INTERNATIONAL SOCIETY OF HAIR RESTORATION SURGERY

HAIR TRANSPLANT forum INTERNATIONAL

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Inside this issue

We are very pleased to have the lead article in this issue by our incoming ISHRS President, Dr. Sharon Keene. This article is the first of her three-part series on low level laser light therapy (LLLT): Part 1, "The Science of LLLT," Part 2, "Regulation of LLLT Devices from a U.S. and International Perspective," and Part 3, "Controlled Trials and Understanding the Methods for Accurate Hair Counts." —RHT

The Science of Light Biostimulation and Low Level Laser Therapy (LLLT)

Sharon A. Keene, MD, FISHRS *Tucson, Arizona, USA* drkeene@hairrestore.com

The use of light therapy from the sun can be seen illustrated long ago in ancient Egyptian hieroglyphics. Today, the critically important process of photosynthesis, or ability of sunlight to induce chemical changes in plants to consume carbon dioxide and produce water and oxygen, is considered basic science, and taught in elementary school classes. The concept of light-induced cellular chemical reactions is not new—but the acceptance of laser light to induce therapeutic chemical changes in human cells has been slow and gradual.

In the early 1960s, only a few years after their discovery, lasers were first introduced to the medical field for their ability to ablate, dissect, cauterize, or vaporize tissue. It was a serendipitous discovery in 1967 when Dr. Endre Mester, a Hungarian physician and surgeon, first observed the biostimulating or photomodulating effects of low level laser light on tissue. Dr. Mester applied a ruby laser beam of 694nm to the backs of shaved mice, seeking to evaluate potential carcinogenic changes, when he noted instead more rapid regrowth of hair.[1] Since that time, low level laser light has been studied in over 100 randomized, controlled trials and accepted as a therapeutic modality in many human tissues.[2] Ironically, it would take 40 years from the first observation of photostimulated hair growth in mice until the first low level laser therapy (LLLT) device would receive legal clearance in the United States for the treatment of androgenetic alopecia in humans.[3] Since the first device clearance in 2007, other devices utilizing light from laser diodes, as well as light emitting diodes (LED), have been cleared by the FDA and introduced to the U.S. market; similarly, a myriad of devices used in Asia and around the world to treat hair loss have emerged, too.

It should be noted at the outset of this planned series of articles on LLLT to treat hair loss, that many questions remain about its true efficacy, and clinical studies have not addressed some of them. Clearly, there are patients who have tried some of these devices without benefit. The purpose of this series of articles will be to review the science that supports a potential benefit for LLLT to treat hair loss in some patients, as well as the practical limitations of current devices based on variations in hair characteristics and coverage—and certain properties of light in general, as well as device designs or use, in particular. Subsequent articles in this series will delve into what doctors need to know about medical and laser device regulation. In particular, how to determine whether the device your patient is using, or you are selling, is legal in your jurisdiction. Devices that haven't been approved by regulatory agencies may not have met requirements for safety, and may also pose issues of legal liability—which means they are not prudent for consumer use, and neither for a doctor's good reputation. Furthermore, there are now several randomized, controlled trials that support the use of LLLT to treat hair loss, and these will likely be used for marketing purposes, so doctors need to be familiar with them and their reported conclusions. Importantly, some of these studies appear to have substantive flaws in hair counting methodology raising critical questions of their validity and claims, and the correct method to gather and analyze this data will be reviewed. Issues pertaining to dosing or application of particular wavelengths and timing/frequency with a view to encouraging member participation in future clinical trials will also be discussed.

Low Level Laser Light and Mechanisms of Cell Biostimulation

Low level laser light is defined in part by its wavelength which is visible light in the 500nm-1100nm wavelength range, and this determines its properties of tissue absorption. The other characteristic is low power and low power density,

1mW-500mW (5W) and 1mW-500mW/cm^2, respectively, ensure a low thermal output and prevent tissue heating. Studies have shown a minimum of 13 W/cm^2 is required to cause first degree skin burns, and 24 W/

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President's Message

Sharon A. Keene, MD, FISHRS *Tucson, Arizona, USA* skeene@ishrs.org

As the incoming president of the ISHRS, returning home from the first annual meeting held in Asia, at the beautiful Shangri-La Hotel in Kuala Lumpur, I was filled with a sense of pride for the breadth and reach of our Society's international stature. The shared commitment among regional societies to the goal of providing hair restoration patients our "best practices" in order to achieve optimal outcomes was inspirational. Those who attended received a superb educational experience under the guidance and planning of our esteemed scientific chairman, Dr. Damkerng Pathomvanich. Despite many challenges, the meeting was managed in a seemingly effortless fashion by our executive director, Victoria Ceh, and her staff.

There was cause for celebration on many fronts. First, not only did we exceed the number of expected attendees, we welcomed the largest number of first-time attendees in ISHRS history! From a program perspective, attendees witnessed a historic and important marriage of surgical techniques—the union and integration of the follicular unit micro-dissection strip harvesting and follicular unit extraction (FUE) methods. In fact, an entire panel was devoted to the video illustration of both techniques simultaneously in patients with extensive hair loss where maximal graft yield could not be obtained by either technique alone. Presenters shared their experience with how these techniques can be used to achieve optimal outcomes, with the caveat that both techniques inherently cause scarring, a risk for donor area shock loss, and, because of finite permanent donor hair, have their limitations. We look forward to the progress of the ISHRS's FUE Research Committee with IRB-approved studies to answer many of the questions about yield and methods to achieve optimal growth and patient selection. Of course, donor harvesting is but one aspect of graft yield; placement techniques and storage solutions remained hot topics of analysis and review. Many of the same questions and subjects have been investigated since we first began to perform follicular unit grafting in the 1990s, but they are now being revisited to ensure the safest and most effective use of FUE harvesting techniques, too.

On a related theme, we are receiving strong support from regional hair restoration surgery (HRS) societies for the ISHRS policies on ethics and best practices. Doctors in our field must be held accountable for wrongly delegating critical aspects of surgery to assistants. Furthermore, members have shared their concerns about websites and advertising that misrepresent techniques, outcomes, or credentials, and they are irate when they see doctors who claim membership in our organization when they do not have it. We are taking measures to address the legal aspects of these issues, however, no medical society can instill ethics. It is an individual doctor's character and commitment to doing what is right for patients, rather than what is easier or, perhaps, more profitable, that will set the ethical doctor apart. Policing is the job of medical boards and regulators, not a medical society. Nevertheless, we acknowledge reports that some doctors are being taken to task by medical regulators for allowing assistants to perform FUE, and we applaud this action. Furthermore, even though the ISHRS is not a regulatory body, as a medical society we are allowed to select and maintain as members only those who adhere to our policies, including best practices. With this in mind, we are expanding our Membership Committee and scrutinizing new applicants more carefully—and listening to regional HRS societies when determining membership approval.

As a medical society, we continue to build our reputation in the world, and want the public and our medical colleagues to recognize membership in the ISHRS will stand for those who strive to follow best practices that result in optimal patient care—and not simply what is legally allowed. Achieving and maintaining these standards includes diligent education and training in all surgical techniques so that a doctor is comfortable and competent to train their own staff and provide important options for informed consent. The ISHRS is committed to continuing medical education to assist in these competencies. We are also committed to providing education on evidence based medical therapies, and promoting research of novel therapies to establish

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Co-editors' Messages

Mario Marzola, MBBS *Adelaide, South Australia* editors@ISHRS.org

Our 22nd Annual Scientific Meeting in Kuala Lumpur was an outstanding success on many fronts. The weather was nice, the hotel accommodation and conference facilities great, and as you will read elsewhere in this issue, Dr. Damkerng Pathomvanich and his Scientific Committee put on a great program. Our indefatigable leader, Victoria Ceh, and her helpers ran the meeting as smoothly as ever. Seamless was a word often used. Congratulations to all. If you weren't there, I'm sorry to say you missed something special. Forty-one percent of registrants were first timers, nearly double the usual number. That is healthy for the future of our Society. There were more attendees from Asia than ever before with America and India vying for first place with 58 each. Read in the Cyberchat column some lighthearted and entertaining banter between Drs. Wolf and Cole, and their take on the meeting. It's great reading.

I join with others who have congratulated our award winners, Dr. Ken Washenik with the Platinum Follicle and Dr. Jim Harris with the Golden Follicle. The highest award our Society can give is the Manfred Lucas award, and Australia is very proud of this year's winner, Dr. Russell Knudsen. We are also very indebted to Dr. Vincenzo Gambino for guiding our Society for this past year. Congratulations to all!

We have many interesting articles lined up for next year's issues of the *Forum*. We hope they will all be informative and fun to read, but we also hope that some will challenge the way we think of hair growth and hair loss. However, the first principle of publication is to give the readers what they want, so please write to us at editors@ISHRS.org and let us know your wishes and we will try to write on the subjects that interest you.

Dr. Bernstein reminded us that in all of this afterglow, we still have many challenges ahead, and indeed we have. False advertising in the pursuit of market advantage has always been with us and we struggle to find ways to curb it. No doubt the doctors who rely on this to secure patients will end up in court being sued by their unhappy patients, but the damage has already been done. Similarly, the practice of medicine by unlicensed and unsupervised technicians who perform all the hair restoration procedure may be difficult to completely control, but the Board of ISHRS has taken strong steps in this direction this year. There is no getting away from the time-tested, traditional way of becoming a successful medical practitioner: do the time, be an apprentice with a helpful mentor, and avoid the avoidable complications and do no harm wherever possible. Not only will we be successful, but we will sleep better at night.

This is our last edition for 2014. My co-editor Dr. Bob True and I have enjoyed our first year in the job and hope you have enjoyed reading the *Forum*. As we head into the holiday season, it is good to reflect upon the year that has just passed. We hope that life has treated you well both personally and professionally and that enough time has been taken to spend with the ones we love. See you in 2015.◆

Robert H. True, MD, MPH, FISHRS *New York, New York, USA* editors@ISHRS.org

As we come to the close of our first year of editing the *Forum*, I want to express my gratitude to all who have made contributions. I think we have had very interesting and relevant issues. Our columnists, Drs. Marco Barusco, Tim Carman, John Cole, Jeff Donovan, David Perez-Mesa, Nicole Rogers, Sara Wasserbauer, and Brad Wolf have done a great job and we look forward to more of the same in 2015.

I want to thank my dear friend, Dr. Vincenzo Gambino, for his courageous and steady service as our President this year. He smoothly took us through the difficulties of the change of meeting venue and in addressing the problem of unlicensed technicians. With Dr. Sharon Keene as our incoming President and Dr. Nilofer Farjo as the Scientific Program Chair, we should expect another great year in 2015.

The Kuala Lumpur meeting turned out to be a great success both in terms of attendance and program quality. Dr. Pathomvanich, Victoria Ceh, the ISHRS staff, and the Annual Meeting Committee members deserve hearty congratulations.

Our full meeting summaries will appear in the January/February 2015 *Forum*. In this issue, we feature the winners of the Poster Presentations, Dr. Haber reports on some surprising norms of practice as revealed by the Audience Response System (ARS) from the Kuala Lumpur meeting, and Drs. Wolf and Cole provide an entertaining discussion of highlights of the meeting in Cyberchat. Part of that discussion addresses the impact of various types and sizes of punches on the donor area in FUE and the best way to obtain single follicle grafts. I'd like to add to these insights. In obtaining single-hair grafts with FUE, it is essential to do so in a way that preserves the donor area follicular architecture. The patchy appearance of the donor area after FUE is primarily related to the size of the area devoid of hair after extraction rather than the size of the punch site. As shown in Figure 1, taking the only follicle in the center of a field produces a much larger area of bald skin; whereas extracting the follicle adjacent to a group of follicles produces a very

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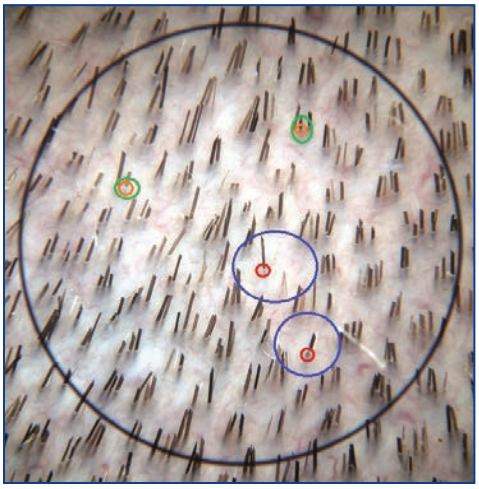

Figure 1. Red circles indicate follicles removed in the center of a field and blue circles the size of the hairless areas that result. Orange circles indicate follicles harvested adjacent to a group of follicles and green circles the size of the hairless areas that result.

INTERNATIONAL SOCIETY OF HAIR RESTORATION SURGERY

Vision: To establish the ISHRS as a leading unbiased authority in medical and surgical hair restoration.
Mission: To achieve excellence in medical and surgical outcomes by promoting member education, international collegiality, research, ethics, and public awareness.

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French Hair Restoration Surgery Society
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Italian Society for Hair Restoration
Japanese Society of Clinical Hair Restoration
Korean Society of Hair Restoration Surgery
Polish Society of Hair Restoration Surgery
Sociedad Iberolatinoamericana de Trasplante de Cabello

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 editors@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. We CANNOT accept photos taken on cell phones.
12. Please include a contact email address to be published with your article.

Submission deadlines:
December 5 for January/February 2015 issue
February 5 for March/April 2015 issue
April 5 for May/June 2015 issue
June 5 for July/August 2015 issue
August 5 for September/October 2015 issue
October 5 for November/December 2015 issue

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their legitimate use. As president, I encourage our members to actively investigate or learn about new therapies to ensure what we recommend is really beneficial to treating hair loss. Based on the lecture I gave in Kuala Lumpur on low level laser therapy (LLLT) to treat hair loss, I will be authoring a series in the Forum to encourage members to scrutinize studies and to know when this modality may benefit a patient, and when it is unlikely to do so.

When properly used, technology can provide advancements in surgical outcomes. But history has shown technology in medicine has risks and limitations, too. Our responsibility is to ensure that technological innovation in the field of hair restoration surgery is only recommended when it is advantageous to patient care and outcomes, and never simply for increased profits, realizing these are not necessarily mutually exclusive.

I also wish to express my gratitude to my predecessor presidents with whom I have worked these past 3 years on the executive committee—most immediately Dr. Vincenzo Gambino, and prior to him Drs. Carlos Puig and Jennifer Martinick—all of whom worked courageously and diligently to establish policies that support best practices—including active opposition to the unlicensed practice of medicine. Their work included providing a way to recognize members who have made the extra effort to learn and teach, with the title of "Fellow" of the ISHRS. I encourage all members who wish to lecture and share their experiences to submit an abstract for the 2015 Annual Scientific Meeting in Chicago, Illinois.

Finally, we have responded to concerns that an onslaught of business forces threatened to turn the breadth of hair restoration science and surgery into a mere technical procedure for any medical practice. To allow this would disadvantage patient care and squash the progress ISHRS members have made toward developing and providing a comprehensive diagnostic and treatment program for men and women who suffer from hair loss—most of which appears to be hormonally and genetically mediated, but may have treatable accelerants. We will continue to educate the public about their options for treating hair loss. I encourage members to share their suggestions, questions, or concerns with me on issues they feel are important to our field. I also wish to thank my colleagues and fellow ISHRS members for placing their faith in me to lead us further toward our goals. My contact e mail address for my year as ISHRS president is skeene@ishrs.org.◆

True Message from page 203

small increase in the size of the hairless skin. Being strategic in follicle selection and in partial harvesting of a group of follicles rather than removing all of the follicles in a group represents an important evolution of the FUE technique that does a better job of preserving the donor region appearance and supply.

Not all practices do so, but some of us do screen our patients for bloodborne pathogens prior to surgery. I have always felt that this is good practice and over the years I have made many primary diagnoses of HIV and hepatitis. The good news is that the new technology HIV-1/2 Fourth Generation testing is significantly more sensitive and is able to detect infection 20 days earlier, so the window between virus acquisition and detection is shortened. Also, the new assays that have replaced the Western blot are able to give same day confirmation and detection of the virus even in the absence of antibodies.◆

SEEKING PRACTICAL TIPS!

Do you have a practical tip for our readers:

How you organize? • Tools you have invented? • Patient education aides? • Staff building? • Post-op care? • Surgical technique?

It doesn't have to be a major discovery…sometimes even small tips can make a big difference.

Please contact Dr. Tim Carman, "How I Do It" column, at **tcarmanmd@me.com** and share your insights.

Notes from the Editor Emeritus

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

With a great meeting fresh on the mind, its time for a summary of the data collected by the ARS audience response system (ARS), some reflection, and perhaps a bit of curmudgeonly commentary. The 22nd annual meeting of the ISHRS in Kuala Lumpur was certainly a success, with credit to Damkerng Pathomvanich and the Scientific Committee team. Also much thanks must go to Vincenzo Gambino for his steadfast guidance during his presidency. And, of course, I'm so very pleased that my friends Jim Harris, Ken Washenick, and Russell Knudsen were deservedly honored with the Golden Follicle, Platinum Follicle, and Manfred Lucas awards, respectively.

These awards were witnessed by an unusually large number of new attendees and Asians, reflecting our first ever meeting in Asia. There was also the commensurate and unfortunate absence of some of our most familiar speakers, who I think will regret, if they had a choice, deciding to sit this one out.

I've had the opportunity to review the available data collected by the ARS over the past four years. Unfortunately, questions have been asked in different ways over these years, making comparisons difficult at times, and yet the data are indeed interesting. Looking first at the demographics, we can see in Figure 1 that since 2011, attendance by North Americans has declined each year. The precipitous drop this year is unlikely to continue for the Chicago meeting, but it will be interesting to see if the long-term dominance of the field by North Americans is coming to an end. Figure 2 reveals that while Dermatologists remain the most common specialty of our field, Plastic Surgery is gaining ground, while Family Medicine and other specialties are decreasing in dominance.

Figure 3 summarizes the attendees experience in the field, and is very reassuring. There is a consistent bump of attendees with less than one year of experience, presumably those sampling our field and our meeting, and a drop in experience for the next two years. The table then reveals a left leaning bell curve with the largest group having 3-5 years of experience, followed by a slope consistent with aging and retirement. So it would appear that our long-standing concern regarding where the next generation of hair surgeons will be coming from may be moot. This table reveals that we have lots of relative newcomers in the field, with enough experience to suggest a long-term commitment. Figure 4 reveals that consistently 50% of attendees devote all or most of their practices to hair restoration, with the other half maintaining more diversity in their practices. And Figure 5 demonstrates that attendees are performing fewer procedures over time. This may be due to an increase in beginners or an increase in the average size of the procedure. Unfortunately, the data does not exist as yet to answer that question.

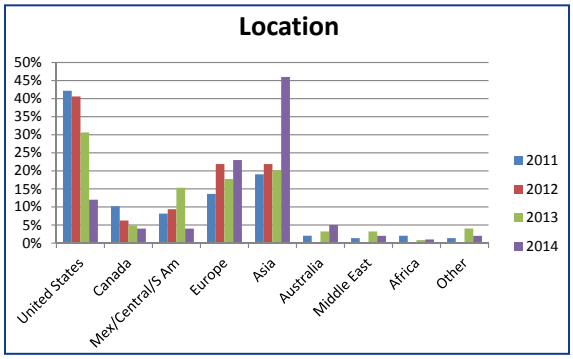

Figure 1

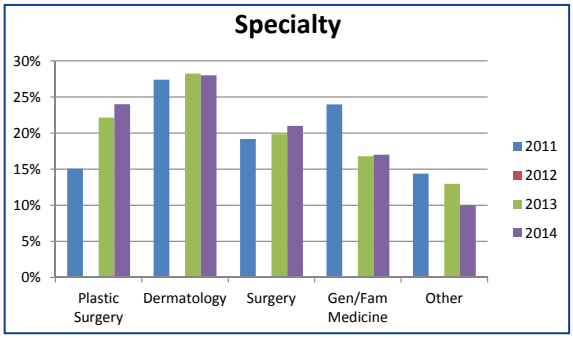

Figure 2

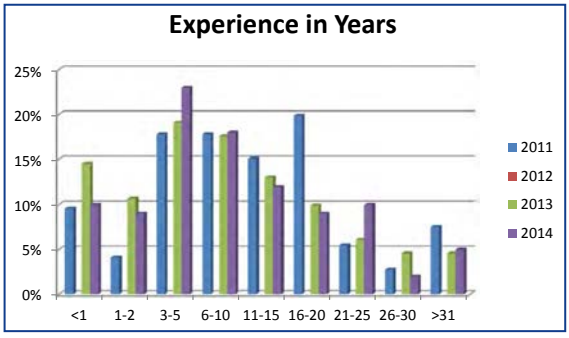

Figure 3

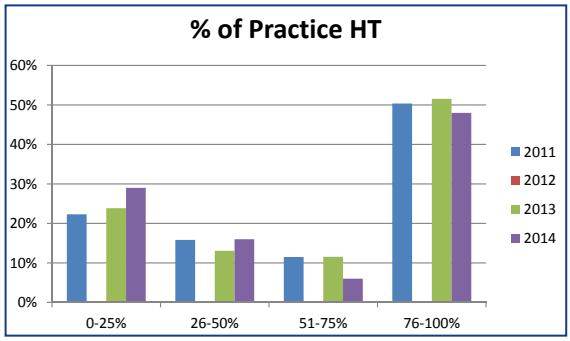

Figure 4

Analysis of ARS responses pertaining just to this meeting was revealing as well. The majority of all hair transplantation in the world is still performed by the strip technique (60%), but clearly the pendulum is swinging. Predictably, beginners (performing HT less than 3 years) are far more likely to primarily perform FUE than FUT (64%), while more established practitioners rely on strip harvesting. In addition, 40% of meeting attendees have been performing HT less than 5 years, 20% of attendees were performing surgery less than 3 years, and 5% for more than 25 years!

Also of note is that 90% of meeting attendees perform FUE at least occasionally, but only 30% perform FUE all or almost all of the time, and interestingly, only 30% felt that in five years, all or almost all of their HT cases would be with FUE, and only 10% felt that FUE would completely replace FUT. So strip surgeons can breathe a sigh of relief that we are not really endangered.

For FUE, almost 50% harvest with a motorized sharp punch and 11% use the ARTAS® robot. Only 4% report using the NeoGraft device, suggesting that most NeoGraft users are not ISHRS members. Also noted is that 60% of FUE grafts are extracted with punches .9mm or smaller in size, and the vast majority of FUE docs are willing to perform

the procedure on women as well as men, and 90% felt that FUE and FUT were complimentary techniques, as opposed to only 11% who felt they produced the same results.

The vast majority (84%) always or almost always use scalp hair for HT. For those performing BHT, almost 60% use beard hair, 35% use torso hair, and only 7% use extremity hair. Of those responding, 82% felt that beard hair gave the best survival.

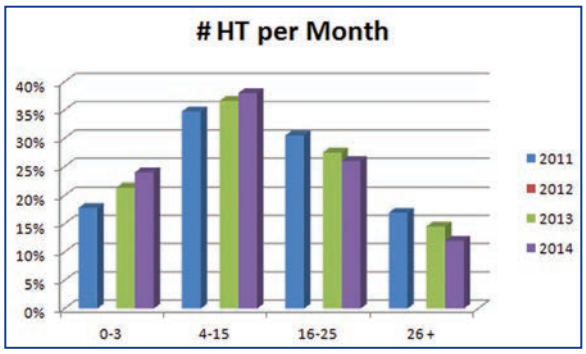

Figure 5

About one-quarter (24%) of attendees perform surgery very rarely (less than 1 per week), while 12% perform multiple procedures each day; the remainder perform 1-5 cases per week. Almost half of attendees devote all or almost all of their practice to HT, while 30% devoted less than 25% to HT. The majority of HT cases are under 2,000 grafts, perhaps because it's more difficult to extract larger cases using FUE. And finally, there was an even split between single- and double-layer closures, with the vast majority choosing to close with sutures.

The ARS system is a valuable tool for the ISHRS to learn about ourselves, review the past, and perhaps predict the future. I eagerly anticipate the gathering of more data.

And now for my curmudgeon side to emerge. Why is it that fully 50% of the presenters seem incapable of using a camera properly, and yet they expect us and their patients to believe they can wield a scalpel competently? How many lectures on photography will it take before we can look at photographs that are even remotely acceptable for a scientific meeting?

We hair surgeons are a conundrum. We invite and eagerly listen to scientific lectures of the highest quality, such as those delivered by Valerie Randall, Desmond Tobin, Rodney Sinclair, and Tom Dawson, yet we often follow the crowd without exercising our critical thinking skills. The most popular table by far at the Coffee with the Experts session was the platelet rich plasma (PRP) table, yet there remains an almost complete vacuum of scientific evidence supporting the efficacy of PRP in clinical practice.

We are our own worst enemy. I am proud to call myself a hair transplant surgeon, and have worked hard, like many of you, over the past 20 years, to elevate the reputation of our field that suffered so badly in prior years due to the actions of unscrupulous practitioners. And yet many of our most prominent and respected members engage in behaviors that call into question their true desire to represent themselves and our field ethically. One example is the widespread and pervasive misuse of initials after names to suggest credentials that do not in fact exist.

As professionals who have completed advanced study, and have passed rigorous examinations, we are privileged to add after our names our credentials. The initials MD, DO, FRCP, and PhD are internationally recognized, and are very meaningful. There are indeed laws that govern the use of such initials and serve to differentiate a "Lawn doctor" from a physician. Other legitimate initials include credentials that are granted after achieving additional certification. As a Board Certified Dermatologist, the American Academy of Dermatology grants me the title Fellow, and thus I am entitled to add the initials FAAD after my name.

Organizations are not credentials, and yet a large number of my respected colleagues feel necessary to include organization acronyms after their names, including ISHRS, ABHRS, and others. While legitimately proud of these affiliations, this is unethical, deceitful, and misleading. The ISHRS has instituted the Fellow category partly to address this issue, and now those granted Fellow status can proudly use the FISHRS credential after his or her name. Those who persist in using organization initials in place of or in addition to bona fide credentials simply reinforce our reputation as a field full of charlatans. And if this was only done by unknown individuals desperate for some sort of recognition, then perhaps I could understand, but well-known and respected men and women persist in adding these misleading acronyms after their name. On the website of the largest hair transplant chain in the world, almost 50% of the listed docs actually use the ISHRS initials after their names. Do none of those physicians have any legitimate credentials?

We have a choice. Either walk the walk, and truly attempt to elevate the reputation of our field by espousing the highest standards of conduct, which includes only using legitimate initials after our names, or give up such pretenses and do whatever it takes to convince prospective patients that we are the most amazing, innovative, respected, honored, and awarded physician since Hippocrates.

If we do not police ourselves, then the very privilege of adding initials after our names will become meaningless. If it's acceptable to add the initials of every organization we belong to after our names, virtually 100% of the population can use initials, and lots of them. So I challenge my respected colleagues to behave in the most ethical manner possible. Remove those misleading initials from your websites and your PowerPoint presentations and videos, and let your competence speak for itself.

Finally, what's happening to FUE? There was a time when strip surgeons were made to feel bad about our scars and threatened by FUE. We responded by improving donor closure techniques that now produce the best scars in our history. And now we are learning that in the interest of profit many FUE practitioners are turning over the most crucial portion of the harvest to unlicensed personnel, and many of those that do not are spending so much time harvesting that they neglect the most critical aspects of hairline design. Are we nearing the second Valley of Darkness for our field? Will we see our slowly burnishing reputation become tarnished once again? I certainly hope not. But as Murphy wisely stated: "Left to themselves, things tend to go from bad to worse," and it is up to each one of us to make sure our personal practices, our colleagues, and the entire field of hair restoration are carefully monitored and nurtured so that the future remains bright.♦

Biostimulation and LLLT *from front page*

cm^2 for second degree burns.[4] Maintaining low power in LLLT devices helps avoid thermal injury to tissue and allows the opportunity for photostimulation to occur. The first law of photobiomodulation states that a cell must have a chromophore or photoacceptor that absorbs light photons in order to stimulate a biologic response. The most common photoacceptors in tissue are melanin, hemoglobin (oxyhemoglobin and deoxyhemoglobin), and water. These are well known to doctors who may have lasers for hair removal or other cosmetic uses as these are targets for laser light. However, these chromophores actually have their lowest rate of absorption of light for the above range of wavelengths, thus creating what is referred to as the "optical window," because with minimum absorption by these chromophores, the light wave can be absorbed elsewhere for its biostimulating effects to occur. Studies reveal the cellular organelles involved in low level laser biostimulation are the mitochondria. Specifically, a portion of that organelle's energy and respiratory chain contains a chromophore called cytochrome c oxidase—it is the last step in the electron transport system of the mitochondria. Cytochrome c oxidase is reversibly inhibited by nitric oxide (NO) from performing its functions of electron transport and creating energy for the cell. Photons apparently are able to remove NO from cytochrome c oxidase, liberating it to perform other cellular functions. Among the functions cytochrome c oxidase is associated with are increased ATP production and modulation of reactive oxygen species, which can induce transcription factors that activate genes and produce proteins useful to the cell. The latter can result in increased cell proliferation and migration, production of growth factors (i.e., nerve growth factor), production of inflammatory mediators and cytokines, as well as increases in tissue oxygen.[2,5] There is some evidence to suggest it may even play a role in modulating 5-alpha reductase. Specifically in regard to hair growth, it is postulated these cellular effects result in stimulation of anagen re-entry, prolongation of the anagen phase, proliferation of anagen hair follicles, and prevention of premature catagen.[5]

It has been observed that cells in tissue culture when stimulated with varying wavelengths of low level laser light produced four peaks of DNA production felt to be a reflection of increased cytochrome c oxidase activity. These wavelength ranges (to the nearest single digit) were 614-624nm, 668-684nm, 751-772nm, and 813-846nm.[1,6] Remarkably, none of the published laser device studies to date conform to these wavelengths, raising the question of whether efficacy would be enhanced if they did.

Low Level Light Therapy as Medication and Dose

When considering low level light as medical therapy, it can help to consider the irradiance parameters as "the medicine." The medicine, then, includes the wavelength, which determines which chromophores will offer the greatest absorption; and the irradiance, which in mathematical terms is the power (Watts) administered to a given area, or Watts/cm^2. Keep in mind that in the United States, LLLT devices are part of a laser class that allows a maximum power of 5mW or .005 watts.

The dosing of the "medication" adds in the element of time, or irradiation duration, known as energy. Energy is given by Watts × time (sec) = Joules. Fluence is Joules/cm^2. The dose is also affected by frequency of or interval between therapies.[2,7]

Therefore, when using low level light as a therapy, the wavelength will determine a target for absorption, and the radiant energy that travels with it will determine the level of cellular excitation the light can create—meanwhile duration and interval will determine how long and frequent this excitation must occur for the desired cellular effect and clinical outcome.

Properties of Light Impacting Light Delivery and Effect on Cells

How Light Interacts with Tissue

Light interacts with tissue in the following ways: it can be reflected, transmitted, scattered or absorbed. Light wavelengths help determine the absorption of various chromophores as previously stated, but other tissue properties contribute to interactions that reduce absorption, too.[8] For example, melanin is a known chromophore that absorbs light. Between the two types of melanin in hair, pheomelanin (blonde or red hair) and eumelanin (brown or black hair), the latter has one of the highest light absorption properties of any tissue. In fact, in a published bioengineering study using a computer simulation model to study the effect of hair color on low level laser light transmission (635nm, 5mW) for photodynamic therapy of the scalp, it was concluded that light transmission was reduced between 32-37% depending on hair color—blonde hair allowing greater light transmission than black hair. Importantly, this model assumed a hair length of only 2mm, and therefore did not consider how layering of hair would reduce transmission. Furthermore these numbers assumed a level of transmission into skin to be very superficial, only .08mm deep—less than full depth of the epidermis.[9] When the model assumed greater skin depths of penetration, light transmission was reduced even further. One could assume transmission would be strongly impacted with longer hair lengths and layering of hair on skin—although the latter was not considered for this study. This strongly draws into question the benefit of beaming LLLT onto hair with hoods and helmets—where hair absorbs, reflects, and scatters light. The more hair present, the less likely it is that light will be transmitted to the scalp and absorbed by its intended target, in particular, follicle mitochondria.

The Inverse Square Law & Lamberts Cosine Law Effecting Light Transmission for LLLT devices

One of the physical properties of light that can affect light transmission and irradiance is referred to as the "inverse square law," which states: intensity of radiation varies inversely with the square of the distance from the source, and is described in the equation I = 1/d2. What this means is that light intensity is reduced based on the target's distance from the source. For example, for a target (scalp) that is twice (2cm) the distance from the source, light intensity is reduced to one-fourth the intensity at 1cm, and a target 3 times (3cm) the distance from the source receives only one-ninth the light intensity. The inverse square law, however, assumes the divergent properties of a normal light beam. Laser light is collimated and coherent with substantially less divergence of the beam and when it hits a target has a spot size that influences its power and intensity. Laser diode beams are more oval in shape—and unless controlled by a focusing lens, they will still follow a modified inverse square law so that distance from the source is a factor impacting light intensity and transmission.

LED lights are not collimated or coherent, but provide less

beam divergence than regular light bulbs. Nevertheless, LEDs are more affected by a modified inverse square law effect because of their beam divergence. This means their beam may cover a larger area, distance from the source (light) can be expected to have an impact on intensity at their target (scalp), too. Ultimately, for LLLT devices, distance is a factor when trying to apply light at a particular dose for scalp absorption and therapeutic response.[10] Devices (such as hoods or overhead apparatus) that beam light from a distance cannot claim comparable dosing, even when using the same wavelengths and treatment frequency, as a similar device that touches, or nearly touches, the skin.

Lamberts Cosine law of light states that a beam perpendicular to its target provides 100% irradiance, but is reduced at oblique angles as a cosine of the incident angle, because the light is spread over a wider area. The cosine law indicates that off angle beams at the most oblique angle can end up being completely reflected. Off angle light from hoods and overhead apparatus will results in reduced irradiance—presumably below therapeutic doses if calculated on the assumption of a perpendicular beam—especially one that touches the skin.[10]

Collimated and Coherent (Laser) vs. Non-coherent Light (LED)

Normal light bulbs, as previously noted, beam light in a variety of colors and wavelengths in all directions, which results in ambient lighting. This is remarkably different than laser light where each beam of light produced is monochromatic (same color and wavelength) and collimated and coherent, so that light waves move parallel to one another and in the same direction forming a "spot" at the target—described as "spot size" for purposes of calculating power density.

LED light, while also a largely monochromatic beam, may vary slightly in wavelength and is much more divergent (non-coherent) than laser light, as previously noted. Furthermore, it is not collimated, so LED beams do not run parallel to each other. LED light illuminates a larger area, but results in much lower light intensity than laser light. LED light in the visible/NIR spectrum has been deemed a non-significant risk by the U.S. FDA and cleared for human use.[11]

The Arndt-Schultz Law or Biphasic Dose Response for LLLT

A biphasic dose response means that when low level laser light is applied at a wavelength and dose that is too low, no tissue response will occur. If it is applied at a dose that is too high, it can inhibit a tissue response. There is, for a given biostimulus, an optimal dose (timing and interval) where a maximal response is obtained. This has been seen in studies of wound healing where too low a dose did not have an impact, and too high a dose prolonged wound healing—while the optimal dose resulted in faster healing.[2]

The clinical significance of this property is important because until we study sufficient variations of dosing and wavelength, it may be difficult to know if we are actually in the peak dosing range. Furthermore, it begs the question as to whether there is a point at which the same effective dose and timing will achieve a maximal response, and then begin to cause an inhibitory response. Thus far, most clinical trials have lasted for only 6 months or less. There is no long-term follow-up data to indicate if tachyphylaxis or inhibition could or does occur.

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Part 2 of this series will deal with regulation of LLLT devices from both a U.S. and international perspective. This portion of the article will look at medical device categories and regulation worldwide, as well as laser device categories and regulation—and why they should/do exist for patient's safety. However, the effect of regulation on cost of device development, and how this may both impact and impede device innovation, will also be discussed. For those who wish to view an abbreviated review and update of LLLT as provided in a PowerPoint presentation at the 2014 ISHRS Annual Scientific Meeting in Kuala Lumpur, a copy of the recorded lecture can be accessed at the ISHRS website.◆

How I Do It

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Donor Closures, Tables, Potato Chip Bags, and All

In this issue of *How I Do It,* I want to offer small, but I think significant, details associated with my current preference in donor closure technique. Quite a lot of discussion can go into the subject: single layer, double layer, sutures vs. staples, absorbable vs. non-absorbable, trichophytic vs. non-trichophytic, etc., etc.

I will outline the basis of the majority of my closures, and the rationale for my approach. Again, this is just my opinion, nothing more. I am of the view that what "works" in a given surgeon's hands is what is "best" for his or her patients.

There are several principles to be observed when talking about donor closures in general. My overriding principle is to respect the tissue. This implies making appropriate judgment calls regarding the amount of tissue that can be safely removed without exposing the wound closure to unnecessary tension. This requires an accurate assessment of laxity as well as locating the strip in the center of the "safe zone" (please see *How I Do It: The "Sweet Spot" for Strip Harvesting* in the January/February 2014 issue of the *Forum*; 24(1):14).

Pre-surgery scalp stretching exercises can improve laxity. Assuming this initial judgment call is correct, the issue of requiring a separate, "stronger," deep layer of sutures becomes moot, which leads to my first observation in practice: most donor wounds are best closed utilizing a single layer running suture. The reasoning behind the running suture is simple: having a single thread along the donor closure line provides equal tension all along the incision, so that no one area has more pressure between the skin edges as opposed to other areas. The idea is to allow blood flow, not to constrict it. Equally important is the distance of no more than 3-4mm between the loops of suture. The principle here again is related to prevention of constriction of blood flow in the tissue, and to reducing the "tension" each suture holds. The more throws per linear length, the less tension each must bear. The analogy would be two individuals versus four lifting a table. With two individuals lifting a 100-pound table, there will be 25 pounds per arm distributed weight. With four individuals lifting the table, that amount decreases to 12.5 pounds per arm. This concept is also one of the reasons I prefer not to utilize the "two-layer" closure technique. Most of the time, "deep layer" suture bites are taken at wide intervals, exacerbating the amount of focal tension on the tissue where they are "anchored," and consequently this can negatively affect local blood flow. They are also typically placed a greater distance from the incision edges than where the "superficial layer" skin sutures are placed, so an even greater area of tissue is unevenly exposed to intermittent increases in tension in the closure.

Of equal importance is the distance from the skin edges that the sutures are placed. This distance should normally be 1-2mm at most. It is also important to observe the rule "deeper than wide" in that the suture should course between the two edges across the wound at a depth of 3-4mm.

The single greatest impediment to performing the closure I found is the type of needle used. Most skin suture needles are some form of cutting needle. I have found that these, when applied specifically to donor closures in hair transplantation, can be counterproductive. The best analogy for my observation I call the "Potato Chip Bag" opening phenomena. Think of the material most potato chip bags are made of. You can pull on that bag every which way and the material won't tear. What is the next move? That's right—typically one takes a small "bite" out of the bag. That's usually all it takes; the bag will then tear, almost too easily. This same principle occurs when using a cutting needle. My solution has been for years to use a *tapered* needle instead. This action "punctures" the skin on entry and exit, but does not produce any "starting edges" along which the skin may tear. This allows me to take bites closer to the wound edge, and accordingly lessens the amount of tissue subjected to constriction by the suture.

Last, but not least, is the question of trichophytic closure. In general, I am selective in its use. I am less likely to use this closure on a patient with very straight hair, as I have noticed (while in line at Starbucks, actually, standing behind a hair transplant patient) that even with hair that is long enough to cover the scar, there can be a "line" in the patients hair that parallels the incision. This comes about by the change in angulation that may occur to the hairs along the border that has the epidermis removed in the trichophytic technique. Consequently, this telltale sign is the exact opposite of the intention of utilizing the technique. While a trichophytic closure may succeed at filling in the scar somewhat with hair, the price in these patients is a visible "demarcation line." This problem is mitigated in patients that have a wave or slight curl to their hair, and these are patients I am more apt to use the trichophytic option on, although, I must say, in general, by using the donor closure technique outlined above I have managed to avoid the indication that the trichophytic closure was intended for initially in the first place.

Just my two cents.◆

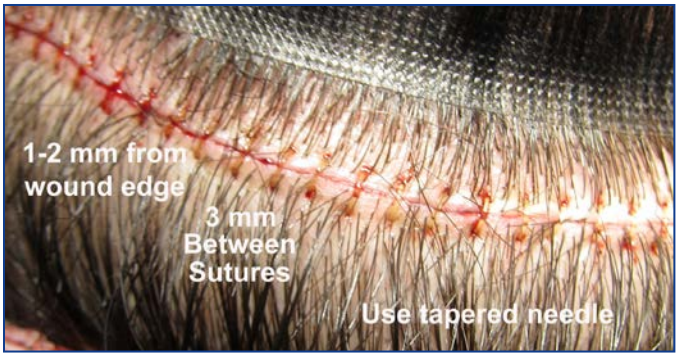

Figure 1. Close-up detail of closure technique.

Figure 2. Typical closure.

Use of Celecoxib for Effective Pain Relief After Hair Transplantation

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Introduction

One of the most common concerns of patients about hair transplantation is post-operative pain. The cause of pain is skin tension and inflammation around the donor incision.

Commercially, acetaminophen plus codeine is one of the most widely used medications for reducing this pain.[1,5]; however, there are two problems with the use of this medication. First, it cannot completely relieve pain, particularly when the donor incision is wide and the surgeon uses single layer donor closure, and second, there are side effects associated with the use of codeine, such as nausea, drowsiness, vomiting, and hypotension.[2]

NSAIDs (nonsteroidal anti-inflammatory drugs) such as aspirin and ibuprofen are not recommended after hair transplantation because of increased risk of bleeding, but the use of COX-2 (cyclooxygenase-2) inhibitors for a short period postoperatively can effectively reduce pain without major bleeding or other side effects.

Method

We studied 100 patients during 2012 and 2013. All had hair transplantation with the FUT method. The number of grafts averaged more than 2,000 and donor excisions were wider than 1.5cm. The donor area was sutured with single layer nylon 0/3 closure. These cases were divided into two groups. In group A (50 patients), acetaminophen 300mg plus codeine 30mg was prescribed 1-2 during surgery and also 1-2 every 4-6 hours post-op as needed. In group B (50 patients), celecoxib 100 was prescribed 1-2 during surgery and 1 every 4-6 hours for 24 hours post-operative. The day after surgery, each patient was asked to describe his or her pain as mild, moderate, or severe, and the patient also was asked about the occurrence of bleeding. The results are shown in the table. In group A, 11 cases (22%) described the pain as severe, whereas in group B, 5 cases (10%) described the pain as severe. In group B, there was only 1 case of little bleeding, which was resolved after the patient compressed the bleeding site with sterile gauze for 5 minutes.

GROUP	SEVERITY OF PAIN DESCRIBED BY PATIENT			BLEEDING
	Mild	Moderate	Severe	
A	23 CASES 46%	16 CASES 32%	11 CASES 22%	NEGATIVE
B	31 CASES 62%	14 CASES 28%	5 CASES 10%	ONLY 1 CASE

Discussion

The exact mechanism of action of paracetamol has not been fully elucidated but may involve blocking impulse generation at the bradykinine-sensitive chemoreceptors that evoke pain. Codeine acts centrally. Codeine is converted partially to morphine in the body. The binding of codeine phosphate to mu, delta, and kappa receptors in CNS can decrease pain sensation.

The conversion of codeine to morphine occurs in the liver and is catalyzed by the cytochrome P450 enzyme CYP2D6. CYP3A4 produces norcodeine and UGT2B7 conjugates codeine, norcodeine, and morphine to the corresponding 3 and 6 glucuronides. Codeine-6-glucuronide is responsible for a large percentage of the analgesia produced by codeine.[4] Use of codeine is associated with side effects such as nausea, hypotension, vomiting, dizziness, and drowsiness.[2]

Celecoxib is a COX-2 inhibitor belonging to NSAIDS. COX-2 enzyme is responsible for the ultimate production of prostaglandins, which can cause pain. NSAIDS such as aspirin and ibuprofen inhibit both COX-1 and COX-2 enzymes.[2]

Inhibition of COX-1 enzyme can cause stomach ulcer and bleeding and therefore is not normally used before or after hair transplantation. Celecoxib specifically inhibits COX-2 and does not affect COX-1 and therefore less stomach ulcer and bleeding is seen with this medication.[2]

In megasessions of FUT, patients typically receive many medications including local anesthetics, analgesics, opiates, benzodiazipenes, adrenaline, and on the like. Many of these medications, alone or in combination, can cause drowsiness, dizziness, nausea, and alterations in blood pressure. Use of high-dose acetaminophen/codeine can exaggerate these side effects. Some of the patients are sensitive to codeine and even small doses of codeine can cause vomiting in these cases.

In contrast, use of COX-2 inhibitors has less interaction with the medications used in hair transplant. One of the most important side effects of COX-2 inhibitors is increased risk of cardiovascular thrombotic events including myocardial infarction and stroke. Risk is increased with duration of use or preexisting cardiovascular risk factors or diseases.[3] Therefore, we use this medication only for the first 24 hours post operation when the pain is maximal, and we use the lowest effective dose. Celecoxib should not be used in elderly patients or patients with past history of cardiovascular diseases.

Conclusion

In this study, we concluded that use of celecoxib for healthy young adults can produce effective pain relief after hair transplantation with an absence of adverse affects. The dose and duration of the prescription should be as low as possible to prevent side effects. Further studies are needed to support these conclusions.

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2014 Annual Meeting Poster Award Winners

At our annual meeting in Kuala Lumpur for the first time the posters were presented on video screens. I thought this was a great way to present the posters and I hope this will become the standard for future meeting. Thanks to Dr. Damkerng Pathomvanich for suggesting the idea.

Every year prizes are given for the top three posters. Posters are judged for technical quality, educational value and originality. Congratulations to this year's winners: 1st Place, Dr. Marcio Crisostomo; 2nd Place, Dr. Kuniyoshi Yagyu, and Best Practical Tip, Dr. Anil Garg. All contain valuable ideas. For those who missed the meeting, Dr. Crisostomo and Dr. Garg's are reprinted in this issue and Dr. Yagyu's in the next issue. —RT

1st PLACE POSTER

Auto Hairpiece to Camouflage the Post-operative Effluvium After a Female Hair Transplant

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Figure 1. 45-year-old, female patient. *A:* Pre-operative view of female pattern hair loss (Ludwig II), and *B:* 9-month post-operative view, 1,845 FUs.

Figure 2. Hair shaved in the strip area.

Introduction

Hair transplants can give good results in female pattern alopecia (Figure 1).

One of the main problems of the post-operative period in female patients is the telogen effluvium that is a shedding due to the surgery stress and trauma, which can sometimes be very intense. This effect can cause a delay in the recovery and return of the patients to their social activities and employment. All patients begin to recover density after a period varying from two to four months. Meanwhile, they need to cover this area with bandages, kerchief, makeup, or hairpieces.

Objective

The objective is to present an inexpensive, practical, and natural alternative to cover the telogen effluvium area after a female hair transplant with an autologous hairpiece.

Technique

During the preparation for the strip excision, the surgeon usually shaves the hair in the strip area, and this hair is thrown out (Figure 2). To produce the auto hairpiece, the shaved hair is saved and inserted into a frame, similar to a tiara, with simple glue and tape for better fixation (Figure 3).

Figure 3. The auto hairpiece made with shaved hair from the strip area is stuck in a frame (tiara).

Figure 4. 35-year-old female patient. *A and B:* Intense telogen effluvium 2 months after surgery, and *C and D:* patient wearing the auto hairpiece made with her own hair to cover the area.

When the post-operative effluvium occurs, the patient can wear the auto hairpiece to cover this area. As the hair used is the patient's own hair, it matches in color, texture, length, and appearance to the surrounding hair. This makes the camouflage much more natural than a common hairpiece (Figure 4).

As the post-operative effluvium takes at least two to four months to regrow, usually it is necessary to camouflage the area affected. Hairpieces can have artificial that differ from the patient's own hair. With the auto hairpiece, a more natural appearance is achieved.

Conclusion

Using patient's own hair is a simple and inexpensive way to produce a natural camouflage as the hair will match the same characteristics of the surrounding hair. This optional camouflage brings more comfort to the post-operative period, while the patient waits for the final result (Figure 5).◆

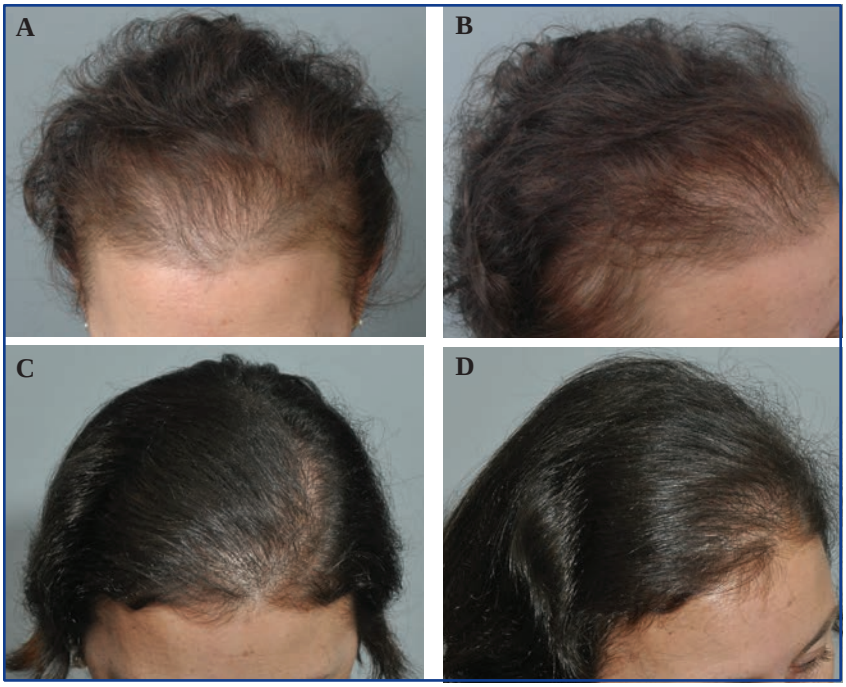

Figure 5. Same patient as Figure 4. *A and B:* Pre-operative view, and *C and D:* 1 year after 1,491 FU hair transplant.

⇨Best Practical Tip page 214

BEST PRACTICAL TIP

Dynamic Hydration Follicle Dissection Board—An Innovative Device

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Introduction

Dissection of follicles in FUT is one of the steps of the hair transplant procedure. It is very important to prevent dehydration of follicles during follicle dissection. Continuous saline irrigation is required to keep them moist. If the graft cutter forgets this important step, the follicles could die of dehydration.

Principle

The dynamic hydration dissection board is an innovative device that keeps follicles wet during dissection. In this device, before cutting, the slivers are not immersed in saline, but when we cut into the sliver with a blade, saline floods into the field of sliver dissection and irrigates automatically. This is a mechanical device that does not require electricity or complicated equipment.

Method

Step 1. Take a wooden board sized 25×25cm, and cut a 10×10cm-deep slot (Figure 1).

Step 2. Put high density foam, cut to size of slot (10×10cm), into the wooden slot (Figure 2).

Step 3. A slot the size of the spatula is also made in the foam so that the spatula is well fixed in the foam pad and does not slip out during graft cutting (Figure 3).

Step 4. Next, after covering it with sterile gauze, the foam is immersed in saline.

All components are sterilized to prevent infection.

Figure 1. Start with wooden board and cut slot.

Figure 2. High density foam is cut to size.

Figure 3. Slot for spatula is cut into the foam.

Mechanism

Each sliver is placed on the wooden spatula and graft cutting is started. The sliver before cutting is not immersed in saline (Figure 4), but when the knife blade is placed onto the sliver for graft dissection, the saline in the foam floods over the sliver and irrigates it (Figure 5). The pressure that we apply for dissection is sufficient to release saline onto the tissue. After the graft dissection, the saline soaks back into the foam (Figure 6).

This is a very simple, easy to use, and economical mechanical device.

Figure 4. Before cutting, saline is not present.

Figure 5. Saline from the foam irrigates the sliver.

Figure 6. After dissection, saline is soaked back into the foam.

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.

ISHRS Trivia

1. What is the size of the ISHRS membership worldwide?
   A. 500-1,000
   B. 1,000-1,500
   C. 1,500-2,000
   D. 2,000-2,500

2. How many countries are represented among the ISHRS membership?
   A. 25
   B. 70
   C. 106
   D. 80

3. What is the most common medical specialty represented among members of the ISHRS?
   A. Dermatology
   B. Internal Medicine
   C. Emergency Medicine
   D. Plastic Surgery

4. Which of the following are benefits of ISHRS membership?
   A. Listing on the ISHRS website as a recommended Hair Surgeon organized by number of surgeries accomplished (i.e., experience)
   B. Morbidity and Mortality conference
   C. Peer review and CME opportunities
   D. Complimentary online (and paper) access to *Dermatologic Surgery* and *Hair Transplant Forum International* articles

5. Which of the following is a requirement for full physician ISHRS membership?
   A. Fellowship training
   B. 50 case reports and 2 letters of recommendation
   C. Attendance of 1 meeting every three years
   D. Ethical behavior and payment of annual dues ONLY

6. The ISHRS mission statement includes promotion of
   A. Scientific research to improve remuneration rates for hair surgeries
   B. Musicianship and Education
   C. Technical Ability and Public Awareness
   D. Collegiality and Ethics

7. The ISHRS was recently honored with which of the following awards?
   A. Accreditation with Commendation by the ACCME
   B. Golden Follicle Award
   C. A "Group Performance" Academy Award (AKA Oscar) for the strong microphone performances of several members of the audience at the past 6 scientific meetings.
   D. A Cannes Film Award for excellence in surgical documentary video production

8. The ISHRS was started in what year?
   A. 1992
   B. 1956
   C. 1993
   D. 2001

9. How many ISHRS members have attended all 22 ISHRS annual scientific meetings (including Kuala Lumpur)?
   A. 5
   B. 22
   C. 127
   D. 10

10. In which of the following cities has an ISHRS meeting occurred?
    A. Paris, France
    B. Amsterdam, The Netherlands
    C. Juneau, Alaska, USA
    D. Sao Paulo, Brazil

11. Who is NOT eligible to be an ISHRS member?
    A. Surgery Office Staff
    B. Surgical Assistants
    C. Hair Research Scientists
    D. Interested Physicians

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Answers

1. **B.** There are approximately 1,250 total members at the time of this writing.
2. **B.** There are 70 countries represented: 61% are non-US for the first time this year (2014)! Truly, we are becoming an "international" society.
3. **A.** The breakdown is as follows:
   Dermatology, 19%
   Plastic Surgery, 17%
   Family Medicine, 13%
   Cosmetic Surgery, 13%
   General Surgery, 12%
   Other, 4%
   ENT/Otolaryngology, 4%
   Internal Medicine, 4%
   Emergency Medicine, 3%
4. **D.** By virtue of the fact that you are reading this, everyone should get this answer correct! The M&M conference has been conducted in conjunction with the ISHRS surgical meeting but it is an ABHRS-sponsored event. I suggested a peer review process to Dr. Cooley in Boston and it may yet become a reality (contact the ISHRS and voice your support if you like this idea!) but it is NOT yet a membership benefit. CME is certainly one of the biggest benefits of membership. Listing on the ISHRS.org website is advantageous, but the number of surgeries and the surgeon experience are not listed.
5. **C.** Fellowship training, case reports, and letters of recommendation are requirements for sitting for the ABHRS exam (i.e., "The Boards"). Since now attendance at 1 meeting every 3 years is required, ethical behavior and annual dues payment alone will not be sufficient for ISHRS membership!
6. **D.** The full ISHRS mission statement reads: "To achieve excellence in medical and surgical outcomes by promoting member education, international collegiality, research, ethics, and public awareness."
7. **A.** The ISHRS received this accreditation in 2014, which is truly an honor, although arguments could be made for B, C, and D as well.
8. **C.** Over 20 years ago now!
9. **D.** This is also known as "Last Man Standing" and these individuals have been in the organization since the very beginning and have never missed a meeting or sharing an alcohol "shot" on stage at the Gala Dinner Dance and Awards Ceremony. Now that is dedication!
10. **B.** ISHRS meetings have occurred all over the world including Kuala Lumpur, Malaysia; San Francisco, California; The Bahamas; Anchorage, Alaska; Boston, Massachusetts; Amsterdam, The Netherlands; Montreal, Canada; Las Vegas, Nevada; San Diego, California; Sydney, Australia; and many others (see ishrs.org for the complete list).
11. **A.** There is no surgical office staff category for ISHRS membership.◆

Complications and Difficult Cases

Marco N. Barusco, MD *Port Orange, Florida, USA* drbarusco@tempushair.com

Below is an excellent article by Dr. Jonathan Ballon. In it, Dr. Ballon gives us his insight and experience as a neurosurgeon and highlights the potentially serious risks of performing hair restoration surgery on patients who were submitted to neurosurgery procedures in the past by describing one case in which the patient faced a major complication. As surgeons dedicated to improving our patient's quality of life, we must always keep in mind that sometimes the potential benefit is not worth the risk for the patient.

On a personal note, I thank Dr. Ballon for his candid comments about my approaches to the cases I have published in this column. Moreover, it is my duty to say—as I did in the articles I wrote—that my protocol for these patients was derived from extensive literature review and an attempt to cover every possible angle to minimize the potential for complications, which always exists.

Finally, I would caution that these types of patients are not ideal for a novice hair transplant surgeon and to the ones unfamiliar with sterile surgical techniques, which may be required for these patients in order to further minimize risks.

I thank Dr. Ballon for his excellent article.

A Neurosurgeon's Perspective on Hair Restoration Surgery

Jonathan Ballon, MD, FISHRS *Atlanta, Georgia, USA* jballonmd1@gmail.com

As perhaps the only representative of my specialty (neurosurgery) among the ISHRS membership, I feel I would be remiss if I did not take a moment to congratulate Dr. Barusco on his thoughtful management of the two challenging cases he presented over the past few months ("Hair Transplantation in a Patient with a Large Cranioplasty," Volume 24, Number 1, pp. 8-11; and "Follicular Unit Transplantation on Irradiated Scalp," Volume 24, Number 4, pp. 134-136). I'd also like to take this opportunity to give a brief overview of the special issues that sometimes need to be considered when evaluating neurosurgical patients for hair restoration surgery, and present a case of my own that illustrates the potential for misfortune.

Cranioplasty is both cosmetic and functional, serving to restore the natural contour of the skull and protect the brain. Dating back nearly 10,000 years to the Neolithic Period, trephination (or trepanation) and cranioplasty are the oldest surgical procedures for which archeological evidence exists.[1] Paintings found in caves suggest that opening the skull was a means of treating a variety of ailments, from headaches to seizures to abnormal behavior.[2] Over the centuries, the materials used to reconstruct the skull have evolved, from precious metals and gourds, to canine bone, to autologous bone, to modern day metals (chiefly titanium mesh and plates), and synthetic materials such as methyl methacrylate, hydroxyapatite, ceramics, and polyetheretherketone (PEEK).[3] Wars have provided the impetus for advances in virtually every surgical specialty, and neurosurgery is no exception.

When considering hair transplantation in a patient harboring foreign material that has been placed either in the skull (e.g., a cranioplasty) or through the skull (e.g., a ventricular shunt or deep brain stimulation system), the physician must be cognizant of the unique risks to which these patients may be exposed. The surgeon's responsibility here is to help the patient make a decision based on what is essentially the very low likelihood of a very troublesome complication. Most patients have no idea whether their neurosurgeon simply replaced their bone flap, or used foreign materials to reconstruct the calvarial defect.[4] Either way, I believe it is incumbent upon the physician to include the patient's neurosurgeon (or at least a neurosurgeon) in the decision-making process so that the patient may be fully informed regarding the potential risks and their implications. Each patient will make his or her own decision about whether or not to proceed with surgery based upon the perceived risk:benefit ratio.

The major concern for a patient with an intracranial foreign body is infection, and the possibility (however remote) that all foreign materials, and perhaps a section of the skull, would need to be removed in order to effectively treat the infection, which could involve bone, brain, and/or cerebrospinal fluid (CSF); in the case of a ventriculoperitoneal (VP) shunt, treatment could also require hospitalization and placement of a temporary ventriculostomy for external drainage of CSF. The closer in proximity the foreign material is to the proposed recipient area, the more likely it is to become infected in the event of post-operative cellulitis or folliculitis. Again, the risk of infection is extremely low (especially if the foreign material is entirely subgaleal, since the galea is generally a formidable barrier to infection), but the stakes are high.[5]

The use of prophylactic antibiotics in clean surgery is controversial.[6,7] With regard to neurosurgical procedures, there is no universally agreed upon drug of choice or protocol for pre-operative antibiotic prophylaxis, even for those patients undergoing VP shunt placement; however, at least a single pre-operative dose is routine for most procedures, and the intravenous route is generally considered to be more effective in reducing the risk of infection.[8] The benefit of oral antibiotic prophylaxis for the hair transplant patient with intracranial foreign material is uncertain, though it would be difficult to argue against it, especially in the absence of intravenous antibiotics. The prevalence of MRSA carriers in the general population has been estimated to be about 2%,[9] which brings into question the need for mupirocin. The most effective aspect of Dr. Barusco's prophylactic protocol may well have been cleansing of the skin with Hibiclens (chlorhexidine).

I was particularly impressed with Dr. Barusco's efforts to transform a "clean" operating environment into a sterile one. Even for those hair transplant surgeons once accustomed to working in sterile operating rooms in the past, it is easy to become forgetful of our aseptic ways. And certainly, most medical

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assistants engaged in hair restoration surgery are unfamiliar with true sterile technique.

The vast majority of patients who undergo external beam radiation (EBRT) for intracranial tumors will not be suitable candidates for hair restoration surgery because of the nature of their underlying disease (most commonly metastatic lesions from a primary tumor elsewhere and glioblastomas) and the poor prognosis for survival; however, as Dr. Barusco pointed out, it is sometimes necessary for patients with benign tumors (typically meningiomas) also to undergo EBRT. In these cases, there are concerns relating to decreased vascularity and tissue turgor, with associated poor wound healing and the possibility of necrosis—to say nothing of poor follicular growth—following hair transplantation. In an effort to optimize his patients' outcome, Dr. Barusco took the appropriate precautions of avoiding the use of epinephrine in the recipient area, as well as making relatively shallow, low-density sites. As we shall see, even when great care is taken to prevent necrosis of the radiated scalp, this can still occur—particularly when the area being addressed is in the mid-scalp, which is more susceptible to ischemia by virtue of its watershed vascular supply.

Stereotactic radiosurgery is increasingly being used to treat intracranial lesions because of the markedly decreased risk of damage to surrounding healthy brain tissue. Likewise, there is little or no associated hair loss, and little or no damage to the scalp, making it much safer for these patients to undergo hair restoration surgery in the event of the more common causes of transplantable of hair loss.

Having experienced a particularly dreadful outcome with a former brain tumor patient of mine, I can assure you that even low-percentage risks do occur. My patient, a 48-year-old nurse, underwent her second craniotomy for a recurrence of her right parasagittal meningioma 10 years later.[10] This time, there was tumor involvement of the overlying skull, thus the bone was discarded and cranioplasty carried out using titanium mesh and methyl methacrylate. In light of the recurrence, the patient underwent a course of post-operative EBRT. She was, understandably, greatly distressed by the resulting large area of hair loss and contacted me after my career change to discuss the possibility of a hair transplant. Her hair in the non-radiated areas of her scalp was "salt and pepper," coarse, and wiry, and her donor density was quite good. With the hubris of a novice, I enthusiastically scheduled the patient for surgery.

I did not go to the lengths that Dr. Barusco did with regard to pre-op antibiotic prophylaxis and rigorous aseptic technique, but 500mg of cephalexin was given an hour before surgery and 8 hours later. The donor and recipient areas were prepped with Betadine. As with Dr. Barusco's patients, "chubby" grafts were prepared and epinephrine was not used in the recipient bed. The shallow, low-density recipient sites were concentrated around the more vascularized periphery of the radiated scalp.

The patient tolerated the procedure well; growth at 1 year was sparse, but she was pleased with the small amount of improvement; unfortunately, I no longer recall how many grafts were transplanted, nor do I have her pre-op and post-op photos. Sufficiently emboldened by my success, a second session was offered to work more centrally in the mid-scalp and add a modest amount of density. The same technical protocol was followed as in the first procedure. Again, I do not have a record of the number of grafts placed in this surgery, but the sites were generously spaced apart. Shortly after the second transplant, the patient developed necrosis in the central recipient area. A plastic surgeon in her home state admitted her to the hospital for excision of the necrotic tissue and closure of the scalp by means of a rotation flap. While hospitalized, the patient developed a MRSA infection; this required removal of all cranioplasty materials and a lengthy in-patient/out-patient course of intravenous antibiotics. At one point, the patient developed intractable seizures followed by a stroke, leaving her essentially non-ambulatory from a left hemiparesis. In spite of a protracted stay in a rehab facility, she was unable to return to her home and has remained in a long-term care facility to this day. Having sold her house and exhausted all of her financial resources, she is now on Medicaid. She decided she had had enough surgery and chose not to undergo delayed repair of her craniotomy defect; thus, she is left with a large, sunken "soft spot" in her scalp through which her right frontal lobe pulsates visibly. (Though I have visited the patient numerous times after the second transplant, I never had the heart—or the stomach—to take any photos.)

Ironically, this woman emerged unscathed—except for her hair loss—from two craniotomies more than 10 years apart for a large, complex and life-threatening tumor, only to meet her downfall as a result of two "simple," elective cosmetic procedures. And the hair for which she has paid such a heavy price? All is gone.

As the numbers of both neurosurgical procedures and hair transplants continue to increase, hair transplant surgeons will encounter more and more prospective patients who have undergone treatment for intracranial pathology. I have spoken with a number of ISHRS members who have successfully performed hair transplants on neurosurgical patients, including those with extensive cranioplasties who have also undergone conventional external beam radiation therapy. While I congratulate them on their achievements, I am nonplussed by the dauntless attitude exhibited by some of my colleagues. It is said that a surgeon's judgment is inevitably tempered by his or her complications. Though it has been 10 years since my patient's surgery, this particular complication haunts me as much as any other in a 34-year surgical career. And it has made me more circumspect with regard to performing a hair transplant on radiated scalp, particularly where there is an underlying cranioplasty. Ultimately, it is important to remember that we are dealing with an elective cosmetic procedure. Our approach should be guided by an understanding of the potential complications, consultation with the patient's neurosurgeon, and the wishes of the patient after he or she has been informed of the possible risks and benefits of the procedure.

References

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2. Brothwell, D. Digging Up Bones: The Excavation, Treatment and Study of Human Skeletal Remains. London: British Museum (Natural History), p. 126.
3. Sanan, A. Repairing holes in the head: a history of cranioplasty. *Neurosurg.* 1997(Mar); 40(3):588-603.
4. *Author's note:* Technically speaking, even filling in bur holes with acrylic cement or plastic covers could be considered a

cranioplasty of sorts; alternatively, the bone flap might have been secured with titanium plates and screws. Either of these techniques introduces foreign material into the skull and thus it would behoove the hair transplant surgeon to make an effort to consult with the neurosurgeon.

5. *Author's note:* In addition to the risk of a ventriculoperitoneal shunt becoming infected, there is also the possibility of puncturing the shunt valve, reservoir, or tubing.
6. Bowater, R.J., et al. Is antibiotic prophylaxis in surgery a generally effective intervention? Testing a generic hypothesis over a set of meta-analyses. *Ann Surg.* 2009(Apr); 249(4):551-556.
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8. Ratilal, B., et al. Antibiotic prophylaxis for surgical introduction of intracranial ventricular shunts: a systematic review. *J Neurosurg Pediatr.* 2008(Jan); 1(1):48-56.
9. CDC; 2012 report. "Active Bacterial Core Surveillance (ABCs) Report Emerging Infections Program Network Methicillin-Resistant Staphylococcus Aureus."
10. *Author's note:* The 10-year recurrence rate for all meningiomas is in the range of 10%-15%. Parasagittal meningiomas are more likely to recur due to their intimate involvement with—and frequent invasion of—the superior sagittal sinus, thereby making an attempt at total resection unwise.◆

SHARE YOUR COMPLICATIONS AND DIFFICULT CASES

Had a particularly difficult case?
What unusual complications have you seen?

Please contact Dr. Marco Barusco, Complications and Difficult Cases column, at **drbarusco@tempushair.com**
and share these valuable learning cases with your fellow members.

Cyberspace Chat

John P. Cole, MD *Alpharetta, Georgia, USA* john@forhair.com, and
Bradley R. Wolf, MD, FISHRS *Cincinnati, Ohio, USA* wolf@wolfhair.com


John P. Cole


Bradley R. Wolf

The following is a conversation between the co-columinsts of Cyberspace Chat, debriefing after the recent ISHRS Annual Scientific Meeting in Kuala Lumpur, October 8-11, 2014. The daily meeting write-ups will be included in the next issue of the Forum. *—RT*

John Cole began: I must say that the meeting in Kuala Lumpur exceeded my expectations. A tropical environment along with the friendly nature of the Malaysians made for the perfect setting to a wonderful meeting. Dr. Pathomvanich certainly did his work preparing for the meeting. We could tell this was not the first meeting he has organized. What would you say are your highlights, Brad?

Bradley Wolf offered: Well, John, overall it was a great meeting. As you are well aware, hair pilgrims are known to unite anywhere in the world. I anticipated a unique experience due to the location, Malaysia, as well as the demographics of the attendees. With the change in dates, location, and troubling geopolitical issues, there were concerns that attendance would be down, but attendance figures exceeded everyone's expectations. The hotel was spectacular, in the center of Kuala Lumpur, and a short, (and relatively inexpensive) cab ride to most tourist attractions. The meeting and hotel rooms were close, making for a cozy meeting, conducive for chance meetings as well as professional and casual interactions with colleagues. The hotel staff was extremely accommodating as were all Malaysians I encountered. Everywhere in the city, they were smiling and helpful.

Forty-one percent (41%) of attendees (214/526) had never attended an ISHRS meeting. The average percentage of first-time attendees the prior five years (2009-2013) was 26%. This is a significant change. I could feel the energy and excitement. The exhibitors' booths were buzzing with business and discussion. Many of the exhibitors' supplies were exhausted by Friday forcing them to take orders. I looked out over the crowd in the lecture hall on Friday, when in most meetings the attendees had thinned a bit, and the seats were as full as they were on Thursday, the first day.

The average number of total attendees over the last five meetings was 555. The last meeting not in North America, Amsterdam, had 476 attendees. So Kuala Lumpur at 526 was quite remarkable. Unlike most ISHRS meetings where North American members dominate attendance numbers, Asian attendees dominated in Kuala Lumpur. The averages by country the last five years show that the United States (236), Canada (35), Brazil (24), United Kingdom (24), and India (19) had the highest attendance. This year, the top five were India (58), United States (58), Thailand (39), South Korea (37), and Australia (29).

John Cole added: While it is impossible to single out any one highlight, I rank the lectures by Rodney Sinclair and Thomas Dawson equally at the top of my list. I thought Dr. Dawson's lecture was relevant to every hair loss practitioner, while Dr. Sinclair offered insights to the physiology of hair that I'd never considered. Dr. Sinclair revealed that there are primary follicles and secondary follicles for the follicular unit. The primary follicles form first in utero. The secondary follicles of a follicular unit form later also in utero. The secondary follicles are the first ones to depart in androgenic alopecia or, as he stated, "last in and first out." His talk centered on the arrector pili muscle. In androgenic alopecia, the arrector pili muscles separate from the secondary follicles first. In that the CK15+ stem cells are located in the arrector pili muscle, the capacity for follicle regeneration is lost when the arrector pili muscle disconnects from the secondary follicles. When the arrector pili muscle detaches from the hair follicle, the attachment is replaced with adipose. In alopecia areata, miniaturized follicles maintain their attachment with the arrector pili muscle. He also mentioned a niche of CK15+ cells at the junction of the arrector pili muscle and the epidermis. The arrector pili muscle does not form a single attachment to the follicle. Rather, muscle attaches at multiple points.

Paco Jimenez has noted that the insertion region of the arrector pili muscle to the hair follicle, which coincides with the lowest end of the isthmus, is located 1.6mm from the skin surface.[1] CK15+ cells are located an average depth of 1mm (0.9-1.35) below the skin surface and extend down to a depth of 1.8mm (1.6-2.25), just below the arrector pili muscle insertion. The average length of the bulge region as detected using anti-CK15 is 0.8mm, almost equivalent to the length of the isthmus.

While Dr. Sinclair suggests that regenerative capacity is lost when the arrector pili muscle detaches from the secondary follicles, Cotsarelis has found that follicle stem cells can migrate.[2] However, according to Dr. Sinclair, it seems imperative that we induce regeneration prior to a point of no return in the miniaturization process.

One thing that has always intrigued me is that the growth of single-hair grafts manufactured by reducing intact follicular units to single-hair grafts *in vitro* is less than 90% in many cases. It could be that stem cell niches are lost during the division process. Alternatively, the yield from secondary follicles of an individual follicular unit may be less than the yield of primary follicles when intact follicular units are fractionated.

Dr. Dawson gave a wonderful presentation on progressive loss of hair volume with age, styling habits that cause hair thinning, and biochemical options to improve hair. Curling, blow drying, shampooing, coloring, brushing, and teasing hair causes hair breakage predominantly in women. He suggested that shampooing three times a week was probably adequate and it is best to rinse in cold water. Dr. Dawson uses the same technology as sheep farmers to measure hair diameter. Wool that is 22 micrometers in diameter makes a pair of inexpensive socks, while wool 15 micrometers in diameter make an expensive garment. Using the methods he obtained from the wool industry, Dr. Dawson began to study hair diameter and calculate hair volume. Although hair is an elliptical structure, Dr. Dawson calculates hair volume using the formula for a cylinder. He included terminal hairs

ranging from 20 micrometers to determine the average diameter of hair is close to 60 micrometers. At age 45-46, women lose hair density from an average of 220 hairs/cm^2 to a density of 170 hairs/cm^2 by age 60. At age 40 to 45, both men and women begin to lose hair diameter and the loss is progressively worse over time. Hair volume decreases from 20,000 to nearly 12,000 by age 70. Thus, not only is the donor area impermanent as previously suggested, hair coverage becomes progressively worse over time due to a loss of hair volume.

In his measurement of hair volume, Dr. Dawson measures the long axis of the hair shaft. He noted that straight hair tends to lie on its minor axis, while curly hair lies on its long axis. Vellus hair is stated to have a diameter of less than 30 micrometers, therefore, I was surprised he included hair follicles lower than 30 micrometers to calculate the average hair diameter. Because a hair below 30 micrometers adds so little hair volume, I did not include follicles below 30 micrometers when I calculated the average hair diameter was approximately 68 micrometers.

Dr. Dawson reviewed a number of ingredients to improve hair quality and volume. Ultraviolet light is damaging to hair. He stated that deposition and coating was a problem with UV protectors for the hair. Caffeine up regulates the aquaporin gene. Aquaporin increases the absorption of water into the hair follicle. A combination of niacinamide and caffeine at the proper concentration, can improve hair diameter and hair coverage. Based on the progressive decrease in hair diameter in time, we certainly need to look at the biochemical solutions to improve hair diameter for our patients.

The workshop on micropigmentation given by William Rassman, Ryu, Jino Kim, and Milena Lardi was excellent. The epidermis varies in depth from 0.5 to 1.5 mm due to undulations. The procedure is angle, depth, and time sensitive. It is important to deposit the particles in the outer dermis. Dr. Rassman feels that it takes about 100,000 tries to get the feel. The ink that Dr. Rassman uses and sells is permanent. The ink Milena sells fades over the span of about one year. Milena uses particle sizes of 15 micrometers and coats them with silicone. She feels her silicone particles are absorbed. Because skin takes about 1 month to turn over and shed any pigment deposited in the epidermis, the result takes about 1 month before you can evaluate it. Dr. Rassman noted that the pigments are carcinogens and we must not promise anything to the patient. Dr. Rassman feels a full head takes about 25 hours to complete, while Milena can accomplish this is 2 hours. She does a second pass the next day that takes 1 hour and then a final touch up one month later that requires another hour.

Bradley Wolf continued: I was certainly surprised to hear Ms. Lardi can accomplish one pass on a patient with Class VI hair loss in two hours. That is fast! It seems that most who perform scalp micro pigmentation (SMP) develop their own technique and timing. Dr. Rassman emphasized that he thinks SMP will become an integral part of every practice that offers hair restoration surgery.

John Cole offered: Dr. Pathomvanich did a nice job organizing the meeting. I think you were our busiest speaker with the most presentations with five as I recall, Brad.

Bradley Wolf added: It takes so many people working a year in advance to pull off what appears to be a seamless event. Much credit goes to Victoria Ceh, our tireless Executive and CME Director, the staff of the ISHRS, and the CME Committee (Continuing Medical Education). I saw Victoria, Kimberly Miller, and Melanie Stancampiano everywhere. I thought they cloned themselves! Of course, Dr. Damkerng Pathomvanich, the program chair, also deserves much of the credit. Dr. Vincenzo Gambino, our president, and Damkerng, with Victoria, spend so many hours behind the scenes for a year working hard to make the five days of the meeting hum like clockwork. There are so many more who worked so hard, it's impossible to mention everyone.

John Cole noted: The first argument of the meeting occurred between Dr. Puig and me. Dr. Puig feels that he is seeing much mature results much faster with liposomal ATP while I disputed this contention. We have some work to go in establishing a protocol for platelet rich plasma (PRP). In presenting a response to PRP it is important to discuss the protocol used so that we can better evaluate the result. We need to disclose the needle size for injection, the concentration of PRP, the depth of the injection, how the PRP is activated, the hematocrit of the PRP, and any ancillary treatments such as microneedling. Dr. Puig gave a wonderful paper that suggests that a 1× concentration of PRP and a hematocrit less than 3% without activation of the PRP produces no improvement in the Hair Mass Index in women with Ludwig II female pattern hair loss (FPHL). Dr. Kumar found no hair transplant surgical result benefit (hair count or hair diameter) in a small sample size of patients with a concentration of 1 million platelets/µl and activation with calcium chloride or thrombin. Dr. Kumar stated that he used to trichoscan to document his results, but he did not present results demonstrated the use of a trichoscan. I have definitely seen an improvement in hair mass in women using a 5× concentration, a 2% hematocrit, injected in all layers from upper adipose to upper dermis using a 25 gauge needle, and activation with Calcium gluconate. I have seen the cross-sectional trichometry improve from 60 to 98 after one year in one woman. Clearly, we need more data with the specific protocol noted. We are lucky to now have some studies that demonstrate protocols that seem to offer no benefit from PRP.

Bradley Wolf added: As with most new medications, surgical modalities, or ancillary treatments, it takes time and studies to determine efficacy. From the lectures in Kuala Lumpur, it appears there is much work to be done on determining optimal concentrations of PRP, which activator, and the needle size that maximize the effects of PRP. It's interesting that there were no studies or lectures on ACell presented in Kuala Lumpur.

John Cole followed: I generally don't care for talks on scarring alopecias, but Dr. Paul McAndrews gave a wonderful talk on hair transplantation in Non-AGA & Scarring Alopecia. I tried grafting into incision scars with slightly larger grafts in the early 1990s. But I did not like the results. I was happy to see some nice results from Ryu using smaller grafts. This clearly gives us one more option in addition to trichophytic closure to improve the appearance of strip scars. In addition to an award for presentation skills, Sarah Wasserbauer gave a wonderful talk on grafting eyebrows. She worked the audience magically. I loved your high speed video, Brad. What camera did you use?

Bradley Wolf responded: I used a GoPro camera on a stationary mount just behind me. It was a challenge to dodge the camera while doing the strip excision surgery. I tried mounting it on my head but there was just too much movement in the video. The GoPro Studio editing software was quite a challenge.

John Cole continued: I think Dr. True presented a very nice study documenting the benefits of human recombinant hyal-

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uronidase in strip surgery. I can't imagine doing a strip without it. One of your scars where you closed with metal sutures was pink. I wonder if you see an increase in pink scars with metal sutures. We perform hair transplants rather than fat transplants so I always wondered what the benefit was from chubby grafts and why so many were worried that FUE grafts lack adipose. I think you clearly demonstrated that we are transplanting the essential structures with FUE in your genomics study comparing hair follicles from FUT, FUE, and plucks, Brad.

Bradley Wolf followed: Thanks to P&G (Proctor & Gamble Co.) who did the genetic analysis. They studied 55,000 transcripts of 18,000 genes and looked closer at 132 genes of hair relevant keratin and keratin associated proteins. I think it's the best evidence to date that shows FUT and FUE grafts are pretty much the same down to the stem cells present in both.

John Cole replied: I'm not sure what to make of the hidden transection rate talk given by Dr. Kim. However, I just received a communication from Dr. Kyuhu Lee discussing the same thing. I believe we have to consider this. Dr. von Albertini gave a nice presentation on the benefits of limiting the incision depth. The volume of the contiguous wound is important in my opinion. A 1cm-wide strip cut 30cm long and 1cm deep removes 30,000 mm^3 of tissue and might yield 2,400 follicular units. A 1mm punch incision 2mm deep removes about 1.56mm^3 of tissue and each incision is separate from the next wound. In total, this would result in the removal of less than 3769.8mm^3 of tissue when 2,400 grafts are removed. I can only approximate with FUE simply because with FUE the lower incision is always deeper than the upper part of the incision, so the excision is always less than a complete cylinder. However, because the punch enters the skin at an angle based on the angle of hair growth, the incision is always an ellipse and the volume of tissue removed is greater than the volume of a cylinder. Regardless, the volume of contiguous wounding with FUE is significantly less than the contiguous excision volume with strip excision.

It was interesting to discover that 47% of FUE physicians use motorized extraction. Only 21% of physicians use a dull punch. In five years, 32% of physicians expect to perform FUE 76-100% of the time and nearly 75% expect to perform FUE at least 26% of the time. Emre Karadeniz found that his grafts from FUE average only 2.03 hairs while his FUT grafts average 2.25 hairs. Clearly, this is a function of punch size and technique. Dr. Lorenzo averages 2.25 hairs per grafts from FUE. In the Farjo clinic, the ARTAS averaged 2.12 hairs per graft, while FUT averaged 1.98 hairs per graft. Quite frankly, I've never seen a clinic consistently average more than 2.05 hairs per graft from FUT though Bernstein's microscope vs. Loop study showed an average of 2.28 hairs per graft from microscopically dissected grafts compared to 2.14 hairs per graft from loop dissection.[3] Sharon Keene gave a nice review of low level laser therapy (LLLT). She clearly did her homework. I appreciate the idea from Dr. Hwang to control the depth of graft placement based on the graft length. Pitting can produce low yields. This is a step in the right direction as variation in graft length can produce pitting when a single depth of insertion is followed.

Yun Joo Lee presented some fascinating data on patient satisfaction in Korean patients from hair transplantation. He found 75% of men were satisfied (3% dissatisfied) and 60% of females were satisfied (13% dissatisfied). I think it is always harder to please a woman. Dr. Dua avoids the mid-sternal area when harvesting chest hair grafts due to a concern about hypertrophic scarring. In hundreds of cases using punches up to 1mm in diameter, I have not seen hypertrophic scarring on the chest regardless of anatomical location. I have seen hypertrophic scarring on the chest in multiple locations by another physician, so clearly there is a way to cause hypertrophic scarring. Fortunately, this patient responded well to injections of 10mg of kenalog/cc with a loss of elevation. The discoloration from the scarring remained on his chest. Drs. Bernstein and Harris were the "caboose" of our meeting. It is exciting to see the advances in robotic recipient site creation as demonstrated by Dr. Bernstein. Dr. Harris presented some retrospective data average hairs per graft by robotic harvest (12.2% one hair, 41.85 two hair, 30.8% three hair, 15.2% four hair). In my regional variation study, I found that in the entire donor area from the mid-occiput to the supra-auricular region the average was number of hairs per follicular group was 12.32% one hair, 36.3% two hair, 31% three hair, 14.9% four hair, 4.24% five hair, and 1.24% six hair.[4] However, if we looked only at the mid-occipital area and the mid-mastoid area, the average number of hairs per group was 9.15% one hair, 37.6% two hair, 28.54% three hair, 17.35% four hair, 5.48% five hair, and 1.86% six hair. The robot harvests most of the grafts from the central part of the donor area and progressively less laterally. The robot is unable to harvest the larger groups containing more than 5 hairs and selectively chooses the smaller grafts. In general, the data is similar in both studies; however, we must also consider that a small amount of fractionation of follicular groups is occurring. Furthermore, when I harvest grafts by FUE using a punch size similar to that of the ARTAS I find it difficult to locate single hair grafts and my mean calculated density is 2.93.[5] Still, we must be impressed with the progress the robot is making. Or should we?

If we look at a photograph comparing the ARTAS to a 0.8mm punch, we note the wounding is much larger with the ARTAS (Figure 1). In fact, the wounding with the ARTAS is much larger than 1mm. The reason we find 12.32% natural single-hair grafts in my regional variation study is that on the surface of the skin we can arbitrarily define natural single hair follicular units (Figure 2). What we cannot do is isolate these single-hair follicular units from the larger adjacent cluster using a punch that cuts holes the size employed by the ARTAS. If we use a punch that cuts holes similar to that of the ARTAS as depicted in Figure 1, we will find it almost impossible to isolate single hair grafts. In order to isolate single-hair grafts in FUE, we must use a punch similar in size or smaller than the 0.8mm punch depicted in Figure 1. We isolate single-hair grafts by taking small bites from larger clusters (Figure 3). In fact, natural single-hair follicular units are uncommon especially in the middle of the donor area where the ARTAS is most efficient. Only patients with a low calculated density and poor candidates for hair restoration surgery will have a large number of natural single-hair follicular units in donor boxes 1,2, 5, and 6.[6] Due to efficiency, the ARTAS often harvests predominately in the middle of the donor area and progressively less laterally (Figure 4). The ARTAS is known to over harvest isolated portions of the middle of the donor area where the resulting follicular unit density in this 0.1cm^2 area following a single pass with the ARTAS was equivalent to only 20 follicular units/cm^2 (Figure 5). The high percentage of single-hair grafts given a wound this size, the predilection to harvest predominately

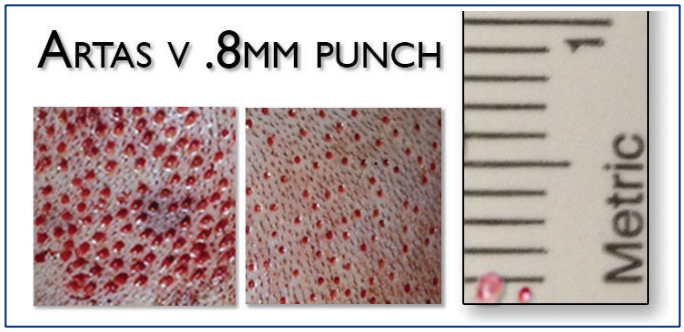

Figure 1. Side-by-side comparison of the ARTAS *(left)* vs. .8mm *(right)* wound size.

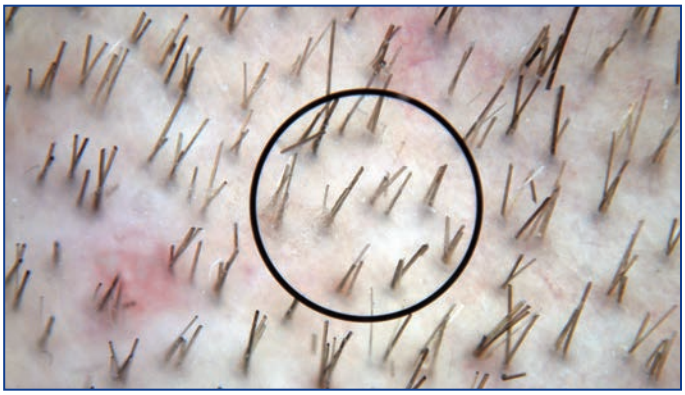

Figure 2. True single-hair follicular units are uncommon in an average donor area. In FUE, single-hair grafts are generally obtained by fractionating the larger follicular units using a punch 0.85mm in diameter or smaller. Isolating single hairs is far more difficult if not impossible with punches 1.1-1.2mm in diameter.

Figure 3. Single-hair grafts in FUE may be isolated *in vivo* using a punch 0.85mm in diameter or smaller.

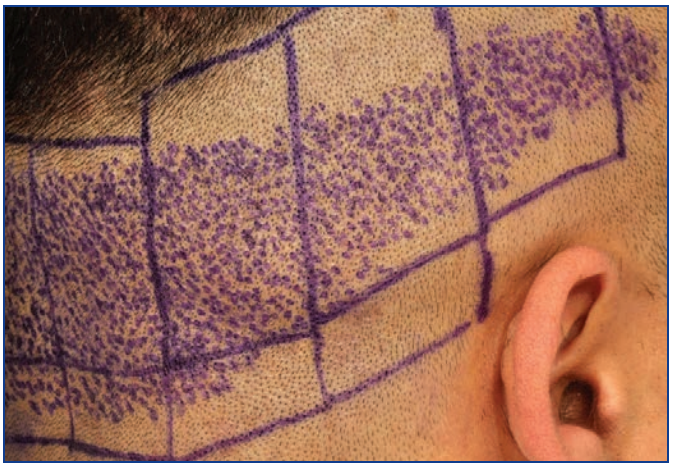

Figure 4. Due to efficiency, the ARTAS often harvests predominately in the middle of the donor area and progressively less laterally.

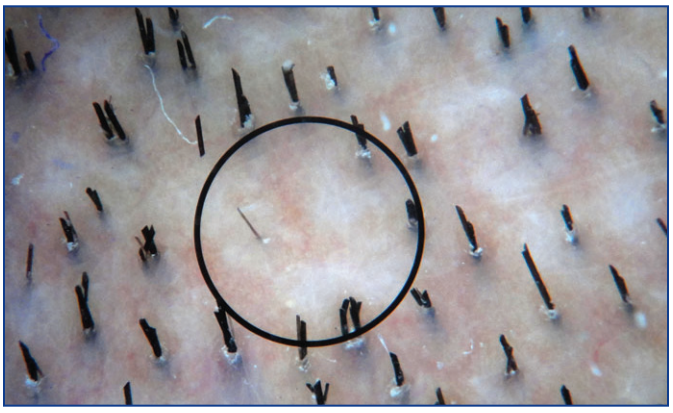

Figure 5. The ARTAS can over harvest in isolated areas; meaning, a single pass with a 1.2cm^2 punch area may leave only the equivalent of 20 follicular units/cm^2 in isolated areas.

from the middle of the donor area, the potential to over harvest isolated areas of the donor area, along with the unexplained high percentage of "missing grafts" remain concerns for the ARTAS.

Finally, I think Drs. Pathomvanich, Bhatti, Ng, and Vong treated us to some impressive results. It was a well-rounded meeting. What are your final thoughts, Brad?

Bradley Wolf concluded: It was exciting to see the energy of the new attendees from Asia, which was very well represented with 56% of the attendees from Asia. Now it's on to Chicago, September 9-13, 2015. Save the date! Good luck to our incoming president, Sharon Keene, and our program chair, Nilofer Farjo, who I am sure are busy right now working on ISHRS #23. I hope to see everyone there.

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Meetings and Studies

Review of the 6th Annual Conference of the Association of Hair Restoration Surgeons – India, HAIRCON 2014 September 19-21, 2014 • Goa, India

Sanjiv Vasa, FRCS *India* drvasa@gmail.com

Titled "Evidence Based Hair Restoration," the congress was organized under Drs. Sandeep Sattur (President), Lakshyajit Dhami (Secretary), Rajesh Rajput (Scientific Chairman), Ajay Hariani (Treasurer), Kapil Dua, Anil Garg (Joint Scientific Secretaries), and Yuri Dias Amborcar (Goa Co-coordinator). The meeting was honored to host international faculty including Drs. Vincenzo Gambino (President, ISHRS), Patrick Mwamba (Belgium), and Akaki Tsilosani (Georgia). A total of 167 delegates attended.

FRIDAY/SEPTEMBER 19, 2014

For the first time in HAIRCON history, a Cadaver Workshop, which was attended to capacity, was arranged at the Department of Forensic Medicine, Goa Medical College, for a limit of 20 attendees. Under the supervision and instruction of national faculty, including Drs. Rajesh Rajput, Sanjiv Vasa, Manoj Khanna, Narendra Patwardhan, Lakshyajit Dhami, Ashok Reddy, Ajay Hariani, Anand Joshi, Puli Ravindra Reddy, Anil Garg, Kapil Dua, Aman Dua, K. Ramchandran, Vinod Vij, and Sandeep Sattur, harvesting by FUT (anesthesia, strip harvest, donor closure, slivering, graft and dissection) and FUE (anesthesia, manual punches, motorized punches) methods with graft implantation were demonstrated.

The meeting was inaugurated by the Chief Guest Dr. Pradeep Naik (Dean of Goa Medical College) and Dr. Gambino.

The meeting was inaugurated by the Chief Guest Dr. Pradeep Naik (Dean of Goa Medical College) and Dr. Gambino *(right)*.

The "Video Surgery Workshop" was the most interesting, informative, and interactive session, and was beneficial for experienced as well as novice surgeons. International and national faculty presented their best videos covering the A to Z of hair transplantation with the pros and cons of different methods.

SATURDAY/SEPTEMBER 20, 2014

In using LED screens for the first time, we found that the presentation clarity was excellent even to the back of the room and with the lights on in the hall so no one dozed off or moved. Dr. Sattur started the scientific program by emphasizing the need of evidence based hair transplantation. Dr. Garg presented his data of 1,456 male patients with non-scarring alopecia: 51% were between 25-45 years of age; 77% were smokers; 30% were doctors; 70% were ferritin and D3 deficient; and 45% were B12 deficient. Dr. Kapil Dua requested all to monitor and record their follicular transaction rate (FTR), noting that FTR should be reduced from around 20% for the beginner to less than 5% for an experienced surgeon. He advised avoiding over harvesting and not crossing the border of permanent donor zone during FUE harvesting. Dr. Desai expressed the opinion that partial as well as complete transection rates are higher in severe degrees of baldness, thin hair texture, and those who had previous FUE procedure.

Female and Young Patient Transplantation

Dr. Patwardhan presented the etiopathogenesis, management, and recent trends in female pattern hair loss. Dr. Gambino spoke on the importance of being conservative in selecting young patients and in avoiding low hairline designs. He also presented the prestigious "VASA GOLDEN PEACOCK ORATION." The title of his talk was "The Hair Mystique: The Power, Symbolism & Significance of Hair Through Time." With beautiful illustrations, he portrayed the purpose of hair and the variety of functions it serves: protective, aesthetic, symbolic, social, communicative, and erotic.

Company-sponsored sessions included the "Role of Biomimetic Peptides (Alembic)" by Dr. Rajesh Rajput; "New Generation Hair Restoration Medical Treatments (IPCA) by Dr. Anil Ganjoo; "Hair Care" (Proctor & Gamble) by Drs. Jeni Thomas and Nina Madnani, and "Surgical Hair Restoration Using a Robot (ARTAS®)" by Dr. Chang-Hun Huh.

Dr. Rajput's "My Overview of the Practice of Hair Restoration" delivered another prestigious AHRS oration. He presented his journey of more than two decades. He concluded his oration with a list of unsolved problems facing current practitioners, including misleading and self-promoting advertising, non-medical persons running clinics, and surgeries done by technicians.

Body Hair Transplant

Dr. Akaki demonstrated extraction harvesting of beard, chest, and abdomen with simultaneous graft implantation and strip harvesting of pubic hair. Dr. Mwamba enlightened delegates by giving details of body hair sources from beard, chest, abdomen, axilla, and legs. Anatomical variation, density, caliber, angulation to skin, telogen/anagen ratio, speed of harvesting, and final yield of various sites were compared. He advised to warn clients about the unpredictability of the end result. Dr. Poswal detailed his anesthesia technique in non-scalp donor areas. Dr. Aman Dua presented an informative chart about anagen/telogen %, its duration, density, and follicular depth of different body hair donor sites.

Large-Session Hair Transplantation

Dr. Kapil Dua discussed the importance of rotation of surgeons, assistants, and implanters during large FUE sessions from scalp, beard, and chest. Dr. Akaki presented how he performed 9,688 grafts in a single FUT session. Dr. Poswal presented how he performed 11,460 FUE grafts harvesting from scalp, beard, mustache, chest, and axilla over multiple consecutive days. Dr. Khanna spoke on strip harvest planning. Dr. Soni and Dr. Ramchandran demonstrated strip harvesting combined with FUE above and below the incision.

Drs. Sandeep Sattur *(left)* and Patrick Mwamba *(right)*.

Recent Trends

Dr. Patwardhan identified platelet rich plasma (PRP), extra cellular matrix, robotics, cloning, and gene therapy as emerging therapies. Dr. Akaki discussed long hair transplantation. Dr. Aman Dua presented cross-sectional trichometry. Dr. Desai demonstrated how harvesting with simultaneous graft implantation could improve survival rate. Dr. Poswal illustrated non-permanent, ultra-refined micro pigmentation.

Difficult Situations

Dr. Mwamba illustrated solutions to misangled hair, a pluggy look, ridging, pitting, and mislocation in revision cases. Dr. Joshi stressed follicular integrity as the key to success. Dr. Soni suggested wide coverage and dense packing for treatment of the vertex, but Dr. Reddy recommended the optimum goal is not maximal density.

Innovative Ideas

To reduce the visibility of the scar from strip harvest, Dr. Poswal transplanted beard hair into the freshly sutured incision. Dr. Garg showed an animated video demonstrating an 8cm distance above the mid-glabellar line as the crucial parameter for frontal hairline design. Dr. Atodaria presented a device for making multiple coronal recipient sites. Dr. Vasa showed an improved version of the "SAVA PLUS" implanter that is more efficient and easier to learn.

Dr. Kapoor highlighted the issue of Professional Indemnity in Hair Restoration surgery. It was an eye-opener as most of us found that we were often not fully covered by insurance companies. He suggested the importance of insurance for clinics as well as doctors.

SUNDAY/SEPTEMBER 21, 2014

In spite of the Great Gala Dinner, the sessions started on time with PRP & Biologics. Dr. Aman Dua presented protocol for PRP and Dr. Yeole presented his study of safety and efficacy in 200 cases. Dr. Ravi discussed the need for more studies and research using PRP alone, not in conjunction with other therapies, to establish evidence for clinical efficacy. Dr. Garg provided the scientific basis for how Ayurveda herbs and food supplements affect hair loss.

Post-op Care and Complications

For patient safety, Dr. Sattur gave the list of emergency drugs, monitoring, and resuscitative devices, and the action plan that each center should be equipped with for potential medical emergencies. Dr. Mysore outlined a practical approach, system, and hints on how to achieve patient satisfaction. Dr. Akaki presented the prevention, early detection, and treatment of early, intermediate, and late complications. He discussed X factor and Poor Growth Index (PGI), where poor growth resulted in spite of all precautions.

Potpourri

Dr. Sharma suggested FUE trial transplantation in cicatricial alopecia. Dr. Mysore questioned the validity of permanent donor zone and showed that in some cases even donor area also recedes. Dr. Ramachandran delivered practical hints for FUE beginners, stressing the need to start slowly with smaller sessions and as eye-hand-hair coordination improves increase the speed and number of grafts. Dr. Mishra supported recipient co-dominance in body hair to scalp. Dr. Vij said that persistence has a habit of producing success whether one uses sharp or blunt, motorized or manual punches. Dr. Agarwal suggested that adding finasteride, tretinoin, and aminexil to topical minoxidil is of inconclusive benefit. Dr. Pothula said that a good front hairline is the index of a good result.

All national and international faculty participated in a lively panel discussion for the live assessment and planning of four cases: a young man, advanced baldness, a woman, and a repair. The second half of the panel included managing with medical modalities, gray hair, and staff recruitment, prevention of attrition, and dealing with freelance technicians.

The conference ended with "Hair Transplant Quiz" by Quiz master Dr. Patwardhan.◆


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Regional Societies Profiles

In this issue, as part of our ongoing series of regional society profiles, we are featuring the ABHRS/IBHRS. While not actually a regional society, it is a valuable and esteemed member of the Global Council of the ISHRS.

It's current President, Dr. Jim Harris of Denver, Colorado, USA is widely known and respected in our Society. He is also the 2014 recipient of the Golden Follicle Award.

It was a pleasure for me (RT) to serve again as an ABHRS examiner in Kuala Lumpur for the 26 candidates who sat for the exam from the following countries: Saudi Arabia, United States, Ireland, Thailand, South Korea, India, UAE, Malaysia, Philippines, the UK, and Iran.

A Look at the American Board of Hair Restoration Surgery

James A. Harris, MD, FISHRS, Diplomate ABHRS, 2014 ABHRS President *Greenwood Village, Colorado USA* jharris@hsccolorado.com

The American Board of Hair Restoration Surgery (ABHRS) was formed in 1996 to fill the recognized need for a certifying body in the field of hair restoration. Its counterpart outside the United States, the International Board of Hair Restoration Surgery (IBHRS), was recognized internationally in 2000. The ABHRS/IBHRS examination is the only psychometrically and statistically validated examination dedicated to the specialty of hair restoration surgery. The express purpose of the organization is to promote the highest quality, ethical care for the patient and to this end provide certification for physicians in this specialty. The examination consists of written and oral portions, and passing the exam assures the public of an individual's educational ability and experience to perform safe, aesthetically sensitive hair restoration surgery.

The organization currently has 178 diplomates representing 24 countries. Because of the international scope of hair restoration surgery, the ABHRS offers the examination in conjunction with the ISHRS annual scientific meetings to make the examination process more accessible to physicians around the world. The most recent examination was held in Kuala Lumpur and the next exam is slated for the Chicago ISHRS meeting in September 2015.

The ABHRS is committed to ensuring that the effort each candidate makes in preparing for and successfully passing the examination brings value to the title of "Diplomate of the ABHRS." To enhance the member's status, the ABHRS has co-sponsored the past two Morbidity and Mortality conferences with the ISHRS in order to provide a unique learning experience.

The concept of "value added" to the certification by the ABHRS prompted an investigation into ABHRS and ISHRS members' perceptions of the ABHRS. This was accomplished by way of a survey sent to members of both organizations. Based on the evaluation of the survey results by the ABHRS board of directors, a strategic planning session was held to chart the course for the organization. While the details of the plan are still being discussed, the ABHRS is committed to ensuring that the designation of "Diplomate of the ABHRS" is recognized by patients as a sign of a physician's commitment to professional conduct, ethical practices, and the pursuit of excellence through education and lifelong learning. In addition to this, the board is investigating numerous options to direct more patients to ABHRS-certified physicians.

Dr. James A. Harris

The relationship between the ABHRS and the ISHRS is both logical and symbiotic; both organizations recognize the value of ethics and education. The ISHRS offers the gamut of educational opportunities for a physician interested in hair restoration and the ABHRS provides the objective evidence that a physician has amassed the requisite experience and factual knowledge of the specialty to provide quality patient care. Because taking the board examination is not required to perform hair restoration, passing the test is a demonstration to patients and colleagues alike that a base of factual information and experience matters to the profession.

There are several paths to candidacy to sit for the certifying examination. Please visit the ABHRS website at www.abhrs.org and read the "Applicant Brochure" to see the pathways and the requirements for application. If you determine that you are qualified to sit for the examination, the materials can be submitted online to streamline the process. The website also lists suggested reading materials to study for the examination. There is also a board preparation course offered in conjunction with the ISHRS annual meetings. It is usually best to take the course the year before your anticipated examination date.

As president of the ABHRS, I would like to invite all of my colleagues that meet the experience and knowledge criteria to apply to take the ABHRS certifying examination. The examination and experience requirements are rigorous, but the benefits of the added certification will enhance your standing among physicians and patients. As more hair restoration surgeons become certified by the ABHRS there will be an implicit endorsement of the educational standards of the ISHRS resulting in an elevation of the profession in the minds of medical professionals and the public alike. Take the exam, and consider your part in elevating the specialty!◆

Review of the Literature

Nicole E. Rogers, MD *Metairie, Louisianna, USA* nicolerogers11@yahoo.com

Pumpkin Seed Oil for Hair Loss?

Cho, Y.H., et al. Effect of pumpkin seed oil on hair growth in men with androgenetic alopecia: a randomized, double-blind, placebo-controlled trial. *Evidence-Based Compl Alt Med.* 2014; 2014:549721.

In April, Korean researchers investigated the use of pumpkin seed oil (PSO) to treat male pattern hair loss. A total of 76 men with mild to moderate androgenetic alopecia were enrolled in a randomized, placebo-controlled, double-blind study. The treatment group took 400mg oral PSO daily for 24 weeks. Results were assessed using standardized photography (taken by a blinded photagrapher), patient self-assessment scores, hair thickness, and hair counts. At the completion, mean hair count increases of 40% were seen in the treatment group versus 10% in the placebo group. The PSO group also had significantly higher self-rated scores. No changes in liver enzymes or creatinine levels were observed in the PSO group, and most tolerated the supplement well.

Comment: For decades, researchers have been trying to identify natural remedies for hair loss. Several plant-based 5-alpha reductase inhibitors already have been identified, including saw palmetto, however, the data to support their use has been limited. This study investigated another plant-based 5-alpha reductase inhibitor also touted for treatment of symptomatic BPH. Although the study was limited to men, it raises the question of whether females may also benefit from supplementation with PSO.◆

Age-related Thinning: Why It Makes Sense

Chen, C.C., et al. Regenerative hair waves in aging mice and extra-follicular modulators follistatin, Dkk1, and Sfrp4. *J Invest Dermatol.* 2014; 134:2086.

New research helps explain why older people tend to have thinner hair. In one clever series of experiments, full thickness skin from "old" mice (aged 24 months) was transplanted to younger, immunodeficient mice aged 3-6 months. In areas where the transplanted area was very small, the hair cycling resumed throughout. In areas where the transplanted area was large, the hair cycling resumed only at the periphery. The researchers concluded that growth factors from young skin apparently diffused into the nearby transplanted skin to help stimulate the more senescent follicles.

Comment: The results of this study may have far-reaching implications for hair and beyond. For hair, it proves that even stem cells in aging hair can be reactivated by an influx of stimulators on Wnt5a, Wnt6, ß-catenin, and follistatin. However, their ability to stimulate hair growth was regionally limited by Wnt pathway inhibitors Dkk1 and Sfrp4, which are more prevalent in more aged hair follicles. For skin, it suggests that we may be able to reverse signs of aging not by adding stem cells but simply by having the right mix of stimulators/inhibitors to jumpstart the repair process.◆

Hair Loss Due to Voriconazole

Malani, A.N., et al. Alopecia and nail changes associated with voriconazole therapy. *Clin Infect Dis.* 2014; 59:e61.

Physicians treating fungal infections associated with the 2012 contamination of methylprednisolone heard many complaints about hair and nail changes. They devised a formal questionnaire and found that among 152 patients who received voriconazole for 1 month or more, 82% of patients reported hair loss. Areas affected were the scalp, arms and legs, and eyebrows or eyelashes, but loss of facial, axillary, chest, and pubic hair was also reported. In addition, 70% of patients reported nail changes, including 10% with complete nail loss. There was no association with serum drug levels and the hair began to regrow by 3 months of stopping voriconazole.

Comment: The results of this study contrast sharply with premarketing trials, which reported hair loss in fewer than 2% of patients on voriconazole. The authors postulate whether the fact that many study participants were on chemotherapy may have confounded the results and falsely lowered the rates of alopecia attributed to voriconazole.◆

Letter to the Editors

Re: "State-of-the-Art FUE: Non-Shaven Technique" (*Hair Transplant Forum Int'l.* 2014; 24(5):161, 166-169).

Michael Kyu-ho Lee, MD *Seoul, South Korea*
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I wish to express my respect and thanks to Dr. John Cole for his great article and share my own experience with this technique.

In 2008, FUE harvesting was introduced to South Korea in earnest. Many patients with hair loss, who were reluctant to do FUT hair transplant surgery because of fear for donor wound scar and post-operative pain, welcomed this less invasive procedure. But they also do not like the need to shave their heads for FUE surgery. Non-shaven FUE (NSFUE) is an innovative technique to overcome this demerit of FUE procedure. NSFUE helps more patients to choose the FUE by reducing concern about their appearance after surgery.

I have used NSFUE mostly on Korean patients for the past seven years. When I first used the technique, I found that harvesting was very time consuming because it was difficult to control the long hairs with hair clips. It was difficult to concentrate on the primary tasks of punching and follicle isolation. Another problem was that if I left the hairs too long it was easy to misjudge the correct exit angle of the hair. The donor surgical field was changed from 2D to 3D because of the surrounding long hairs. Honestly, I felt it looked like exaggerated "Magic Eye pictures." And with 5× loupes, I would get nauseated. NSFUE harvesting was like finding a four-leaf clover in an untrimmed grass yard.

But with time, and as we gained experience, getting the four-leaf clover became easier. The longer hairs weren't a problem any more and my transection rates improved to match those of my shaved FUE cases.

In East Asian patients like Koreans, one of the useful advantages of NSFUE is that we can evaluate the donor area hair coverage during and immediately after harvesting, especially in giga sessions (> 4,000 grafts). Koreans have less hair and follicular density than Caucasians. We have to harvest higher percentage of donor hairs to cover advanced balding. Pre-trimming the hairs to be harvested gives me information about coverage of residual hairs after surgery. This helps me not to overharvest.

Dr. Park described direct NSFUE, which does not need pre-trimming of hairs. (*Hair Transplant Forum Int'l.* 2014; 24(3); 103-104). He explained that direct NSFUE has an advantage of time saving compared with NSFUE because pre-trimming of hairs usually takes 1-2 hours. But, in my opinion, direct NSFUE does not reduce total procedure time because in NSFUE 1) follicular selection has been done already, 2) punch centering and scoring is faster and more accurate, and 3) I can use the time while my assistants are pre-trimming to prepare the recipient area. If I need to get additional grafts more at the end of surgery, I perform direct NSFUE.

Sometimes I get long hair grafts with direct NSFUE whether by intention or not, as shown in Figure 1. Although long hair grafts have some advantages, they can be pulled out easily by accident during or after surgery. It is better to cut the long hairs shorter before placement.

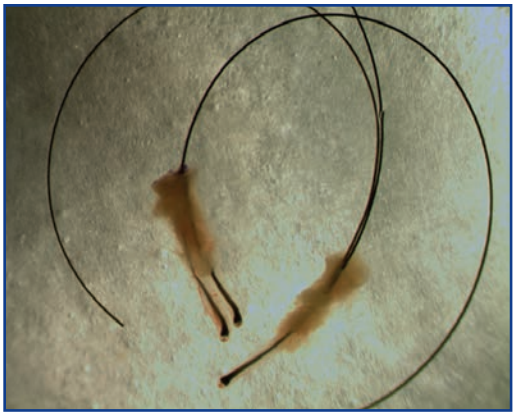


Figure 1. Long hair graft.

I don't like using micro-suction during FUE donor harvesting, unlike Dr. Cole, because grafts may be lost in the suction device, the sound of the suction is disturbing to patients, and it requires another assistant.

As an aside, an interesting experiment was done on a Korean TV program that does experiments to confirm if a general hypothesis is true. On the show, they were testing to see if an electric vacuum cleaner made infants stop crying and fall asleep due to its noise. The hypothesis was that the electric sounds were very similar to what fetuses hear in their mother's womb. It worked! In the same manner, the aimless, noisy suction sound may make my patient doze off, which can be a real problem because my patients, like Dr. Cole's, are sitting upright during the procedure.

In conclusion, I think it is not too much to say that NSFUE is the most valuable FUE technique. I think every FUE practitioner will want to master NSFUE and many patients will prefer this technique to all others.◆

Recorded Sessions from Kuala Lumpur & Video Library

We recorded sessions that we thought the membership would find interesting. The recordings below are available for viewing exclusively to ISHRS Members.

Access the video links via the Members Only section at www.ishrs.org.
- Log in to the Members Only section.
- Top, right, click the maroon box "Members Only."
- Under "Resources," it is the first item.

VIDEO LIBRARY – SURGICAL VIDEOS: As another member benefit, the ISHRS also makes available for members a "Video Library" of many surgical videos shown at past meetings.

To access:
- Under "Members Only" section, click "Video Library" tab.

HAIRLINE DESIGN

Presented on Thursday/October 9, 2014, 9:15AM-10:20AM, in the General Session

Learning Objective:
Compare and contrast different surgeons' approaches to designing hairlines and temporal points.

Asian Hairline
6:17 running time
Damkerng Pathomvanich, MD

Caucasian Hairline
8:12 running time
Ronald L. Shapiro, MD

African Hairline
8:05 running time
Melvin L. Mayer, MD, FISHRS

Woman Hairline
8:55 running time
Nilofer P. Farjo, MBChB, FISHRS

Transexual Hairline
6:22 running time
Russell G. Knudsen, MBBS, FISHRS

Questions & Answers
16:37 running time

THE ROLES OF ANCILLARY STAFF IN THE OPERATING ROOM

Presented on Friday/October 10, 2014, 8:45AM-9:10AM, in the General Session

Moderator Introduction
1:30 running time
Vincenzo Gambino, MD, FISHRS

Who Can Do What: The Standard of Care and Legal Perspectives
11:55 running time
Scott Fintzen, JD, Gaido & Fintzen Attorneys at Law, Chicago, Illinois, USA

Questions & Answers
15:53 running time

ANDROGENETIC ALOPECIA: CURRENT & POSSIBLE FUTURE NON-SURGICAL TREATMENTS

Presented on Friday/October 10, 2014, 2:45PM-3:55PM, in the General Session

Learning Objective:
Review the latest studies of efficacy and safety of drugs and other related treatments in androgenetic alopecia.

Moderator Introduction
3:10 running time
Carlos J. Puig, DO, FISHRS

Androgenetic Alopecia: New Insights into the Role of the Arrector Pili Muscle in Hair Biology
23:26 running time
Rodney Sinclair, MBBS, MD – Featured Guest Speaker
Professor of Dermatology, University of Melbourne, Australia

Low Level Laser Therapy (LLLT): How Does It Work? What Is the Difference Between the Different Devices?
16:04 running time
Sharon A. Keene, MD

Questions & Answers
10:14 running time

Fellow of the ISHRS (FISHRS)

In 2012, the designation of Fellow was established in order to recognize members who met its exceptional educational criteria.

In order to be considered, the hair restoration surgeon must achieve a specific level of points in a system of various educational parameters, such as serving in leadership positions, American Board of Hair Restoration (ABHRS) certification, writing of scientific papers, and teaching at scientific programs, among others.

It is a great honor for a member to achieve the Fellow designation of the International Society of Hair Restoration Surgery (FISHRS). This recognizes the surgeon who strives for excellence in this specialized field. To maintain this status, the surgeon must continue to meet established educational criteria over time. Fellows may vote and hold office in the Society, and they may use the ISHRS Fellows logo on their websites and in other promotional materials.

We encourage all Physician Members to consider applying for Fellow status.

Qualifications and process can be found in the Members Only section of ISHRS website at: http://www.ishrs.org/members-only/ishrs-fellow-category

Congratulations to the 23 Fellows of the ISHRS Approved at the Recent 2014 Annual Scientific Meeting!

Marc R. Avram, MD, FISHRS
Jonathan Ballon, MD, FISHRS
Alan J. Bauman, MD, FISHRS
Pierre Bouhanna, MD, FISHRS
Bijan Feriduni, MD, FISHRS
Steven Gabel, MD, FISHRS
Aditya K. Gupta, MD, FISHRS
Sunjgoo Tommy Hwang, MD, PhD, FISHRS
David Josephitis, DO, FISHRS
Sharon A. Keene, MD, FISHRS
Gabriel Krenitsky, MD, FISHRS
Kongkiat Laorwong, MD, FISHRS
Masahisa Nagai, MD, FISHRS
Bernard Nusbaum, MD, FISHRS
Damkerng Pathomvanich, MD, FISHRS
Paul T. Rose, MD, JD, FISHRS
Marwan Saifi, MD, FISHRS
Ronald Shapiro, MD, FISHRS
Tseng-Kuo Shiao, MD, FISHRS
James M. Swinehart, MD, FISHRS
Ken Washenik, MD, PhD, FISHRS
Sara Wasserbauer, MD, FISHRS
Greg Williams, MBChB, FISHRS

The full list of 83 FISHRS as of Oct. 11, 2014, may be found online at the link above.

Message from the 2015 Annual Scientific Meeting Program Chair

Nilofer P. Farjo, MBChB, FISHRS *Manchester UK* dr.nilofer@farjo.com

It is with great pleasure that I invite you to the 23rd Annual Scientific Meeting to be held in Chicago, Illinois, USA, September 9-13, 2015.

The Venue

The meeting will be held at the Chicago Hilton, a landmark building that opened in 1927 and at the time was the largest hotel in the world. Although now, in spite of having more than 1500 rooms, it no longer can claim this title, it does have the largest event and conference facilities in Chicago. The hotel is situated in the heart of Chicago overlooking the waterfront, Grant Park, and nearby museums and shops. In 2012, the hotel had a $150 million renovation so we can expect a very high standard of their facilities.

Access

Chicago O'Hare International airport is one of the biggest airports in the world with easy access from all continents. So if getting to meetings has been a problem in the past, please make a point of attending this meeting.

Abstracts

The deadline for abstract submission is early this year as our meeting is 1 month earlier so get planning now! Abstract submission is open as of December 2014 and will close in early February 2015. As always, the abstracts will be rated blindly by the scientific committee and we do have a limited number of spaces for talks so please make your abstract count and follow the guidelines on the ISHRS site to increase your chances of being chosen for an oral presentation. There is also the opportunity to have your submission chosen for a poster or video presentation.

If you have never submitted an abstract before or you have been rejected in the past, here are a few tips. Have a good title that is concise but explains fully what your topic is about. If the reviewers are intrigued by your title, then they are more likely to rate your abstract higher. If you are describing a study, then follow the usual format: Introduction, Method, etc. Make sure you follow the online system guidelines, and it is important that you have final results. The reviewers will reject any abstract that says "Results Pending" or "I will present the results at the meeting," but which doesn't have the results for them to see. Also important is good quality photographs with standard views. Any photograph that doesn't have high enough resolution will not project clearly onto the large screens in the conference room. If you have any questions about the abstract process, then please send me an email or contact the ISHRS headquarters and we will be happy to help.

If your abstract is chosen, then you will be asked to submit your PowerPoint or video at least 6 weeks ahead of the meeting. Why is this? The moderator for your assigned session has the task of ensuring that the content of your presentation meets the required guidelines for quality and time limit and also fulfils the learner objectives.

The Program

I look forward to feedback from the Kuala Lumpur meeting, and I am excited about putting together a program that will meet everyone's educational needs. The meeting is geared for the intermediate-to advanced-level surgeon; however, there are some learning opportunities for novices through the pre-congress beginner course and workshops. The Advanced/Board Review Course and ABHRS examination will be held again before the conference, so please take advantage of one trip to attend these programs as well as the annual meeting.

Guest speakers will cover wide-ranging topics from the latest thinking on female hair loss, to nutrigenics, to the latest in hair biology research. Together with popular workshop topics, such as FUE and micropigmentation, I hope that I can put together a great program. It is a daunting task, though, to follow in the footsteps of previous program chairs who have done the society proud. So I ask you all: please send me your ideas, volunteer your help for workshops, and most importantly, send in your abstracts. I hope you have all received the eblast below asking for your help. The deadline for your ideas is coming up fast so don't delay!◆

Propose a Session for the 2015 Annual Scientific Meeting

Would you like to share your knowledge with your peers while gaining valuable speaking experience?

Do you have a colleague with expertise that is relevant and valuable to hair restoration?

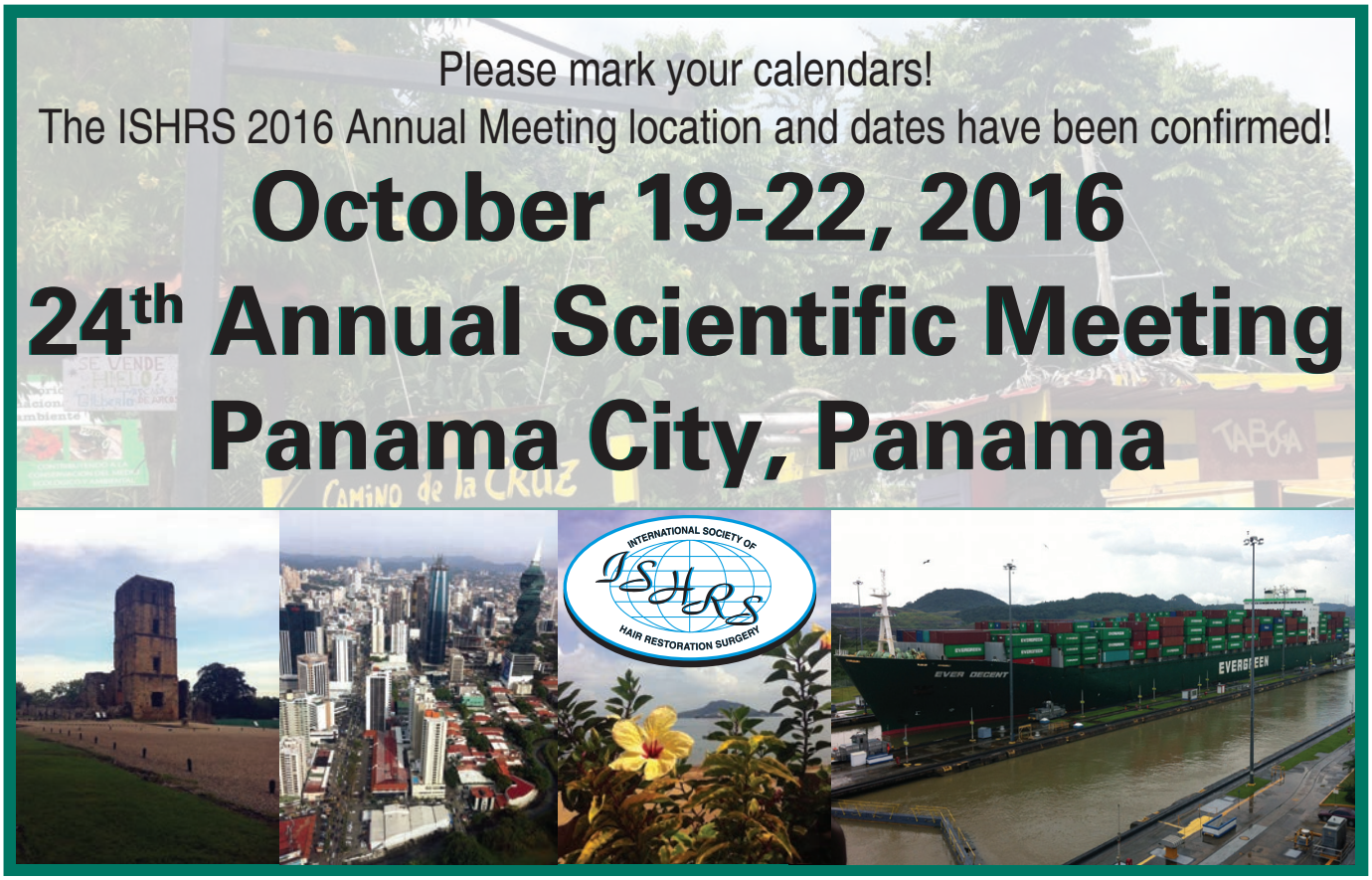
Have you been to a session that you feel was particularly valuable?

Have you seen an inspiring speaker you'd like the ISHRS to invite to next year's annual meeting?

Submit your topic/speaker proposals for the 2015 ISHRS Annual Scientific Meeting by December 31, 2014.

Abstract deadline: February, 2015.


Happy Holidays
Warmest wishes for a happy, healthy holiday season!


Please mark your calendars!
The ISHRS 2016 Annual Meeting location and dates have been confirmed!
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Save the Date

Call for Abstracts!
Submission Deadline:
February 2015

SEPTEMBER 9-13

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ISHRS 23RD ANNUAL SCIENTIFIC MEETING

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Dates and locations for future ISHRS Annual Scientific Meetings (ASMs)

2015: 23rd ASM
September 9-13, 2015
Chicago, Illinois, USA

2016: 24th ASM
October 19-22, 2016
Panama City, Panama

HAIR TRANSPLANT forum INTERNATIONAL

Advancing the art and science of hair restoration

Upcoming Events

Date(s)	Event/Venue	Sponsoring Organization(s)	Contact Information
November 23-24, 2014	19th Annual Meeting of the JSCHR *Okayama, Japan*	Japan Society of Clinical Hair Restoration (JSCHR) Hosted by Shinsaku Kawada, MD	Dr. Shinsaku Kawada, Program Chair *kawada@kawada-keisei.gr.jp* *www.jschr.org*
December 13, 2014	First Seminar of Circadian Rhythms in the Skin and Hair *Milan, Italy*	International Hair Research Foundation (IHRF) *www.ihrf.it*	Marta Buffa *segreteria@ihrf.eu*
February 27-March 1, 2015	ISHRS Asian FUE Hair Transplant Workshop *New Delhi, India*	International Society of Hair Restoration Surgery Hosted by Kapil Dua, MBBS, MS & Aman Dua, MBBS, MD	For details: *www.asianfuehairtransplantworkshop.com*
March 3-6, 2105 & May 26-29, 2015	University Diploma of Scalp Pathology and Surgery *Paris, France*	University of Paris VI Coordinators: P. Bouhanna, MD and M. Divaris, MD *www.hair-surgery-diploma-paris.com*	Dr. Pierre Bouhanna, Course Director *sylvie.gaillard@upmc.fr*
March 28-29, 2015	AAHRS Scientific Meeting & Live Surgery Workshop *Bangkok, Thailand*	Asian Association of Hair Restoration Surgery Hosted by Damkerng Pathomvanich, MD, FACS *www.aahrs.asia*	For details: *infoaahrs@mail.com*
June 26-28, 2015	ISHRS 3rd Mediterranean FUE Workshop *Istanbul, Turkey*	International Society of Hair Restoration Surgery Hosted by Koray Erdogan, MD, Alex Ginzburg, MD, & José Lorenzo, MD	For details: *www.3rdmediterraneanfueworkshop.com*
July 8-11, 2015	1st SILTAC Annual Meeting *www.congreso-silatc2015.com* *Buenos Aires, Argentina*	Ibero Latin American Society of Hair Transplantation (Sociedad Iberolatinoamericana de Trasplante de Cabello - SILATC) *www.silatc.org*	Dr. David Perez-Meza, Meeting Chairman *drdavid@perez-meza.com* *info@congreso-silatc2015.com*
September 9-13, 2015	23rd Annual Scientific Meeting of the International Society of Hair Restoration Surgery *Chicago, Illinois, USA*	International Society of Hair Restoration Surgery *www.ishrs.org*	Tel: 1-630-262-5399 Fax: 1-630-262-1520
November 18-21, 2015	9th World Congress for Hair Research *Miami, Florida, USA*	North American Hair Research Society *www.hair2015.org*	For details: *info@nahrs.org*
December 5-6, 2015	20th Annual Meeting of the JSCHR *Kochi, Japan*	Japan Society of Clinical Hair Restoration (JSCHR) Hosted by Ryuichiro Kuwana, MD	Dr. Ryuichiro Kuwana, Program Chair *der-r-kuwana@mte.biglobe.ne.jp* *www.jschr.org*