360 Cadaver Workshop & FUE Hands-On Workshop <i>St. Louis, Missouri, USA</i>	Saint Louis University School of Medicine, Practical Anatomy & Surgical Education in collaboration with the International Society of Hair Restoration Surgery	Dr. Samuel L. Lam, Course Director Emina Vance, Asst. Course Director http://pa.slu.edu

*2017 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

26TH WORLD CONGRESS

October 2018 USA

27TH WORLD CONGRESS

November 13-17, 2019 Bangkok I Thailand 28TH WORLD CONGRESS

October 21-25, 2020 Panama City I Panama

INTERNATIONAL SOCIETY OF HAIR RESTORATION SURGERY

Vision: To establish the ISHRS as a leading unbiased authority in medical and surgical hair restoration.

Mission: To achieve excellence in medical and surgical outcomes by promoting member education, international collegiality, research, ethics, and public awareness.

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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 progressing the art and science of hair restoration and benefiting patient outcomes.
- If results are presented, the medical regimen or surgical techniques that were used to obtain the results should be disclosed in detail.
- 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 who are experts in the particular area in question, for the purpose of obtaining rebuttal 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 blinded 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.
- A completed Author Authorization and Release form—sent as a Word document (not a fax)—must accompany your submission. The form can be obtained in the Members Only section of the Society website at www.ishrs.org.
- 10. All photos and figures referred to in your article should be sent as *separate* attachments in JPEG or TIFF format. Be sure to attach your files to the email. Do NOT embed your files in the email or in the document itself (other than to show placement within the article).
- 11. Images should be sized no larger than 6 inches in width and should be named using the author's last name and figure number (e.g., TrueFigure1).
- 12. Please include a contact email address to be published with your article.

Submission deadlines: April 5 for May/June 2017 issue June 5 for July/August 2017 issue August 5 for September/October 2017 issue October 5 for November/December 2017 issue

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COURSE OUTLINE

Welcome and Opening Remarks Marco N. Barusco, MD | USA & Bernard A. Arocha, MD, FISHRS | USA State of the ABHRS/IBHRS Michael W. Vories, MD | USA Criteria for ABHRS Certification and Application Process Scott Boden, MD | USA The Written Exam Robert P. Niedbalski, DO | USA The Oral Exam Marco N. Barusco, MD | USA Ethical Guidelines for the ABHRS Daniel G. McGrath, DO | USA

SESSION 1 – ALOPECIAS Moderator: Marco N. Barusco, MD | USA

Male & Female Pattern Alopecias Ricardo Mejia, MD | USA Other Alopecias Ricardo Mejia, MD I USA *Questions & Answers*

SESSION 2 – PATIENT SELECTION & DONOR AREA Moderator: Bernard A. Arocha, MD, FISHRS | USA

Consultation and Medical Evaluation of the Patient Robin Unger, MD | USA Medical Treatment of AGA Gholamali Abbasi, MD | Iran Surgery Planning – Age and Potential for AGA Márcio Crisóstomo, MD, FISHRS | Brazil Donor Planning and Harvesting – FUT

Daniel G. McGrath, DO | USA Donor Planning and Harvesting – FUE Michael W. Vories, MD | USA Questions & Answers

SESSION 3 – RECIPIENT AREA PLANNING Moderator: Michael W. Vories, MD | USA

Strategies for Advanced AGA Márcio Crisóstomo, MD, FISHRS | Brazil Hairline Design (Male and Female) Bernard A. Arocha, MD, FISHRS | USA Transplantation of the Crown Timothy P. Carman, MD, FISHRS | USA Transplantation of the Eyebrows Robert J. Reese, DO, FISHRS | USA Transplanting into Scars / Reconstructive HRS Marco N. Barusco, MD | USA Questions & Answers

SESSION 4 – ODDS AND ENDS Moderator: Robert P. Niedbalski, DO | USA

Emergency Situations in HRS Carlos J. Puig, DO, FISHRS | USA Flaps and Scalp Reductions Carlos J. Puig, DO, FISHRS | USA Most Common Complications in HRS Timothy P. Carman, MD, FISHRS | USA *Questions & Answers*

SESSION 5 – ORAL EXAM SAMPLE CASES Moderators: Daniel G. McGrath, DO | USA & Michael W. Vories, MD | USA

- Case # 1 Robert J. Reese, DO, FISHRS I USA Michael W. Vories, MD | USA
- Case # 2 Marco N. Barusco, MD | USA Michael W. Vories, MD | USA
- Case # 3 Bernard A. Arocha, MD, FISHRS | USA Michael W. Vories, MD | USA

Closing Remarks/Adjourn Marco N. Barusco, MD | USA Bernard A. Arocha, MD, FISHRS | USA

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