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IN THIS ISSUE

A Histological and Clinical Evaluation of Plasma as a Graft Holding Solution and Its Efficacy in Terms of Hair Growth and Graft Survival

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Disclosure: Authors have no conflict of interest.

INTRODUCTION

The surgical trauma of hair transplantation triggers inflammation, which is the first step in wound healing. The brunt of the biochemical changes has to be borne by the newly transferred grafts, which are devoid of any blood supply. Graft survival is affected by a multitude of factors including graft harvesting, dissection, manipulation during implantation, and ischemia/reperfusion injury following implantation in the body. The insults inflicted from these unfavourable factors lead to apoptosis, which affects graft survival and the quality of hair regrowth. In order to achieve the best results, we should focus on improving all of the above mentioned factors.

Grafts harvested and maintained out of the scalp are preserved in a holding solution until they are implanted. Thus, the holding solution plays a crucial role in the hair transplant procedure. An ideal holding solution should have the same osmolality as the graft cells, should prevent acidosis, should provide energy to the cells, and should prevent the release of free radicals. There are two types of holding solutions: extracellular and intracellular. Examples of extracellular solutions are normal saline, Lactated Ringer's (LR), and plasma-like fluids. The intracellular solutions are represented by HypoThermosol®. Extracellular holding solutions do not require chilling, which causes sodium pump failure leading to swelling of the cells, whereas intracellular holding solutions do require chilling.[1]

At our center, we use autologous plasma with platelets as a graft holding solution during hair transplantation surgery. Clinical results have been evaluated with trichoscan analysis and supported by histological evaluation for graft viability. There is literature advocating the use of platelet-rich plasma (PRP) to promote hair growth, based on the logic that platelets have growth factors that stimulate the stem cells of hair follicles.[2]

OBJECTIVE

To evaluate plasma as a graft holding solution in terms of its efficacy in hair growth and hair graft survival.

METHOD

A split-scalp study was carried out comparing grafts transplanted on the right and left fronto-temporal areas selected as recipient sites in the same patient. In the initial study, we used mainly FUT grafts, and in the last phase, we used FUE grafts. A total of 6 patients have been enrolled in the study so far. The left side was designated as the control area (Group A), and the right side behaved as the test area (Group B), for comparison of the results. The right fronto-temporal area received grafts preserved in autologous plasma, while the left fronto-temporal area received grafts preserved in LR solution. Both sides were implanted with grafts harvested using the same technique, with an equal number of grafts of the same quality, and with the same implantation time. Grafts on both sides were implanted by two surgeons sharing similar experience and expertise using optical loupes for magnification (4.5×).

Both the autologous plasma and the LR holding solutions with the grafts were maintained at a temperature of approximately 12 ± 2°Celsius, whereas the room temperature was maintained around 18°Celsius.

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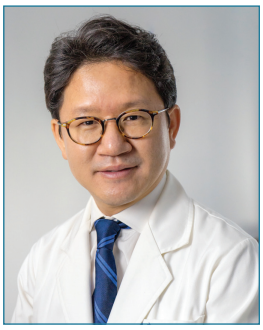

President's Message

Sungjoo (Tommy) Hwang, MD, PhD, FISHRS | *Seoul, South Korea* | president@ishrs.org

Dear Colleagues,

Recently, I have been attending numerous meetings held by members of the Global Council Society. I visited India in February for HairCon and Dubai in early March for the ISHRS World Live Surgery Workshop. Also, I attended the Taiwan Society meeting in late March and went to Beijing in May to attend a joint conference of the AAHRS–China Association of Hair Restoration Surgeons. The Taiwan Society and Chinese Society are planning to apply to be members of the Global Council.

The joint conference held by the AAHRS and the China Association of Hair Restoration Surgeons was especially meaningful and special. At the meeting, there were a total of 400 physicians, including 300 Chinese doctors and 100 Asian and international doctors. It was the second biggest conference after the ISHRS. At this meeting, many doctors shared their ideas and wisdom via the lectures and six surgical procedures were demonstrated. I was very pleased to be able to meet many of my old colleagues from the ISHRS, such as Walter Unger and Richard Shiell, whom I have not been able to see often. Richard Shiell traveled abroad for the first time in many years, since his retirement in 2006, to meet with fellow physicians and to give advice and encouragement to junior doctors. Furthermore, the knowledge shared by Walter Unger, who has 50 years of experience in hair transplantation, was a great help to many participants. I believe that it was an outstanding academic conference, which gave the opportunity to learn from experienced seniors in the field of hair transplantation.

I am aware that many members have submitted abstracts for the Hollywood ISHRS World Congress and you can expect many new and exciting things at the meeting. We have also invited experts on chemotherapy-induced alopecia, which is frequently encountered in clinical practices. I think this topic will be of great help to many of our members. I am deeply grateful to Parsa Mohebi, Program Chair, and the World Congress Committee members who have been working hard to prepare this Congress.

The ISHRS issues the *Hair Transplant Forum International*, or *Forum* for short, once every two months. Over the past 20 years, many research papers and articles on surgical skills have been published. These medical resources are extremely useful for hair transplant physicians. Unfortunately, until now there has been no way to access previously published materials. In order to access old data, you would need a paper copy of the *Forum* or a pdf file. To tackle this, we are developing an e-publishing platform to enable search functions. When this is in place, you will easily be able to look up research materials published in the past, which will be of great help to our members. I would like to thank Bob True for all his work and efforts on putting this in place.

Regarding potential venues for the World Congress, we have already decided Hollywood, USA in 2018, Bangkok, Thailand, in 2019 and Panama City, Panama, in 2020. We are currently in the process of thinking about potential venues for 2021. Members are welcome to make suitable suggestions, as it would be of great help. In addition, I would like to encourage you to apply for ISHRS Research Grants and recommend candidates for the Platinum Follicle Award, the Golden Follicle Award, the Distinguished Surgical Assistant Award, and the Board of Governors. I am sure that there are many suitable candidates for these grants, awards, and positions.

Lastly, I would like to sincerely thank you all for your effort and continuous support for the development of the society. I will do my best to assist in any way. ■

Co-editors' Messages

Andreas M. Finner, MD, FISHRS
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I just returned from the Meeting of the European Hair Research Society in Bologna (www.ehrs.org). A lot of research was presented.

The hair follicle is an exciting object to study for basic scientists. This includes hair immunology, stem cells, signals, receptors, cycling, inflammation, pigmentation, hair care, and genetics. While male pattern hair loss can be attributed to several genes, female pattern hair loss appears to have a different and poorly understood genetic etiology. Minoxidil works in both conditions but some patients have a deficiency of the activating enzyme sulfonyl transferase and need higher concentrations.

As explained in this issue's Literature Review, topical finasteride may become a new treatment option. However, in higher doses, it also suppresses systemic DHT, which would diminish the potential advantage over oral finasteride. PRP is increasingly used, but platelet lysate produced with ultrasonic waves may contain even higher concentrations of growth factors.

Hair transplantation lectures and sessions have become a regular part of hair research meetings. This is because more and more studies have demonstrated the effect of hair surgery to improve advanced alopecia.

This issue contains a study on using plasma as a holding solution and a Cyberchat discussion about graft chilling. More and more data on the final outcome of different techniques and instruments will further improve the acceptance of our work and results.

To have your report be published in an upcoming issue of the *Forum*, please email it to forumeditors@ishrs.org. ■

Bradley R. Wolf, MD, FISHRS
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To be successful in our field, surgeons need stay current on the increasing number of topics and details necessary for successful and maximal hair regrowth. In this issue, we are fortunate to present articles on holding solutions, fat cells to stimulate follicles, and topical finasteride, among other useful and pertinent topics.

I have heard Anil Kumar Garg's lecture on plasma with PRP as a graft holding solution at more than one meeting and have been impressed with his results, which we present here. Although obtaining and using plasma and PRP is more difficult than other holding solutions, the impressive results suggest it may be worth the extra effort, but further studies are certainly warranted to prove this.

Robin Unger's Cyberspace Chat presents important contemporary and practical information on holding solutions from some of our more experienced surgeons as well as the results of studies performed on holding solutions. I urge everyone who uses holding solutions to read this column.

We welcome Mario Marzola's first Editor Emeritus column. Mario and fellow past Co-editor Bob True were certainly mentors for me and I admire their ability to remain at the forefront of new developments in our field. Mario writes about using fat cells to unlock the potential of miniaturized follicles while Bob is hard at work updating our website to improve the *Forum* search function as well as making the articles more visible to the medical community.

As the lay press and literature continue to vilify finasteride, topical finasteride is getting more interest by those concerned about the potential side effects of finasteride. In Literature Review, Nicole Rogers examines an article which summarizes the results of seven studies regarding the efficacy of human *in vivo* topical finasteride treatment. In general the studies appear to support the use of topical finasteride.

From 2008–2011, the Hair or Basic Sciences column was written by Nilofer Farjo. Jerry Cooley took over from 2014–2016. We would like to thank Nilofer and Jerry for their work on this column over the years. Jerry has decided to turn the reins over to Vladimir Ratushny who practices in Beverly, Massachusetts, about 30 miles northeast of Boston. Dr. Ratushny grew up on Long Island, New York, completed a combined MD–PhD Program at Drexel University College of Medicine and Fox Chase Cancer Center in Philadelphia, and completed his dermatology residency training at the Harvard Dermatology Residency Training Program. We thank him for accepting this position and look forward to his learned contributions.

We would also like to thank Bob Niedbalski, President of the ABHRS, for his update in addition to all columnists and article authors for their contributions. ■

Notes from the Editor Emeritus, 2014–16

Mario Marzola, MBBS | *Adelaide, South Australia* | mario@marzola.net

Hello, friends and colleagues! This is my first Editor Emeritus column. How time flies! I have always enjoyed reading the *Forum*s, no more so than now. Congratulations to Brad Wolf, Andreas Finner, and all the columnists. The journal has never been in better hands.

My world continues to be dominated by the unsolved mysteries of medicine, none more than the mysteries of hair biology. Rather than follicular neogenesis in a laboratory, then planting the new follicles into the scalp, the Holy Grail for me is the reversal of miniaturization of our existing follicles. See the photos in Figure 1, the second of which is computer generated as you would have guessed. But why not dream of this? We already know that hair can move from vellus to terminal and back to vellus again, and what's more, make that transition over and over. All that is needed are the appropriate signals.

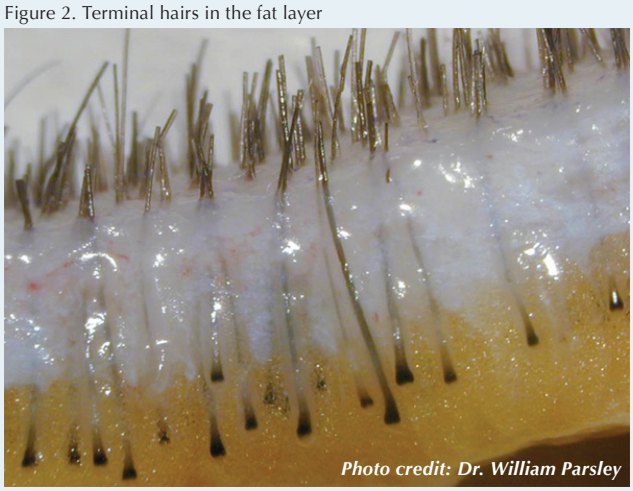
Figure 1.

We also know that the miniaturized follicles can live in the vellus state for many years. Some say forever, but most researchers would agree that there is an attrition rate sooner or later. Nevertheless, every person currently miniaturizing would still have all the follicles alive and capable of reversal if we knew the way. Today, we are already seeing reversal of miniaturization with finasteride and dutasteride. I'm sure we have all been amazed when the occasional patient returns with a "wow" factor of much more hair growth than before. I'm seeing it occasionally with these drugs but more with oral minoxidil. Even more with the two combined. How can we increase the number of these "wow" factor patients?

With our current medications, the untapped potential is most likely in the potassium channel openers/activators like minoxidil. There are many other medications with the same action so the possibility of improving the effect on hair is enticing. It was Professor Valerie Randall of University of Bradford who shed light on the potassium channels, but I believe she has retired. Now this may be a great opportunity for a PhD student to take it further. By good fortune or by good research, we will find the answer.

Another fascinating area that is emerging is the relationship between anagen follicles and fat cells. Big, healthy terminal hairs bury their bulbs well into the fat layer (Figure 2, courtesy of Dr. William Parsley). Bald scalps possess much less fat than scalps with a full head of healthy hair. It seems that we can't have one without the other. Another Valerie, Dr. Valerie Horsley of Yale School of Medicine, speaks of a correlation as yet unexplained between fat and hair growth. Even before we can discover why terminal bulbs need fat cells, why don't we give scalps with miniaturizing hairs a fat transfer? Many case studies and trials doing just that are on their way; let's watch this space.

Figure 2. Terminal hairs in the fat layer



Fat, as we know, contains a large reservoir of stem cells, which some of us have used successfully in the treatment of osteoarthritis. In this space, the fat is processed to remove the large lipid-filled cells leaving behind a "soup" called stromal vascular fraction (SVF). This contains stem cells, progenitor cells, pericytes, endothelial cells, fibroblasts, and some red and white cells as well as extracellular matrix and damaged cells. SVF has been successful in treating osteoarthritis but not so in hair loss. Many of us have injected SVF into balding scalps with little to no benefit. Is it possible, therefore, that the secret ingredient for hair growth is in the fat cell itself?

History will tell us that nothing is forever, especially in this fast-evolving field of hair restoration. Less invasive treatments have been the feature of the evolution of hair restoration in my 40-year tenure, perhaps soon we will have good enough reversal of miniaturization to dispense with surgery. Burns, accidents, and scarring alopecia loss I imagine will still need surgery, but hopefully for our average MPHL and FPHL patients… no. ■

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The following parameters were taken into consideration for the study:

- A histological study with MTT stain (a colorimetric assay for assessing cell metabolic activity) was done in order to confirm the viability of cells in the grafts at 12 hours and 72 hours.
- Periodical post-operative patient follow-up with regular photographs and trichoscan evaluations was used to identify any event of anagen effluvium due to post-surgical shock loss.
- Trichoscan study for hair density was done at 3 months for hair growth.
- Hair thickness was assessed at 6 months and 12 months for the quality of hair growth.

Preparation of autologous plasma

Preparation of autologous plasma was the first step before performing the hair transplant. We collected 23cc of blood from the patient in a syringe with 2cc ACD (acid citrate dextrose) solution as an anti-coagulant. The blood was transferred to a high-quality glass container designed by the author. The blood was centrifuged in a temperature-controlled (19°Celsius) centrifuge machine at 5,000 RPM (rotations per minute) for 16 minutes. The process resulted in the separation of red blood cells (RBCs) at the bottom of the tube and plasma with platelets forming the upper fluid compartment. The 23cc of blood yielded approximately 12cc of plasma. Hence, we can deduce that the platelet concentration was twice normal levels. The lab further confirmed that the platelet count ranged between 400,000–500,000/mm^3. The plasma created was then stored in a sterile stainless steel bowl (a petri dish can also be used) maintaining a temperature of 12° ± 2°Celsius on a cool gel pack ready to receive the grafts.

The harvested grafts were divided randomly into two groups, with an equal number of grafts per side. Control Group A grafts were stored in LR solution and test Group B were stored in plasma solution. The temperature of both graft holding solutions was maintained as the same. Grafts dipped in plasma formed a very loose clump. A trained assistant separated the individual grafts from a small clump and placed it on the surgeon's hand to implant.

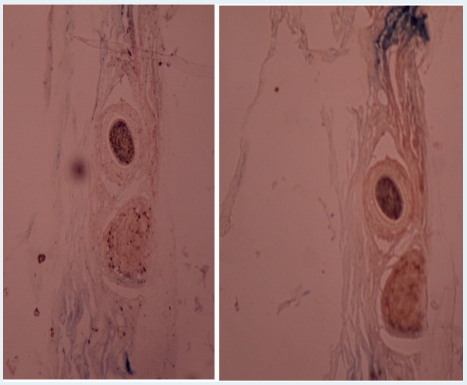
Six volunteer patients ranging in age between 25 to 40 years old and having similar grades of male pattern hair loss (MPHL) were included in the study. Grafts were implanted over the bilateral fronto-temporal areas as planned. Grafts stored in plasma solution were implanted on the right fronto-temporal side and the grafts stored in LR solution were implanted on the left fronto-temporal side. The same number of grafts were implanted resulting in a standard density of 40 grafts/cm^2. Routine post-operative care of the donor and the recipient areas was followed as per general guidelines for all hair transplant patients. The study was conducted as follows:

- The graft samples A and B were sent for MTT staining at 12 hours and 72 hours of graft holding time in order to determine viability of the cells.
- Patient follow-ups were conducted at 1, 2, 3, 4, 6, and 12 months after transplant.
- Photographs were taken for comparison of the left and right fronto-temporal areas with and without flash.
- Hair count and density were taken on both sides using trichoscan.
- At the 6- and 12-month follow-ups, photographs and trichoscan for hair thickness were repeated for evaluation of terminal hair.

OBSERVATION

MTT staining at 12 hours showed that grafts stored in LR solution showed poor staining, while the grafts stored in plasma solution were well stained, indicating good cell viability in the plasma group when compared to the LR group (Figure 1). MTT staining at 72 hours showed grafts stored in plasma showed good staining while the LR group showed very poor staining.

FIGURE 1. MTT staining at 12 hours



Trichoscan study

As shown in Table 1, the hair count and density in the plasma group were significantly higher than in the LR group. The unpaired t-test showed the LR group had a mean 4.5 ± 2.95 SD and the plasma group had mean 27.50 ± 4.135 SD with P-value < .001.

TABLE 1. Hair Count and Density at 3 Months on LR Side and Plasma Side
(Implanted density: 40 grafts/cm^2)

	Hair Count		Hair Density (per square cm)		Average % of Hair Growth	
G.H. SOLUTION	**RL**	**PLASMA**	**RL**	**PLASMA**	**RL**	**PLASMA**
	2	9	6.6	29.7		
	1	10	3.3	33	11.00%	68.75%
	2	7	6.6	23.1		
	0	8	0.0	26.4		
	2	7	6.6	23.1		
	1	9	3.3	29.7		
AVERAGE	***1.3***	***8.3***	***4.4***	***27.5***		

CLINICAL EVALUATION

Photographs of the right and left fronto-temporal areas were taken at 50 days (Figure 3) and 120 days (Figure 4) after hair transplant for evaluation of hair growth and anagen effluvium. Also shown is a patient 120 days after transplant. Plasma holding solution was used for all grafts (Figure 5).

DISCUSSION

The most important benefit of a graft holding solution would be an increase in hair yield from the transplanted grafts. The optimum holding solution would reduce the damage from reperfusion injury and free radical formation as well as from ionic imbalance and variation in osmolality created by the ischemic phase.

Holding solutions are formulated according to the composition of intracellular and extracellular body fluid environment

FIGURE 3. Immediate post-op *(top)* and 50 days post-op: plasma *(bottom left)*, Lactated Ringer's *(bottom right)*

FIGURE 4. Pre-op *(top)* and 4 months post-op: patient's right hairline *(bottom left)*—plasma, left hairline—LR; LR side *(middle photo)*; plasma side (right photo)

FIGURE 5. Pre-op *(top)* and 4 months post-op *(bottom)*; both sides plasma holding solution

and behave differently. An intracellular graft holding solution needs chilling, which is not user-friendly.[1] It also does not ensure protection from reperfusion injury and is expensive.[3] Extracellular solutions are widely used, economical, and do not need chilling. Intracellular fluids like hypothermasol with ATP added have significant benefits when graft holding time is more than 10 hours, however, this is a very rare situation as most hair transplant procedures are complete within 4-6 hours.

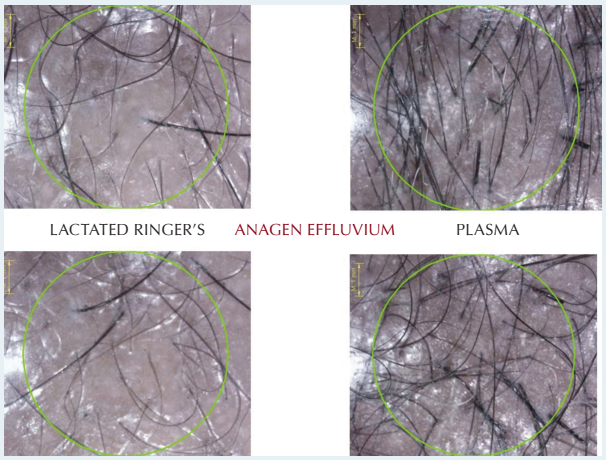
Autologous plasma is an extracellular fluid that is isotonic with nutrients and platelet-derived growth factors. It is cost effective and can be prepared by a surgeon or a pathologist. Drying and dessication of grafts immersed in plasma is delayed, and grafts look shiny and more hydrated even at the end of 4 hours holding time. Ubel in his study had implanted grafts after dipping in plasma and reported a 5 to 53% increase in hair count after 7 months of hair transplant.[2,6]

MTT (3-(4,5-Dimethylthiazol-2-Yl)-2,5-Diphenyltetrazolium Bromide) Assay

The MTT assay is a colorimetric assay for assessing cell metabolic activity. NAD(P)H-dependent cellular oxidoreductase enzymes reflect the number of viable cells present under defined conditions. These enzymes are capable of reducing the tetrazolium dye MTT 3-(4,5-dimethyl-thiazole-2-yl-2,5-diphenyl tetrazolium bromide) to its insoluble form.[9] Therefore, the dye can detect metabolically active live cells. In our study, samples of hair follicle grafts were sent for MTT histological assay in order to detect live cells. Results of staining showed that at 12 hours the grafts held in plasma solution were better stained than those held in LR solution. Staining results at 72 hours were surprising: plasma grafts showed good staining while LR grafts showed very poor staining indicating that the cells were viable in plasma grafts even at the end of 72 hours.

Trichoscan study done at 3 months for the hair count on the LR side showed an average of 1.3 (density 4.4g/cm^2); on the plasma side, the average hair count was 8.3 (density 27.5g/cm^2). Thus, the plasma side had 68.75% hair growth, while the LR side had only 11% growth. The unpaired t-test showed mean 4.5 ± 2.95 SD for the LR side and mean 27.50 ± 4.135 SD for the plasma side with a P-value < .001, which is significant. This indicates that anagen effluvium (Figure 6) on the plasma side was 31.25% while on LR side the effluvium was 89.00%. This shows that anagen effluvium was controlled by 58.75%, which is significant (P-value < .001).

FIGURE 6. Photomicrograph 50 days post-transplant showing significant anagen effluvium on LR side *(left)* while on plasma side *(right)* implanted hairs were still present.



In the first 7 days following a hair transplant, there is a period of inflammatory response (involving neutrophils, eosinophils, macrophages, platelets, fibroblasts and growth factors[2]) in which both erythema and edema occur followed by apoptosis and the grafted, as well the existing, hair follicles may enter into an involution phase resulting in hair shedding. This process is triggered and propogated due to ischemia. The follicles become refractory and those that survive will regrow at the stimulus of

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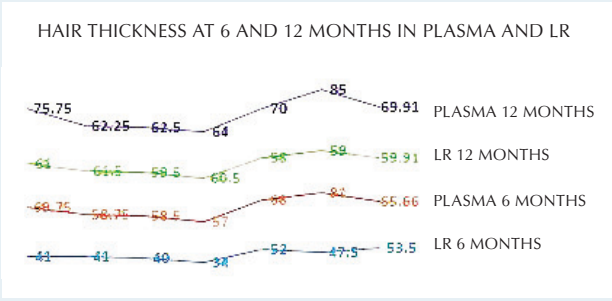
the next growth cycle, which begins after the third month and continues up to the seventh month. Prevention of anagen effluvium can be achieved with prevention of apoptosis of the more metabolically active progeny of the stem cells. This observation may help us in the development of an ideal holding solution by further bio-enhancement of platelet and plasma solution.

Hair thickness measured at 6 months by trichoscan showed an average of 53.5 µmm on the LR side while on plasma side it was 65.66 µmm, which was significantly higher (Figure 7). The unpaired t-test showed the LR group mean 53.5 ± 6.377 SD and the plasma group mean 65.67 ± 9.688 SD. The P-value was <.001, which is very significant.

At the 12-month follow-up, hair thickness measured 60.6 µmm on the LR side while on the plasma side it was 66.125 µmm. The thickness of hair on the LR side increased by 12 months but was still less than on the plasma side. The unpaired t-test showed the LR group mean 60.00 ± 1.414 SD, and the plasma group mean 69.86 ± 9.218 SD. The P-value was < .001, which is very significant.

FIGURE 7. Hair thickness in both groups at 6 months and 12 months was compared. There was an improvement in hair thickness in both groups from 6 months to 12 months with P-value .002.



Hair diameter depends on a number of viable cells in the matrix. These are the mesodermal stem cells known to be very sensitive to ischemia. Ischemia leads to accumulation of free radicals and anaerobic metabolic pathways resulting in apoptosis of cells thereby affecting hair thickness. The hair thickness on the plasma graft side was better than on the LR side. This may be because of the effect of multiple beneficial factors in the plasma holding solution.

Platelets are activated on contact with collagen around hair follicles resulting in the release of various platelet derived growth factors.[15,16] Fibrinogen in plasma gets converted to fibrin, which forms a mesh in which platelets are trapped.[2,4-6] This fibrin mesh with activated platelets forms a 3D fibrin scaffold. Platelet-rich fibrin (PRF) was first described by Choukroun et al. in France.[10,11] Fibrin glue along with skeletal myoblasts in the fibrin scaffold preserve cardiac function after myocardial infarction.[12] *In vitro* prefabrication of human cartilage is created in shapes using fibrin glue and human chondrocytes.[13] Long-term regeneration of human epidermis is achieved on third-degree burns transplanted with autologous cultured epithelium grown on a fibrin matrix.[13] There is a definite role of the fibrin matrix in angiogenesis.[14]

CONCLUSION

Autologous plasma is an easily available graft holding solution. It is isotonic in nature having nutrient growth factors as well as the advantage of fibrin. Platelets along with the plasma provide multiple growth factors promoting epithelialization and neovascularization, and action on hair follicle stem cells to improve growth. The fibrin coating around the graft makes it sticky and prevents dehydration. The growth factors and nutrients successfully prevent the anagen effluvium and shock loss post hair transplant. The thickness of hair and yield of the graft is also better in plasma. The split-scalp controlled study certainly shows the advantages of using plasma over other extracellular graft holding solutions. At the same time, it is not an ideal graft holding solution where chilling cannot be done and the availability of energy source is not clear. But this can be developed as an ideal graft holding solution by some innovative bioenhancement.

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Hair Restoration in Cranial Surgery Patients

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Scalp scars can be a huge burden in patients who already have associated and complicated health challenges. For the neurosurgical patient, scalp incisions following cranial surgery may result in unique aesthetic problems. For example, transected hair follicles can cause hair loss in surrounding areas. In addition, scalp scars often stretch when incisions are not made parallel to Langer's lines (aka relaxed skin tension lines).

Shaving the head before neurosurgical procedures has been a matter of debate for years due to its psychosocial disruption, and several studies were performed to address this issue.[1-5] However, scars from neurosurgical surgeries can produce an even bigger and more permanent problem for this group of patients. Most neurosurgical scars or other cranial scars are surrounded by normal hair, which does offer a degree of camouflage. A problem arises when there is not enough native hair to cover the scar (particularly in men with male pattern hair loss [MPHL]) or when the scar extends beyond the areas of normal hair distribution. Location, direction, and the method of wound closure can affect the visibility of the final neurosurgical scars.

A number of techniques have been recommended to improve scalp scars. De-epithelialization of one or both wound edges, trichophytic closure, allows hair to grow into the scalp scar and make it less visible.[6] Also, zigzag incisions have been used to reduce scar visibility with some success.[7,8] More recently, scalp micropigmentation (SMP) techniques have been developed as a non-surgical cosmetic solution to scars.[9]

The appearance of an undesirable scar is inevitable in many circumstances regardless of the surgical technique. The final scalp scars could be disfiguring and hair transplantation might be desirable to disguise them. Follicular unit transplantation (FUT) can produce natural looking results that can match a normal head of hair in patients with MPHL.[10] This technique can also be used to fill in a scalp scar by transplanting directly into it. Due to the diversity of neurosurgical scars and their needs, different hair restoration methods are used to camouflage them.

Neurosurgical scars produce disfigurement primarily in two ways. One is when the scalp scar is in a dense hair-bearing area of scalp so a lack of hair in the scar in comparison to surrounding areas produces a sharp contrast that stands out to a discriminating eye. The second is when a scalp scar becomes visible due to the progression of MPHL.

METHODS

FUT, which is the technique of transplanting hair in its natural groupings of follicular units, was used exclusively in this study. In this technique, a horizontal strip of donor skin is taken from the back of the scalp and grafts are isolated under the microscope or grafts are individually harvested using follicular unit excision (FUE) methods. In our patients, incisions were made in the recipient area according to the natural direction and distribution of the patients' surrounding hairs using 18, 19, or 20g solid needle trocars depending on the size of the grafts. SMP was used in one patient to camouflage the scalp scar by injecting dermal pigment into the scar and in the areas of MPHL. We used computerized tomography imaging (CAT scan) in one patient to locate a ventriculoperitoneal (VP) shunt before harvesting the donor skin strip.

Case I

A 27-year-old male patient who had a history of hydrocephalus during childhood and with an indwelling VP shunt was evaluated for MPHL with recession of temple hair exposing a sagittally oriented linear neurosurgical scar in the right fronto-parietal area (Figure 1). The patient was diagnosed with MPHL with extensive thinning in the front and crown areas of the scalp. During the first evaluation, he was found to have significant miniaturization (hair shafts were decreased in size, which is an indication of future progressive hair loss) in the Norwood Class VI pattern. The patient was initially started on finasteride (Propecia®) in an attempt to stop or reverse his active hair loss. He was re-evaluated 21 months after his first visit. During this follow-up visit, the gross appearance was stable and there was no significant change seen in the trichoscopic evaluation. The patient was scheduled for hair transplant surgery using FUT to fill the scar and the surrounding areas of MPHL.

FIGURE 1. Patient with cranial scar in frontal area *(left)* and occipital area *(right)* at the placement of the ventriculoperitoneal shunt.

Prior to surgery, a CT scan of the patient's head was performed to assess the integrity of the skull and to determine the location of the VP shunt. The lower edge of the presumed strip incisions (where we would remove the skin containing donor hair) was marked with metal staples before imaging. The CT scan showed the location of the shunt in proximity but below the lower edge of the planned strip (Figure 2).

FIGURE 2. CT scan images with metal markers at the lowest level of presumed strip incision. Shunt is seen before exiting cranium.

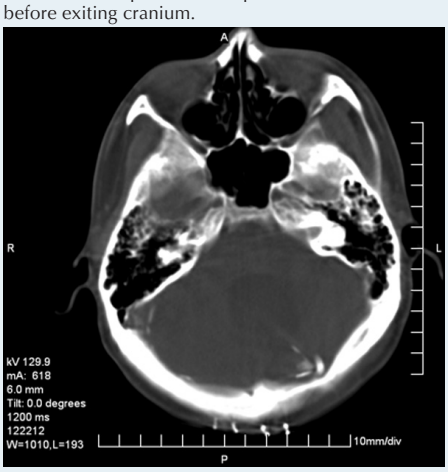

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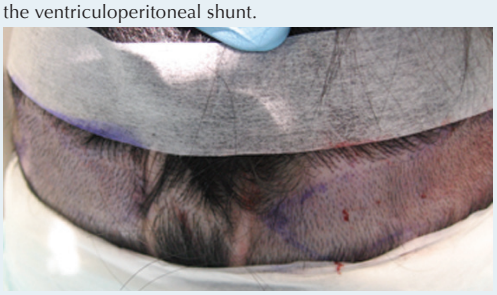
FIGURE 3. Strip is marked before donor excision. Note that the midline area of scalp is skipped due to its proximity to the ventriculoperitoneal shunt.



When harvesting the donor skin strip for hair transplantation, we avoided excising the skin in the area near the shunt hardware to prevent injury to the shunt (Figure 3). The donor wound was closed with absorbable sutures at the fascial level and staples at the skin level. After microscopic preparation of grafts, the frontal area of MPHL and scar were transplanted with 1,384 follicular unit grafts. (See Figure 4.) The patient was seen and evaluated several times in the first 2 weeks post-surgery as well as 7 months after his hair transplant procedure. The patient was satisfied with the coverage from his procedure because he could easily camouflage his neurosurgical scalp scar (Figure 5).

FIGURE 4. Recipient area *(left)* and donor area *(right)* immediately after completion of hair transplant surgery and transplanting of 1,384 FU grafts.

FIGURE 5. At 7-month follow-up, although the coverage is yet to be completed, scar is completely camouflaged.

Case II

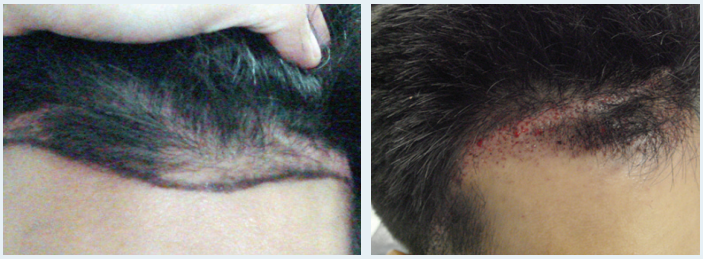
A 20-year-old male patient presented with a craniotomy scar about a half inch behind his original frontal hairline, which extended to the right temple. The proximity of the scar to the hairline made the scar visible. The patient had early MPHL with hairline and fronto-temporal triangle recession, which impaired the scar covering effect of his existing hair. (See Figure 6.) He was scheduled for a procedure to transplant grafts into the scar. During surgery in his frontal and temple areas, 519 follicular unit grafts were placed into the scar and surrounding areas (Figure 7).

FIGURE 6. Frontal scar of a cranial surgery *(left)* involving the entire frontal area with extension to the right temple area *(right)*.

FIGURE 7. Immediate post-op; scar filled with 519 FU grafts.

Although initially satisfied with the results, the patient returned to our clinic after four years with further recession of the hairline in non-transplanted areas in the front and temple. The progression of his alopecia made the scar more noticeable in the front and corners. He subsequently underwent another hair transplant procedure of 1,021 follicular unit grafts for restoration of his hairline and frontal area and to add to the density in the scar that was transplanted four years earlier (Figure 8). The patient was seen in follow-up 6 months after his second surgery. He was pleased with the results and the scar was completely undetectable (Figure 9).

FIGURE 8. Before *(left)* and immediately after *(right)* surgery of frontal hairline restoration and reinforcement of scar area 4 years after first hair transplant procedure.



The goal of camouflaging the scar in this patient was achieved by filling the scar with grafts and increasing the density in the immediate areas of MPHL surrounding the scar.

FIGURE 9. Six-month follow-up of second transplant consisting of 1,021 FU grafts in scar and frontal area.

Case III

A 36-year-old male patient presented with a large horseshoe cranial surgical scar, which measured between 1-2cm in width, that extended from his left posterior parietal area to the occipital area (Figure 10). Five months before the patient's first visit with us, scar removal was attempted by a plastic surgeon but the scar showed no improvement. To produce enough density to cover the patient's

FIGURE 10. The 1–2cm-wide scar *(left)* extends from the left posterior parietal area to the occipital area *(right)*.

FIGURE 11. Immediate post-op *(left)* and at 8-month follow-up *(right);* 787 FU grafts in scar.

FIGURE 12. Thirty-one months post-op; a total of 1,595 FU grafts transplanted into cranial scar.

neurosurgical scar, he underwent two surgeries. In the first surgery, he received 787 FU grafts transplanted directly into the scalp scar. When the patient was assessed 8 months after the first surgery, the scar was still noticeable (Figure 11). He then was scheduled for a second procedure to add to the density of the scar. During the second surgery, 808 FU grafts were transplanted. At follow-up after 31 months, the patient's neurosurgical scar was noted to be completely camouflaged and undetectable (Figure 12).

Case IV

A 39-year-old male patient had FUT surgery using strip excision. He was evaluated for widening of his donor scar after completion of his healing at 9 months post-op. He opted for SMP and underwent 3 sessions, with one-week intervals between sessions, to add dermal pigments to the scar and areas of MPHL on the top and crown. Photos that were taken before and immediately after the third session of SMP are shown in Figure 13.

FIGURE 13. Before *(left)* and after *(right)* SMP procedure of a patient with previous strip hair transplant scar in the donor area.

DISCUSSION

Scalp surgery can produce extensive scarring that cannot be disguised using typical styling methods and often this can be devastating for the patient. Although in many cases scalp scars can be hidden by a patient's existing hair, some scars in special anatomic locations cannot be hidden due to the inability of native hair to cover them. In patients who experience subsequent MPHL, the neurosurgical scar that has been initially hidden by the patient's existing hair may become detectable with the progression of MPHL.

New advancements in hair restoration procedures, particularly the emergence of FUT, have improved the appearance of transplanted hair. Hair transplantation can be used to camouflage disfiguring cranial scars. Many patients and physicians may be unaware of the possibility of using hair transplants to treat different types of scars when other methods cannot improve their appearance.[11,12] Based on the anatomic location of the scar, as well as the density of the surrounding hair and characteristics of the patient's native hair, one or more hair transplant procedures may be required to fill the scar with grafts and make it unnoticeable. SMP is another good method that can be used to camouflage or minimize the visibility of scars in selected patients.

CONCLUSION

Scars from cranial procedures or cranial trauma can cause significant aesthetic deformities for patients. While the undesirable scar might be detectable immediately after surgery, for half of the male population, it might not become visible until years after surgery as the genetic hair loss process progresses. Underlying scalp defects should be excluded preoperatively. A possibly impaired blood supply or atrophy in the scar may influence the surgical technique. Today's modern hair transplant surgery and SMP technologies offer these patients a way to mask a cranial scar by filling in the scar with grafts or dermal pigments, thus reducing or eliminating its visibility.

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A New Multi-Graft Implanter System

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Disclosure: Dr. Devroye is owner of Devroye Instruments and proprietor of the Multi-Graft Implanter.

INTRODUCTION

Sharp implanters have been used for a long time, especially in Korea where they were invented. The implanter's placing is essentially a stick-and-place technique with the incision and placement being made in the same sequence.[1] In the past few years, another derivative technique, dull needle implanter (DNI), has appeared. It's difficult to know who invented it. Speranzini, who wrote three important articles in this publication in 2016 and 2017, contributed largely to the popularization of the DNI.[2-4]

FIGURE 1. Skinny FUE graft with an isolated hair ready to be folded

FIGURE 2. J Hair

The DNI technique has indisputable advantages:

- Follicles are protected by the implanter's wall. There is minimal trauma during the graft's insertion, which is crucial especially when the FUE grafts are poor in surrounding tissue and present with significant splay (Figure 1). With forceps it is possible to create a "J hair" deformity (Figure 2), while with implanters, the rate of this injury decreases dramatically. It's common to believe J hairs can decrease the rate of hair growth by 30%.[5]
- It's also obvious dull needle implanters are safer because you are no longer transferring a sharp instrument from loader to user and this reduces the chance of a puncture wound for your team.
- The pre-made incisions are created by blades cut to size. These blades and their incisions are very thin compared to the holes made by a needle implanter. The length of the incision made by the blade is 0.1mm smaller than the incision made by the implanter needle. It is easy, therefore, to build a very precise pattern using the combination.
- Finally, it's possible to delegate a large portion of the placing to the assistants; something impossible to do with the sharp implanters.

Personal experience

I'm always looking for efficiency, trying to optimize the team's work and ergonomics. For the past couple of years, I began to use only implanters with all FUE grafts. The FUT placement is still manual but I hope my team will be convinced, when performing FUT, to switch to the DNI technique soon.

Over the past few months, we tried using the Lion and Hwang implanters, which were initially sharp, but we transformed them into dull implanters. We still seldom used them.

The main criticisms were the following:

- The need for many assistants; for two placers, we needed four loaders.
- The incessant ballet of the implanters causes fatigue and musculoskeletal injuries.
- The implanters' disassembly and cleaning is also very time consuming.

Although some are highly trained in implanter placement (1,500 grafts placed per hour),[6] for the majority of us, the placing with traditional implanters is still long, difficult, and tiring.

A NEW IMPLANTING METHOD

I often wondered how I could improve the implantation technique. My goal was essentially to reduce the number of movements and simplify the whole system. I realized we would need a multi-graft implanter system.

In 1998, 20 years ago, Rassman and Bernstein, always on the innovation front, wrote an article about their carousel,[6] which unfortunately was not fully developed. To this day, some surgeons in the United States and Korea are still searching for a semi-automatic system around the principle of a revolving cylinder.[7,8]

A multi-graft placing assist device developed in 1994, the Banuchi Graft Dispenser, is an elongated hollow tube having both proximal and distal ends open to facilitate the graft loading and placing processes.[9]

I also tried Erdogan's "KEEP" implanter (Figure 3).[10] This idea was patented in 2004 by Dr. Sanjiv Vasa. The loading is made on the side of the needle, but more important, the graft is gently slid into a pre-made incision with angled forceps. It worked very well. However, the KEEP implanter has three disadvantages: it holds only one graft at a time, it is very fragile, and it is very difficult to manage the orientation of the hair's curve.

FIGURE 3. Keep implanter

The orientation of the natural curve of the hair is crucial, especially in the hairline, the temples, and the eyebrow. I always ask my placers to be aware of and maintain the natural curve to give the graft the correct orientation (Figure 4).

FIGURE 4. Implantation curve

I'm a big fan of the adage "less is more" adopted by the architect Ludwig Mies van der Rohe, father of the modern skyscraper. Consequently, I decided to try to create an implanter as simple as possible composed of a long needle with a long slit (Figure 5). I chose the best stainless steel to be strong and removed any sharpness.

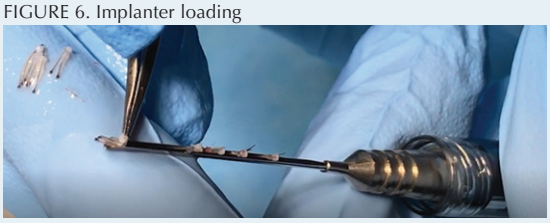
All the edges are blunted. I use mainly the 0.7, 0.8, and

FIGURE 5. WAW Implanter

1.0mm diameter implanters, though sometimes I use 0.6, 0.9, and 1.1mm implanters. The needle is attached to a Luer Lock Tip in stainless steel.

The grafts are loaded, as with other implanters, from the tip (Figure 6). The grafts are gently slid into the lumen of the implanter. They are moved from the tip to the top. Special attention is taken to give good orientation to the hair curve.

FIGURE 6. Implanter loading



In contrast to the traditional implanter, the curve has to be directed face down. The reason is that the implanter is used with the slit placed upward. The number of grafts loaded varies from 5 to 8, rarely more. The needle can receive 10 grafts maximum.

The loading is faster than with classical implanters. Less movement means less loss of time.

The implanter doesn't move, the grafts placed near the implanter tip, on the finger, are engaged in the lumen very quickly. The beauty of the system is that now, a placer needs only one loader instead of the two required with the classical DNI technique. The placing is also faster. As you can see on the video I made on YouTube, the implanter tip could be used to adjust the graft's placement (Figure 7).[11]

Multiple loaded implanters can be held and soaked in a chilled or room-temperature storage solution. Ten implanters loaded represents 50-70 grafts ready to place.

With this new implanter, it's also possible to use the traditional stick-and-place technique with two people: one makes the slit and the other places the graft.

FIGURE 7. Implanter tip can be used to adjust graft placement.

A close observation of some grafts removed after placing didn't show any added injuries. In a 2016 article, von Albertini demonstrated the absence of grafts suffering from loading and placing injuries in his article.[12]

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Cyberspace Chat

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Storage of Grafts Outside of the Body

There was a recent chain of emails pertaining to graft storage during hair transplant surgery. The main issue reviewed included the optimal temperature for graft storage solution and, by extension, also included the type of solution being used by the surgeon. It is likely that many readers will assume that colder temperatures (ideally 4-5°Celsius) are preferred for grafts while outside the body, because that is what has been taught for quite a long time at meetings. However, this is not necessarily true. The main reason behind storing grafts at cold temperatures is to reduce the metabolic rate of the cells and hopefully minimize the oxygen and energy requirements—and eliminating the by-products of that metabolic activity (free radicals). There is nonetheless some concern regarding "cold injury" to the grafts and injury to cells when there are fluctuations in temperature.

One of the most important factors influencing most of the surgeons' opinions is the holding solution being used. Namely, is it a solution optimized for hypothermic or normothermic conditions? With cold storage, the Na^+/K^+ pumps and $Ca2^+$ channels are shut down. The intracellular-type preparations (HypoThermosol®, ViaSpan®, Custodial®) are optimized for cold storage. The extracellular-type solutions (Normal saline, Lactated Ringer's, tissue culture media, and Plasma-Lyte A), however, can actually cause an electrolyte imbalance and result in cells that swell when these solutions are chilled.

The studies performed to date are fairly small. Some study only *ex vivo* effects and others evaluate growth *in vivo*. It is difficult to draw any real conclusions based merely on the theoretical. The conclusion at this point is still somewhat unclear, but the consensus is that at 4-5 hours out of body, room temperature (RT) solutions are probably acceptable. After that time, there is some decrease in overall survival, and this may perhaps be mitigated by the use of storage solutions optimized for cold storage.

The conversation was started by **Francisco Jimenez**:

It is the current consensus that lowering temperatures to <10°C may be deleterious for graft survival when using saline, Lactated Ringer's (LR), or Plasma-Lyte A as holding solutions because low temperature inhibits the sodium (Na^+) cell membrane pump. So, unless you use HypoThermosol, it seems better to keep the grafts at room temperature when using saline or LR, provided that grafts are kept for less than 4-6 hours out of the body.

If the above is correct, then I have one question and one observation:

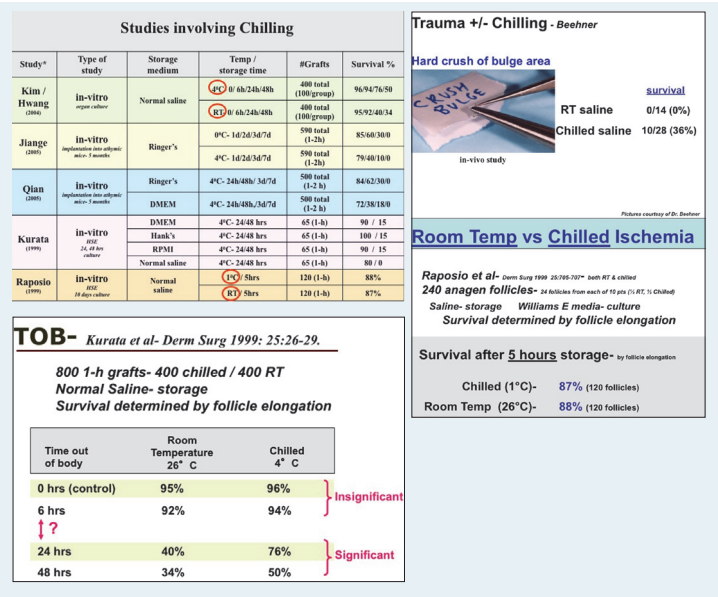
Question: Is there any study on this kind of cold injury showing that grafts kept in chilled saline have less survival growth than grafts kept at room temperature? I recall that Mike Beehner presented something about this a couple of years ago but can't recall the conclusions.

Observation: We still see in workshops that most surgeons adamantly keep their grafts in cold saline using those containers where you put ice at the bottom with the purpose of lowering the temperature; doing that, we are accepting that chilling grafts in saline is the standard of care…and I think this issue should be clarified in the workshops where there are people in training.

Bill Parsley responded:

I am unaware of any studies showing an advantage of room temperature over chilled temperature. Up to 6 hours it seems to make little difference. Beyond 6 hours, chilled grafts have an advantage that increases with time out of body. In addition, I believe Mike Beehner showed that chilled grafts handle trauma better than room temperature grafts. Room temperature is still hypothermic for grafts.

LR pretty consistently beat saline, which generally comes in last in comparisons. (See my PowerPoint slides below.)



Tommy Hwang stated:

I agree with most of Bill's comments. I published a paper on this study in the past and it is also included in the Unger textbook. There is no difference between the room temperature and the 4°C within 6 hours, but preservation of hair follicles at 4°C is more advantageous after 6 hours.

I also use a petri dish containing hair follicles on a box of ice to keep the temperature at 4°C, but later I thought it was much colder than 4°C and could cause cold damage to the hair follicles. Since then, I have been trying to keep the temperature below room temperature using multiple layers of gauze between the box of ice and the petri dish.

Ron Shapiro added:

I guess this emphasizes the difference between theoretical issues and how that translates into practical application and how you have to pay attention to detail.

Cold injury exists…decreasing the metabolic rate is beneficial for organs being transplanted or for brain injury and during cardiac surgery. But at this point, I think the majority of the comments lean toward the difference not being that great at 4°C if the surgery is less than 6 hours.

Since I can never be sure if my surgery will be less than 6 hours for all the grafts, I tend to lean toward keeping things cooler for now. And I use the HypoThermosol so I don't have to worry. Better to be safe than sorry for those times things might go longer since the temperature issue does not seem to translate from a theoretical to actual issue at the temperature we use. If we could ensure we did surgery in 2-3 hours and had some sort of culture type media that was allowed, it might be better.

I think there is an intrinsic danger to teaching those new to the specialty that room temperature is ok with the huge variation in time of procedures and with the only real data showing a difference if warm over 6 hours.

Bob Bernstein commented:

I think that most of the studies were done with FUT (rather than FUE), so that those follicles had significantly more protective tissue around them. My concern is that with FUE, the grafts are more fragile and the potential damage from a mismatch between holding solution and temperature may be exaggerated. John Cole's articles in the *Forum* best explains this. In addition, with FUE, the grafts are often out of the body longer than with FUT. In our practice, we use HypoThermosol with ATP diluted 50:1, chilled to 42°F degrees. But who knows?

Mike Beehner revealed the following:

We just finished doing a study on 1,400 FUT grafts, half placed for minimum of 4 hours in cold Plasma-Lyte A versus the same number in room temperature Plasma-Lyte A. We have found a consistent advantage for the room temperature grafts of around 10-15% greater survival. We have finished the counts on the first two patients, but are waiting for a few more months to pass before counting the third man's results. As of next week, our office is going to start storing grafts in room temperature Plasma-Lyte A and do away with the iced petri dishes we have used in the past. My only hunch as to the difference is that perhaps there is a certain negative "jolt" to the grafts after passing so abruptly from the warm scalp to the cold environs of the petri dish with a block of ice beneath it.

But **Bill Parsley** pointed out:

Your past studies showed nearly 100% or greater survival with chilled grafts at under 6 hours. How can the survival be improved by 10-15% at RT?

Mike Beehner responded:

That study you refer to was extremely tiny and was done at the Orlando Workshop with only 7 grafts in each box. These other studies were done with much higher numbers and in my mind supersede the prior results.

All of the grafts in the Orlando study were out of the body around 4½ hours up to 6 hours. We didn't stretch any out to 8 hours. That would be interesting, though, to see if cold was better for those grafts out of the body 8 hours and longer. I would almost guess that the ideal way to handle such grafts would be to gradually cool them, starting out with room temperature for a couple of hours, then cool it down a bit for a couple more hours, and then work your way up to 4°C. Just a guess.

Paul Rose pointed out:

Just to throw a wrench into this issue. How is it that for years whether we did FUT or FUE we have all had superb results overall with chilled media?

We routinely use HypoThermosol and ATP, but even when we did not have it available years ago, we still had results that suggested 80-110% growth per the studies in the hair transplant texts.

The work with room temperature might apply to larger organs, but it seems logical to me that chilling to some extent slows down metabolic processes. For spinal injuries, the common strategy is hypothermia initially. It is all very interesting and needs further study.

Sharon Keene added:

Interestingly, new studies in the solid organ transplant literature are supporting techniques that maintain body temperature to avoid cold reperfusion injury.

Bill Parsley elaborated:

For solid organs, you have cold static storage (CS), normothermic machine perfusion (NMP), and hypothermic machine perfusion (HMP). Normothermic static storage appears to be a disaster for solid organs. Some of the perfusions have added supplements and mesenchymal tissue depending on the organ. One study suggested that machine perfusion at 22 degrees is better for the liver than NMP and much better than normothermic static storage. At RT, we use subnormothermic static storage on hair grafts.

The science for solid organ storage is far in advance of hair graft storage, but it has always seemed logical to try to apply their principles to our hair grafts. It has become clear to most of us that hair grafts are very different than solid organs. They seem to tolerate different storage solutions quite well and can tolerate static RT storage better than solid organs. The pH of our storage solutions and the electrolyte content and osmolality differences seem to be better tolerated. However, some differences seem to be consistent. Whereas grafts stored in normal saline grow well, comparison studies have consistently shown it to be the least effective of all the solutions. It has been a wonder to me that normal saline is so popular when we have other solutions that are better, even if it is not dramatic. Lactated Ringer's is a better choice. Plasma-Lyte A theoretically is even better, but we have fewer studies comparing it to the others.

Many will argue that ischemia reperfusion injury, which is so destructive in solid organs when reperfused, might not occur with our grafts since we don't hook up the vascular supply causing a sudden increase in oxygen levels. How-

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ever, work by Jerry Cooley and the Moser Clinic suggests that it does occur.

Time out of body (TOB) seems most critical. However, it seems to become significant only after 4-6 hours. Most of our studies jump from 6 hours to 24 hours or more, so we don't have good stats on that critical 6- to 12-hour time frame. That's because the researchers go home and show up the next day. Very likely the storage solutions and chilling become critical at that time period and beyond, but likely the effects of TOB and storage solutions do not suddenly appear after 6 hours. Fatal changes do occur, and it is likely that sub-fatal changes are starting in the first 6 hours. So long-term survival helps make it clear what storage solutions and additives are best while they are difficult to determine during the first 6 hours.

Bob Bernstein made an excellent point about FUE grafts. They are more vulnerable and are usually out of the body longer. A lot of the beginners coming into the field aren't as well versed about storage as the veterans. For that reason, I think it is unwise to recommend room temperature storage for them. There are no TOB studies at any time, period, that show an advantage of RT over chilled. As Winston Churchill noted: "However beautiful the strategy, you should occasionally look at the results."

Bill Ehringer told me that in his *in vitro* cell cultures, sudden change of temperature will cause cells to immediately pop off the medium. For this reason, I always add my donor strips to RT solution and then let them chill slowly over ice. I don't know if this makes any difference but it seems logical. During placement, the grafts naturally warm with the time out of the chilled solution. It is nice to revisit the basics. Before we jump on this too much, there have been studies in the past on chilled graft survival, many showing terrific survivals of 100% or better. The best studies I have found with *in vivo* results are attached above.

In addition to *in vivo* studies, there have been *in vitro* hair shaft elongation studies, which at best have shown an early stalemate between chilled and RT, but after 6 hours, the results have been dramatically in favor of chilled.

If you don't want to chill, or just want to believe RT is better, then this may be all you need. We all talk about hypothermic damage but don't talk too much about ATP depletion and toxic waste buildup with warmer temperatures, which are devastating to solid organs.

I love Mike Beehner's window studies as they have tended to be backed up with further larger studies, and maybe this one will also. However, I think more studies need to be done to back this up as it has a different result from all previous studies, many of which are larger than this study.

In the meantime, I don't think it makes much difference in short cases, but keep in mind that this is the only study that has shown an advantage of RT over chilled at any TOB.

Jerry Cooley added the additional concerns regarding bacterial growth:

It would also be good to get Bill Ehringer to address the issue of bacterial growth. One benefit of chilling is inhibiting bacterial growth in solution. A room temp media with ATP, glucose, amino acids, etc., may be more likely to promote bacterial growth compared to room temp saline. I'm sure it would be easy to compare solutions after 4-6 hours with grafts in them.

Bill Ehringer then gave us his perspective on the issue of optimal graft storage temperature. He said he may store various solutions at chilled and RT, then check for microbes hourly. One problem, however, is that a solution containing grafts would probably develop microbes at a faster rate. He also mentioned gradual temperature changes and changing solution to fresh solution at least hourly. Uric acid and lactic acid, for example, cross the cell membrane into the solution. In solid organ transplants, solutions and perfusions are done with very gradual change in temperature.

The consensus amongst most surgeons is that hypothermic storage results in better graft survival. This is certainly true as hypothermic storage decreases ATP consumption of the tissue. However, it is also known that storage of tissue at reduced temperatures can lead to significant issues that may affect graft viability and function. For example, hypothermic preservation leads to protein denaturation, increased cell membrane permeability after reheating, and decreased membrane potential. Current research suggests that the best scenario for preservation of tissues is to keep them at normothermia, however, this requires specialized equipment and a method to maintain tissue ATP levels, such as oxygenation. Unfortunately, there is no current normothermic preservation protocol for FU grafts, and further research in this area is needed.

He further commented that he believed changing the storage solution every 30-60 minutes would significantly reduce the risk of bacterial growth during the time out of the body. ■

MRSA and Hair: Then and Now

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In 2008, Dr. Robert True published "Hair Transplant in the Age of MRSA," which was the lead article in the ISHRS *Forum*.[1] Almost 10 years later, MRSA is still a concern, and the second *Forum* article on the subject inadvertently omitted reference to this piece.[2] Sincerest apologies to Dr. True for this omission.

The omission did have a silver lining, however, in that it brought attention to the member survey done in 2009 that quantified the epidemiology of this dangerous bacterial infection in our specialty. We recently repeated this survey and were able to compare the information. The survey responses before our printing deadline demonstrated that the incidence of MRSA seems to be increasing in our practices, although our screening has not. If nothing else, these two articles should make hair surgeons more aware of and reconsider adding MRSA-specific policies to their practices. The Centers for Disease Control and Prevention in the United States takes MRSA so seriously that they have an entire section on their website on this one type of infection. The monitoring programs for this infection center mostly on the hospital-acquired and life-threatening blood infections for those at risk, so an outpatient healthcare facility like a hair transplant center would be "under the radar." The good news for those more serious infections (invasive and sepsis) is that the rate is falling, especially in hospitalized patients.[1,6,8]

MRSA Practice Survey	2008 survey(n=93)				2017 survey(n=54)			
	N/A	Yes	No		N/A	Yes	No	
Has MRSA occurred in practice?	0	14	79		1	11	42	Increased from 15% to 20%
MRSA cases within past 12 months?	0	6	87		20	4	14	Slightly increased from 6% to 10%
Nasal culture screening of employees?	5	5	83		7	3	31	Slightly increased from 5%-7%
Regular staff carrier screening?	0	1	92		6	3	31	Slightly increased from 1% to 5%
Patient screening for MRSA?	0	1	92		7	0	34	Unchanged
Hand washing polices?	0	82	11		2	37	2	Slightly increased from 88% to 90%
Hand sanitizer policies?	0	64	29		1	36	4	Increased from 68% to 87%
Made changes in practice due to MRSA risk?	0	18	75		5	13	23	Increased from 19% to 31%

Combined treatments may have something to do with this and may improve the treatment and prevention decisions of hair transplant surgeons.[3] For instance, during an outbreak in one facility in Finland in 2001, increased antiseptic hand gel (chlorhexidine, alcohol, etc.) use was associated with decreased transmission rates. For hair transplant surgeons, this is a simple plan to implement. Less common or unconventional treatments such as gentian violet, honey, topical silver, or preventive treatments like ultraviolet germicidal irradiation, or even just nasal swab with triple antibiotic ointment, should likewise be kept in mind—particularly during any suspected infectious outbreak.[2] Obviously, antibiotics that are targeted to the susceptibilities of the particular strain are key, so the well-prepared hair surgeons will keep (unexpired!) swabs for bacterial culture stocked in their offices for the occasion that MRSA pays a visit.[4]

From a cost perspective, screening all employees may not make as much sense as targeted screening, but targeted screening is definitely more cost effective than no screening at all.[5,7] Instead of a blanket screening approach, hair surgeons should consider a plan to screen all new employees, those employees who have the most patient contact, and high-risk patients, in addition to themselves. Take the time you have given to read this short update to implement just a few protective strategies when you have finished this paragraph, and you will be better prepared to protect both your patients and yourself… until a MRSA vaccine can be developed and we can all rest a little easier!

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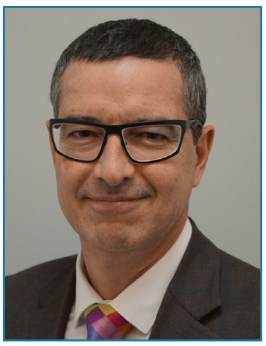

Medical and Professional Ethics

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Spotlight on the Administrative Support Team

Hair transplant surgeons work as individual practitioners, in partnership with other doctors, have freelance relationships with clinics, or are employed by clinics. There are very few successful hair transplant surgeons who function completely in isolation. At the very least, they will have a secretary or personal assistant. At the other extreme, they may have a large team of receptionists, patient advisors, and sales persons. Those entities with multiple locations, several doctors, and a heavy commercial presence are likely to have a greater number of such employees. For the purpose of this article, the term "patient advisor" is used for any member of the team who gives the patient clinical advice.

A doctor's time is valuable. Some patients are just looking for information about hair loss and hair restoration. This can be delivered using printed material or website content, but it can also be provided by a patient advisor who may be a nurse, physician's assistant, non-clinical individual, or have another background. Many patients are not suitable for a hair transplant and can be triaged by a well-trained patient advisor. However, the patient advisor should make it very clear what their role is and what their qualifications are, if any, especially if the patient is paying a fee for this advice. Name tags are a good way of making this clear, but there should also be a verbal introduction. Certainly, the patient advisor should not mislead a patient into thinking he or she is a doctor.

Patient advisors may play a role in collecting a patient's demographic information and medical history, and they should maintain the same level of confidentiality with this information as would be expected of the doctor. They may give the patient general information about hair loss, surgical and medical treatment options, the hair transplant surgery procedure, and administrative processes, but they should not make medical diagnoses unless qualified to do so, and they definitely should not make definitive surgical recommendations including hair transplant surgery design, graft/follicle number estimation, or donor harvesting method. It should always be the doctor who does the preoperative scalp examination and surgical planning. This should ideally be done prior to the day of surgery to allow a "cooling off" period for the patient to consider the surgical recommendation.

A patient advisor should certainly be an advocate for their doctor and may want to promote them in a way the doctors themselves may not be comfortable doing (e.g., by listing qualifications, awards, and other accolades). They may facilitate the patient getting in touch with satisfied past patients and provide relevant "before and after" pictures as well as employ other methods of convincing the patient to have surgery with their doctor rather than going elsewhere. This is where the lines start to blur between offering a surgical procedure and selling it. The way a patient advisor functions will be dependent on how they have been trained and instructed to behave, but it might also be influenced by how they are paid. Those who are on commission, receive activity related bonuses, or benefit from other financial incentives are more likely to try and inappropriately cajole a patient to have surgery than those who are flat salary based. This, of course, also applies to convincing patients to purchase products and medications, and to undergo non-surgical hair loss treatments that have been recommended as suitable by the doctor.

from emojidex

Reflective Question: Do I really know what my administrative staff is telling patients and is it always what I would expect them to be saying on my behalf?

Many doctors do not feel comfortable discussing surgical fees directly with patients and prefer to delegate this to a member of their administrative support team. Some hair transplant clinics will have explicit fee structures listed on their website, while others offer a more "flexible" approach. In some parts of the world, advertised discounts are against medical professional guidance, but most hair transplant clinics will offer reductions in their standard fees for a variety of reasons. These negotiations between the patient and the administrative team can deteriorate into haggling in order to sway the patient's decision on whether or not to have surgery and where to have it. Some clinics have different philosophies on how much off the standard fee they are willing to drop in order to maintain activity levels, and they will give the persons responsible for booking patients varying degrees of responsibility in controlling this.

Any hair transplant surgeon who has been in practice for a while will know of clinics with pushy sales tactics where, following an enquiry or consultation, patients are hounded by administrative personal trying to use various tactics to convince patients to commit to surgery.

The ISHRS is a global organisation and there are huge cultural differences around the world in the roles of patient advisors and administrative staff. Periodically having someone pretend to be a patient and provide feedback to you about their experience with your administrative support team is a good way to keep a check that your practice is being promoted in an ethical manner and in the way that you want it to be.

Editor's note: There is one course of conduct that in every profession is known as a matter of common knowledge to be improper and unprofessional. That is conduct by which, after a professional has been licensed by the State, he enters

into a partnership in his professional work with a layman, by the terms of which he divides with the latter, on a percentage basis, payments made by client or patient for professional services rendered. This is fee splitting. The reason it is believed not to be in the interests of patients is because it represents a conflict of interest that may adversely affect patient care and well-being, since patients will not necessarily be referred to the most appropriate doctor.

While fee splitting may be legal in some of the world's jurisdictions, there are some instances where medical ethics will supersede the laws that govern medicine. Such is the case with fee splitting. When Dr. Williams implies a physician's patient advisor or consultant is "on commission, receives activity related bonuses, or benefits from other financial incentives…," he is alluding to fee splitting. While I have not looked up the laws in all 50 of the United States, fee splitting is generally not legal in the USA. The American Medical Association states: "Payment by or to a physician or health care institution solely for referral of a patient is fee splitting and is unethical." The American Psychiatric Association Ethics Committee expressed in 1990: "A physician is licensed by the people of a state to provide medical care. He is not licensed to establish an entrepreneurial business when the care of patients is subordinated to profit." The American Academy of Family Practice is firmly opposed to the practice of fee splitting and defines fee splitting as any division of fees without the full knowledge of the patient and with the intent of influencing the choice of physician, consultant, assistant or treatment on any other basis than that of the greatest good of the patient.

Paying a non-licensed consultant on a commission basis is improper, unprofessional, unethical, and may well be illegal in your jurisdiction. —BW ■

Hair Sciences

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The landmark 2013 Proceeding of the Natural Academy of Sciences publication reviewed in this month's column serves as the foundation for multiple future investigations.[1] In the article titled "Microenvironmental reprogramming by three dimensional culture enables dermal papilla cells to induce *de novo* human hair-follicle growth," Claire Higgins and colleagues describe a methodology of using three-dimensional (3D) *in vitro* culturing of dermal papillae cells to induce human hair neogenesis in an *in vivo* mouse model.

Background knowledge

Prior to this publication, the field of using cell transplantation for hair follicle neogenesis (or "hair cloning") was limited by two-dimensional (2D) *in vitro* culture of dermal papilla cells on cell culture plates. This artificial culture environment resulted in the loss of microenvironmental cues that are normally supplied by epithelial cells in the native 3D *in vivo* environment of the dermal papilla. This artificial culture environment resulted in the loss of microenvironmental cues that are normally supplied by epithelial cells in the native 3D *in vivo* environment of the dermal papilla. As such, the 2D *in vitro* culture model was insufficient to induce hair follicle neogenesis from cultured dermal papillae cells in the context of human skin. Below are the study techniques and key findings:

- A human hair induction assay was established using neonatal foreskin as the non-hair-bearing recipient tissue. Either dissected human dermal papillae or 2D-cultured dermal papilla cells were placed between the epidermis and dermis of the neonatal foreskin. The foreskin was then grafted on the back of SCID mice and hair follicle induction was assessed after 6 weeks.
- There was loss of expression of the Wnt signaling pathway, as well as DNA expression perturbations, when dermal papilla cells were transferred from intact tissue to 2D culture. Since Wnt is important for hair follicle morphogenesis, the loss of Wnt signaling may have played a large part in the loss of inductive capacity of dermal papilla cells in 2D culture.
- A 3D culture model was developed using dermal papilla cells grown in hanging drop cultures to establish spheroids containing approximately 3,000 cells.
- When grafted onto the back of SCID mice, *de novo* human hair follicle formation was demonstrated in 3D-cultured spheroids in cell lines from 5 out of 7 donors.
- The gene expression profile of intact dermal papilla cells was partially restored (22% of gene transcripts restored) when dermal papillae were grown in 3D culture as compared to 2D culture.
- The restoration of just 22% of gene transcripts in 3D culture was sufficient to induce follicle neogenesis.
- Gene expression analysis identified genes such as FLI1 and HCLS1 that serve as potential master regulators of genes differentially expressed in spheroid 3D culture compared to 2D culture.

The significance of this study was that it used the techniques of 3D culture to recapitulate the growth of intact dermal papilla cells in an *in vitro* environment. Strikingly, the 3D-cultured cells, but not the 2D-cultured dermal papilla cells, were able to induce human hair follicle neogenesis in intact recipient human skin in an *in vivo* mouse model. While the cell-to-cell cohesion in 3D cultures likely re-created some of the hair growth inductive capacities, 2 out of the 7 3D-cultured cell lines didn't demonstrate follicular neogenesis. The hair follicles that did grow in the 3D-cultured cell lines lacked associated sebaceous glands. They were also small and often failed to produce hair follicles that exited the skin surface. This suggests that while spheroid culture is necessary for hair follicle neogenesis, it alone is not sufficient to induce hair follicle induction. Genetic analysis suggested that the interaction of dermal papilla cells with their microenvironment was important in the induction of follicular neogenesis. FLI1, one of the purported master regulator genes that was differentially expressed between 2D and 3D cultures, has an important role in extracellular matrix production in the skin.

If spheroids can be induced to produce sebaceous glands and externalize hairs, then a single follicular papilla can be theoretically used to produce a large number of spheroids and resulting hair follicles. This can allow for an unlimited donor supply for hair restoration applications currently limited by a fixed donor supply such as scarring alopecias, burns, and advanced androgenetic alopecia. As such, this article serves as a pivotal step in the advancement of tissue engineering of cellular therapy of the skin and hair follicle.

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Hair's the Question

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*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.

The theme of hair color continues with the most common hair color in the whole world! No matter where you are in the world, you are exposed to this hair color in your surgeries. Let's test your knowledge!

Black Hair

1. What is the most common hair color in the world?
   A. Brown
   B. Blond
   C. Grey
   D. Black

2. Black hair is
   A. an X-linked (maternally linked) genetic trait.
   B. associated with the genes for hair loss in women.
   C. a dominant genetic trait.
   D. a recessive genetic trait.

3. Two types of pigment exist to color hair: eumelanin and pheomelanin. Which is the predominant pigment coloring in black hair?
   A. Melanin
   B. Eumelanin
   C. Pheomelanin
   D. Both eumelanin and pheomelanin

4. Which of the following is true about black hair?
   A. Patients with black hair can have eyes of any color.
   B. It is genetically linked to the color brown for eyes (i.e., black-haired people will have brown eyes),
   C. Black hair is usually straight.
   D. Black hair is usually curly.

5. An African female patient comes to your office with diffuse thinning at the hairline surrounding her face. The thinning is most predominant at the temples and framing her face. Her hair is currently in dreadlocks that she has maintained for over 10 years. She mentions that she has seen many other women with black hair of her race with the same type of hair loss. Which of the following is true about her hair loss?
   A. It is temporary and will regrow if she stops the dreadlock hairstyle for 6 months.
   B. It is most likely triangular alopecia, which is more common in patients with black hair.
   C. It is most likely due to traction alopecia, which is more common in patients with black hair (Afro-textured type).
   D. It is most likely Frontal Fibrosing Alopecia (FFA), since this is most common in black hair types.

6. Black hair can be curly (Afro-textured) and straight (Asiatic). Which of the following is true of these types of black hair?
   A. Afro-textured hair is more common than Asiatic.
   B. Asiatic hair appears denser than Afro-textured.
   C. Both types are easily curled or styled.
   D. One is nearly round in cross-section and the other is an ellipse.

7. On average, patients with black hair (all types) are MORE likely to have which of the following?
   A. Less dense hair (in FU/cm^2)
   B. Very dense hair (in FU/cm^2)
   C. Thicker hair shafts
   D. An oval cross-section

8. From a surgical perspective, which of the following pairs of advantages and disadvantages is accurate for black *Afro-textured* hair types?
   A. Higher appearance of density : higher contrast
   B. Thicker hair shafts : higher density
   C. Thicker hair shafts : lower contrast
   D. Higher appearance of density : lower density

9. From a surgical perspective, which of the following pairs of advantages and disadvantages is accurate for black *Asiatic* hair types?
   A. Higher appearance of density : lower contrast
   B. Thicker hair shafts : higher density
   C. Thicker hair shafts : lower density
   D. Higher appearance of density : lower density

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Answers

1. **D.** Did you READ the title for this column? Come on! Total freebie.
2. **C.** It is true that black hair is a dominant genetic trait.
3. **B.** Eumelanin is brown or black; pheomelanin is reddish yellow. The degree to which your hair is black, brown, red, or blond depends on the relative amounts of these pigments your hair is genetically pre-programmed to produce.
4. **A.** There is no genetic link between eye color and black hair, only genetic distributions in areas with different ethnicities. Black hair can be totally straight (very common in Asian hair types) or curly (very common in African hair types) or anywhere in between.
5. **C.** While it is true that traction alopecia can happen with any hair color, certain ethnicities tend to have certain hair types that lead to a definite predominance of diagnoses in that ethnicity. Afro-textured hair can be worn in dreadlocks, and tight dreadlocks can cause traction alopecia when worn for prolonged periods of time.
6. **D.** When examining the predominance of one hair type over the other in black-haired individuals, Afro-textured hair is actually the least common and Asiatic is the most common. Afro-textured hair appears more dense than Asiatic, however, owing to the curl. Both types can be difficult to curl or style.
7. **A.** Oval cross-sections do occur primarily in the Afro-textured type of black hair, but Asiatic hair is significantly more common and its cross-section is nearly round. The thickness of the hair shaft varies between the black hair type, so C would not be correct.
8. **D.** The curl of Afro-textured hair gives it a higher appearance of density, but the tendency for actual lower density means fewer grafts. Thicker hair shafts are not necessarily a feature of black Afro-textured hair in the way that they are certainly an ubiquitous feature of black Asiatic hair types. Black Afro-textured hair can occur with a variety of skin tones, so contrast is variable as well.
9. **C.** Asiatic hair types tend to have thicker hair shafts, but that advantage is offset by the tendency for lower density. The straightness of the hair means there is not an appearance of higher density—and it is often quite the opposite. Contrast may be an advantage or a disadvantage since, like Afro-textured hair types, this type of black hair can occur with a variety of skin tones.

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Literature Review

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Topical Finasteride: To Use or Not to Use?

Lee, S.W., et al. Systematic review of topical finasteride in the treatment of androgenetic alopecia in men and women. *Journal of Drugs in Dermatol.* 2018; 17:457-463.

This recent article set out to review the existing data on the use of topical finasteride for androgenetic alopecia.

Researchers conducted a search of Pubmed, Medline, Embase, PsychINFO, and the Cochrane database to identify studies regarding the efficacy of human *in vivo* topical finasteride treatment, including case reports, randomized controlled trials (RCT), and prospective studies. Strict exclusion criteria were applied and they narrowed it down to seven articles: five RCTs and two prospective uncontrolled trials. A total of 256 (24 female, 232 male) human subjects were studied and results summarized in a two-page table. The first (Mazarella 1997) was an RCT with 28 males and 24 females treated with topical finasteride solution 0.005% vs. placebo for 16 months. Based on physician assessment, 73% of patients in the finasteride group had moderate treatment effectiveness while 70% of the placebo had no to slight treatment effectiveness.

The second study (Hajheydari 2009) had 38 male patients in an RCT who used topical finasteride 1% gel with placebo oral tablet while the other group used oral finasteride 1mg with placebo gel for 6 months. Both groups had statistically significant increases in total and terminal hair counts but the oral finasteride group showed improvements earlier.

The third study (Rafi & Katz 2011) was a prospective cohort study in 15 males using NuH Hair (proprietary topical finasteride, dutasteride, and minoxidil) and it showed significant growth in all patients compared to baseline.

The fourth (Tanglertsampan 2012) was an RCT with 33 males who used either topical minoxidil 3% alone or topical minoxidil 3% plus 0.1% finasteride lotion for 24 weeks. Hair counts increased in both groups but was only significantly improved from baseline in the minoxidil + finasteride group.

In the fifth study (Caserini 2014), 23 males were put in an RCT using topical finasteride 0.25% solution BID vs. oral finasteride 1mg once daily for 7 days and their plasma DHT and testosterone levels were assessed. They found that the DHT was reduced by 68-75% with topical finasteride and by 62-72% with oral finasteride. There were no relevant changes in plasma testosterone with either treatment and no clinically significant adverse events occurred.

The sixth study (Caserini 2014) was an RCT with 50 males and two parts. In the first part, 1ml of topical finasteride solution 0.25% was applied once daily vs. 1mL of topical finasteride 0.25% applied twice daily vs oral finasteride 1mg daily for 7 days. This showed a 70% decrease from baseline in scalp DHT after once daily topical finasteride versus a 50% decrease for both twice daily topical finasteride or oral finasteride. In the second part, placebo versus varying quantities of topical finasteride 0.25% were applied to scalps to study the respective changes in scalp and serum DHT levels. Serum DHT was reduced by 24%, 26%, 44%, and 48% by 100µl, 200µl, 300µl, and 400µl, respectively. Scalp DHT was decreased by 47% (100µl), 52% (200µl), 37% (300µl), and 54% (400µl). There were no significant changes in serum testosterone levels.

In the seventh study, (Chandrashekar 2017), 50 males were retrospectively assessed with topical 5% minoxidil and oral finasteride 1mg for 2 years, followed by either topical minoxidil 5% fortified with finasteride 0.1% for 1 year either immediately or after 8-12 months without treatment. Of the 45 patients who had continuous treatment (oral to topical), 84.4% maintained good hair density with the combined topical treatment. Five patients took a break of 8-12 months in between oral and topical therapy. Of these, 80% maintained good hair density while on the 5% minoxidil and 0.1% finasteride solution.

No incidence of decreased sexual desire, performance, or sperm count were reported among the patients using topical finasteride.

Comment: These studies are helpful in determining the safety of topical finasteride for men who wish to avoid systemic side effects. The authors conclude that the most effective concentration and frequency at this time (suppressing scalp DHT with minimal serum DHT reduction) is achieved with doses of 100µL (0.2275mg) and 200µL (0.455mg) topical finasteride 0.25% solution applied once daily. However, additional questions remain, such as whether it is safe for use in women of childbearing potential (will it be considered pregnancy category C, as with topical retinoids, where the systemic form is category X?), whether to combine with minoxidil, and what vehicle is preferred. Drug industry funding and expertise would be helpful in establishing the best concentration and vehicle. There is still much more to be established in the development of a topical finasteride. ■

Fine-Tuning Your Local Anesthesia

Zelickson, B.R., et al. Finer needles reduce pain associated with injection of local anesthetic using a minimal insertion injection technique. *Dermatol Surg.* 2018; 44:204-208.

Almost all skin surgeons routinely use 30g syringes for their local anesthesia. However, many patients still complain and remember the pain associated with local anesthesia. Dermasurgeons at the Houston Methodist Hospital looked into whether they could observe a difference in pain outcomes by decreasing the needle size to 33g. They performed an IRB-approved single-blinded study on patients presenting for outpatient Mohs surgery. Three hundred and eighteen patients with head or neck tumors were injected with lidocaine using either a 30g or 33g needle. In all patients, they used 0.5% lidocaine HCl containing 1:200,000 epinephrine buffered 1:10 with 8.4% sodium bicarbonate at room temperature. All injections were by the same investigator (LHG) using the same technique of minimal needle insertion with the needle placed bevel down and parallel to the skin. On average, about 2 minutes were spent injecting the first full 3mL syringe. After injection, the patients were surveyed using a continuous 10-point visual assessment scale (VAS) for pain (0 = no pain, 10 = worst pain imaginable). They found that on the face, 77% of patients felt no pain with the 33g needle, compared with 64% for the 30g needles. On the scalp, 94% of patients felt no pain with the 33g needle vs 54% who felt no pain with the 30g needle. On the neck, there was no difference in pain levels between the two needles used.

Comment: As hair surgeons, we are constantly looking for ways to improve the tolerability of local anesthesia for our patients. Existing techniques include talkesthesia, vibration, chilling the area, and warming the anesthesia, and now we can add yet another technique—using 33g syringes. The authors' use of a diluted 0.5% lidocaine for the first pass, buffered with sodium bicarbonate, is also likely helpful in minimizing pain associated with anesthesia. ■

ABHRS Profile

Robert Niedbalski, DO, FISHRS | *Tacoma, Washington, USA* | drbob@northwesthair.com

It is my honor and privilege to serve as the American Board of Hair Restoration Surgery (ABHRS) president for 2018. Now in its 21st year, the ABHRS is a respected organization with a growing, international membership. Today we are comprised of 229 Diplomates representing 29 countries. ABHRS Diplomates offer consumers the benefit of hair restoration services performed by physicians with the most respected credentials in the industry—worldwide. This didn't happen by accident…it has taken years of planning and hard work by leaders within our membership together with an administrative team led from day one by our Executive Director, Peter Canalia.

The 2018 leadership team consists of an amazing group of ABHRS Diplomates that includes men and women from five different countries working hard for the membership.

2018 Executive Committee

President: Robert P. Niedbalski, DO, FISHRS
Vice President: Daniel G. McGrath, DO
Secretary: Sara Wasserbauer, MD, FISHRS
Treasurer: Sam Lam, MD, FISHRS

Board of Directors (BOD)

David Alpeter, MD, New York, USA
Konstantinos Anastassakis, MD, PhD, Greece
Bernardino Arocha, MD, FISHRS, Texas, USA
Timothy Carman, MD, FISHRS, California, USA
Steven Gabel, MD, FISHRS, Oregon, USA
Rana Irfan, MBBS, Pakistan
David Josephitis, DO, FISHRS, Minnesota, USA
Shalini Malhotra, India
Bertram Ng, MBBS, FISHRS, Hong Kong
Robin Unger, MD, New York, USA
Kenneth Williams, DO, FISHRS, California, USA

Executive Director

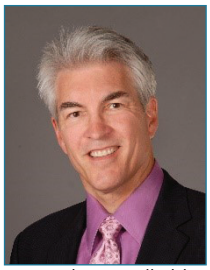
Peter B. Canalia, Indiana, USA

Director of Operations

Emily Valerius, Indiana, USA

The BOD is primarily responsible for the creation and administration of at least two unique oral and written certification exams. A monumental task in and of itself, the BOD has other important jobs including the following:

- Managing the finances of the ABHRS
- Publishing and managing the ABHRS website
- Responding to ethical concerns within the membership and in the hair restoration community at large
- Growing the membership
- Recognizing trends in the industry that impact patient outcomes



Dr. Robert Niedbalski

In addition, the BOD feels it is of paramount importance that it acknowledge and respond to a disturbing trend in the industry: FUE hair restoration surgeries being performed by unlicensed personnel. In many cases, the physicians involved may have little or no training in hair restoration surgery, but they purchase equipment and use the services of teams of technicians who essentially perform most or all of the surgery. Other instances involve experienced hair restoration physicians who use technicians to perform FUE graft excisions so they can do other work at the same time. I am not referring to the legitimate use of properly licensed sub-providers, such as an Advanced Registered Nurse Practitioner (ARNP) or a Physician Assistant (PA). Every state, province, and country where medicine is practiced will have regulations and laws stipulating who can legally perform these procedures. The issue becomes one of transparency as well because, most of the time, the patient has no idea the physician is not performing the surgery.

What can the ABHRS do about this? By focusing its resources on a public education campaign outlining the value of working with an ABHRS-certified doctor, consumer demand for board certified hair restoration surgeons will increase significantly over time. Substantive changes will need to take place within the ABHRS in order to sway public opinion.

REPORTS FROM THE ABHRS EXECUTIVE COMMITTEE

ABHRS Secretary and Written and Oral Exam Committee Chair Sara Wasserbauer regarding proposed changes to the certification exam: In order to elevate our status as the lone certifying board for physicians practicing hair restoration medicine, the ABHRS needs to continue pursuing ways to improve the quality and availability of the exams we administer. Although we currently publish our own exams twice a year that are independently statistically validated, we recognize the need to improve the capacity of the exam as demand for ABHRS certification increases. We are considering proposals to contract with organizations such as the National Board of Medical Examiners (NBOME) for further exam development to allow the exam to be administered on computers at conveniently located testing centers. This will drastically improve availability and access to those interested in becoming board certified in hair restoration medicine.

ABHRS Vice President and Ethics Committee Chair Dan McGrath regarding the ethical challenges facing our profession today: During the past year, the ethics committee, along with the BOD, has certainly had its hands full and we are striving to uphold the high standards that the ABHRS has come to represent. We have dealt with several issues ranging from the pirating of photos to false advertising, just to mention a few. Our role is to evaluate each complaint and take appropriate action to ensure ABHRS members are adhering to the ABHRS Code of Ethics. This applies especially to the unlicensed practice of medicine. This is the driving force behind the proposed implementation of a public relations campaign to highlight the high ethical and practice standards of ABHRS Diplomates.

ABHRS Treasurer Sam Lam regarding the financial implications of these proposals: As treasurer this year, I have been very focused on making sure the ABHRS remains financially solvent and "in the black." Our only sources of income are annual member dues and administering the certification exam twice a year. Funding sustained improvements in the exams and a public relations campaign about the value of ABHRS Board Certification will require the development of additional financial resources. We are proposing the establishment of a capital campaign with the goal of raising $100,000. This initiative has been successfully implemented by other similar organizations to provide a source of funding that will be sufficient to power the growth of this organization as outlined by the BOD.

2018 ABHRS CERIFICATION EXAM SCHEDULE

The next certification exams (oral and written) will be administered in conjunction with the 26th World Congress of the ISHRS at the Loews Hollywood Hotel. The application deadline is June 1, 2018. Applications received after the deadline will be assessed a $250 late fee until June 30, 2018. Applications received after June 30, 2018, will be considered for the 2019 examination. Please consider taking the exam or, if you're already a Diplomate, encourage your colleagues to take the exam.

The Recertification Exam will be administered on October 10 at 6:00PM at the Loews Hotel in Hollywood, California. If you have not registered for this exam, please do so at your earliest convenience. (See abhrs.org for information on the exam process.)

So it looks like we have our work cut out for us this year and beyond. I invite every member to reach out to the ABHRS leadership team with questions or concerns. ■

Letter to the Editors

Re: Transection rates

Gregory Williams, MBBS, FISHRS | *London, England, UK* | dr.greg@farjo.com

I recently attended the ISHRS World Live Surgery Workshop in Dubai and found it extremely beneficial both from seeing so many different doctors demonstrating their surgical techniques and also from the stimulating educational presentations and discussions.

However, I was disappointed that at both this meeting and the last World Congress in Prague, hair transplant surgeons continue to talk about "transection rates" both in their presentations and at the microphone when asking questions or making comments. This is far too vague a term and should never be used in isolation. In the May/June 2014 issue of the *Forum* (Volume 24, Number 3), the FUE Terminology subcommittee eloquently defined three types of transection rates: total transection rate (TTR), partial transection rate (PTR), and follicle transection rate (FTR). What is meant by a 10% "transection rate" is completely different depending on which transection rate is being referred to, and this should always be explicitly stated.

I would like to encourage the Chairs of all ISHRS-endorsed scientific meetings to issue specific instructions to speakers to define what kind of transection rate they are referring to when they are discussing graft transections. It is only then that concepts regarding graft damage can be discussed rationally.

I would also encourage you, as editors, to take a similar stance and to not publish any article in the *Forum* that mentions "transection rate" without specifically defining what kind of transection rate is being referred to.

Editors note: Thank you, Greg, for reminding us about the exact classification of transection rates. Using the exact terms and providing exact data remains the goal, especially in studies and when comparing devices and techniques. As a reminder, we are reprinting the classification here.

Completely Transected Graft Rate (Total Transection Rate, TTR): The result of the total number of grafts completely transected divided by the total number of grafts extracted.

TTR equals:
Total number of completely transected grafts × 100
÷ Total number of extracted grafts

Partially Transected Graft Rate (Partial Transection Rate, PTR): The result obtained by dividing the number of grafts partially transected by the total number of grafts extracted.

PTR equals:
Total number of partially transected grafts × 100
÷ Total number of extracted grafts

Follicle Transection Rate (FTR): The result obtained when the number of transected follicles is divided by the total number of follicles that have been extracted, both intact and transected.

FTR equals:
Total number of transected follicles × 100
÷ Total number of extracted follicles (intact + transected)

However, in daily practice and when reporting personal observations, a microscopic evaluation of each graft may be unrealistic, lead to graft desiccation, and delay the surgery. In these cases, the total transection rate seen during the excision serves as an orientation.

To further improve quality control, a subset of grafts can be closely examined to also estimate the partial transection rate and follicle transection rate. At the same time, the newly established Graft Quality Index (GQI), presented by Dr. Robert True in the March/April 2018 *Forum* (Volume 28, Number 2; pp. 45, 51-53), can be assessed. Technique and instruments can then be adjusted to improve these parameters. —AF ■

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Meeting Review

Review of the 2nd Bi-Annual Meeting and Live Surgery Workshop of the Sociedad Iberolatinoamericana de Trasplante de Cabello (SILATC) • May 2-3, 2018 Cancún, México

David Pérez-Meza, MD, FISHRS | *Benalmádena, Malaga, Spain* | drdavid@perez-meza.com;
Luis Nader, MD | *Reynosa, Tamaulipas, Mexico*

The 2017–2019 SILATC Board of Governors had the dilemma of organizing the meeting in May 2018 or during the week of the 2018 ISHRS meeting scheduled for October in Los Angeles. The BOG finally voted and decided to go ahead in May, and it was a great success.

The venue was the city of Cancun, Mexico, which has one of the most beautiful white sand beaches in the Caribbean. We had the participation of 80 physicians coming from such places as Spain, Mexico, Ecuador, Cuba, Venezuela, Dominican Republic, Brazil, Honduras, and Colombia among other Iberolatin countries.

Meeting directors Drs. David Pérez-Meza and Bruno Szyferman, along with co-director Dr. Luis Nader, arranged for a full-day immersion of lectures and panel discussions followed by a day of live surgeries that included FU Excision (FUE), donor strip excision (FUT), and eyebrow and goatee surgeries. There were a total of 5 surgeries in one day, in 4 surgical rooms. The live surgeries were hosted by Dr. Ariel Diaz and the Kaloni Center.

The faculty included Drs. Bruno Szyferman, David Pérez-Meza, Luis Nader, Maricamen Morales, Marie Schambach, Víctor Vallejo, Juan Ruiz, Leoncio Moncada, René Rodriguez, and Ariel Diaz, with guest speaker Carmen Serrano .

WEDNESDAY/MAY 2, 2018

Dr. Szyferman gave an opening speech and explained our relationship with the ISHRS. Dr. Pérez-Meza's focused on explaining the ISHRS's guidelines to the Global Council Societies and our commitment to abide by them including the new FU Excision terminology. He also reminded us about what to avoid in our websites, marketing materials, and our communication with patients, such as the phrases no scars, minimally invasive, no pain, no scalpel, no touch, hair cloning, and hair multiplication.

Dr. Morales spoke about scarring and non-scarring alopecias, followed by Dr. Szyferman on the ethics of hair transplantation. Our guest speaker from Spain, Dr. Cristina Serrano, gave an excellent speech on identifying different aspects and hair patterns that facilitate the diagnosis of scarring and non-scarring alopecias using electronic dermoscopy. Dr. Schambach followed by showing video examples of how to perform nerve and ring blocks to effectively create anesthesia for hair restoration.

Dr. Vallejo explained the importance of learning how to perform a donor strip technique and procedure, including strip excision and performing a good trichophytic closure. Dr. Szyferman's lecture on body hair showed that the proper angle of punch insertion does not always follow the angle of the hair as it emerges from the skin. Dr. Shambach's lecture on long hair FUE showed a modified slit to allow for excision of the graft without cutting the hair shaft. Dr. Luis Nader showed the different steps of the FUE technique, emphasizing the proper management and care of the grafts during the entire procedure.

Dr. Szyferman then gave a video lecture on how to create an inexpensive punch instrument from a needle shaft. Drs. Moncada and Ruiz gave important lectures on the use of implanters and the ability to minimize popping with these instruments. Dr. Vallejo then gave an important lecture on the importance of the proper landmarks of a frontal hairline design and recipient area coverage.

Dr. Rodriguez spoke about medical treatments for hair loss. Dr. Pérez-Meza went over alternative treatments for hair loss and post–hair transplantation, including laser therapy, PRP, use of autologous fat transplantation, stromal vascular fraction (SVF), and how to provide adequate education to the patient He pointed out that "there are no miracle treatments for hair loss."

Dr. Schambach introduced the audience to Operation Restore and Operacion Cabello, and showed an example of their work and the use of hair systems. Dr. Rodriguez showed the correct design of an eyebrow hair transplant as well as the technique for eyelash transplantation and growth. Dr. Schambach gave examples of beard hair transplants, a design guide, and how to avoid complications.

A great panel of speakers followed with questions and answers on different topics such as acceptable density, poor growth and how to avoid it, as well as good post-operative instructions.

Dr. Perez-Meza spoke about the importance of diagnosing and treating teenagers and young adults with hair loss, and proper instructions to educate them and avoid pitfalls. A series of lectures on complications of hair restoration and poor designs was presented by Drs. Vallejo and Schambach as well as how to correct them. Dr. Szyferman presented a positive example and a good outcome from one of his patients.

Dr. Morales was the moderator of the video session of surgeries showing different aspects of extraction via donor strip and FUE techniques. Panelists included Drs. Vallejo, Szyferman, and Schambach.

To wrap up an excellent day, a brief explanation of each surgical patient was given to provide a preview of what the surgeons were going to perform the next day.

The main goals of the Scientific Session were to include all the aspects of hair loss causes, possible medical and non -medical treatments, and different surgical options including

possible complications and the new FUE terminology. Each session and panel included a Q&A from the audience. The meeting always offered communication and camaraderie between the panelists and the audience.

THURSDAY/MAY 3, 2018

Live Surgery Workshop

Dr. Ariel Diaz and Clinica Kaloni hosted the five live surgeries. The same faculty was assigned to the different surgery cases. One by one, each patient was previewed, and all the participants observed as the surgeons explained the medical history and then proceeded to draw the design and devise the surgical plan.

Drs. Szyferman and Nader restored a hairline and front of a male patient. They demonstrated the FUE technique with different FUE systems and custom-made punches by Dr. Szyferman, followed by placement via pre-made incision with forceps on one side and implanters on the other.

formed a donor strip surgery technique followed by implantation of the grafts by Dr. Ruiz.

And finally, Dr. Rodríguez performed an eyebrow transplant/enhancement of a male patient using the FUE technique and implanters. In addition, extraction and placement was performed with FUE and implanters in a second patient with goatee.

Evening wrap-up

The meeting ended with a formal four-course dinner, drinks, dancing, and karaoke. Everyone had a chance to get together and comment on what they learned during the conference and surgical procedures, while getting to know each other and making new friends from other countries.

In conclusion, our 2nd bi-annual meeting experience was a huge success and very positive blend of hair restoration theory, accomplishing the learning objectives, and visual

Dr. Schambach performed a long hair transplant using FUE and placed the grafts with implanters with the assistance of Dr. Moncada.

In the third surgery case, Drs. Vallejo and Morales per-

live surgery experience, with our traditional touch of Latin camaraderie and friendship.

Thank you to everyone who helped organize and/or participated in our meeting. ■

Message from the ISHRS 2018 World Congress Program Chair

Parsa Mohebi, MD, FISHRS | *Encino, California, USA* | info@parsamohebi.com

We are changing the field of hair restoration forever!

We are getting closer and closer to our Hollywood style World Congress in October! I hope you have your "red carpet" look ready for the ceremony.

World Congresses have always been the main platforms that bring together the active members of our community. These gatherings join brilliant minds with novel ideas and outside speakers that can have a great impact on the science of hair restoration. I would like to give you an update on some of the items we have been discussing for the past few months in preparation for the conference:

- We have finished the abstract submission process. As expected, we received plenty of abstracts with novel ideas from great hair transplant doctors from all over the world. Some of the doctors are familiar to all of us while others might be a new name to you. The diversity of the abstracts is a good representation of the rapidly changing landscape of the field of hair transplantation.
- I have been involved in many international workshops and conferences. Actively participating in these meetings has given me the chance to cherry-pick "the best of the best" ideas from a variety of regional meetings and workshops. It looks like we will have a good mix of presenters with plenty of experience and new, brilliant doctors armed with innovative ideas.

Our hardworking team at the ISHRS has been working tirelessly to create the most valuable program for our World Congress. Speakers are being carefully selected from our more experienced peers and talented new doctors.

The California Science Center spans more than 400,000 sq. feet and includes four major exhibit areas.

Photo from the Los Angeles Visitor's Bureau

The excitement is building and the conference will be here before we know it. In addition to the educational activities, the Hollywood World Congress will provide an incredible venue in which we can enjoy new experiences. Los Angeles is a vibrant city where memories are made—home to the movies that have entertained us all through the years. You can see the stars in the night's sky or while out strolling the streets of West Hollywood, which has been anointed California's most walkable city. Be part of the glamour as our own awards ceremony is designed to give you the chance to experience an Academy Award–style event here in the heart of Hollywood.

Located in Griffith Park in Los Angeles, the Autry Museum offers a treasure trove of history of the American West.

I would like to thank all members who submitted great presentations, the CME committee members who have been helping me in the selection process, and our ISHRS team that is committed to making the Hollywood World Congress one that will create lasting memories for all of us.

How far are you traveling?

I invite all of my friends and colleagues to the City of Angels and to our World Congress in beautiful, and sunny, Hollywood, Los Angeles in 2018. ■


Aileen Ullrich


Deanne Pawlak

Message from the ISHRS 2018 Surgical Assistants Chair & Vice Chair

Aileen Ullrich, MA, Chair | *Portland, Oregon, USA* | aileen@gabelcenter.com
Deanne Pawlak, LPN, Vice Chair | *Calgary, Alberta, Canada*

When I reflect on my 15 years as a surgical technician, there have been many great memories and experiences that I have gained from attending the Surgical Assistants Workshop and program at the annual ISHRS World Congress. It is within those meetings where sharing with my peers has led me to strengthen my techniques in order to provide patients with a more fulfilling outcome from their procedure. When these programs are attended, we as technicians are learning from each other and growing in our ability to ensure patient satisfaction.

In order to achieve consistently satisfying patient results, we must first have a firm foundation of knowledge and skill. Our Surgical Assistants Core Skills Workshop has been designed to provide this type of fundamental knowledge along with an opportunity to develop the associated skill sets necessary for assisting in hair restoration surgery. The course will begin with lectures on hair anatomy and physiology, graft preparation, and graft placement. Participants will then work closely with highly experienced faculty from around the world as they rotate through various practical hands-on stations. At each station, innovative materials will be used to provide a realistic, yet challenging, opportunity to learn and develop core skills and techniques. For experienced assistants, it is an opportunity to learn from our peers and explore new instruments and methods.

Following the workshop, the focus will shift from basic skills to advanced topics during our Surgical Assistants program. These lectures will include plenty of visual content with an emphasis on video. We will examine what a typical surgery day is like in multiple clinics from all around the world, extract pearls from our colleagues during the section "New or Improved," delve into the science of hair restoration, get inspired with interesting cases, and engage with each other as we hone our eye towards quality control.

I look forward to co-chairing this year's workshop in Hollywood, California. My hope is that each attendee leaves feeling inspired with new ideas, new techniques, or an expanded knowledge or skill to implement when they return home. Let's explore where sharing our ideas and techniques will take us.

Can't wait to see you in Hollywood! —Deanne ■

Plan your 2018 meeting schedule!

2018 Qualifying Meetings for Member Educational Maintenance Requirement

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

Educational Maintenance Requirements

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

2018 Remaining Qualifying Meetings

August 2-5, 2018 Hair Transplant 360 Cadaver Workshop & FUE Hands-On Workshop St. Louis, Missouri, USA **http://pa.slu.edu**	October 10-13, 2018 26th World Congress of the ISHRS Hollywood, California, USA **www.26thannual.org**

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

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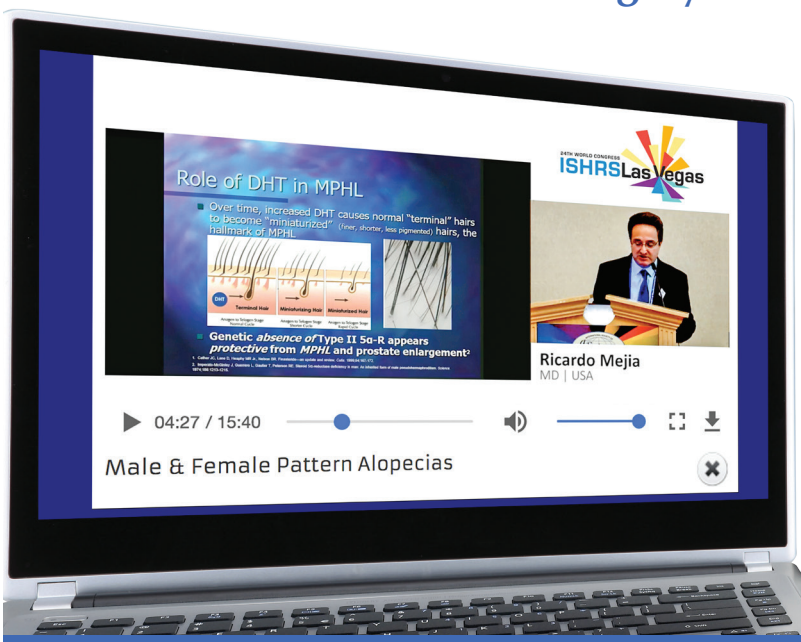

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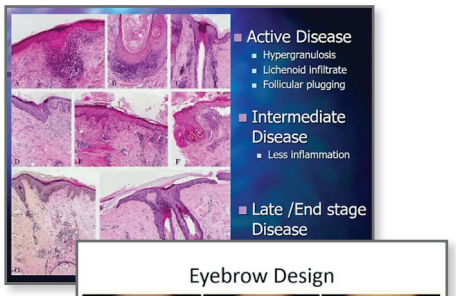
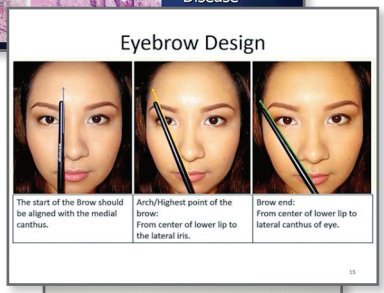
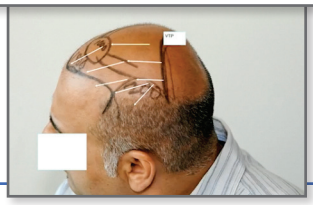






COURSE OUTLINE

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

International Society of Hair Restoration Surgery
303 West State Street, Geneva, IL 60134 I Tel 1 630 262 5399 or 1 800 444 2737
Fax 1 630 262 1520 I www.ISHRS.org I info@ishrs.org I www.ISHRS.org

HAIR LOSS DIAGNOSIS COURSE FOR THE NON-DERMATOLOGIST

What You MUST Know If You Are Performing Hair Transplantation Surgery

FREE VIEWING FOR ISHRS PHYSICIANS

- Over 3.5 hours of lectures and discussion
- Recorded at the ISHRS 2017 World Congress Prague
- No CME credits issued for watching this course
- Internet/online video files.

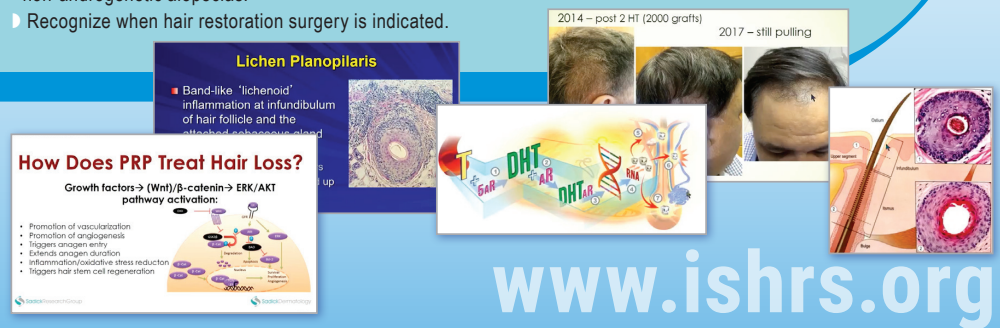
LEARNING OBJECTIVES

Upon completion of this course you will be able to:

- Describe many hair loss disorders as well as common scalp dermatologic conditions that the hair transplant surgeon may encounter.
- Discuss the diagnosis and treatment of many non-androgenetic alopecias.
- Recognize when hair restoration surgery is indicated.

COURSE DESCRIPTION

The course covers all aspects of hair loss diagnoses, classification, treatment, and management. An emphasis is placed on understanding the anatomy and the hair growth cycle to better understand the pathologic consequences of hair loss. The course includes an in depth review of male and female pattern hair loss as well as diagnosing and managing cicatricial forms of alopecia. Common inflammatory scalp conditions is also reviewed to insure participants have a better understanding of managing scalp disorders as well as recognizing benign and malignant scalp tumors that may arise in the consultation process. An emphasis on recognizing alopecia areata and managing hair loss in women is discussed as well as understanding PRP and its therapeutic indications.



www.ishrs.org

COURSE OUTLINE	running time
Welcome & Opening Remarks Ricardo Mejia, MD	06:01
Hair Loss Diagnosis, Anatomy and Classification René Rodriguez, MD	20:01
Alopecia Areata, Diagnosis and Management Ivan S. Cohen, MD, FISHRS	22:29
Cicatricial Alopecias Nicole E. Rogers, MD, FISHRS	29:08
Inflammatory Scalp Disorders/Lumps and Bumps Jennifer Krejci, MD	24:08
Q&A All Panelists	13:25
Dermoscopy/Trichoscopy Lessons Learned Aron Nusbaum, MD	20:12
Diagnosing Hair Loss in Women Neil S. Sadick, MD	36:01
Scalp Cancers Ricardo Mejia, MD	13:55
PRP Basics Neil S. Sadick, MD	24:10
Q&A All Panelists	11:04

VALUE-ADD for ISHRS Members

PRAGUE WORKSHOPS RECORDED FOR MEMBERS TO VIEW

At the Prague Congress, there were 14 workshops organized by Drs. Sara Wasserbauer, Workshops Chair, and Jean Devroye, Program Chair.

When there are concurrent workshops covering so many wonderful topics, it is often difficult to decide which ones to attend. As a solution, five of the topics were repeated at the meeting and offered on two occasions. Further, we recorded the Workshops at the Prague World Congress and are making them available online after the meeting so members have the opportunity to view a single workshop or all of them.

This is a value-add for all ISHRS Physician members. There is no extra charge and is offered as an additional benefit of being an ISHRS member.

To view, go to the Members Only section of www.ishrs.org.

It is easy to navigate; simply click on the lectures or discussions you would like to view. Watch from your computer, tablet, or phone.

TOPICS

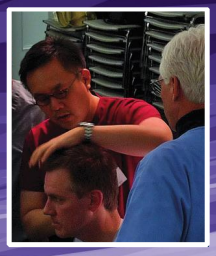
Female Difficult Cases / Dermoscopy / Storage Solutions & Bioenhancements / Implanters / Transgender & Eyebrows / FUE Robotic-Assisted / SMP–Scalp Micropigmentation / PRP–Platelet Rich Plasma

10th Annual

August 2-5, 2018 St. Louis, Missouri, USA

Hair Transplant 360 WORKSHOP

Comprehensive Hair Transplant Course & FUE Hands-On Course



- *New, Expanded Course Format*
- *3 Information Packed Days*
- *Latest High-Definition Live 3D Lectures and Surgery Dissection*
- *Extensive, Hands-on Cadaver Workshop with Low Student-to-Faculty Ratio*
- *Fast-Track Stand Alone or Combined Full-Day FUE Course*

- ▸ Hairline Design
- ▸ Donor Harvest/Closure
- ▸ Recipient Site Creation
- ▸ Graft Dissection
- ▸ Graft Placement
- ▸ Crown Design
- ▸ Female Hairline Design
- ▸ Temporal Point Design
- ▸ Graft Calculation
- ▸ Marketing
- ▸ Consulting
- ▸ Medical Treatment
- ▸ Critical Thinking Day
- ▸ Quality Control
- ▸ FUE

In collaboration with: ISHRS

SAINT LOUIS UNIVERSITY EST. 1818

An offering through:
Practical Anatomy & Surgical Education
Department of Surgery
Saint Louis University
School of Medicine
http://pa.slu.edu

Course Director:
Samuel M. Lam, MD, FACS, FISHRS

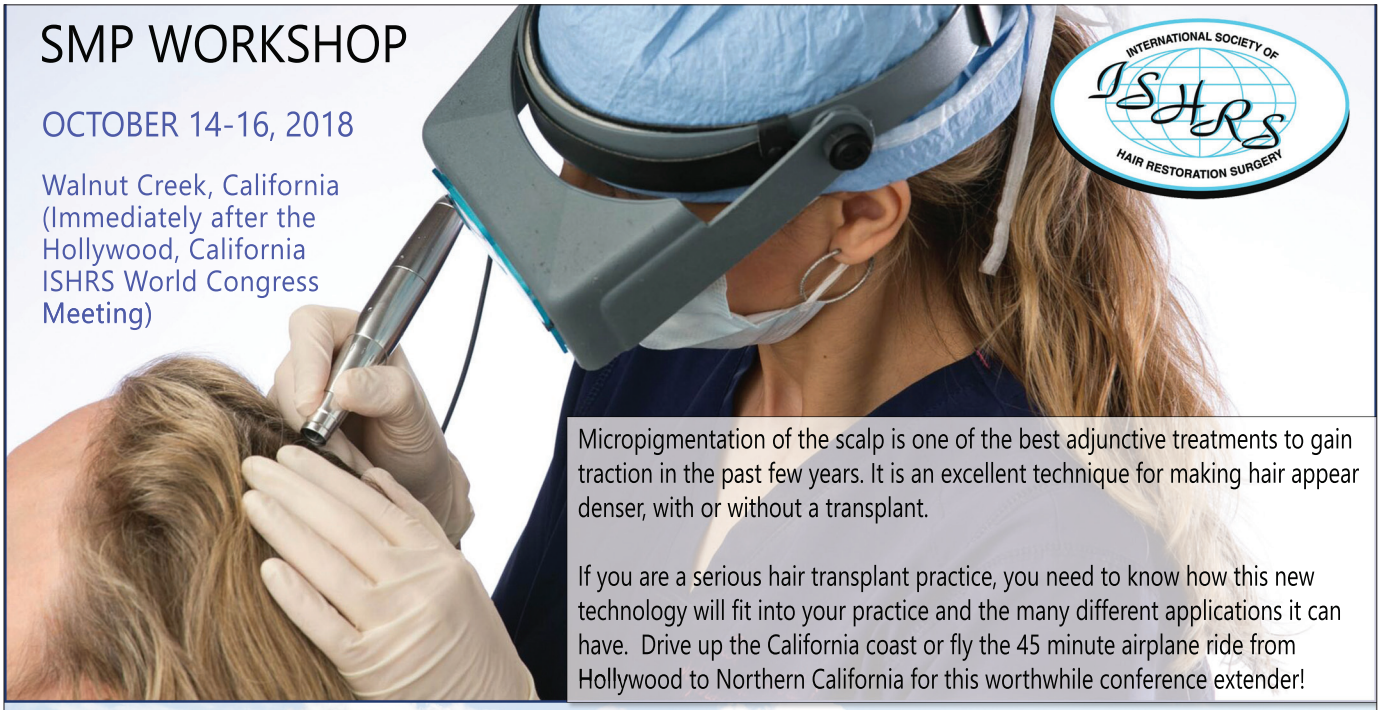
Assistant Course Director:
Emina Karamanovski Vance, MD

International World Class Faculty

SMP WORKSHOP

OCTOBER 14-16, 2018

Walnut Creek, California
(Immediately after the Hollywood, California ISHRS World Congress Meeting)



Micropigmentation of the scalp is one of the best adjunctive treatments to gain traction in the past few years. It is an excellent technique for making hair appear denser, with or without a transplant.

If you are a serious hair transplant practice, you need to know how this new technology will fit into your practice and the many different applications it can have. Drive up the California coast or fly the 45 minute airplane ride from Hollywood to Northern California for this worthwhile conference extender!

California HAIR SURGEON

Sara Wasserbauer, MD | info@californiahairsurgeon.com
www.californiahairsurgeon.com

ISHRS Regional Workshop
Hosted by: Sara Wasserbauer, MD, FISHRS
Faculty: Robert Haber, MD FISHRS &
Ronald Shapiro, MD FISHRS
Register @ www.smpworkshop.com

Hair Transplant 2018
Pre-Congress Course 12 SEPTEMBER

The ISHRS is pleased to present this Pre-Course on September 12th at the

4TH INTERNATIONAL CONGRESS OF THE AESTHESTIC ACADEMY OF EGYPT (AAEgy)

13-14 September 2018 • The Nile Ritz Carlton Hotel • Cairo, Egypt

The ISHRS is pleased to participate with the Aesthetic Academy of Egypt to organize a full-day pre-congress course on HAIR TRANSPLANTATION on 12 Sept. 2018, which is the day prior to the AAEgy Congress.

COST OF THE PRE-CONGRESS COURSE		
EARLY BIRD *Until 1 July 2018*	$200	*BEST DEAL*
REGULAR *Until 1 Sept. 2018*	$250	
After 1 Sept. 2018	$300	

For those registered for HT Pre-Congress Course, you may choose to attend the full Congress on 13-14 September for additional $50 registration fee.

PRELIMINARY PROGRAM

9:00AM-1:00PM Overview and the Basics

- Opening and Welcome Introduction
- About the ISHRS
- Overview of Hair Restoration Surgery: History, Terminology
- Follicular Unit: Macro and Microscopic Anatomy for Hair Surgeons
- Anatomical Landmarks in Hair Transplantation including Safe Donor Zone and Density in Donor and Recipient Area
- Anesthesia of the Donor and Recipient Area
- Hairline Design in Males and Females

COFFEE BREAK

- Strip FUT (Follicular Unit Transplantation): Overview
- FUE (Follicular Unit Excision): Overview
- Graft Placement Techniques including Implanters
- Discussion Panel: Candidate Selection Strip vs FUE

LUNCH BREAK

2:00PM-5:30PM Advanced Topics

- Differences in the Devices Used in FUE (sharp, blunt and hybrid punches, robotic devices)
- Recipient Sites: Special Considerations
- Female Hair Loss: Special Considerations
- Transplanting into Scars and Scarring Alopecias
- Transplanting the Eyebrows

COFFEE BREAK

- Body Hair Transplantation
- Tips and Tricks in HT of Curly Hair Candidates
- General and Most Common Complications in HRS
- Discussion Panel: Getting Started—How to Get Training and Setting up a HT Practice

Francisco Jimenez, MD

Ahmed A. Noreldin, MD

Francisco Jimenez, MD, FISHRS | Spain
Chair, HT Pre-Congress Course
Executive Committee Member, ISHRS

Ahmed A. Noreldin, MD, FISHRS | Egypt
Co-Chair, HT Pre-Congress Course
Chair, AAEgy Congress

ESTEEMED FACULTY

Conradin von Albertini, MD, FISHRS | Switzerland
Konstantinos K. Anastassakis, MD, PhD | Greece
Jean M. Devroye, MD, FISHRS | Belgium
Shady El-Maghraby, MD, MSc | Egypt
Francisco Jimenez, MD, FISHRS | Spain
Ahmed A. Noreldin, MD, FISHRS | Egypt
Ahmed A. Youssef Ibrahim, MD | Kuwait

REGISTRATION AND INFORMATION http://www.aaegy.org/

In Memorium
Emanuel "Manny" Marritt, MD

James A. Harris, MD, FISHRS | *Greenwood Village, Colorado, USA*

"Jim, there are only two kinds of people in this world…people who hate their hair loss and liars…"

Dr. Emanuel "Manny" Marritt, my teacher, mentor, and friend, passed away on February 26, 2018. The quote is representative of the humor and insight that came so naturally to this icon of hair restoration. He was never at a loss for saying those things that represented the truth, whether it had to do with the human condition or hair restoration surgery.

Manny was born May 30, 1941, in Waterton, New York. He attended Amherst College in Massachusetts and received his medical degree with honors from New York University School of Medicine in 1967. He completed his residency in psychiatry at the University of Colorado.

While practicing in a psychiatric emergency room in California, a patient was admitted with a large bandage around his head. His curiosity piqued, Manny inquired, and the patient told him about a hair transplant performed by Dr. Sam Ayres III in Hollywood, California. Manny had never heard of this type of procedure and eventually spent time training with Dr. Ayres and Dr. Walter Unger to learn the specialty of hair restoration. Eventually, Manny would quip that he started his career working on the inside of the head and ended up fixing the outside.

From the 1993 *Hair Transplant Forum International* Special Edition, page 4

THE OVERWHELMING RESPONSIBILITY

by Emanuel Marritt, M.D.

(Englewood, Colorado)

The longer I perform hair transplants, the more I realize how complicated and intricate a procedure it truly is. Sixteen years ago, when I didn't know what I didn't know, growing hair in blissful ignorance seemed so easy. In retrospect, growing hair is still easy; it's trying to make it look natural and undetectable that's so damn[ed] difficult!

Now, whenever I begin to draw the hairline on a 30-year-old grade V patient with dark straight hair and light skin, I am aware of an anxiety that never afflicted me fifteen nostalgic years earlier. It is the anxiety of awareness; the apprehension of experience.

At that moment I must be aware of the variables of hair color, curl, texture, density, present balding pattern, future balding pattern, present styling preferences, future styling preferences, facial features, forehead contour, temporary graft concealment and, of course, the fact that hair transplantation is the only cosmetic procedure that deliberately and intentionally plans to disfigure its patients for an entire NBA season, including the playoffs!

As I step back and look at the hairline I have just drawn, I further remind myself that this hairline and the graft dispersement must look natural--not only when he is 35, but also when he is 45, 55 ... and 65.

This "simple office procedure" has, in reality, just handed me a life sentence of follicular responsibility. The weight of this awareness is not only humbling; it can be, at times, simply overwhelming.

Manny was known for many things, but mostly for his search for excellence in the field and patient advocacy. He published many articles challenging the status quo and had a penchant for patient advocacy even in the face opposition. His sense of humor and knowledge of the obscure was legendary… if you wanted to know lyrics of a haunting song or a line from in a movie from the 1950's…all you had to do was ask.

Manny's personal interests were reading, cooking, and researching alternative therapies for the treatments of cancer. He enjoyed biking and rollerblading as well. He was kind and compassionate, willing to do anything to help a friend or colleague.

From the first day I met Manny, I knew he had one passion that made hair restoration pale in comparison. That was the love and devotion he had for his wife, Ellen.

Manny was also known for his willingness to share his knowledge…and share, and share, and share…sometimes to the point of being pulled off the podium; he had a lot to say. When I started working with him in 1998, he would have me come into his office and I would spend hours listening to his thoughts, trying to absorb all he had to say, which was abundant and worthwhile.

I will miss Manny's request, "Jim come into my office and grab your legal pad…." I knew he was going to tell me something great…he always did. ♥

Walter P. Unger, MD | *Toronto, Ontario, Canada*

I am so sad to have received this news, that words cannot express it. For those of you who never had the pleasure to know him or hear him lecture, you have missed knowing an outstanding person as well as physician. He came to watch me operate at least three times and for a week or two each time. In those days, I allowed physician observers to come for only a day or two because there was a long line of others waiting, but to me, he was immediately and obviously going to be exceptional, so I let him stay for such long periods. He never disappointed me! Suffice it to say that of all the people who I taught, he was at least equal to the two or three best. He wrote for 3 of the editions of (my textbook) "Hair Transplantation" before he retired, and if any of you have those editions or can get them, I strongly suggest you take the time to read what he wrote in each of them. You should also look for his articles in Hair Transplant Forum International. ♥

Raymond J. Konior, MD | *Oakbrook, Illinois, USA*

Manny was a profound mentor of mine who helped mold much of my approach to patient care and planning during my early years. I first met him at an AAFPRS Hair Symposium exactly 30 years ago in March of 1988 during my chief residency year, and I was privileged to see him operate during my fellowship year in 1989. As a young surgeon, I was honored when he worked hours with me writing a paper entitled "Patient Selection, Candidacy, and Treatment Plan for Hair Replacement Surgery" in a 1994 Facial Plastic Surgery Clinics of North America. He was one of the first in our specialty to critically assess the impact of the future and how age ties into surgical planning. As a young man just beginning my career, we would spend exactly one hour every Sunday morning for many weeks speaking on the phone with me recording countless hours of his deeply cerebral thoughts. He coined phrases like "Hari Krishna Syndrome" (to describe the end result of grafting into a small crown balding zone on a young man), "Parting of the Red Sea Syndrome" (to describe the unnatural hair direction that followed repetitive scalp reductions), and "Last of the Mohicans Syndrome" (to describe the "Mohawk" end result of progressive balding after placing grafts into a scalp reduction scar. His Woody Allen comedic style always brought a chuckle at meetings back in the day. I was saddened when he retired from active practice, but I was moved and impressed that, like the TV show "Mash" and the sports legend Michael Jordan, he quit in his prime. I am deeply saddened by his passing, and even more saddened that I was never able to tell him how much he meant, and still means, to me.

Rest in peace, Manny. A truly great man. ♥

William M. Parsley, MD | *Louisville, Kentucky, USA*

Even though I talked with Manny a few times, I can't say that I knew him personally. However, he had a great influence on my thinking and I had a great deal of respect for Manny. He would do what few people were willing to do at that time—take on the established thinking and the supposed principles. He was a refreshing voice and one I feel I could trust. We could certainly use more Manny Marritt's today: doctors with the boldness to say what they are thinking regardless of the consequences. And he did get some attacks in return, nearly all of which were unfair in my opinion. He will be missed. ♥

William R. Rassman, MD | *Los Angeles, California, USA*

When I decided to get into this business, I visited a number of doctors who were the pioneers in the industry at the time. When I called Manny about visiting him and he knew that I was not in the business, he told me I could visit him, but he would charge me for the training. I was a bit taken back, assumed that was his way of saying he was too busy, but I agreed on the spot for the fee. Then a few weeks later, I arrived at his office at 8am. He delayed the surgery to speak with me. He and I were the same age, both of us grew up in Brooklyn only a few miles apart, went to competing high schools, and found that we had a lot in common. After almost 3 hours of chit-chat, I realized that the patient was waiting for the surgery, so I interrupted him and asked: "Is the past 3 hours on the meter?" He then smiled at me, said it was on the house, and we became friends. I admired his creative thinking as he knew what was wrong with the hair transplant technology of the time, but when I started doing hair transplants, I did not adapt his frontal forelock philosophy, which he was very intent on, but rather tackled the entire hairline with small grafts as an alternative to his approach. We agreed to disagree, but a mutual respect arose, and I appreciated him even more.

Manny certainly made his dent in this industry and I am sorry that so many of the younger people did not get a chance to meet this remarkable man. ♥

Sheldon S. Kabaker, MD | *Oakland, California, USA*

I was one of those chosen by Manny to visit many times on his self-designated training program to become a hair surgeon. He was fascinated by the flap surgery that was evolving at the time, offering suggestions that came from his unique perspective. His goal to develop philosophies and techniques that were within his capabilities to allow him his dream to leave LA and give up Psychiatry (and working emergency rooms) to settle and practice hair in the Denver area became clear during the time I knew him. He visited everyone he could, taking technical points or philosophies that made him the guru that we knew. His abilities to verbalize and search for the truths of MPB seemed to lead to his frustration in dealing with MPB and his eventual move to leave the field. Jim Harris should know this best. The 1990s are now becoming old history and it is where many of us left off with Manny Marritt—but not without fond memories and deep affection. ♥

John D.N. Gillespie, MD, FISHRS | *Calgary, Alberta, Canada*

I do recall one of Manny's last lectures at a meeting in Chicago I believe (not the ISHRS). I think this witty lecture probably ended the popularity of scalp reductions. Whenever I have a young man wanting to have his vertex transplanted, I show him the picture that Manny published in *Dermatologic Surgery* in 1995. "The hairy island floating in a sea of baldness." No one said it better than Manny. ♥

Ronald L. Shapiro, MD, FISHRS | *Bloomington, Minnesota, USA*

I remember listening to Manny speak on naturalness and the hairline in Los Angeles when I first started back in 1990 (I think). I remember being that new guy waiting to ask him questions after he finished. And I had to wait. He was surrounded by many others. But he explained how he used true one hair grafts trimmed from the edge of larger grafts to soften the hairline. He was the first to explain this to me. It improved my results immediately and his obvious concern about naturalness and patient satisfaction influenced my approach to the hairline tremendously. ♥

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 Technicians

The Paragon Hair Clinic in Southlake and Mansfield, Texas is currently looking for full-time technicians with planting experience, minimum speed requirement of 600 grafts per hour. We are a multiple case practice per day utilizing FUT and FUE (motorized and robotic). Required 90-day trial/training period.

Please email your résumé to careers@markbisharamd.com.

Hair Transplant Staff Needed in Miami

Vinci Hair Clinic is opening a hair transplant centre in Miami. We are looking for a hair transplant doctor and technicians for the new clinic. We will consider part-time, freelance or full-time employment depending on the individual candidate.

Please email your CV and information to info@vincihairclinic.com

If you are interested in working with Vinci Hair Clinic in any of our other locations, feel free to contact us.

For Sale: California Hair Transplant Practice

Established FUE/FUT facility well equipped and staffed. Serving San Diego County, Orange and Los Angeles County. Plus a strong fly-in patient base from Northern California.

Inquire. Randal McKenzie Associates Bruce C. Keller: bruce@randahlmckenzie.com or 1-760-815-4767

For Sale: 2015 ARTAS with Chair

2015 ARTAS for sale with chair. Used 3 times. Perfect condition. Originally $250,000. Asking $150,000 or best offer. Here is your chance to own a mint robotic hair transplant device at a substantial savings!

Email: artasforsale@gmail.com

For Sale: ARTAS Robotic System

Newer ARTAS robotic hair transplant system for sale. Originally purchased in 2017 and barely used. Excellent condition. Asking $125,000 or best offer for complete ARTAS system.

Send inquiries to artasrobotsales@gmail.com.

For Sale: WAW FUE Device and Cole Dissection Device

Almost new Dr. Devroye's WAW FUE system gently used and in excellent condition. System complete with Hybrid Trumpet punch (with extra punches), support box, NouClean spray, and plastic color. $6,000.

Used Cole Dissection Vortex device complete with foot pedal and punches. $800.

Email: hairsurgical@gmail.com

Calendar of Hair Restoration Surgery Events

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

DATES	EVENT/VENUE	SPONSORING ORGANIZATION(S)	CONTACT INFORMATION
JUN 9-10, 2018	8th International Congress of the KSHRS *Seoul, Korea*	Korean Society of Hair Restoration Surgery	www.kshrs.org or kshrs@naver.com
* AUG 2-5, 2018	Hair Transplant 360 Cadaver Workshop & FUE Hands-On Workshop *St. Louis, Missouri, USA*	Saint Louis University School of Medicine, Practical Anatomy & Surgical Education In collaboration with the International Society of Hair Restoration Surgery	info@ishrs.org
AUG 22-25, 2018	7th Congress of the ABCRC *Wish Resort Golf Convention, Foz do Iguassu, Brazil*	Brazilian Society of Hair Restoration Surgery – ABCRC	Additional details available in January 2018
SEP 12, 2018	Pre-Congress Course on Hair Transplantation *The Nile Ritz, Cairo, Egypt* At the 4th International Congress of the Aesthetic Academy of Egypt (AAEgy), Sept. 12-14, 2018	Organized by the International Society of Hair Restoration Surgery	www.aeegy.org info@aeegy.org
* OCT 10-14, 2018	26th World Congress of the ISHRS *Hollywood, California, USA*	International Society of Hair Restoration Surgery www.26thannual.org	info@ishrs.org
OCT 14-16, 2018	ISHRS Regional Workshop: Scalp Micropigmentation *Walnut Creek, California, USA*	International Society of Hair Restoration Surgery Hosted by: Sara Wasserbauer, MD, FISHRS	info@californiahairsurgeon.com

*2018 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	27TH WORLD CONGRESS	28TH WORLD CONGRESS
October 10-14 2018 Hollywood, California I USA	November 13-17, 2019 Bangkok I Thailand	October 21-25, 2020 Panama City I Panama

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.

2017–18 Board of Governors

2017–18 Chairs of Committees

Global Council of Hair Restoration Surgery Societies

Membership proudly includes:

American Board of Hair Restoration Surgery
American Society of Hair Restoration Surgery
Argentine Society of Hair Recovery
Asian Association of Hair Restoration Surgeons
Association of Hair Restoration Surgeons–India
Australasian Society of Hair Restoration Surgery
Brazilian Society of Hair Restoration Surgery (ABCRC)
British Association of Hair Restoration Surgery
French Hair Restoration Surgery Society
German Society of Hair Restoration Surgery
Hair Restoration Society of Pakistan
Hellenic Academy of Hair Restoration Surgery
Ibero Latin American Society of Hair Transplantation (SILATC)
International Society of Hair Restoration Surgery
Italian Society for Hair Science and Restoration
Japanese Society of Clinical Hair Restoration
Korean Society of Hair Restoration Surgery
Paraguayan Society of Hair Restoration Surgery
Polish Society of Hair Restoration Surgery
Swiss Society for Hair Restoration Surgery
Thai Society of Hair Restoration Surgery

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.
2. 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.
9. 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:
June 5 for July/August 2018 issue
August 5 for September/October 2018 issue
October 5 for November/December 2018 issue
December 5 for January/February 2019 issue

Please note new submission address:
forumeditors@ishrs.org

Classified Advertising Guidelines for Submission

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

Classified Ads cost $100 per insertion for up to 75 words. You will be invoiced for each issue in which your ad runs. The *Forum* 2017 Advertising Rate Card can be found at the following link:

http://www.ishrs.org/content/advertising-and-sponsorship

Submit your Classified Ad to:
cduckler@ishrs.org

INTERNATIONAL SOCIETY OF HAIR RESTORATION SURGERY

When Award Winning
Hair Transplant Surgeons Meet

2018

ISHRS 26TH
WORLD
CONGRESS

SAVE THE DATE

OCTOBER 10-14
HOLLYWOOD
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www.ISHRS.org

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International Society of Hair Restoration Surgery
303 West State Street
Geneva, IL 60134 USA

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