

FORUM

HAIR TRANSPLANT FORUM INTERNATIONAL

VOLUME 30 | NUMBER 5
SEPTEMBER/OCTOBER

2020

IN THIS ISSUE


Personal Tributes to O'Tar Norwood

The Case for Asymmetry: Right-Side versus Left-Side Temporal Recession

An Innovative and Versatile Instrument for Creating Multiple Brick-Pattern Sagittal Recipient Sites in a Single Stroke

Hair Science Mini-Series: Episode 1

**EARLY BIRD DEADLINE
SEPTEMBER 30!**



ISHRS VIRTUAL 2020

Connecting Ideas and Surgeons from Around the World

Don't Miss the First Virtual Big One!

**OCTOBER 17-25
28TH WORLD CONGRESS**



FORUM
ePUB
Official Publication of the ISHRS

The Life and Legacy of O'Tar T. Norwood: A Founding Father of the Norwood-Hamilton Classification System for Male Pattern Baldness, the *Forum*, and the ISHRS

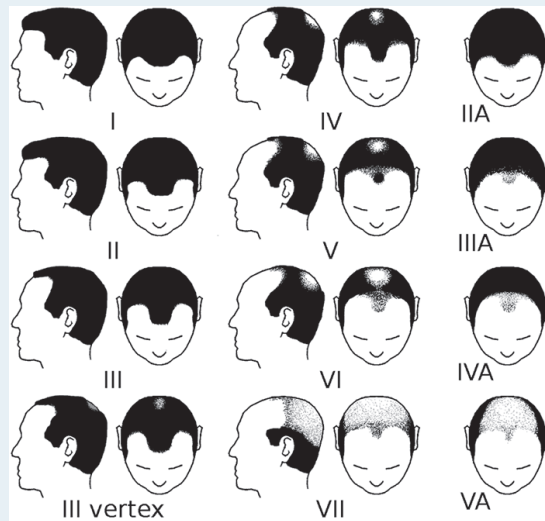
Aditya K. Gupta, MD, PhD, FISHRS | London, Ontario, Canada; Jeffrey S. Epstein, MD, FISHRS | Miami, Florida, USA

Dr. O'Tar T. Norwood, a globally prominent physician who was founder of our journal, *Hair Transplant Forum International*, and co-founder of the International Society of Hair Restoration Surgery, has left a legacy that will forever impact the hair transplant field.

Dr. Norwood was one of the original pioneers in hair transplant surgery. With the increasing popularity of this technique in the 1970s, he recognized the need to establish a widely accepted, uniform, and accurate method for classifying male pattern baldness in order to successfully screen and identify good candidates for hair transplant surgery. Previous classification scales had been published, but their limitations kept them from being widely adopted.

The first classification system was published by Beek in 1950 where he evaluated 1,000 Caucasian males with patterned hair loss and proposed a two-type classification system: frontal baldness and frontovertical baldness;¹ however, this system was too simple and did not

FIGURE 1. Norwood-Hamilton Male Baldness Classification Scale



**O'Tar T. Norwood
Feb. 1, 1931 – Jul. 28, 2020**

account for evolutionary stages of hair loss. In 1951, based on an evaluation of 312 normal men and 104 eunuchs and eunuchoid men, Hamilton proposed a more detailed classification system with an elaborate description of the various evolutionary stages of hair loss, but this scale was missing the inclusion of a few rare patterns and was based on a small population. Hamilton also elegantly demonstrated that male pattern baldness was interdependent on androgens, genetic predisposition, and age.²

Dr. Norwood published his revolutionary study in 1975 that founded the currently most accepted male pattern baldness classification system, the Norwood-Hamilton scale (Figure 1).³ Using the previously published Hamilton scale as a guide, Dr. Norwood evaluated 1,000 individuals and made modifications and added considerable detail to the scale to better conform to observed stages of hair loss. Dr. Nor-

TABLE OF CONTENTS

161	The Life and Legacy of O'Tar T. Norwood
163	President's Message
164	Co-Editors' Messages
177	In Memory of Dr. Aleksiy Makharashvili
178	The Case for Asymmetry: Right-Side versus Left-Side Temporal Recession
180	Reducing Surgical Time: An Innovative and Versatile Instrument for Creating Multiple Brick-Pattern 180 Sagittal Recipient Sites in a Single Stroke
184	Hair Science Mini-Series: Neuroendocrinology of the Human Hair Follicle; Episode 1: Introduction & Overview
191	Hair Sciences: Does Androgenetic Alopecia Predispose Our Patients to a More Severe COVID-19 Outcome? A Critical Look at the Data
192	Medical and Professional Ethics: Spotlight on Framing, Nudging, and Informed Consent
194	Regenerative Medicine and Hair Loss: Isolation of Adipose-Derived Stem Cells: A Primer
196	Hear from the Assistants
197	In Focus: Global Council Societies
198	2020 World Congress Tidbits
199	Message from the ISHRS 2020 World Congress Program Chair
200	Classified Ads
201	Calendar of Events

HAIR TRANSPLANT FORUM INTERNATIONAL

is published bi-monthly by the
International Society of Hair Restoration Surgery

First-class postage paid Milwaukee, WI and
additional mailing offices.

POSTMASTER Send address changes to:

Hair Transplant Forum International
International Society of Hair Restoration Surgery
1932 S. Halsted St., Suite 413
Chicago, IL 60608 USA
Telephone 1-630-262-5399
U.S. Domestic Toll Free 1-800-444-2737
Fax 1-630-262-1520

President	Francisco Jimenez, MD, FISHRS president@ishrs.org
Executive Director	Victoria Ceh, MPA vceh@ishrs.org
Editors	Jeffrey S. Epstein, MD, FISHRS Aditya K. Gupta, MD, PhD, FISHRS forumeditors@ishrs.org
Managing Editor & Advertising Sales	Cheryl Duckler cduckler@ishrs.org

COLUMNISTS

ABHRS President's Corner	Sara M. Wasserbauer, MD, FISHRS
Controversies	Russell G. Knudsen, MBBS, FISHRS
Cyberspace Chat	Robin Unger, MD
Hair's the Question	Sara M. Wasserbauer, MD, FISHRS
Hair Sciences	Vlad Ratushny, MD, PhD
Hear from the Assistants	Marwan Noureldin, MSc
How I Do It	Timothy Carman, MD, FISHRS
In Focus: Global Council Societies	Lt Col Ret David Perez-Meza, MD, FISHRS
Literature Review	Aditya K. Gupta, MD, PhD, FISHRS Nicole E. Rogers, MD, FISHRS
Medical & Professional Ethics	Gregory Williams, MBBS, FISHRS
Meeting Review	Rachael Kay, MBChB
Regenerative Medicine and Hair Loss	Gorana Kuka Epstein, MD
The Notable Articles Project	Jeffrey S. Epstein, MD, FISHRS Aditya K. Gupta, MD, PhD, FISHRS

The views expressed herein are those of the individual author and are not necessarily those of the International Society of Hair Restoration Surgery (ISHRS), its officers, directors, or staff. Information included herein is not medical advice and is not intended to replace the considered judgment of a practitioner with respect to particular patients, procedures, or practices. All authors have been asked to disclose any and all interests they have in an instrument, pharmaceutical, cosmeceutical, or similar device referenced in, or otherwise potentially impacted by, an article. ISHRS makes no attempt to validate the sufficiency of such disclosures and makes no warranty, guarantee, or other representation, express or implied, with respect to the accuracy or sufficiency of any information provided. To the extent permissible under applicable laws, ISHRS specifically disclaims responsibility for any injury and/or damage to persons or property as a result of an author's statements or materials or the use or operation of any ideas, instructions, procedures, products, methods, or dosages contained herein. Moreover, the publication of an advertisement does not constitute on the part of

ISHRS a guaranty or endorsement of the quality or value of the advertised product or service or of any of the representations or claims made by the advertiser.

Hair Transplant Forum International is a privately published newsletter of the International Society of Hair Restoration Surgery. Its contents are solely the opinions of the authors and are not formally "peer reviewed" before publication. To facilitate the free exchange of information, a less stringent standard is employed to evaluate the scientific accuracy of the letters and articles published in the Forum. The standard of proof required for letters and articles is not to be compared with that of formal medical journals. The newsletter was designed to be and continues to be a printed forum where specialists and beginners in hair restoration techniques can exchange thoughts, experiences, opinions, and pilot studies on all matters relating to hair restoration. The contents of this publication are not to be quoted without the above disclaimer.

The material published in the Forum is copyrighted and may not be utilized in any form without the express written consent of the Editor(s).

Copyright © 2020 by the
International Society of Hair Restoration Surgery,

1932 S. Halsted St., Suite 413
Chicago, IL 60608 USA

Printed in the USA.



Official Publication of the
International Society of Hair Restoration Surgery



President's Message

Francisco Jimenez, MD, FISHRS | *Gran Canaria, Canary Islands, Spain* | president@ishrs.org

As my last message as ISHRS president, I would like to reflect a little on the journey that brought me here. When I joined the ISHRS, I never dreamt I would become the president of the most prestigious international scientific society in hair surgery. It is difficult to express how much this society has meant to me in my professional career and personal life. No other society that I know of embraces the spirit of friendship and collegiality like the ISHRS. This spirit has been handed down from O'Tar Norwood and the founding members who, with generosity and altruism, developed the model of the society that persists today. I remember back then, when I'd just become a hair surgeon, how prestigious doctors such as Bobby Limmer, Dow Stough, and Jim Arnold, among many others, were willing to share their surgical techniques with us, hiding nothing, while at the same time encouraging all new doctors to pass on any knowledge they had to them. In reality, they gained nothing in exchange as we novice doctors had so little to teach them. I also remember how, during the breaks of the meetings, these true luminaries would invite me for a drink or for dinner, and would always treat me as a peer. That is what I call collegiality, and it is something that has been transmitted to all subsequent generations of ISHRS members.

Isn't it kind of unusual that a doctor working in such a remote place like the Canary Islands—albeit beautiful and blessed with a wonderful climate—ended up as president of the largest scientific society of hair surgeons in the world? Well, it just demonstrates that any ISHRS member can become a Board member and, from that stepping stone, have the chance to become president. All that is needed is to be generous in thought or deed without requesting anything in return, the same type of gesture that was so clearly evident in our founders. I always give the same two pieces of advice to all the ISHRS members who ask me how they can become more involved in the ISHRS. First, you have to show your scientific value by presenting abstracts at the meetings so that people get to know your face and value as a clinician, surgeon, or scientist. It is not easy, and it takes courage to stand in front of hundreds of peers giving a talk, especially if English is not your native language. And second, you should volunteer to serve on the different committees.

The criticisms that I occasionally hear about the "anti-democratic" nature of the ISHRS tend to come from people outside of our society and don't bother me at all. What does bother me is when I hear that same argument coming from ISHRS members (and I am sorry if any reader feels personally alluded to by this comment). In this case, the criticism generally comes from members who feel that they should be on the Board, or at least have greater recognition or a

leadership position in the ISHRS. To me, this type of stance reveals a lack of humbleness and patience. I assure you that if a member works hard and diligently for the ISHRS, his/her merits will be recognized sooner or later, but first you have to bide your time and swallow your pride. Having an extroverted personality or special social skills is of little or no relevance if the goal is to attain a leadership position in the ISHRS. I am a good example of that. In the ISHRS, we value modesty and humility far more than arrogance and showy manners.

My tenure as president has been marked by the outbreak of the COVID pandemic. As soon as we realized the magnitude of the pandemic, I tried, with the excellent assistance of Victoria Ceh and the Executive Committee, to keep our members in as close contact as possible with the ISHRS, setting up webinars and helping our members with guidelines on the preventive measures required to enable our clinics to open again. Faced with such a complicated situation, we had to make some rapid decisions and changes, including budget readjustments and, of course, the cancellation of the World Congress in Panama. But positive experiences can nevertheless emerge from difficult times, and I am excited about the development of the virtual World Congress in October.

As part of this farewell message, I would like to thank all the people who have gone out of their way to help me, but the list is so long that there is enough space to mention just a few. First, Victoria Ceh for always being there when needed, for organizing everything and handling situations with the skills and excellence we have grown accustomed to over the years. I would also like to express my gratitude to our past president, Arthur Tykocinski, for his unconditional support. A special mention, too, for our next president, Paul McAndrews, our gifted treasurer, Kapil Dua, and our diligent secretary, Nilofer Farjo. After working closely with these individuals, I can assure you that the ISHRS will be in good hands for the next few years.

I also wish to thank our co-editors, Aditya Gupta and Jeffrey Epstein; the Board of Governor members for their support and active involvement in what on occasions have been complex and onerous matters; Brad Wolf for his hard and excellent work as Chairman of the Virtual Congress; and all our committee chairs, including the ad hoc chairs formed during the COVID pandemic.

Finally, while I have undoubtedly made mistakes like anyone else, I can assure you that I have always tried my very best as president to make all decisions based solely on the best interest of the ISHRS and its members.

I very much look forward to seeing you online at the 28th World Congress Virtual 2020. ■

Co-Editors' Messages



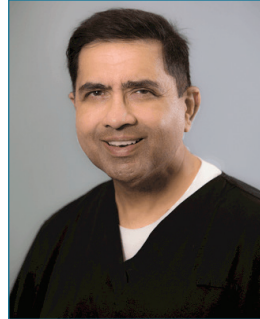
Jeffrey S. Epstein, MD, FISHRS |
Miami, Florida, USA |
forumeditors@ishrs.org

During the preparation of this special issue, I could not but wonder how humbled, even surprised Dr. Norwood would be by the accolades bestowed upon him. It is my experience that this is one of the more common—and certainly noble—traits possessed by those who do great things, for they seem to do so not for the pursuit of fame or fortune, but merely because it is the commonsense thing to do. Identify a need, in this case needs (for a more accurate MPB classification scheme, for a scientific meeting that led to the formation of a society of like-interested hair restoration surgeons, and, finally, for a publication to facilitate the rapid transmission of these surgeons' ideas), then fill that need. Easy-peasy, simple. Then, have a scotch.

O'Tar, without your efforts and foresight that resulted in my attending that first hair meeting in Dallas in 1993, that resulted in my recognizing that this was to become an incredibly exciting innovative field, that drove me to focus on hair restoration surgery during my fellowship with my mentor, Shelly Kabaker, that led me to write articles for the *Forum* that allowed me to feel relevant, I would not have so much of what are so important to me today: professional fulfillment, appreciation of 25 years' worth of patients, a worldwide collection of HRS colleagues who are meaningful friends, the respect of (and referrals from!) my plastic surgery colleagues for my expertise, and of course my wife, Gorana, with whom 10 years after meeting in the Boston convention center hall we share son Alex and a daughter on-the-way.

Deep and sincere gratitude, O'Tar. I can't help but wonder how amazed you would be over how admirably your society is conducting its first virtual annual meeting. And to keep true to your commonsense approach, Aditya and I made sure to include in your dedication issue some outstanding columns and original articles, maintaining the mission of the *Forum*—the rapid dissemination of ideas amongst colleagues... and friends.

Of special interest in this issue is Dr. Ralf Paus's contribution by invitation, which presents some of the many fascinating traits of the hair follicle, making it one of the most versatile and valuable areas of study for researchers in many different fields ranging from dermatology to neurology to endocrinology. Dr. Paus wanted to package this as a binge-worthy read, but he agreed to divide it into four sections, section one which is presented here. So, give your online streaming service a break and spend some time reading about the hair follicle. ■



Aditya K. Gupta, MD, PhD, FISHRS |
London, Ontario, Canada |
forumeditors@ishrs.org

Dr. O'Tar Norwood has been an inspiration to us all. He will forever be remembered by the hair restoration community, and his memory will live on in the *Forum*. We have dedicated much of this issue to tributes from his closest colleagues and friends to commemorate his legacy.

When we hear of an icon passing, it can be shocking. Even if you don't know the icon personally, you feel a kinship with them. Their work was influential or perhaps shaped your life or livelihood. I feel it is safe to say a substantial portion of ISHRS members felt this kinship with Dr. Norwood. We started, or continued, our practices with his guidance through the *Forum*, listened intently to his presentations at ISHRS congresses, and, of course, still continue to use his scale on a daily basis when evaluating candidates for hair restoration therapy. His influence has shaped not only our specialty but our own practices. There is no doubt Dr. Norwood was an icon to all in the hair restoration field. And it can be hard when our icons depart this world. We grieve as we feel our world just got smaller, less interesting.

If you haven't noticed, we seem to be living in a *weird* moment in history with bad news around every corner. But, in the spirit of Dr. Norwood's "glass half full" attitude, let's celebrate that we were all lucky to be alive during his time here and that we have the *Forum* and the ISHRS from him to hold on to. We also have multiple generations of hair transplant surgeons who have been inspired by his work!

I implore you to take some time to read all of the heartfelt tributes to Dr. Norwood. Take a moment to grieve. Then, as a lasting tribute to Dr. Norwood, channel your creativity and keep advancing the field of hair restoration with your inspiring ideas, novel approaches, lively debate, and perseverance.

Keeping with the theme of advancing the hair restoration field, we have a few original contributions as well as columns in this issue that are tantalizing reads. Paul Rose enlightens us about how natural hairlines are actually asymmetrical, and he encourages us to incorporate an element of asymmetry into the surgical planning and hairline design. Pradip Atodaria introduces an innovative instrument that creates brick-pattern slits, and Ralf Paus debuts the first installment of a series of four articles about the neuroendocrinology of the human hair follicle. Our columnists, as always, present provocative and engaging topics such as the relationship between AGA and COVID-19 (Hair Sciences), the ethics of framing and nudging regarding informed consent (Medical and Professional Ethics), adipose-derived stem cells and hair restoration (Regenerative Medicine and Hair Loss), and development of the implanters (Hear from the Assistants). ■

wood also documented that hair loss steadily increased with advancing age, paradoxically to steadily decreasing levels of testosterone, emphasizing the complex interplay of endocrine, ageing, and genetic predisposition, corroborating Hamilton's earlier findings.² The expansion of the different stages of male pattern alopecia in the Norwood classification system made it easier for clinicians to categorize hair loss progression; thus, it was adopted and widely used by clinicians. This classification system has since provided an indispensable tool for screening candidates for hair transplant surgery, recording results of examinations, discussing patients with colleagues, and documenting case reports. The Norwood-Hamilton scale has been the gold standard classification system for more than 40 years, attesting to its effectiveness and versatility. This scale has also aided the medical profession in other ways, such as identifying androgenetic alopecia as a risk factor for early onset of severe coronary heart disease.⁴

In September of 1990, Dr. Norwood published the first issue of the *Forum*—4 pages, typewritten (Figure 2). Standard hair transplantation was 4mm plugs, and scalp reductions were hugely popular. With incredible foresight again, Dr. Norwood recognized the need for a platform for physicians from all background specialties who shared a common interest in hair restoration to swiftly exchange ideas to support the rapidly changing hair restoration field; similar to the benefits of a professional meeting, but with the added advantage of more frequent publications and a written record. With prominent surgeons sharing their tips and techniques in the *Forum*, it was clear that the establishment of a society was needed. Three years later, under the leadership of Drs. Norwood, Stough, Rousso, and Kabaker, the first world congress of the International Society of Hair Surgeons took place in Dallas, Texas, in the spring of 1993, and was hugely successful. Since then, the society (now known as the ISHRS) has provided a collegial community for hair restoration surgeons to work together to push the envelope of the field, raising the bar and providing a major influence on hair restoration standards worldwide.

Dr. Norwood's work is a pillar on which hair transplant surgery was built. He will be remembered throughout history as a founding father of hair restoration surgery.

References

1. Beek CH. A study on extension and distribution of the human body-hair. *Dermatologica*. 1950; 101(6):317-331. doi: 10.1159/000257143
2. Hamilton JB. Patterned loss of hair in man; types and incidence. *Ann N Y Acad Sci*. 1951; 53(3):708-728.
3. Norwood OT. Male pattern baldness: classification and incidence. *South Med J*. 1975; 68(11):1359-1365.
4. Matilainen VA, Mäkinen PK, Keinänen-Kiukaanniemi SM. Early onset of androgenetic alopecia associated with early severe coronary heart disease: a population-based, case-control study. *J Cardiovasc Risk*. 2001; 8(3):147-151. doi: 10.1177/174182670100800305 ■

FIGURE 2. Cover of Dr. Norwood's first issue of *Hair Transplant Forum* (top), and the passing of editorship (bottom) of *Hair Transplant Forum International*.

HAIR TRANSPLANT FORUM
VOLUME 1, NUMBER 1 SEPTEMBER 1990

New Publication Aims at Idea Sharing Among Surgeons

In this age of instant communication and exploding information, it is incongruous that it should take so long to exchange information. The purpose of this informal publication will be the rapid dissemination of ideas, questions, concepts, views and opinions. Its course and content will largely be determined by the comments, questions and reactions of its readers.

Timely Information a Must

Currently it takes up to two years to get an idea into print. Most physicians attend meetings to listen, discuss and learn from one another; but these meetings are infrequent. A doctor who hears of an interesting approach at a conference may be motivated to go back to his or her practice and apply it . . . but may be afraid to try it without more discussion and feedback from other experienced practitioners. This factor is exacerbated by the usual lead-time of 18 months to two years before work on a patient is complete and results can be evaluated.

Divergent Ideas, Responses Sought
Hair Transplant Forum will fill the void by eliciting ideas, questions and responses from those who are doing hair transplants and getting them into print immediately.

With sufficient reader participation, the newsletter can offer much the same benefits as professional meetings, informal discussions and one-on-one conversation, with the added advantage and convenience of a written record of the dialogue which can be retained for future reference.

"Good results go unnoticed, but bad results are obvious."

A lively debate can be expected, since doctors in the field come from so many different backgrounds and carry out their business in such varied ways.

Good results go unnoticed, but bad results are obvious. One bad result can damage the entire hair transplant community. More rapid communication will reduce bad results and benefit the entire industry—not to mention helping all our patients.

HAIR TRANSPLANT forum INTERNATIONAL
VOLUME 5, NUMBER 6 NOVEMBER-DECEMBER 1995

A New Forum!

My Last Forum
O'Tar T. Norwood, M.D.

This will be the last *forum* with me as Editor and Publisher. My enthusiasm is beginning to wane, and in order to maintain the *forum's* force and freshness, I think it is time for a change. I have decided to give the *forum* to the ISHRS and in return they will set aside fifty-thousand dollars (\$50,000) to start the Hair Transplant Foundation. This organization will be under the control of the ISHRS and will have tax-exempt status so it can receive gifts. The Foundation will be dedicated to education and research in hair transplant surgery. Guidelines will be set up at a later date on how the moneys will be used. I think large contributors should be able to specify projects they want

(Continued on page 2, column 1)

A Word From Your New Editor
by Dr. Richard C. Shiell (Melbourne, Australia)

I have been asked by Dr. Norwood and The Board of Governors of the ISHRS to take over as Editor of the *Hair Transplant Forum International*. I accept this post with pleasure and also with a sense of humility at the responsibility I have been given. The *forum* is no longer the private journal of one individual but is now the property of the Society. As such it will have to reflect the needs and aspirations of the Society and grow with that body over the decades ahead.

Dr. Norwood and I have worked together harmoniously for 15 years, first with our textbook "Hair Transplant Surgery" and then with the *forum* since 1989. He will stay on as Emeritus Editor to give assistance and advice and will write a regular column for the *forum*, sharing with us his insight and wisdom.

It cost Dr. Norwood a lot of personal time and money getting the *forum* established and building its circulation to the point that is presently exceeds the membership of the ISHRS. The Society has been negotiating with Dr. Norwood over the past year to purchase the *forum* and his recent generosity in gifting his magazine to the Society has left a deep impression on us all. It can only be hoped that others will follow his lead to make benefactions to the Hair Transplant Foundation which has been established by the ISHRS. Perhaps the Board would see fit to

Dr. Richard C. Shiell, Editor

Dr. O'Tar T. Norwood, Emeritus Editor

(Continued on page 2, column 2)

Personal Tributes to O'Tar T. Norwood

Richard C. Shiell, MBBS | Melbourne, Australia | Forum Editor 1996–98

Many people live interesting lives but few leave behind a name and reputation that will be remembered for decades or enter the history books of their time and profession. O'Tar Tetreau Norwood was one such person, and I am glad to have known him for over 45 years. His contributions to his profession of Dermatology and in particular, Hair Restoration Surgery, have been immense.

We first met at a hair transplant meeting in Hot Springs, Arkansas, in February 1975, and remained close friends since that time. I was immediately attracted to O'Tar by his sheer dedication to hair transplantation and the fact that he had, unknown to me, already published a book on the topic in 1974. He gave me a copy and I read it on my way back to Australia making notes that eventually became a 40-page, hand-written commentary. He realised that he had a like-minded friend in far-off Melbourne, Australia, and that I already had 8 years of experience, 5 as a full-time hair transplant specialist. This was still unusual in the USA, where hair transplant surgery was usually performed as a sideline to Dermatology or Plastic Surgery.

After a visit to our land in 1982, O'Tar asked several Australians (Drs. Wayne Bradshaw, Bruce Fox, Mario Marzola, James Mason, Neil McLeod) to contribute chapters to the 2nd edition of his textbook. This was published in 1984 with me as both a contributor and co-author. Later, I was proud to be able to assist him to get his newsletter, *Hair Transplant Forum* (the *International* was added later), up and running after its commencement in September 1990. Prior to this, authors on the subject of hair transplant fought for limited space in Dermatology, Plastic Surgery, and Otolaryngology journals. Many other surgeons quickly joined this enterprise; Dow Stough, Sheldon Kabaker, Paul Straub, Russell Knudsen, Marcelo Gandelman, Pierre Pouteaux, Marc Pomerantz, Dan Rousso, Emanuel Marritt, and others quickly became regular contributors.

Hair transplant meetings were not common in the 1970s and 1980s but averaged about one meeting every two years; they were organised by specialist organisations such as the American Society of Dermatologic Surgery, the American Academy of Cosmetic Surgery, and the American Academy of Facial, Plastic and Reconstructive Surgery. Understandably, these bodies were not particularly receptive to ideas from those not certified in their own Board qualifications. Hair transplant surgeons were coming from increasingly diverse specialties such as Cardiology, Orthopedics, Psychiatry, and Emergency Medicine. In particular, there were many Family Physicians with MD and

Published in *Oklahoman* on Aug. 2, 2020.

O'Tar T. Norwood
Feb. 1, 1931 – Jul. 28, 2020

OKLAHOMA CITY

O'Tar Tetreau Norwood, physician, husband, father, friend, life-long learner passed away on July 28th at the age of 89. Born on February 1st, 1931 in Weiser Idaho, his mother was a telephone operator, his father was a machinist for the railroad, O'Tar rose from humble beginnings in Idabel, Oklahoma to become known as a globally prominent physician in dermatological community, pioneering hair transplant surgery with the Norwood Method, a medical classification bearing his name. O'Tar was a graduate of Idabel High School and attended the University of Arkansas for both under-graduate and medical school and was a member of Lambda Chi Alpha fraternity. As a naval officer, he served as a MD stationed at Barbers Point, Hawaii and there became an avid surfer. Small in stature, grand in confidence, an encounter with O'Tar was not soon forgotten. Though he was most renowned for his accomplishments in the medical field, including participation as President of Oklahoma State Dermatology Association, President of Oklahoma City Dermatological Society, Founding Member of Board of Directors of American Society for Dermatologic Surgery, Diplomat of American Board of Dermatology, and Clinical Assistant Professor of Dermatology at the University of Oklahoma Medical School, he will personally be remembered by those close to him for his fire and candor. O'Tar loved Arkansas football, his wife's cooking, and dancing. His love of travel included visits to all seven continents. Always willing to go and do. He was constantly on the move and not one to sit idle. Well into retirement, he had remarkable energy exceeding those decades younger than he. Rising at 5am to swim, he loved to play golf, fish, hunt, and socialize. In his mid-70s, O'Tar took up the accordion and falconry. Throughout his life, his spirit remained fiery and remarks unfiltered. O'Tar was preceded in death by the mother of his children, Mary Ann Norwood and his eldest son, Michael. He is survived by his wife Elissa Norwood and his children: Paula Crutchmer, Ross Norwood, Mary Rompf, and step-daughter Jacquelyn Sterling along with five grandchildren and three great grand-children. No service will be held. In lieu of flowers donations may be made to Oklahoma Humane Society.



(L to R) George Farber, Walter Unger, Richard Shiell, and O'Tar Norwood

DO or the equivalent British MBBS or MBChir degrees. Our numbers continued building as a result of our widely read bi-monthly newsletter. The scene was set for increasing conflict, but many former leading hair surgeons never joined the future ISHRS.

Dow Stough proposed that we call a meeting in Dallas, Texas, with a view to setting up an international organisation open to all registered medical practitioners with an interest in hair restoration. Board qualifications were not a pre-requirement.

This suggestion was embraced by many in the pages of the *Forum*, and a meeting was organised for May 1993. This was held at the huge Grand Kupinski Hotel outside Dallas,

and was an outstanding success with 430 attendees from 17 countries. The new society was founded with Dow Stough, President; Paul Straub, Vice President; Robert Leonard,



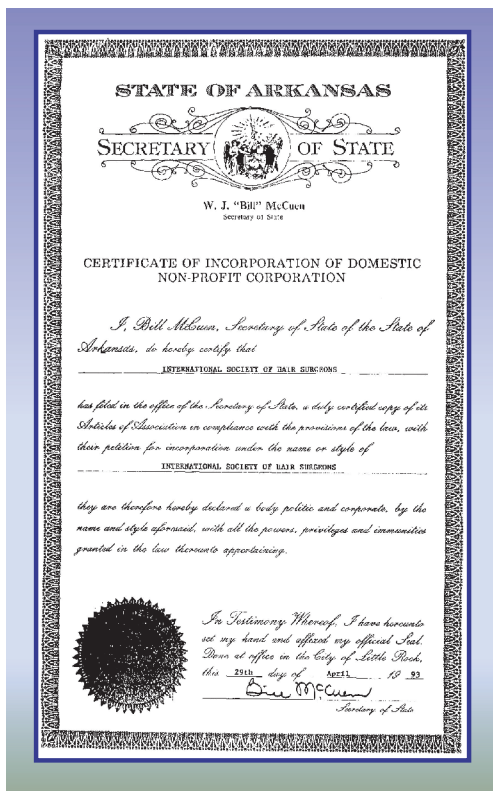
Secretary; and Pat Quinlan, Treasurer. O'Tar and I both declined office and concentrated on continuing our work with the *Forum*.

Although devastated by the loss of his wife Mary Ann from cancer on 4th

December 1992, O'Tar carried on the wonderful work he had started with the *Forum* until he sold it to the fledgling ISHRS as an up-and-running organ of communication. He then generously donated the \$50,000 sale price back to the ISHRS to be used as a memorial to Mary Ann. Interest on this money has been used from that time to pay for notable guest speakers for our Norwood Lecture at annual meetings.

I was appointed Editor for 3 years in late 1996 and *Forum* readership grew with steadily increasing membership of the ISHRS. Scientific contributions increased and the newsletter gradually expanded from 8 to 36 pages (today it runs 40 to 44). The editorship was an enormous task on top of my family responsibilities to four young children and a busy workload of some 600 operations per year.

Beginning with Russell Knudsen and Dow Stough in 1999, the editorship has been subsequently shared by two experienced practitioners for 3-year periods. The list of former editors now reads like a "Who's Who" of Hair Restoration, with each pair of editors acting as Peer Reviewers and managing to maintain the high standards set by O'Tar. In fact, the *Forum* has evolved with better funding, better paper, colour printing, and very professional production staff.



FOUNDING BOARD MEMBERS

From the Office of the President
by Dow Stough, M.D.

The First Annual Meeting of the International Society of Hair and Scalp Surgery was a tremendous success. The Board met prior to the annual meeting and the following is a brief summary of the Board meeting.

The Board of Directors was named. The business and affairs of the Society shall be managed by the Board of Directors. Disbursement of its funds and disposition of its property in fulfillment of its corporate proposals shall be vested in and controlled by the Board.

The following is a list of the Board members:

Dominic Brandy, M.D.	Sheldon S. Kabaker, M.D.
Russell Knudsen, M.D.	Robert Leonard, M.D.
O'Tar T. Norwood, M.D.	Marc Pomerantz, M.D.
Patrick Quinlan, M.D.	Daniel Roussu, M.D.
Dow Stough, M.D.	Paul Straub, M.D.

The Society will also form an International Advisory Board to assure representation from around the world. We will need a representative from each country. The list includes:

Yong Chol Choi, M.D. (Korea)
Henry Clamp, M.D. (England)
Patrick Frechet, M.D. (France)
Masumi Inaba, M.D. (Japan)
Sajjad Khan, M.D. (Pakistan)
Russell Knudsen, M.D. (Australia)
Manfred Lucas, M.D. (Germany)
Dankberg Pathmanach, M.D. (Thailand)
Carlos Uebel, M.D. (Brazil)
Martin Unger, M.D. (Canada)

The officers have now been elected. They are:

Dow Stough, M.D. President
Paul Straub, M.D. Vice-President
Robert Leonard, M.D. Secretary
Patrick Quinlan, M.D. Treasurer
O'Tar Norwood, M.D. Advisor to the President

All officers will be elected or appointed by the Board and shall serve two-year terms.

RECOGNITION AND AWARDS

O'Tar had been very prominent in Dermatology circles as outlined in the obituary submitted by his family that ran in the *Oklahoman* [reprinted above]. As the editor of two books, creator of the *Forum* newsletter, and co-founder of the ISHRS, his fame grew even further. O'Tar was presented with the society's Golden Follicle and the Manfred Lucas Awards in 1998 for his contributions to hair restoration surgery. At the New York meeting in 2003, he was one of 12 doctors awarded elegant plaques for their contributions as pioneers in HT surgery education.



O'Tar, Golden Follicle and Manfred Lucas Awards winner, with Marcelo Gandelman, Platinum Follicle Award winner, at the 1998 annual scientific meeting in Washington, DC.

O'Tar attended very few meetings following that time, so I was delighted when he visited us in Melbourne in January 2012 during a stop-over on a world cruise with his wife Elissa. We dined and drank his favourite beverage—"double scotch"—at a nearby restaurant. It was a great night, and although we corresponded occasionally on the internet, in the following years, I never did get to see him again.

I will miss his friendship and his great company. The ISHRS has lost another of its pioneers.

Dow B. Stough, MD | *Hot Springs, Arkansas, USA* ISHRS President 1993–94; Forum Co-Editor 1999–2001

After a courageous battle, Dr. O'Tar Norwood passed away on July 28, 2020. His wife, Elissa, wished to relay her gratitude for the overwhelming responses and condolences from all his colleagues and friends.

Elissa reflected back on his career and what was most important to him, stating that "O'Tar absolutely adored the camaraderie with those who shared his same profession of hair restoration." With O'Tar, there was never a sense of competition or jealousy. His mind was always bent toward the future. All the way back to 1975, when he first published the Norwood Classification of Male Pattern Baldness.

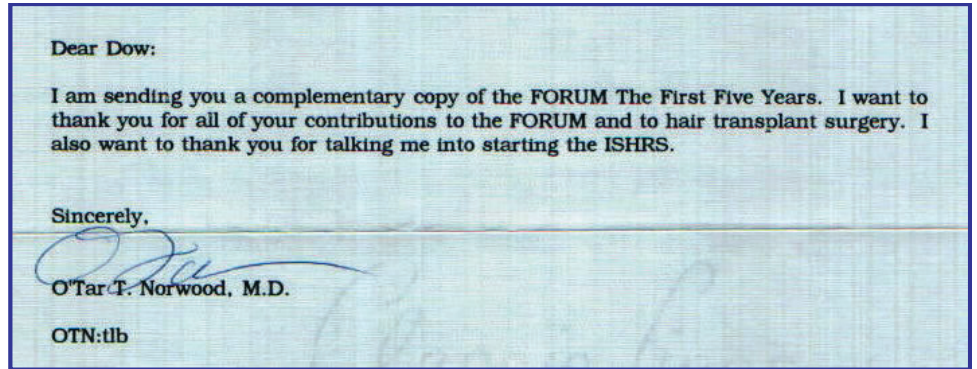
O'Tar received great joy in watching his beloved journal, *Hair Transplant Forum International*, prosper through the years. He began the *Forum* in 1990. In his own words: "The purpose of this informal publication will be the rapid dissemination of ideas, questions, concepts, views, and opinions." He felt the content would be largely determined by the readers. This novel idea grew to become the educational foundation of the field. Dr. Richard Shiell, his close friend, helped mentor the *Forum* to the prestigious level it is at today. The *Forum* was the gel that brought our society together. Yes, we were rebels, cowboys, and multispecialty physicians, but somehow it all worked. Thanks in no small part to the giant outpouring of love from one small physician from Oklahoma.

Two years after the *Forum*, O'Tar and I started the International Society of Hair Restoration Surgery (ISHRS) following a very successful meeting in Dallas, Texas. It was a meeting with no paid speakers, no airfare reimbursements, no waiver of meeting fees, all of which was customary. The money raised was substantial, and it was all donated to pay for the incorporation and formation of this new society, the ISHRS. O'Tar and I were but a small cog in a big wheel of individuals all working towards a common goal. The *Forum* support provided the impetus for the formation of the ISHRS. So, without his *Forum*, the path may have been much different.

O'Tar was particularly fond of email exchanges with his colleagues. I recall discussing this with him decades ago, and he commented: "I think this Internet thing will eventually become more important than the *Hair Transplant Forum* one day. You don't even have to prepare a print copy."

There are so many accomplishments to be attributed to O'Tar that it seems unfair to single out only a few in any tribute. But echoing the words of Elissa Norwood, he had a love for his colleagues and the sense of joy this fellowship brought him.

Thirty years after the first *Forum*, we honor O'Tar's legacy, his innovation, and his spirit. The best tribute we could give him is to maintain and extend those friendships throughout the globe that our field has laid before us.

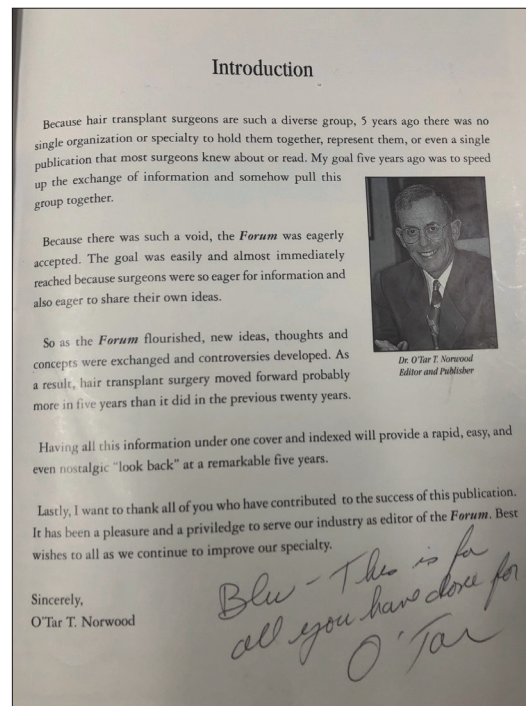


A Side Note

My father, Dr. Blu Stough, studied under Dr. Norman Orentreich in the early 1960s, taking multiple trips to New York to learn the technique. He began transplanting patients in the 1960s, and by the early 1970s was teaching the technique to others. Dr. Norwood graduated from the University of Arkansas medical school in 1957, and while doing his Dermatology residency, he visited my dad and Dr. Orentreich. O'Tar performed his first transplant in Oklahoma City in 1961, on one of his patients while he was a first-year dermatology resident. His handwritten note to my dad was to show his gratitude for his introduction to this field.



O'Tar with Bluford Stough at the second annual meeting of the ISHRS in Toronto, Ontario, Canada.



Russell Knudsen, MBBS, FISHRS | Sydney, Australia
ISHRS President 1997–98; Forum Co-Editor 1999–2001

When O'Tar started the *Forum*, I submitted something about the Australian society supporting the idea of an international society. He wrote back to tell me I wrote well and should do more of it. His encouragement was instrumental in getting me to begin contributing to the *Forum*.

When I was ISHRS Secretary, I heard O'Tar wanted to sell the *Forum*, so I rang him to discuss the idea of the ISHRS purchasing it. This eventually happened, and he promptly donated the sale price back to ISHRS to be used as an educational fund, which began the program of Research Grants that continues to this day from invested proceeds of the original gift.

O'Tar was a champion in advocating the free sharing of knowledge. His wise encouragement of young Dow Stough (Dow's dad Blu was a great friend of O'Tar), together with his prominence, resulted in the successful co-founding of the ISHRS in 1993. A pivotal contribution to the improvement of standards around the world has come from that!

Michael L. Beehner, MD, FISHRS | Saratoga Springs, New York
Forum Co-Editor 2002–04

Like many others, I owe a tremendous debt of gratitude to O'Tar Norwood for my career in hair transplanting, not to mention the tremendous effect his twin creations of the *Forum* and the ISHRS society have had on all of us. Besides being a hair transplant patient myself back in 1981, my first exposure to hair transplantation was purchasing and reading the textbook, "Hair Transplantation," which was written by Richard Shiell and O'Tar. I re-read the book 3 times to get off and running. In 1994, when I got home from the second ISHRS meeting in Toronto, I wrote O'Tar a note asking him why there wasn't any mention of the frontal forelock pattern of transplanting, which I had heard Manny Marritt talk about. So, instead of answering my question, he asked me to write up an article for the *Forum* on my experience with the forelock design, and, lo and behold, he put the article on the front page. With that one move, I became more involved with the ISHRS and started to come up with new ideas of my own. While the *Forum* gave us a great means for discussing all of the various issues and controversies of the day, the annual meeting of the ISHRS enabled us all to learn in much greater detail what many of our colleagues were doing, which would help each of us. I hate to think where the field of hair transplantation would be today if it weren't for the courage of Dow Stough and O'Tar to create the ISHRS. This organization instantly became the meeting place and forum on an international scope for anyone in the world serious about performing hair transplant surgery.

On a personal level, the Society has been a great forger of friendships, which I have treasured over many years. I recall the golf tournament of sorts we had in Nashville, which allowed me to bond with Jerry Cooley and Bill Parsley. Serving in the first paired editorship of the *Forum* with Bill Parsley was a real joy for those 3 years. Before we put the *Forum* together online, I understand that Richard Shiell was literally cutting and pasting on his dining room table to construct the *Forum*. Bill and I decided it was too much for one person to do, and so we set up the current setup of two

co-editors that continues today. A great big thank-you to you, O'Tar, as you continue to look down on the great organization you set up with Dow.

William M. Parsley, MD, FISHRS | Louisville, Kentucky
ISHRS President 2008–09; Forum Co-Editor 2002–04

I first met O'Tar Norwood back in the mid-1970s. I had a budding interest in hair transplantation and discussed it with him at the hair meetings and at the Academy of Dermatology meetings. As time went on, I realized that he was a very special person. All of the accolades used in describing him are an indication of the respect he earned, but the truth is that he was much bigger than that. He published the first textbook on hair transplantation in 1973 and started the *Hair Transplant Forum* in 1990, which was invaluable to those wanting to learn about the field. The *Forum* was later donated to the ISHRS and was renamed *Hair Transplant Forum International* in 1992. He remained the editor through 1995, but passed the position to Richard Shiell in January 1996. Additionally, he created the male pattern hair loss chart that is still used today, and was one of the first doctors to realize that women's hair loss was very different.

I have never met anyone more enthusiastic about new developments in our field as O'Tar, and he was so even while assessing their true value and resisting undue hype. In meetings, he was brutally honest in his comments, but offered them in a civil way (usually). When the field was moving toward microscopes, he quipped, "I had a great assistant who worked with me for years and was the best I ever had, but she didn't want to use microscopes. So, I fired her." It got some laughs, but showed that nothing stopped him from offering the best current care for his patients.

When Dow Stough realized that leadership in hair restoration seemed to be a closed shop and that a new organization solely devoted to hair restoration was needed, he knew who to contact. Dow had the vision and O'Tar had the name and the clout. O'Tar enthusiastically joined the effort. The result was the birth of the International Society of Hair Restoration Surgery (ISHRS). Dr. Carson Lewis, while flying home from the first meeting in 1993, quoted Victor Hugo: "Nothing is so powerful as an idea whose time has come." Those words were so true. Hair restoration at that time had a strong group of brilliant doctors well on their way to becoming the future leaders who enthusiastically joined in. The quality of hair restoration immediately surged at a speed it had never before seen—as did the number of friends and respected colleagues that the ISHRS brought into my life.

If you are looking for a true giant in hair restoration edu-



O'Tar and wife, Elissa



know where from or when the next powerful idea will come.

**Robert S. Haber, MD, FISHRS | Beachwood, Ohio
ISHRS President 2002–03; Forum Co-Editor 2005–07**

In 1993, at the conclusion of my dermatology residency, I was fortunate to be selected by Dow Stough as the first ISHRS Fellow. That put me at ground zero with regards to the birth of the ISHRS, and through Dow I was introduced to luminaries I would otherwise not likely have crossed paths with, including O'Tar Norwood.

I was familiar with the Norwood hair loss classification, and meeting Dr. Norwood was like meeting Tesla, or Ohm or Ampere, pioneers whose names are indelibly linked with their contributions to science. It would have been understandable if O'Tar was pompous or arrogant, or if he had dismissed me as the nobody I was, but that was not the case. He was humble and friendly and affable, and although I have no recollection of what we spoke about the first time we met, I came away astounded at the way this man treated me.

The ISHRS became a significant part of who I am, and later as President, and even later as *Forum* co-editor, I grew to appreciate more and more how instrumental O'Tar's vision had been, and how the rapid dissemination of ideas he facilitated with the *Forum* not only fostered the creation of the ISHRS, but advanced the field far beyond where it would have been. O'Tar was here before us, he is here with us now, and he will always be with us, and we are immeasurably better because of him.

**Jerry E. Cooley, MD, FISHRS | Charlotte, North Carolina
ISHRS President 2010–11; Forum Co-Editor 2005–07**

I entered the field as O'Tar was retiring and, unfortunately, I never had the chance to get to know the man. However, after immersing myself in every issue of the early *Forums*, I felt like I did know him. He had a dominating presence in those early issues, commenting on all the submissions, so in a sense he acted as a mentor to me as I digested all this new information. I literally devoured every article in those early *Forums*. I credit the *Forum* (and therefore O'Tar) with giving me the enthusiasm to enter this field, to continually try new things, and to share my experiences with my colleagues. The influence that O'Tar had on me in those early days through the *Forum* has continued to shape me and make me the hair surgeon I am today.

cation, you won't find any better example than O'Tar Norwood. If you truly want to honor his memory, submit an article to the *Forum* to offer your own creative ideas. Don't be shy. We never

**Nilofer P. Farjo, MBChB, FISHRS | Manchester, UK
Forum Co-Editor 2011–13**

The greatest gift that anyone can give is knowledge. Since its inception, the ISHRS has had some extra-ordinary individuals who have freely shared their valuable ideas with the hair restoration community. One of these unique individuals was O'Tar Norwood. Many people knew this very unassuming man, who was the epitome of a gentleman, as a friend and colleague. I was privileged to meet him and his wife at several ISHRS meetings, and though I am not sure he knew who the youngster was that was talking to him, he generously engaged in conversation and answered my questions. I cannot remember what I asked him, but I am sure my questions must have seemed very basic to him!

Dr. Norwood gave us a great invention of a scale to use for classifying patients. Although not the most detailed scale, it still has been one of the most useful tools that hair loss specialists use. I still use his scale because it is straightforward for patients to understand as many have seen it published on the internet. Some doctors decide to use modifications of the scale, but I prefer to rely on photographs along with Norwood-Hamilton classification. The other wonderful gift from O'Tar is this journal, which was the start of many years of useful communication between ISHRS members as an informal place to discuss both medical and social matters.

By the time I became co-editor, the journal had already been going for over 20 years. However, unlike most journals, we still had the freedom to make the journal our own. In my first editor's note in the March/April 2012 issue, I wrote the following:

Richard Shiell made the following statement on the Forum back in 2001 (Vol. 11, No. 1): "Hair Transplant Forum International is a privately published newsletter of the International Society of Hair Restoration Surgeons. Its contents are solely the opinions of the authors and are not formally 'peer reviewed' before publication. The standard of proof required for letters and articles is not to be compared with that of formal medical journals. The newsletter was designed and continues to be a printed forum where specialists and beginners in hair restoration techniques can exchange thoughts, experiences, and pilot studies on all matters relating to hair restoration."

It is only recently that some articles have been peer reviewed for open access, so it is still mainly a forum for sharing of information and debating issues. So, the gift of knowledge started by O'Tar all those years ago remains as his legacy and may it continue! Thank you O'Tar.



William H. Reed, II, MD | *Weaverville, North Carolina*
Forum Co-Editor 2011–13

Reflecting upon hearing of O'Tar's death gave me a realization that hadn't been clear in my mind. Although I never knew O'Tar personally, I realized in my reflections how important he was in my life. Had it not been for him and a very short list of his peers who refined the standards for hair transplantation, I would never have entered the field. But with the evolution of subtle grafting enabled by O'Tar and the formation of the ISHRS, I was to have the great satisfaction of being a participant, using hair transplantation as a medium, in many intimate relationships with patients and, through the ISHRS, fellow hair transplant surgeons. I know that I am not alone on the impact O'Tar has had on many of our lives. Wow, what an impact one person can make upon so many people as the energy and intention ripples through time.

Thank you, O'Tar, and thank you for being an example to remind all of us that our intentions and behaviors have consequences and, therefore, that our lives have made a difference.

Robert H. True, MD, MPH, FISHRS | *New York, New York*
Forum Co-Editor 2014–16

One of the greatest gifts Dr. Norwood gave to the ISHRS and the field of hair restoration surgery is the *Hair Transplant Forum International*.

The *Forum* has been very valuable to me throughout the past 30 years. Sometimes, we talk about how it doesn't have the power of a peer reviewed journal. But, in some ways, I think it is even more powerful because it isn't. It has always been a vehicle of new ideas and debate. It provides a platform for all of us to share what we know and what we don't know. It helps all of us to be better practitioners. So, as a reader I am grateful. And I am also grateful for having been an editor. It was engaging and fun to do my best to put together interesting issues.

On a personal note, when I was beginning my career in hair restoration surgery, I started attending meetings to learn more. I was at the very first ISHRS meeting in 1993. That first year, I just listened and learned. I particularly remember what wonderful clarity and energy O'Tar brought to the meeting. For me, he immediately became a key person to learn from.

The next year, I decided I had learned something that could be worthwhile to share with others. So, I gave a presentation. I tell you, I worked and sweated over it so much. And I was so nervous at the podium, you could have knocked me over with a leaf. Afterward, I was sitting in the audience wondering if I had given a successful presentation. O'Tar came and sat next to me. He started to talk and asked me about my practice and my family. He told me he appreciated my presentation. He told me to keep thinking and sharing and that he would expect more from me.

I will always look back to that moment as pivotal in my career. O'Tar made a big difference in my life.

We all know about the concept of "Pass it on." Ever since that time in 1994, thanks to O'Tar, I made it a point to congratulate and encourage new doctors joining our society. And now I see them doing the same. Ripples in the water from a pebble, O'Tar. Ripples in the water. Rest in Peace.

Mario Marzola, MBBS | *Adelaide, South Australia*
ISHRS President 2003–04; Forum Co-Editor 2014–16

Dear O'Tar,

From Helen and Mario, we would like you to know, O'Tar, that we loved you.

It was plain to see that you had the intellect and the passion for our field, so it was a pleasure to follow you.

There were no easy lessons when it came to be serious about patient outcomes. You told it as it was, warts and all, shot down false arguments whether they came from friend or foe. Respect was easy.

Most enjoyable O'Tar was your company after hours. A Glenlivet with a splash of soda in hand and we were off. Funny, laughing, endearing.

We miss you but will always remember you.

Andreas M. Finner, MD, FISHRS | *Berlin, Germany*
Forum Co-Editor 2017–19

O'Tar Norwood was one of hair surgery's pioneers. He had a huge impact on our field and how far we have come as an educational and cooperative society.

He not only founded the *Forum* newsletter, which has become a truly scientific journal, he also inspired me to constantly aim for the highest standards of hair surgery and patient care. If we follow his example to progress together and share our experience during our meetings and in our *Forum*, I am optimistic for the future.

Bradley R. Wolf, MD, FISHRS | *Cincinnati, Ohio*
Forum Co-Editor 2017–19

At first glance, O'Tar Norwood appeared as a shortish man of relatively average build. A closer view revealed a head covered with large, 4mm, plugs, circa 1980s, made less noticeable due to matching hair and skin color. He had a mischievous, at times elfin, grin that belied his respected standing in the hair restoration and dermatological communities. After all, he was the Norwood in the Hamilton-Norwood scale used to classify the progressively more severe, seven stages of male pattern baldness. This measurement scale was first introduced by James Hamilton in the 1950s and later revised and updated by O'Tar Norwood in the 1970s. It is sometimes referred to as the Norwood-Hamilton scale, or simply the Norwood scale. The scale is, to this day, regularly used by doctors to assess and communicate the level of hair loss in men. New scales have been developed, and the Norwood scale has been criticized by some due to its failure to describe every possible variant of male pattern hair loss, but I still find it the simplest, most elegant and communicative way to describe this male affliction that we treat.

I knew none of the above when I saw Dr. Norwood at that first ISHRS, and my first "hair" meeting in Dallas in 1993 and remember little as my head was spinning at the sight of all the icons of hair restoration surgery at that seminal meeting. Faces I could finally associate with the names on the articles and books I had been reading during the first 3 years of what would become a 30-year obsession with a cutaneous appendage. At first glance, the name O'Tar conjured up someone of an exotic background, but this image was quickly changed when he spoke with a thick Oklahoman accent delivered in a staccato

cadence reminiscent of the cartoon character, Foghorn Leghorn. He was somewhat of an accidental comedian when he, as described above, presented patients during his lectures.

But O'Tar was and will always be a giant in the ISHRS. Not only was he the co-founder of the society, with Dow Stough, but also the founder of the *Hair Transplant Forum*, a publication that informed and united a disparate group of individualists. It is to this day, read cover to cover by serious movers of hair. O'Tar eventually and altruistically donated the *Forum* to the ISHRS.

At the start of my career, I could only dream of having an article published in the *Forum*. I thought its space was reserved for only the biggest names in the specialty. As time went on, I submitted a few pieces, like letters to the editor, but was intimidated by its standing relative to my experience. I finally decided to get serious, invest some time describing my experience, and wrote an article on the art and craft of incision making and graft placement. That was followed by an invitation from Bob True and Mario Marzola to write the Cyberspace Chat column for three years. That experience gave me the confidence to accept the invitation to become Co-Editor with Andreas Finner. It is still difficult to believe I went from someone who could not imagine having an article published to being responsible for every printed word in the *Forum*. It has been quite a journey that would be impossible if it weren't for the foresight and vision of O'Tar Norwood.

Robert T. Leonard, Jr., DO, FISHRS | Warwick, Rhode Island ISHRS President 1995–96

Our profession has lost a giant with the death of Dr. O'Tar Norwood, the co-founder of our beloved society. Though a man of small physical stature, he was a giant in the international world of hair restoration surgery!

I first heard of O'Tar in the earliest days of my hair restoration professional life in 1986. I was training under my mentor, Dr. CP Chambers, who gave me a small, but enlightening textbook, *Hair Transplant Surgery*, written by O'Tar and Richard Shiell. It expanded my horizon to see what other surgeons had been doing, and it made me feel quite good that I was learning surgical methods that had advanced from that austere textbook.

At our very first ISHRS scientific meeting in Dallas, Texas, in 1993, I got to meet and to speak with O'Tar—a dynamo

of a man! From that meeting on into the future, as he offered, I used him as a sounding board for any problem that arose in my solo hair restoration practice.

I'll never forget one incident on a Friday afternoon in 1999 when I began a "plug" transplant on a patient who was bleeding a lot. He was given his pre-op instructions two weeks before; I asked him before surgery if he had followed them, to which he answered in the affirmative, and the surgery began. Well, so did the bleeding! I asked the patient again about the pre-ops when he exclaimed, "Oh shit! I took three aspirins at work yesterday!" (*Excuse my language, but that's what he said.*)

I had my assistants apply pressure to the donor area, and I called O'Tar. He calmly told me to remove the grafts, suture the incision, apply a pressure dressing (which I never had done before due to Dr. Chambers Dovetail Closure and Hats Off technique that I learned), and store the grafts in the refrigerator in saline solution. He said to reschedule the procedure for Monday morning, and all would be well. I worried about future graft growth after being chilled for the weekend; he told me that they all would grow—and they did! Say what you may say about those big grafts, but they were very hardy suckers!

I truly have scores of fantastic memories of O'Tar—particularly from the yearly Italian Society of Hair Restoration meetings during the decades of the 1990s and early 2000s. What an impressive mind coupled with a great wit and an overall wonderful man.

He will be sorely missed. May his memory be eternal!

James E. Vogel, MD, FISHRS | Owings Mills, Maryland ISHRS President 1996–97

My first contact with O'Tar was a phone call from me to discuss my interest in the advertised hair transplant videotapes he was selling in the very early '90s. We hit it off on the phone, and the next thing I knew, he connected me to Dow Stough and the developing ISHRS. Of course, the rest is history.

Over the years, we had many interesting discussions and he was always most humble and genuinely interested in my thoughts and contributions. We also traveled together in Italy following the Italian Society meeting in Rome in 1996. He was particularly enthusiastic about the development of the Golden and Silver Follicle awards and the establishment of the scientific committee. Outside of the lecture rooms, O'Tar was full of energy, and his testosterone supplements always made him extra "spunky"!

Sheldon S. Kabaker, MD, FISHRS | Oakland, California ISHRS President 1998–99

By the time I was in office as the 6th president of the ISHRS, O'Tar had retired and left the organization to be developed by "lesser" individuals such as myself. My involvement in the hair restoration field was in flap surgery for aesthetic and reconstructive purposes. In the 1970s and 1980s, hair restoration work was a very small part of American dermatology, plastic surgery, and facial plastic surgery. But a great deal of hair work and innovation was done by surgeons from other backgrounds. I was active in



the American Academy of Facial Plastic and Reconstructive Surgery, which put on some of the original hair restoration surgery meetings/workshops of this pre-ISHRS period. Other organizations put on occasional hair meetings. But it was the wisdom of O'Tar Norwood to have an organization independent of any prior one.

By 1999, during my presidency, our organization and its annual meeting was still being run by our small Board of Governors with little involvement from the remainder of the membership. Victoria Ceh had just come on board and brought professional organization management to our small organization, which was a major turning point. Emphasis was placed on forming committees, which involved more of our members, leading to the type of organization that we have today. Also, we were able to qualify for CME for our meetings.

We have evolved into a truly international organization. I am very proud of the organizational advancement accomplished during my presidency ending in the first San Francisco meeting in 1999.

Marcelo Gandelman, MD | São Paulo, Brazil ISHRS President 2000–01

I was fortunate to meet O'Tar Norwood in Birmingham, Alabama, in 1990 during a hair meeting organized by Dr. Daniel Rousso at Dr. McGollough's clinic.

I remember that he asked me about my hair transplantation work, and I timidly explained sketching some drawings on a paper napkin. This meeting with Dr. Norwood strengthened my affair with hair transplantation since he introduced me to the top professionals in hair transplantation.

By inviting me to write for the *Forum* in 1990, O'Tar expanded my horizons and allowed me, next to the persons I had long admired, to publish my ideas. Always generous, he published all the articles I sent him.

I introduced O'Tar to the Fax machine, but it became a nightmare for me because sometimes someone would send me articles from the other side of the world at 4:00AM in my time zone.

In 1994, O'Tar had the idea to create the Hair Transplant Video Forum, a collection with more than 10 hours of hair surgery videos.

The founding of the *Forum* by O'Tar and its direct descendant the ISHRS were the most important elements for changing empirical Hair Transplantation into a scientific method that day by day has been polished through research and the sharp expertise of its members.

When the ISHRS was created, through his altruism and generosity, O'Tar donated the *Forum* with its subscribers to the society. Creative and innovative, O'Tar always encouraged younger colleagues to improve their techniques and share and publish the results.

Always dynamic, in 1995, when he was 64 years old, O'Tar discovered Falconry and became affectionate of the field.

O'Tar Norwood was a landmark and a beacon pointing the direction of ethical and human medicine.

Paul T. Rose, MD, JD, FISHRS | Coral Gables, Florida ISHRS President 2005–06

I believe that I first met Dr. Norwood at one of the initial meetings that he and Dow Stough put together. This meeting would turn out to be foundational to the subsequent formation of the ISHRS. The purpose of the meeting was to promote the exchange of information about techniques and transformative ideas about hair restoration.

When I met O'Tar at that meeting, he was approachable and welcoming. To meet someone who I considered a patriarch in the field and who garnered so much respect was an honor. His attitude at first caught me off guard; pleasantly so.

O'Tar's sense of enthusiasm was contagious. He was very gracious and he displayed interest in wanting to know about me and in fact everyone who he came in contact with. He genuinely wanted to know you as a person and sought to learn what you were doing in the field of hair restoration. He would inquire as to the techniques you used, and more importantly why you utilized a technique. He wanted to know how you treated the grafts or why you used one suture over another or one device over another. He also was not shy to tell you why he disagreed with you about some aspect of the process. O'Tar emphasized the dissemination of ideas. He was skeptical about people who had "secret" techniques and did not wish to share their knowledge.

Over the next few years, I came to know O'Tar a bit better. I had the pleasure of having several conversations at dinner during meetings. We talked about a wide range of topics from fishing to politics. I quickly learned how much he valued honesty, integrity, generosity, and ethics. In every conversation, he wanted to discuss new concepts, new inventions, and the ongoing science of hair research. Throughout the years, he came to see the many changes in the field. From large punch grafts, to mini- and micrografts, to scalp reductions and lifts, to follicular unit grafting and follicular unit excision. At each point, he would seek to adopt that which worked, being careful to learn the advantages and disadvantages of each method. If he came to believe that a technique was no longer the best means to treat the patient, he would forthrightly explain his alteration in course, always seeking to provide patients with the best possible outcome.

O'Tar displayed all the virtues he espoused for others. He forever brought to the ISHRS these values, and we continue to see this throughout the succession of leadership in the society that remains to this day.

I have had the honor as serving on the BOG, EC, and as President of the ISHRS. I had the extreme good fortune to be preceded by physicians such as Dow Stough, Mario Marzola, Russell Knudsen, Jim Vogel, Bob Leonard, Tony Mangubat, and other luminaries of our field who brought to the position the very ideas that O'Tar expected. Each put the interests of the society above personal gain and sought to grow the society and its benefits for the membership and the public. As a Past President, I hope that I demonstrated some of the admirable characteristics of our co-founder, Dr. O'Tar Norwood.

Could O'Tar have imagined that the ISHRS would have grown to such an extent? Could he have initially envisioned the *Forum* that exists today? Could he have imagined so many years ago the ISHRS of today where there is an ex-

traordinary flow of excellent scientific material and information through the annual congress, workshops, and live surgery meetings that reaches worldwide? Add to these accomplishments the charitable endeavors that are performed by ISHRS members.

It is a testament to O'Tar that the ISHRS is what it is today, and it is a legacy he has gifted to us. We should be thankful for having had the presence of Dr. O'Tar Norwood in our lives and in our field of medicine.

**Paul Cotterill, MD, FISHRS | Toronto, Ontario, Canada
ISHRS President 2006–07**

Having known O'Tar since the first ISHRS meeting in Dallas, he struck me from the beginning as a straight shooter who always told it like it is. He was a great inspiration, a visionary, and father to modern day hair restoration surgery.

**Bessam K. Farjo, MBChB, FISHRS | Manchester, UK
ISHRS President 2007–08**

Nilofer and I were lucky to have met O'Tar and his wife Elissa on several occasions and share the same warmth and engaging conversation. The hair transplant community owes O'Tar a lot; although many have tried to bring in their own hair loss classification systems, the Norwood scale is the one that is still the most popular. I remember clearly when O'Tar announced that he thought female pattern hair loss (FPHL) had a different etiology and many thought he had gone mad. Well now we know just how clever he was!

**Edwin S. Epstein, MD, FISHRS | Richmond, Virginia
ISHRS President 2009–10**

My thoughts on O'Tar:

C.P. Chambers taught me his HT technique: 4-5 patients, 30-50 grafts each shift, 8-11, 11-2, 2-5...so I learned how to do a lot in one day.

At the first ISHRS meeting in Dallas, I met O'Tar, and he asked me how many procedures I had done. I told him 8-12 a day. He said, "Damn son, that's more than I do. You should be giving the presentation."

As I got to know him better, our conversations usually were not so much about hair and more about family and falconry.

He invested both personally and financially in the ISHRS, and teaming up with Dow created an amazing educational institution.

**Vincenzo Gambino, MD, FISHRS | Milan, Italy
ISHRS President 2013–14**

My experience in hair restoration started in 1990. I was looking for a job and answered a blind ad in the New York Times that read: "Foreign educated doctors wanted to work for a national medical practice in their NYC office." The medical practice was "Elliott Thomas Medical Group."

I interviewed, was offered the job, came home to my wife, Irene, and said, "They do hair restoration. I don't know what it is, but the pay is good." She said, "Take the job!"

That blind ad changed the trajectory of my life.

During the ensuing years, I knew I finally found my passion. I loved hair restoration surgery. Four years later, in 1994, I

made the move back to Italy, opened a practice in Milan, and joined the international society.

If hair Restoration surgery changed my life—the ISHRS brought it to another level. It was an opportunity to learn from the best in the field. I only had the pleasure of a few personal experiences with O'Tar, and as many others have said, he was a warm, humble man, who with his vision, experience, and knowledge brought our field to the next level. The creation of the ISHRS—the brainchild of O'Tar and Dow Stough—created a platform where the best would share and others could grow. I owe it all to these pioneers.

In 2013–14, I had the great honor and privilege of serving as ISHRS President. I hope I have helped other young doctors as I was helped. The friends I have made, the things I have learned, the spirit of community is what it is all about.

O'Tar Norwood was a great man. He will be missed, but his vision lives on.

**Sharon A. Keene, MD, FISHRS | Tucson, Arizona
ISHRS President 2014–15**

O'Tar deserves our salutes and thanks...for so many things, including giving *Hair Transplant Forum International* to the ISHRS—and the fact that we say his name every day in discussing hair loss patterns! Well done, O'Tar—onward and upward! As my father used to say: No one makes it out of this world alive...we will all walk that path someday.

**Ken Washenik, MD, PhD, FISHRS | Beverly Hills, California
ISHRS President 2016–17**

O'Tar Norwood will be forever remembered as a true giant in our field. He is an iconic figure in every sense of the word and his contributions are the stuff of legends. Dr. Norwood is the founder of *Hair Transplant Forum International*, the official journal of the International Society of Hair Transplantation Surgery (of which he is a founder). He, ultimately, gifted the *Forum* to the ISHRS, thereby ensuring the legendary future success of both. As the Norwood-Hamilton Scale is the most often used scale for male pattern hair loss, his name is evoked daily in all of our offices around the world.

I had the pleasure of meeting O'Tar a couple of decades ago at an ISHRS meeting and was struck by his contagious interest in hair, the science of hair restoration, and a genuine interest in hearing the thoughts of others. Although we had never met before, as was his way, he treated me warmly. He was known as a giver and a contributor and will be forever revered by his colleagues. I will always cherish my copies of Dr. Norwood's first and second editions of "Hair Transplant Surgery."

Dr. Norwood definitely left the hair transplantation world a better place than he found it, and he firmly laid the foundation for the ISHRS's three core pillars: education, research, and collegiality. The ISHRS, Dr. O'Tar Norwood's legacy, has brought me untold benefits in all three areas and for that I will be forever grateful.

Robert M. Bernstein, MD, FISHRS | New York, New York

In the late 1990s, I was a new kid on the block and O'Tar, curious to see what I was up to, stopped by my Fort Lee, New Jersey, office on his way back from a trip to Europe. At meetings, he always had people around him, so I was so

excited to meet him one-on-one and honored that he would go out of his way to visit. We spent the whole afternoon together, and I remember vividly his inquisitiveness and gently probing questions into what I was doing. He also spent time explaining a new idea he had about the mechanism of female pattern hair loss. I was so touched that he was really interested in what my thoughts about it were. O'Tar's contributions to our field are immeasurable, and I will always remember that one afternoon.

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

I first met O'Tar in Hot Springs, Arkansas, in the late 1970s. He was a force to be reckoned with, and he had some strong opinions. I recall him expressing one of his strong opinions at a meeting in Beverly Hills, sponsored by Dr. Toby Mayer and Richard Fleming. My feelings were very similar to O'Tar's, and I was very pleased to join him as a member of the ISHRS.

The Marzolas and my wife and I were fortunate to be invited to stay with O'Tar at his home in Oklahoma City. O'Tar held a cocktail party to introduce us to his closest friends.

Mario and I sang "Oklahoma" to all of them. It is one of my favorite songs. O'Tar was a wonderful host, and we were intrigued by his fairly new interest in falconry. Marilynne and I were lucky to be able to fly his hawk with him.

I had an opportunity to watch surgery with him also. I injected some of the local anesthetic. When O'Tar was out of the room, the patient commented about how much less it hurt when I did it. There was some bleeding. O'Tar's response to it was "bleeding stops." It did.

It was an honour to have known him and to be his friend for many years.

Paul J. McAndrews, MD, FISHRS | *Pasadena, California*

Thank you, O'Tar, from the many of us who never had the pleasure of meeting you. I am sure of what O'Tar is most proud is the people that he influenced who grew the ISHRS (i.e., my mentors). O'Tar accomplished what he desired of getting the future ISHRS leaders to do what he would do—foster inclusiveness, education, and research.

Damkerng Pathomvanich, MD, FISHRS | *Bangkok, Thailand*

I met O'Tar at the hair transplant meeting in Dallas almost 30 years ago. It was an honor and pleasure to get to know him. R.I.P., O'Tar, you will be missed by all of us.

Your name will be in our hearts.

Lt Col Ret David Perez-Meza, MD, FISHRS | *Spain/Mexico*

I met O'Tar Norwood around 1994 when I was doing a Hair Transplant Fellowship with Dow Stough in Hot Springs, Arkansas. I remember seeing O'Tar in Dow's clinic. The ISHRS had been founded by them a year earlier and was still in its infancy. O'Tar was already a big name in the hair transplant field. He was well known for describing the classification of male pattern baldness and was also one of the first physicians to edit a textbook devoted solely to hair transplantation.



At that time, most hair surgeons still used minigrafts, and the concept of follicular unit transplantation was just beginning to be developed by Limmer, Bernstein, and Rassman. It caught my attention that O'Tar, who came from the old "big punch" school, very soon started to acknowledge and embrace the advantages of follicular unit transplantation. I always remember O'Tar at one of the ISHRS meeting saying how it was such a shame that we hair surgeons had taken so long to realize that the hair exits the scalp in groupings and not singly. It may sound strange, but at that time in the early nineties we still had a wrong idea of the follicular anatomy, but O'Tar seemed willing to admit the mistake and the advantages of follicular unit transplantation.

This man with his open mind and vision gave us a great gift: *Hair Transplant Forum International*, which fulfilled a very important mission before the internet era. It allowed the interchange of ideas and new techniques between hair surgeons. This journal played a major role in the advancement of hair surgery.

O'Tar's contributions and legacy to the hair loss and hair restoration industry will stay in our lives forever. (By the way, I just saw a 42-year-old male patient and I told him: you have MPH and "Norwood Class" 5V.)

Thank you, Dr. Norwood, for all you did to progress our field.

Sara M. Wasserbauer, MD, FISHRS | *Walnut Creek, California*

I always wanted to meet O'Tar. He has influenced so much just by taking an uncommon interest in a common thing. I hope we will be able to have a special "celebration of life" for him—and if we chance to meet in heaven, I am hopeful he and I can sit and have a solid chat about all things hair. Lord knows none of us will be able to leave nearly as significant a mark on our tiny niche of medicine as he did. ■

O'Tar T. Norwood, the Author, Still Resonates Today

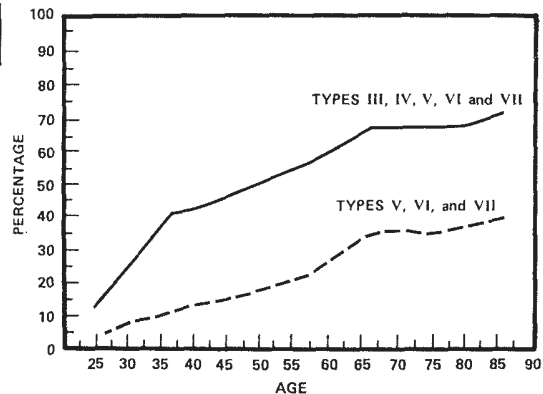
Did I Do That?

by O'Tar T. Norwood

Manfred Lucas, Russell Knudsen, O'Tar Norwood, and Henry Clamp all warned of the dangers of not anticipating the future progress of male pattern baldness. When seeing a patient years after transplantation with hair receded far past the grafts, Henry Clamp expressed it best when he said, "Did I do that?"

The incidence of cosmetically significant male pattern baldness (types III, IV, V, VI, and VII) increases steadily with age and is represented by a solid line. The incidence of baldness characterized by only a remaining horseshoe fringe of hair (types V, VI, and VII) is depicted by the dotted line.

from Chapter 1, Classification and Incidence of Male Pattern Baldness, Hair Transplant Surgery, 1st Ed., 1973, O'Tar T. Norwood, M.D.



Hair Transplant Forum Int'l. 1993 (Mar); 3(3): 2; DOI: <https://doi.org/10.33589/3.3.0002a>

Truth in Advertising?

by O'Tar T. Norwood, M.D.

(Oklahoma City, Oklahoma)

Because hair transplant surgery has improved so much it is becoming very popular and there are many more procedures being performed. In addition, there are many more physicians entering the field and the competition is increasing. With increased competition, there is more advertising, and we must be careful in what we say and how we word it. We must be careful, ethical, and truthful. It is very easy to emphasize the positive things about a procedure and ignore, or de-emphasize, the negative aspects. We must be very careful because it is very easy when dealing with hair and aesthetics to mislead an under-educated consumer. Consider the following advertisement which has appeared in national magazines for years. This ad discredits 90% of the industry and I'm sure discourages many from having any hair surgery at all.

"This advertisement discredits more than 90% of all hair transplant surgeons."

THE FLAP VERSUS PUNCH GRAFTS (PLUGS)

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Hair Uniform, can be combed in any direction, even straight back, with natural appearance. 2. Surgery is undetectable even when hair is blown or wet. 3. No change in hair texture. 4. Hair density thick. 5. Never need additional work in a Flap area. 6. Results are immediate. Hair does not fall out. Patient returns to work 4-6 days after Flap with dense, natural hair. 7. Cost comparable or less than equivalent number of plugs needed with much better and immediate results. | <ol style="list-style-type: none"> 1. Hair must be styled to cover "rows of corn" appearance of plugs. 2. Plugs visible when hair is parted through transplant area or when hair is disturbed. 3. Hair is kinky and wiry. 4. At best, only 50% density. 5. Continual hair loss in "plug" areas. Requires future procedures. 6. Usually 2-3 years to complete. Transplanted hair falls out. Takes months to grow back. 7. Cost \$15-\$75/plug but can be spread over the several years it takes to complete the process. |
|---|--|

Although many of these statements are not completely false, they are nevertheless not completely true and probably represent half truths. Someone reading this without any background knowledge of hair transplant surgery would certainly get a distorted view of punch grafts (plugs).

In order to enter the hair transplant business in today's market it is essential to advertise. There are no formal regulations and no standard enforced by the society (ISHRS). Therefore, it is important for each individual help maintain high, ethical and professional standards and not try to promote themselves by making negative statements about others.

Hair Transplant Forum Int'l. 1993(Jun); 3(4): 6. DOI: <https://doi.org/10.33589/3.4.0006a>

HAIR TRANSPLANT *forum*

VOLUME 3, NUMBER 5 SEPTEMBER-OCTOBER 1993 INTERNATIONAL

Male Pattern Baldness is Progressive

O'Tar T. Norwood, M.D.
(Oklahoma City, OK)

Male pattern baldness is progressive throughout life. Failure to recognize this has caused many of the problems in hair transplant surgery today. This issue will illustrate those problems.

In looking at these photos, I wonder why it has taken us so long to recognize the problems and why we have been so slow to address them. I think the main reason is that we are just now seeing patients we did 20 to 25 years ago and are only now realizing the full impact of it.

I think this is one of the most important issues of the *forum* because it warns us of the dangers of starting surgery on young men and also shows us how to avoid trouble with different designs. I want to thank all the contributors, they did a great job.

O'Tar T. Norwood, M.D.

"What if our assumptions and predictions were just simply ... wrong?"

Emanuel Marritt, M.D.

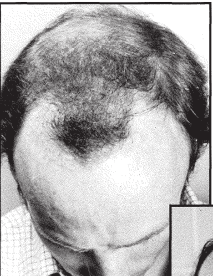
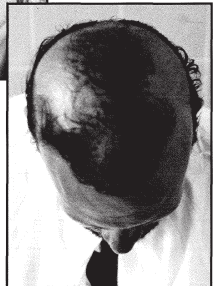



Figure 1. Eighteen years old.

Figure 2. Twenty years later.

Res ipsa loquitur

Photos contributed and/or furnished by Emanuel Marritt, M.D.

Hair Transplant Forum Int'l. 1993(Sep); 3(5): 1. DOI: <https://doi.org/10.33589/3.5.0001>

In Loving Memory of Dr. Aleksiy Makharashvili

28.04.1970–04.09.2020



We are saddened to inform you of the death of our dearest colleague, Prof. Aleksiy Makharashvili, who died suddenly September 4th.

Aleksiy, an ISHRS member since 2009, made important contributions in the introduction of modern hair transplantation technologies and in the development of this field in Georgia and beyond its borders.

Originally an oncologist surgeon, Aleksiy loved his work. After many years working in the Public Hospital in Tbilisi, the capital city of Georgia, he decided to devote himself to a new direction in surgery and founded a hair transplantation department at a multi-profile surgical clinic in Moscow, Russia, in 2002.

Currently, Aleksiy was Lead Surgeon at DeaMed Clinic where he worked beside his wife, Dea (Diana) Papaskiri, MD, PhD. Dea started studying the modern technologies of hair transplantation during her residency program, and she notes that is where Aleksiy played the most important role in her development as a professional. In 2003, Aleksiy and Dea established a specialized hair transplantation department in Moscow, which is still successfully running.

Aleksiy was a sincere, humble, and wise man, who truly loved his country of origin, returning to Georgia to share his knowledge with others. Dedicated to his new professional passion, Aleksiy was the first to apply Long Hair FUE in Eastern Europe, where he introduced the most modern techniques of hair transplantation. Aleksiy and Dea taught new recruits in Tbilisi, Georgia, training a whole team of doctors and nurses in the newest hair transplantation technologies. It was through this experience that Aleksiy founded "Hairline International," in Georgia, where he demonstrated hair transplantation surgeries using the FUE (sutureless) method; long hair transplantation; brow, moustache, and beard transplantation; transplantation in scars, and hair transplantation from beard and other parts of body.

Aleksiy was happy to always share his knowledge and skills with other surgeons. He founded a qualification program, Hair Autotransplantation, at Tbilisi State Medical University, and he trained physicians in hair transplantation coming from many countries including Georgia, Russia, Ukraine, Bulgaria, Kuwait, Germany, Azerbaijan, Moldova, and Israel.

Wishing to facilitate the training of physicians and achieve excellence in medical and surgical outcomes, Aleksiy started the Georgian Society of Hair Restoration (GSHR) and regularly organized annual meetings and conferences.

Aleksiy enjoyed attending and learning at the ISHRS World Congresses. He was a humble person and never aspired to public speaking, although he had tremendous skills and knowledge.

The news of his sudden death was shocking and unbelievable to all who knew Aleksiy.

I am confident his projects will be successfully continued by his friends and trainees, and his legacy will live on through their work.

Our sincere condolences go out to his family.

Rest in Peace,

Tatiana Silyuk, MD *St Petersburg, Russia*



The Case for Asymmetry: Right-Side versus Left-Side Temporal Recession

Paul T. Rose, MD, FISHRS | Coral Gables, Florida, USA | paultrose@yahoo.com; Aron G. Nusbaum, MD | Coral Gables, Florida, USA

ABSTRACT

Introduction: A major goal in constructing a hairline with hair transplantation is to achieve a natural appearance. Patients and surgeons often strive to create a symmetric hairline in terms of height and recession depth. In this study, the authors demonstrate that a component of the natural hairline is actually asymmetry of the fronto-temporal recession depth.

Methods: The study looked at 100 male patients seeking reconstruction of the frontal hairline, including the fronto-temporal recessions.

Results and Discussion: Asymmetry in the temporal area was noted in almost all patients.

Keywords: asymmetry, fronto-temporal recession, hairline

INTRODUCTION

Patients commonly seek hair transplantation to reconstruct the frontal hairline and fronto-temporal recessions.¹⁻⁴ While patients usually seek a symmetrical hairline including the depth of the recessions, the author has found that the right side and left side recessions are almost uniformly different.

This study evaluated 100 male patients to determine if the left side fronto-temporal recession differs from the right-side recession and, if so, by what amount of distance.

METHODS

One hundred consecutive male hair transplant patients with at least some visible remaining hair in the temporal area were examined. The patients varied as to ethnicity, age, pattern of hair loss, and hand dominance (right versus left). All were seeking to restore the frontal hairline and temporal areas. Measurements were obtained of the depth of the temporal recessions on the right side versus the left side measured from a predetermined point on the brow.

The process was as follows. The authors typically create the hairline by drawing marks at the supraorbital notch and a second set of marks 2cm from the supraorbital marks. The second set of marks made usually coincides with an imaginary lateral canthus line. From the supraorbital notch marks, measurements were made to ensure a reasonably symmetrical height of the hairline. Measurements for the height of the lateral portion of the hairline were taken from the lateral marks.

In this study, the measurement for the depth of the recession was made at one side, from the mark at the supraorbital notch location to the area where it subjectively appears that there is reasonable density of terminal hairs (Figure 1). The angle was approximately 45 degrees from the mark to the area of hair in the temporal area.

FIGURE 1. Photograph demonstrating the method of measuring the depth of the fronto-temporal recession from the supraorbital notch.



A similar measurement was made for the other temporal recession. The measurements were then compared.

In addition, notation was made of the patient's ethnicity, age, pattern of hair loss, and whether they are right-hand or left-hand dominant.

RESULTS

Measurements for the distance of the recession were taken from 100 patients. As noted in Table 1, 57% were Caucasian, 40% Hispanic, and 3% Asian. The age varied from 27 to 64 years of age, with an average age of 45.2. Of the 100 patients, 92% were right-handed and 8% left-handed.

In almost every instance (96%), it was noted that the right-side recession was further posterior than the left-side recession. The average difference in terms of distance for those 96% who had recession greater on the right side than the left was 0.7cm. In 4 patients who had greater recession on the left side, the average difference was 0.87cm.

DISCUSSION

While symmetry of the hairline and the fronto-temporal recessions is sought by patients and surgeons, this study shows that the natural recession distances vary from right to left. In more than 96% of the patients, it is the right side that is further posterior than the left side recession.

Surgeons who seek to make both sides equal are often defying the natural design of the hairline. Moving the recession too far forward on the more recessed side may create an unnatural and artificial appearance as the hairs blend into the temporal point area.

It is interesting to speculate as to why there is asymmetry and why it is the right side that is almost always further recessed. An easy explanation might have been that it correlates to right-handedness versus left-handedness, but this does not seem to be the case.

Aesthetic studies in humans have noted that the vast majority of humans have asymmetry of the face.⁵ When one cuts an image of the face in half vertically and then matches it with a similar mirror image reproduction of the same side, the face looks quite different from the original person's image.

It may be that various positional and chemotactic signal dispersion changes in the developing embryo and varying

pressures on the tissue may account for asymmetry of the face and thus the hairline.

If the goal in a hair restoration procedure is to ensure complete naturalness, then the surgeon should be aware that an element of asymmetry is natural. The approach should be to incorporate an element of asymmetry into the surgical planning and hairline design while trying to achieve the patient's hairline goals.

References

1. Norwood OT. Patient selection, hair transplant design and hair-style. *J Dermatol Surg Onco.* 1992; 18:386-394.
2. Rose PT. Considerations in establishing a natural hairline. *Int'l J Cosmetic Surg.* 1998; 6(1):24-26.
3. Parsley W, Rose P. In: Hair Replacement. D Stough and R Haber, eds., Dover J, Senior Editor. Philadelphia: Elsevier Press, 2005; pp. 55-72.
4. Shapiro R. Principles of Creating a Natural Hairline. In: W Unger, R Shapiro, and R Unger, eds., Hair Transplantation. London: Informa Healthcare, 2011; pp. 382-386.
5. Thiesen G, Gribel BF, Mota Frietas MP. Facial asymmetry: a current review. *J Orthod.* 2015(Nov-Dec); 20(6):110-125. ■

TRIVELLINI

THE FUTURE OF HAIR RESTORATION IS HERE!



FAST
EXTRACTIONS

OPTIMAL
QUALITY GRAFTS

HIGH
SATISFACTION

TRIVELLINI

WWW.TRIVELLINITECH.COM

Reducing Surgical Time: An Innovative and Versatile Instrument for Creating Multiple Brick-Pattern Sagittal Recipient Sites in a Single Stroke

Pradip R. Atodaria, MS, MCh | Surat, Gujarat, India | dratodaria@gmail.com; Kuldeepsinh P. Atodaria, MBBS | Surat, Gujarat, India

Disclosure: The authors' described instrument is registered under "Patent" and "Design Registration."

ABSTRACT

Introduction: Recipient-site creation is a very important step in the hair transplant procedure as it ultimately decides the density, direction, and exit angle of the implanted hair and the final result of the procedure. It can be done with knives or needles. The slits can be *sagittal* (parallel to hair direction) or *coronal* (perpendicular to hair direction). For better visual density and coverage, the majority of hair restoration surgeons use sagittal slits.

Methods: Recipient-site creation takes up a significant amount of the surgeon's time. A considerable reduction in surgical time for coronal slit creation has been described using a multi-slit knife.¹ A multi-slit knife for sagittal slits has not been described until this paper. Our technique reduces surgical time by the use of an innovative and versatile new instrument that enables the creation of single rows of equidistant "brick-pattern" sagittal slits of the same direction, angle, and depth in a single stroke.

Results: The device that we have designed enables the surgeon to reduce the time needed for recipient-site creation while increasing precision. It is a versatile instrument that can be used with appropriate configurations in bald, thinning, and vertex regions.

Discussion: The vast majority of hair restoration surgeons typically use cut-to-size knife blades to create recipient sites, which is repetitive and time-consuming. Brick-pattern slits are preferred to minimize the "see-through effect," which adds time and challenges.³ Our instrument is easy to assemble and use, and can create slits at desired density, depth, and angle.

Keywords: brick-pattern slit, coronal, sagittal, recipient-site creation

INTRODUCTION

The vast majority of hair restoration surgeons typically use cut-to-size knife blades to create recipient sites, which is a repetitive, time-consuming step that requires considerable concentration to optimize the design, planning, and process of slit placement. Brick-pattern slits are preferred to minimize the "see-through effect," but creating them adds time and challenges for the surgeon.³ Our innovation seeks to reduce surgical time and effort while increasing precision at the same time.

current innovation is to provide a multi-slit knife instrument that can make multiple, simultaneous "brick-pattern" sagittal slits in the desired direction, angle, depth, and distance, saving the surgeon time. In addition, significant reduction in the time for creating slits reduces the out-of-body time for the grafts as they can be implanted sooner and thus should result in improved survival.¹

Our easily assembled instrument optimizes hair transplantation by allowing the surgeon to replicate a natural hair pattern. A video demonstrating its assembly and use is available at: <https://youtu.be/0GmGyNYvnl8>.

The instrument consists of the following:

1. Handle with rear plate (Figure 1): A long circular, rectangular, or conical, solid or hollow rod with a rear plate with two circular holes. These holes allow for passage of bolts to attach the depth guards, spacers, knife blades, and front plate to the handle.
2. Two sets of knife blades (Figure 2): Both sets of blades are identical; however, when they are assembled alternately they collectively form a "brick pattern" (Figures 2 and 3). These blades are fixed on the handle with the help of bolts that pass through the holes on the blades. The blades are separate and are disposable. They are sharp enough to last for one session of 3,000-slit creation. The size of knife ranges from 0.7 to 1.5mm.

Review of Prior Innovations

A previous innovation of this optimization includes the device of James Transue, which can create up to three coronal or sagittal non-brick-pattern slits in a single stroke.² The device maintains a fixed distance between two blades, so changing the density by closer or farther apart graft density using the same handle is not possible thus preventing customization.

The advantages and disadvantages of the currently available instruments are outlined in Table 1.

OBJECTIVE

The main objective of our

TABLE 1. Comparison of Currently Available Instruments

Features	Atodaria & Atodaria	James Transue ²
Maximum number of slits in one stroke	> 10	3
Brick Pattern	✓	✗
Customized Density	✓	✗
Ease of changing depth without dismantling	✓	✗
Angle and Direction control of slit	✓	✓
Depth Guard/control	✓	✓
Chisel edge knife	✓	✓
Option of knife: Conical or rectangular	✓	✓
Ergonomically designed to have same/uniform depth in all rows	✓	✓
User friendly in slit making	✓	✓
Easy assembly	✓	✓
Universal handle for different size of knife	✓	✓

FIGURE 1. Instrument parts

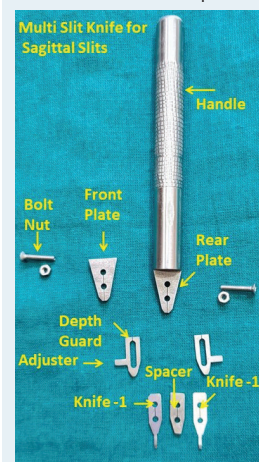


FIGURE 2. Different views of instrument

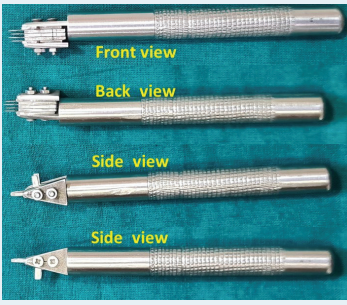


FIGURE 3. Brick-pattern slits



3. Spacers (Figure 1): Spacers of variable thickness from 0.5 to 1.2mm can be placed between two blades. They have two holes for passing the bolts. These enable varying the density of the sites from 20 to 70/cm².

4. Depth guards with adjuster (Figure 1): The depth guards are similar to

spacers but have a long extension called an adjuster. Its single long hole enables it to move. The depth guards are placed next to the blades underneath the front and rear plates. The depth guards can be moved up or down with the help of the adjuster before the nuts and bolts are tightened all the way, thus allowing the setting of the depth guards to control the depth of the slits.

5. Front plate (Figure 1): Identical to the rear plate.

6. Nut and bolts

Cleaning and Sterilization

The instrument is autoclavable, and the blades can be sterilized either by ETO (Ethylene Oxide) or gamma radiation. At present we are doing it by ETO.

Recommendations

In completely bald area, brick pattern should be used. To achieve this brick pattern for slits, an even number of blades (i.e., 2, 4, 6, 8, 10, or 12) should be used.

In thinning areas, avoid brick pattern and use a smaller number of blades to avoid damage to already present hair.

In the vertex area, the central part requires the slits to be made in a whorl pattern. This can be accomplished using 1 or 2 blades; for the peripheral part, 3 or 4 blades can be used.

The advantages of our device include the following:

- It is user friendly and easy to assemble.
- It allows for recision of depth, direction, and angle of recipient sites/slits.
- Brick pattern as well as non-brick patterns of slits are possible.
- Customization is possible, with respect to recipient site density, depth, and angle.
- Chisel tip makes the incisions less traumatic.
- It is easy to keep track of the count of total number of slits created
- It saves time.

The limitations of our device include the following:

- Density change is not possible without dismantling the instrument.
- In areas of thinning, because of the native hair, it is necessary to use only one, two or three blades while creating slits to reduce surrounding follicle damage.

To overcome the limitations, it is necessary for the surgeon to keep a second handle with appropriate configuration ready.

DISCUSSION

The instrument requires getting used to. It is advisable to start with two or four blades during the first few cases to get a feel of the instrument before using more blades. The chances of missed areas between two strokes of slit making are greater in the beginning, and these areas require the use of a single knife for slit creation. This problem is eliminated once the surgeon has gained enough experience using the instrument. (See Figure 4.)

There will be more bleeding while making recipient sites with any "multi-slit" instrument compared to making recipient sites with a single knife. This is because several sites are made simultaneously and more pressure is exerted while making slits than using a single knife. Additional pressure while making slits could force blood to ooze out of previously made slits.¹

References

1. Atodaria PR. An innovative instrument for reducing surgeon's time in making recipient sites. *Hair Transplant Forum Int'l*. 2014; 24(4):131-132.
2. James Transue, US Patent No. 20010034534A1, Apparatus and method for making incisions for hair grafts. 45202.010034534A1
3. Lam SM. *Hair Transplant 360*, First Edition; 2014. ■

FIGURE 4. Clinical application



HypoThermosol®

The Optimized Hypothermic Storage Solution Trusted By Leading Hair Restoration Professionals Worldwide

Join the growing list of hair restoration professionals who trust ex vivo graft storage to HypoThermosol.

1.866.424.6543 BioLifeSolutions.com
info@biolifesolutions.com



Contact SalesOne@BioLifeSolutions.com
for Volume Discount Pricing



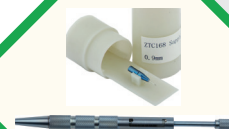
ERTIP® Hair Transplant Instruments

For the past 12 years, Ertip Medical has been a leading company for hair transplant and surgical instruments. Our FUE Motorised System helps improve FUE technique. We are CE certified and produce Sharp/Dull FUE motorised or manual punches. We aim to provide our customers with excellent service.



Ertip Medical instruments are

- * Made using the latest technology
- * Of the highest quality, and
- * Budget-friendly.



Ertip offers a basic Must Need Set or a Full Set for hair transplantation and specials for wholesalers. We offer fast, worldwide delivery service.



For more details about our instruments,
Halide Edip Adivar Mah. Akar Cad. No:38
Sisli 34382 ISTANBUL TURKEY



call us at +90 212 210 3220 & GSM +90 507765 6095



or visit our website at www.ertipmedical.com

ISHRS Members Urged to Join the AMA

I urge you to consider joining the American Medical Association (AMA). I will explain. The AMA is the most influential medical organization in the world, and when it speaks all the State Medical Boards listen. The ISHRS has been a voting member of the American Medical Association's House of Delegates (HOD) since 2009. The AMA HOD is the world's largest representative democratic organization with more than 600 voting members.



The ISHRS's participation in the AMA HOD shows our physician peers that organization and our specialty is important and credible. It provides our members the opportunity to have a voice in developing the medical profession's position on important policy issues such as the definitions of our scope of practice, marketing professional ethics, and physician and patient responsibilities within the Doctor-Patient relationship.

To retain our voice in the House of Delegates, at least 100 of our U.S. members must join the AMA. If you are an AMA member, please renew your membership. If given the option, please indicate your specialty or society affiliation (ISHRS). If you have not joined, then I urge you to do so, to help the ISHRS continue to represent your best interests in the House of Medicine.

Your prompt action is appreciated: <https://commerce.ama-assn.org/membership/>

Sincerely,
Carlos J. Puig, DO
ISHRS Delegate to the AMA House of Delegates; Past President, ISHRS



ISHRS 2020 Advanced/Board Review Course

Excellent Preparation to take the ABHRS Exam



Two 2-Hour Live, Oral & Written Mock Exam
Zoom Meetings*



Participate & Engage
in Live
Questions and Answers



On Demand Video
Lectures & Additional
Mock Oral Exams

*September 26 & October 3, 2020 <https://28thannual.org/advanced-board-review-course/> #ISHRS2020

HAIR SCIENCE MINI-SERIES

Neuroendocrinology of the Human Hair Follicle Episode 1: Introduction & Overview: Looking Back into the Future

Ralf Paus, MD | Miami, Florida, USA | rpx803@med.miami.edu

Editors' note: This is the first in a series of four articles submitted by notable researcher Ralf Paus, who is conducting some of the most exciting innovative research on the hair follicle. We have decided to grant space in the Forum to present Dr. Paus' work, packaged as a mini-series (no binging however!) confident that our readers will find this and future episodes valuable and enjoyable. If you doubt us, just read the first few paragraphs and we are sure you will be "hooked." —Jeff and Aditya

That I (present this paper) ...on the pages of this journal is no coincidence: I sincerely hope to attract my esteemed colleagues in the field of hair transplantation surgery to the astounding and clinically relevant neurohormonal activities and responses that the (mini-)organ they routinely deal with unfolds 24/7, but with which they may not yet have had a chance to familiarize themselves. —Ralf Paus

INTRODUCTION

When physicians or biologists rave about the many mysteries that the "secret life of the hair follicle" (Hardy 1992) harbors, one of its most fascinating secrets rarely finds mentioning: the fact that this (mini-)organ is not only the target of many neurohormones, but that it also produces a wide range of these itself (Paus et al. 2014, Paus 2016). It is therefore only appropriate that the first installment in this new Hair Science mini-series explores this underappreciated and as yet very incompletely studied aspect of hair follicle (HF) biology in more detail.

In four episodes, this mini-series will shine light on clinically important neuroendocrinological aspects of human HF biology that may be less famous than, for example, HF stem cells, hair growth regulation by androgens, or HF responses to finasteride and minoxidil, but by no means less intriguing and illuminating. This first episode provides an overview of human HF neuroendocrinology and some of its key principles. Episodes 2 and 3 will deal with hormones of the hypothalamus-pituitary-adrenal (HPA) and hypothalamus-pituitary-thyroid (HPT) axis (Lechan 2020), respectively, while Episode 4 will cover the role of prolactin and growth hormone in human HF biology, and will close the mini-series by sketching important open questions in the field and future research perspectives.

A few months back, I had the opportunity to synthesize the main results of a long neuroendocrine research journey on which I had embarked many years ago when I was a post-doc at the Dept. of Dermatology, Yale University, and which is still ongoing in my current laboratories at the University of Miami. During this journey, I have attempted to obtain a better understanding of the human HF as a "microcosmic" model system for exploring "non-classical," ancestral functions of neurohormones beyond standard neuroendocrinology textbook knowledge (Lechan 2020). In a DSc thesis currently under critical review with the University of Manchester, UK, I have summarized and discussed selected human HF studies that were largely generated in my laboratory and published between 2004 and 2019. In this mini-series, I have excerpted and complemented text elements from this thesis, thus expanding on an earlier review of the topic (Paus et al. 2014).

That I do so on the pages of this journal is no coincidence: I sincerely hope to attract my esteemed colleagues in the field of hair transplantation surgery to the astounding and clinically relevant neurohormonal activities and responses that the (mini-)organ they routinely deal with unfolds 24/7, but with which they may not yet have had a chance to familiarize themselves. While I cannot offer more than a superficial glimpse into HF neuroendocrinology here, this synopsis aims to intrigue readers into looking beyond the most obvious product of the HF, its pigmented hair shaft, and to shed the field's hormonal fixation on androgens by following me on this neurohormonal discovery tour. This may recall distant memories from medical school, when we were all struggling to obtain some basic understanding of neuroendocrinology, and many of the engrams you made back then will serve you well when you now dive into HF neuroendocrinology.

This excursion comes with a devious little twist. Even though I realize that many of this journal's readers are visually inclined individuals, with limited patience for reading lengthy scholarly texts, I purposely do not present any illustrations—in the hope that this focuses your mind stringently on the main concepts I am trying to convey here, rather than on pretty pictures, and that this encourages you to engage in at least some follow-up reading of the cited literature, where you shall find an abundance of images.

At the end of this tour, I would hope that you will view the HFs you routinely transplant through different eyes: not only as the highly proliferative and stem cell-rich, cyclically remodeled biofactory for the production of resilient, pigmented protein fibers (Montagna and Ellis 1958, Paus and Cotsarelis 1999, Paus & Foitzik 2004, Schneider et al. 2009, Tiede et al. 2009) that you already are very familiar with, but also as major target tissue and production site for some of the human body's most important neurohormones. Surely, this will expand your view of the surprisingly complex and varied functions of the human HF beyond hair shaft production.

Besides the neuroendocrine activities we shall exclusively explore here, let us not forget that the HF also is a key instrument of psychosocial communication (Hadshiew et al. 2004), a highly sensitive neuro- and chemosensory organ (Botchkarev et al. 1997, Paus et al. 1997, Telek et al. 2007, Peters et

al. 2007, Cheret et al. 2018), an amazingly active and versatile metabolic factory (Philpott et al. 1990, 1991, 2018; Kealey et al. 1994, Vidali et al. 2014, Lemasters et al. 2017, Flores et al. 2017), an important organ of excretion (Carre et al. 2020), a crucial microbial habitat (Lousada et al. 2020), a key immune organ (Paus et al. 2005), and a potent promoter of cutaneous wound healing (Jimenez et al. 2015), to name but a few of the HF's many, often underappreciated functions.

I would be absolutely delighted if this mini-series motivates some of my esteemed hair transplantation colleagues to join in the ongoing endeavor to explore more deeply the fascinating neuroendocrinology of the HF, whose surface we have barely scratched so far. Jointly, we can best translate the newly won neuroendocrinological research insights into novel therapeutic strategies for the modulation of human hair growth and pigmentation.

Exploring Human HF Neuroendocrinology: Trajectory and Methodology

My own journey into human HF neuroendocrinology began in earnest with an exploration of HPA axis hormones in human HFs, with emphasis on corticotropin-releasing hormone (CRH) (Ito et al. 2004, 2005). This revealed the existence of a fully functional peripheral equivalent of the central HPA axis in human scalp HFs and also showed that CRH promotes HF pigmentation, inhibits hair growth (Ito et al. 2005), and stimulates the intracutaneous maturation of functional skin mast cells from resident progenitor cells in the HF mesenchyme (Ito et al. 2010) (Episode 2). The journey then moved on to the HPT axis. Namely, we started to investigate whether and to what extent the HPT neurohormones thyrotropin-releasing hormone (TRH) and thyrotropin (TSH) play a role in human HF biology. This revealed that TSH and TRH both operate as important, hitherto unknown stimulators of keratinocyte mitochondrial function and modulators of keratin expression. TRH also surfaced as a potent promoter of human HF growth and pigmentation (Paus et al. 2014, Episode 3). Before that, we had explored the role of prolactin (Foitzik et al. 2006, 2009), and by last year, we had started to explore how growth hormone (GH/STH) impacts on human scalp HFs (Alam et al. 2019) (covered in Episode 4).

The following text traces this trajectory, synthesizes key take-home messages, defines major open questions, and sketches my personal vision of the direction into which the unfolding field of human HF neuroendocrinology will or should be moving. This journey will show that our work in organ-cultured scalp HFs has revealed "novel" neurohormone functions well beyond their accepted endocrinology textbook properties (Fink et al. 2012, Jameson 2017, Lechan 2020). Given our strict focus on classical neurohormones, however, we shall not cover the equally fascinating roles of neuropeptides, neurotransmitters, endovanilloids, and endocannabinoids in hair biology, which we have examined extensively elsewhere (Paus et al. 1994a, 1997, 2006; Paus and Arck 2009, Arck et al. 2005, 2006; Bodo et al. 2005, Telek et al. 2007, Peters et al. 2006, 2007; Samuelov et al. 2012, Sugawara et al. 2012, Langan et al. 2013, Bertolini et al. 2016).

Methodologically, this neuroendocrinological discovery tour has largely relied on the organ culture of microdissected human scalp HFs as a uniquely instructive, clinically relevant assay system that permits one to interrogate and

hormonally manipulate an entire, autonomous human (mini-)organ *ex vivo*, that is, in the absence of confounding systemic and neural inputs (Philpott et al. 1990, Langan et al. 2015). Without the generous, sustained, and dedicated support of many colleagues from hair transplant and plastic surgery, who pursue their quest for knowledge despite the clinical, administrative, and economic pressures of daily medical practice and who have co-authored our publications, this work would have been entirely impossible. Whatever insight we have been able to obtain, therefore, is a testament to how fertile it can be when hair transplant surgeons, dermatologists, and skin biologists come together to jointly reveal the HF's many remaining secrets and to link forces in exploring how the knowledge gained from such preclinical research can best be brought to clinical fruition. Please, do join us on this quest!

Hair Follicles as a Neuroendocrinology Research Model

Neurohormones came into existence long before mammalian species had developed HFs as one of their trademark features—but also long before there were specialized neuroendocrine glands. In fact, neurohormones may have developed first in the epithelium of "primitive" evolutionary ancestors of the skin organs that have survived until today. We know that, for example, human epidermal keratinocytes, dermal fibroblasts, and skin mast cells can synthesize and secrete classical neurohormones (Paus et al. 1999a, 2006; Slominski et al. 2000a, 2007, 2018a/b). These cells, probably all immunocytes, and numerous other non-neuronal cells also respond with distinct changes in cell function, as well as gene and protein expression, to stimulation with neurohormones such as corticotropin-releasing hormone (CRH), adrenocorticotropin (ACTH), or prolactin (Murphy & Travers 2017, Blake et al. 2019, Valente et al. 2019, Bielekova et al. 2019). Therefore, neurons and neuroepithelial and glial cells clearly are not the only cells capable of generating and responding to "neurohormones." Arguably, these ancestral functions of neurohormones can be studied nowhere in a more accessible, experimentally tractable, and clinically more relevant manner than in human scalp HFs (Paus 2011, Paus et al. 2014).

- It has long been known that human skin and its appendages can respond to changes in the serum level of classical neurohormones and thus generate distinct skin lesions and symptoms including hair loss or undesired hair growth (Paus 2016). Until the work synthesized here, however, these important clinical pointers had never been systematically studied in isolated human HFs, the best-accessible and most abundant complete mini-organ of the human organism.
- HFs and their associated skin structures (i.e., sebaceous gland, arrector pili muscle, and—where present—apocrine gland, eccrine gland coil, and a distinctive cone of dermal white adipose tissue that reaches up to and wraps the HF stem cell region [Poblet et al. 2018]) are the only human organs that are obtainable with minimal invasiveness, for example, during hair transplant or facelift surgery. Since large, well-pigmented terminal scalp HFs in the melanogenically active growth stage of the hair cycle (anagen VI) (Oh et al. 2016) are easiest

- to microdissect from scalp skin samples or extract from follicular unit biopsies, this HF population is the main study object in preclinical human hair research (Philpott et al. 1990, Langan et al. 2015).
- Production of a pigmented hair shaft requires highly coordinated bidirectional interactions of different cell populations of distinct embryonal origin, for example, interactions chiefly between distinct subpopulations of HF keratinocytes, melanocytes, and inductive HF fibroblasts (Schneider et al. 2009). Therefore, HFs represent a prototypic neuroectodermal-mesodermal interaction system that is perfectly suited to characterize and experimentally interrogate complex cell-cell and tissue interactions as they occur in the human system *in vivo* (Paus & Cotsarelis 1999, Stenn & Paus 2001, Schneider et al. 2009). Thus, novel principles one discovers in this mini-organ, for example, regarding new, previously unknown functional activities of neurohormones, are clinically relevant, since they have been generated directly in a human (mini-)organ, and likely are physiologically relevant also in related human neuroectodermal-mesodermal interactions systems.
 - HFs are continuously remodeled mini-organs that undergo lifelong, cyclic switches between periods of extremely rapid growth, pigmentary activity, and hair shaft production (anagen), followed by apoptosis-driven, precisely controlled organ involution (catagen) and a subsequent period of relative “quiescence” (telogen), which nevertheless is associated with much hidden biological activity that prepares the HF for re-entry into the next anagen stage and controls this transition (Paus & Cotsarelis 1999, Stenn & Paus 2001, Paus & Foitzik 2004, Schneider et al. 2009, Geyfman et al. 2015, Oh et al. 2016). The inbuilt, developmentally pre-programmed permanent cycling activity of the HF is essentially autonomous, driven by an as yet insufficiently understood *intrafollicular* “hair cycle clock” (Paus et al. 1999, Paus & Foitzik 2004, Al-Nuaimi et al. 2012, 2013, 2014). Therefore, anyone interested in how neurohormones contribute to the regulation of an autonomous, rhythm-generating *human* oscillator system (Paus et al. 1999, Al-Nuaimi et al. 2012, 2013, 2014) is well-advised to turn to human HFs.
 - Moreover, HFs are the most densely innervated peripheral organ in the mammalian organism (Paus et al. 1997, Peters et al. 2006a) and are well-known to be highly sensitive to neuroendocrine signaling, both in rodents and in human individuals *in vivo*. In fact, human HFs respond quite sensitively *in vivo* to abnormalities in the serum level of a wide range of neurohormones, leading to either hirsutism/hypertrichosis or effluvium/alopecia (Paus 2016). This makes human HFs an excellent, very sensitive test system for identifying novel or non-classical functions of neurohormones in human cells and tissues beyond their traditionally appreciated ones (Paus et al. 2014, Paus 2016).
 - Despite its fundamental autonomy, not only in rodents (Arck et al. 2005, Peters et al. 2006), but also in human skin, the cycling activity of the HF is eminently sensitive

to numerous extrafollicular signals, including neurohormones (see below), neuropeptides, and neurotransmitters (Paus & Foitzik 2004, Paus & Arck 2009, Paus et al. 2014) as well as to signals arising from perifollicular adipocytes (Nicu et al. 2019). In addition, perifollicular immunocytes such as macrophages (Castellana et al. 2014, Muneeb et al. 2019, Hardman et al. 2019) and mast cells (Paus et al. 1994b, Maurer et al. 1997) as well as certain T-cell subpopulations (Kloepper et al. 2013, Ali et al. 2017) are increasingly appreciated as important intracutaneous regulators of HF cycling. All these immunocytes are regulated by various neurohormones (Murphy and Travers 1997, Arck et al. 2006, Theoharides 2017, Bielekova et al. 2019).

Thus, addressing neuroendocrine research questions in human HF models permits one to probe the impact of the investigated neuroendocrine signaling system not only on multiple different, interacting cell populations (e.g., HF keratinocytes, fibroblasts and melanocytes, perifollicular mast cells) *simultaneously*, but also on dynamic, physiological tissue remodeling events of an intact human mini-organ.

The development of a “quiescent” telogen HF into a maximally growing anagen HF (Oh et al. 2016) requires angiogenesis, massive extracellular matrix synthesis, and remodeling, and shares many principles, signaling pathways and target genes with wound healing (Ansell et al. 2011, Jimenez et al. 2015). Therefore, neurohormones that promote or prolong anagen are automatically also candidates as novel wound healing-promoting agents. Thus, studying human HF neuroendocrinology can actually identify previously unsuspected novel wound healing promoters. The tri-peptide neurohormone TRH, which stimulates both hair growth (Gaspar et al. 2010) and human skin reepithelialization after wounding *ex vivo* (Meier et al. 2013), provides a compelling case in point (see below).

Taken together, this offers a compelling rationale for investigating cutaneous neuroendocrinology research questions specifically in microdissected, organ-cultured human scalp HFs.

Human Scalp HF Organ Culture in Neuroendocrinological Research

Systematic study of the role of neurohormones in human HF biology relies on the serum-free organ culture of microdissected terminal human scalp HFs in anagen VI, pioneered by Philpott and colleagues (Philpott et al. 1990) and methodologically expanded by my lab (Foitzik et al. 2006, Telek et al. 2007, Bodo et al. 2007, Tiede et al. 2009, Samuelov et al. 2012, Langan et al. 2015). This landmark assay has allowed us to demonstrate the direct impact of the tested neurohormones on human HFs in the complete absence of systemic (vascular) and neural stimuli. However, exclusion of the neural and vascular inputs that every HF continuously receives in human skin *in vivo*, which may modulate its response to neurohormonal stimulation under physiological conditions, also constitutes an important limitation of this *ex vivo* assay system.

Moreover, at least during the first 24 hours after surgery, microdissection, and organ culture set-up, human scalp HFs are stressed by the traumatic procedure and the transfer to a medium that lacks many of the nutrients, hormones, lipids, cytokines, and other signals HFs are physiologically perfused

with by their vasculature. Both must be expected to impact the HF response to test agents, including on gene expression profile changes (Langan et al. 2015). Also, after 6 days, this organ-cultured mini-organ begins to show increasing signs of tissue degeneration, which limits the window in which meaningful experimentation can be executed. In addition, the number of HFs from different individuals that can realistically be tested with this assay system is typically very low. This essentially precludes classical pharmacological dose-response studies and forces one to restrict testing to a bare minimum of agents/groups (Langan et al. 2015). Finally, the traditional organ culture conditions using ambient air lie well above the estimated 5% oxygen that HFs have been calculated to be exposed to in human skin *in vivo* so that human HF organ culture conditions reflect a rather hyperoxic state. However, human HFs are extremely well-equipped to handle oxidative stress, not only due to high levels of reactive oxygen species (ROS) scavenging enzymes such as catalase, but also because human anagen HF display high and rapidly inducible Nrf2 activity (Haslam et al. 2017) and synthesize both melanin (a highly efficient ROS-capturing biopolymer) and the anti-oxidant neurohormone melatonin (Kobayashi et al. 2005). Also, similar to the kidney (Carre et al. 2020), human scalp HFs synthesize erythropoietin, whose production is increased by lowering the oxygen content to 5% (Bodo et al. 2007b), documenting that human scalp HFs remain quite sensitive to changes in oxygen tension under organ culture conditions (Langan et al. 2015, Philpott 2018).

Recurrent Themes in Hair Follicle Neuroendocrinology

The below neurohormones have in common *that they all target two or more of these key aspects of human scalp HF physiology ex vivo*:

- **Hair growth**, as evidenced by an impact on hair shaft production, HF cycling (i.e., the spontaneous anagen-catagen transition of HFs in organ culture [Kloepper et al. 2010]), and/or hair matrix keratinocyte proliferation/apoptosis *in situ*
- **Hair pigmentation**, as documented by changes in the activity of the HF pigmentary unit (HFPU) such as increased melanin synthesis, tyrosinase activity, and/or gp100 mRNA and protein expression
- **Hair shaft keratin expression** (note that the HF displays the richest diversity of keratins and keratin-associated proteins [KAP] among all mammalian tissues [Langbein & Schweizer 2005, Langbein et al. 2007]), whose intrafollicular regulation remains poorly understood; this makes it particularly fascinating that neurohormones have turned out to be prominently involved in this regulation (Ramot et al. 2010, 2018; Ramot and Paus 2014)
- **HF immunology**, namely the relative immune privilege of the HF epithelium including the bulge, the seat of epithelial and melanocyte HF stem cells, and the anagen hair bulb (Ito et al. 2004, Paus et al. 2005, 2018; Meyer et al. 2008) and/or on perifollicular mast cells in the HF mesenchyme (connective tissue sheath [CTS]) (Bertolini et al 2014)
- **HF mitochondrial biology**, as evidenced by changes of the expression of mitochondria-specific enzymes (MTCO1), key mitochondrial transcription factors

(TFAM, PGC1a), mitochondrial activity, and/or even mitochondrial biogenesis

- Expression of **key HF growth factors** that regulate human HF cycling, growth and immune privilege by HF keratinocytes *in situ*: **TGFβ1**, **TGFβ2**, and **IGF-1** (Paus et al. 1999, Stenn & Paus 2001, Schneider et al. 2005, Geyfman et al. 2015, Paus et al. 2018)
- **HF response to damage** (e.g., chemotherapy-induced) (Bodo et al. 2007, Paus et al. 2013, Gao et al. 2019), as exemplified by our finding that alpha-Melanocyte-stimulating hormone (α-MSH) provides some degree of protection from the HF dystrophy-inducing effects of the cyclophosphamide metabolite, 4-HC, *ex vivo* (Böhm et al. 2014)

Collectively, this attests to the power of neurohormonal controls in human HF physiology and renders knowledge of HF neuroendocrinology useful also to hair transplant surgeons. In the few cases where this was systematically examined (Ito et al. 2005, Kobayashi et al. 2005, Langan et al. 2010, 2013a; Bodo et al. 2010 [in human epidermis]), another important recurrent theme is that *the regulatory controls and feedback loops that govern the central and the major neuroendocrine axes*, such as the HPA axis and the control of pituitary prolactin secretion (Jameson 2017, Lechan 2020), *can also be demonstrated to operate within human skin and HFs*, albeit with some notable differences.

Another vexing recurrent theme is that the neurohormone expression patterns found in human scalp HFs tend to be puzzlingly diffuse, in contrast to the hypothalamus, pituitary, pineal, or adrenal glands, where defined cell populations in sharply circumscribed tissue compartments synthesize and secrete (often via specialized neurosecretory vesicles) a given neurohormone, which then typically stimulates cognate receptors on distinct, distant cell populations in a classical endocrine manner (Fink et al. 2012, Lechan 2020, Jameson 2017). Instead, several neurohormones and their high affinity receptors appear to be expressed widely and often seemingly homogeneously within the HF epithelium, typically (but not always) in and by the same outer root sheath (ORS) and/or hair matrix keratinocytes that also express cognate receptors.

Perhaps though, the widespread expression patterns of neurohormones and their receptors within the tiny space of a human scalp HF simply reflect more primitive ancestral configurations of neurohormone expression that dominated biology for millions of years when the precursor structures of vertebrate skin and these neuromediators evolved first. One wonders: Have these ancestral expression patterns been particularly well-conserved in human scalp HFs? The so-called “ectopic,” intrafollicular expression of neurohormones described below raises the question: which cells and tissues were the first to develop specialized neuroendocrine signaling molecules, and in which species did this happen first? Chronologically, the evolution of a primitive skin-like organ system seems to have preceded by far that of any other distinct organ, possibly first in sponges, with a central nervous system (CNS) and specialized neuroendocrine glands presumably having evolved only long thereafter (Alibardi 2003, Schmidt-Rhaesa 2007, Haslam et al. 2014).

Therefore, many, if not all, of the neurohormones that have survived selection pressures during evolution up to the

human system may in fact have originated in early precursors of skin epithelium, for example, as a mode for cell-cell communication, epithelial-mesenchymal tissue interactions, and/or as an immediate response system to environmental signals and stressors (Paus et al. 2014, Slominski et al. 2018). At least one pleiotropic “neurohormone,” melatonin, predates multicellular eukaryotic life and is found in unicellular bacteria (Slominski et al. 2018), and is still synthesized in human scalp HFs, under the same adrenergic control that regulates melatonin synthesis and secretion in the pineal gland (Kobayashi et al. 2005). Also, several key neuropeptides and neurohormones, such as substance P and TRH, were first discovered in amphibian epidermis (Haslam et al. 2014), not the CNS or neuroendocrine glands, with the molecular structure, for example, of melatonin and TRH having been conserved across a huge evolutionary species divide (Slominski et al. 2018a+b, Van Sinay et al. 2017).

Therefore, what endocrinology textbooks label as a “non-classical” or “ectopic” hormone expression pattern may actually be representative of their tissue origin and original functions during evolution (Paus et al. 2014). Investigating neuroendocrine systems in human skin and its appendages may therefore provide revelatory insights into underestimated, ignored, or as yet undiscovered ancestral functions of these neurohormones that have persisted in human tissues, most prominently in the skin and its appendages. The preservation of ancestral neurohormones and their cognate receptors in such an extremely late evolutionary “invention” as the human HF also suggests that they continue to execute very important functions in human skin and HF physiology, which we cannot afford to ignore. Viewed from this perspective, the hair phenotypes that occur in response to abnormalities in the systemic (serum) level of selected neurohormones (alopecia, telogen effluvium, hypertrichosis, hirsutism) (Paus 2016) may perhaps best be viewed as clinical spotlights on the biological consequences of excessive or insufficient stimulation of these ancestral neuroendocrine signaling systems.

In the next episode of this new Hair Science mini-series, I shall discuss in more detail a few studies from my lab that exemplify and underscore the above principles, beginning with the discovery that scalp HFs have a fully functional equivalent of the HPA axis. Of course, we shall not neglect to also contemplate why this may be of interest and importance to hair transplant surgeons.

Hope to see you again in “Episode 2”!

References (Alphabetical)

- Alam M, Below DA, Chéret J, et al. Growth hormone operates as a neuroendocrine regulator of human hair growth *ex vivo*. *J Invest Dermatol*. 2019a(Jul); 139(7):1593-1596.
- Ali N, Zirak B, Rodriguez RS, et al. Regulatory T cells in skin facilitate epithelial stem cell differentiation. *Cell*. 2017(Jun 1); 169(6):1119-1129.e11.
- Alibardi L. Adaptation to the land: the skin of reptiles in comparison to that of amphibians and endotherm amniotes. *J Exp Zool B Mol Dev Evol*. 2003 Aug 15;298(1):12-41.
- Al-Nuaimi Y, Baier G, Watson RE, et al. The cycling hair follicle as an ideal systems biology research model. *Exp Dermatol*. 2010(Aug); 19(8):707-13.
- Al-Nuaimi Y, Goodfellow M, Paus R, et al. A prototypic mathematical model of the human hair cycle. *J Theor Biol*. 2012(Oct 7); 310:143-59.
- Al-Nuaimi Y, Hardman JA, Bíró T, et al. A meeting of two chronobiological systems: circadian proteins Period1 and BMAL1 modulate the human hair cycle clock. *J Invest Dermatol*. 2014(Mar); 134(3):610-619.
- Ansell DM, Kloepper JE, Thomason HA, et al. Exploring the “hair growth-wound healing connection”: anagen phase promotes wound re-epithelialization. *J Invest Dermatol*. 2011(Feb); 131(2):518-28. doi: 10.1038/jid.2010.291. Epub 2010 Oct 7.
- Arck PC, Handjiski B, Kuhlmei A, et al. Mast cell deficient and neurokinin-1 receptor knockout mice are protected from stress-induced hair growth inhibition. *J Mol Med (Berl)*. 2005(May); 83(5):386-96.
- Arck PC, Slominski A, Theoharides TC, et al. Neuroimmunology of stress: skin takes center stage. *J Invest Dermatol*. 2006(Aug); 126(8):1697-704.
- Bertolini M, Zilio F, Rossi A, et al. Abnormal interactions between perifollicular mast cells and CD8+ T-cells may contribute to the pathogenesis of alopecia areata. *PLoS One*. 2014(May 15); 9(5):e94260.
- Bertolini M, Pretzlaff M, Sulk M, et al. Vasoactive intestinal peptide, whose receptor-mediated signalling may be defective in alopecia areata, provides protection from hair follicle immune privilege collapse. *Br J Dermatol*. 2016(Sep); 175(3):531-41.
- Bielekova B, et al. (eds.): Neuroimmunology. Oxford Univ Press, Oxford, 2019.
- Blake KJ, Jiang XR, Chiu IM. Neuronal Regulation of Immunity in the Skin and Lungs. *Trends Neurosci*. 2019(Aug); 42(8):537-551.
- Bodó E, Bíró T, Telek A, et al. A hot new twist to hair biology: involvement of vanilloid receptor-1 (VR1/TRPV1) signaling in human hair growth control. *Am J Pathol*. 2005(Apr); 166(4):985-98.
- Bodó E, Tobin DJ, Kamenisch Y, et al. Dissecting the impact of chemotherapy on the human hair follicle: a pragmatic *in vitro* assay for studying the pathogenesis and potential management of hair follicle dystrophy. *Am J Pathol*. 2007(Oct); 171(4):1153-67.
- Bodó E, Kromminga A, Funk W, et al. Human hair follicles are an extrarenal source and a nonhematopoietic target of erythropoietin. *FASEB J*. 2007b(Oct); 21(12):3346-54.
- Bodó E, Kany B, Gáspár E, et al. Thyroid-stimulating hormone, a novel, locally produced modulator of human epidermal functions, is regulated by thyrotropin-releasing hormone and thyroid hormones. *Endocrinology*. 2010(Apr); 151(4):1633-42.
- Böhm M, Bodó E, Funk W, et al. α -Melanocyte-stimulating hormone: a protective peptide against chemotherapy-induced hair follicle damage? *Br J Dermatol*. 2014(Apr); 170(4):956-60.
- Botchkarev VA, Eichmüller S, Johansson O, et al. Hair cycle-dependent plasticity of skin and hair follicle innervation in normal murine skin. *J Comp Neurol*. 1997(Sep 29); 386(3):379-95.
- Carre JL, Suzuki T, Paus R. Do hair follicles operate as primitive, multifocal kidney-like excretory (mini-) organs? *Exp Dermatol*. 2020(Mar); 29(3):357-365
- Castellana D, Paus R, Perez-Moreno M. Macrophages contribute to the cyclic activation of adult hair follicle stem cells. *PLoS Biol*. 2014(Dec 23); 12(12):e1002002.
- Chéret J, Bertolini M, Ponce L, et al. Olfactory receptor OR2AT4 regulates human hair growth. *Nat Commun*. 2018(Sep 18); 9(1):3624.
- Fink G (ed.): Stress Science: Neuroendocrinology. Elsevier/Academic Press, Amsterdam 2010.
- Flores A, Schell J, Krall AS, et al. Lactate dehydrogenase activity drives hair follicle stem cell activation. *Nat Cell Biol*. 2017(Sep); 19(9):1017-1026.
- Foitzik K, Langan EA, Paus R. Prolactin and the skin: a dermatological perspective on an ancient pleiotropic peptide hormone. *J Invest Dermatol*. 2009 (May); 129(5):1071-87.

- Foitzik K, Krause K, Conrad F, et al. Human scalp hair follicles are both a target and a source of prolactin, which serves as an autocrine and/or paracrine promoter of apoptosis-driven hair follicle regression. *Am J Pathol*. 2006(Mar); 168(3):748-56.
- Gao Q, Zhou G, Lin SJ, et al. How chemotherapy and radiotherapy damage the tissue: Comparative biology lessons from feather and hair models. *Exp Dermatol*. 2019(Apr); 28(4):413-418.
- Gáspár E, Hardenbicker C, Bodó E, et al. Thyrotropin releasing hormone (TRH): a new player in human hair-growth control. *FASEB J*. 2010(Feb); 24(2):393-403.
- Geyfman M, Plikus MV, Treffeisen E, et al. Resting no more: re-defining telogen, the maintenance stage of the hair growth cycle. *Biol Rev Camb Philos Soc*. 2015(Nov); 90(4):1179-96.
- Hadshiew IM, Foitzik K, Arck PC, et al. Burden of hair loss: stress and the underestimated psychosocial impact of telogen effluvium and androgenetic alopecia. *J Invest Dermatol*. 2004(Sep); 123(3):455-7.
- Hardman JA, Muneeb F, Pople J, et al. Human perifollicular macrophages undergo apoptosis, express Wnt ligands and switch their polarization during catagen. *J Invest Dermatol*. 2019(Jun 22); pii: S0022-202X(19)31785-3.
- Hardy MH. The secret life of the hair follicle. *Trends Genet*. 1992(Feb); 8(2):55-61.
- Haslam IS, Roubos EW, Mangoni ML, et al. From frog integument to human skin: dermatological perspectives from frog skin biology. *Biol Rev Camb Philos Soc*. 2014(Aug); 89(3):618-55.
- Haslam IS, Jodkauskaitė L, Szabó IL, et al. Oxidative damage control in a human (mini-) organ: Nrf2 activation protects against oxidative stress-induced hair growth inhibition. *J Invest Dermatol*. 2017(Feb); 137(2):295-304.
- Ito N, Ito T, Betterman A, et al. The human hair bulb is a source and target of CRH. *J Invest Dermatol*. 2004(Jan); 122(1):235-7.
- Ito N, Ito T, Kromminga A, et al. Human hair follicles display a functional equivalent of the hypothalamic-pituitary-adrenal axis and synthesize cortisol. *FASEB J*. 2005(Aug); 19(10):1332-4.
- Ito N, Sugawara K, Bodó E, et al. Corticotropin-releasing hormone stimulates the in situ generation of mast cells from precursors in the human hair follicle mesenchyme. *J Invest Dermatol*. 2010(Apr); 130(4):995-1004.
- Ito T, Ito N, Betterman A, et al. Collapse and restoration of MHC class-I-dependent immune privilege: exploiting the human hair follicle as a model. *Am J Pathol*. 2004(Feb); 164(2):623-34.
- Jameson JL. Harrison's Endocrinology, 4th Edition. McGraw-Hill, New York, 2017.
- Jimenez F, Poblet E, Izeta A. Reflections on how wound healing-promoting effects of the hair follicle can be translated into clinical practice. *Exp Dermatol*. 2015(Feb); 24(2):91-4.
- Kealey T, Williams R, Philpott MP. The human hair follicle engages in glutaminolysis and aerobic glycolysis: implications for skin, splanchnic and neoplastic metabolism. *Skin Pharmacol*. 1994; 7(1-2):41-6.
- Kloepper JE, Sugawara K, Al-Nuaimi Y, et al. Methods in hair research: how to objectively distinguish between anagen and catagen in human hair follicle organ culture. *Exp Dermatol*. 2010(Mar); 19(3):305-12.
- Kloepper JE, Kawai K, Bertolini M, et al. Loss of $\gamma\delta$ T cells results in hair cycling defects. *J Invest Dermatol*. 2013(Jun); 133(6):1666-9.
- Kobayashi H, Kromminga A, Dunlop TW, et al. A role of melatonin in neuroectodermal-mesodermal interactions: the hair follicle synthesizes melatonin and expresses functional melatonin receptors. *FASEB J*. 2005(Oct); 19(12):1710-2.
- Langan EA, Ramot Y, Hanning A, et al. Thyrotropin-releasing hormone and oestrogen differentially regulate prolactin and prolactin receptor expression in female human skin and hair follicles *in vitro*. *Br J Dermatol*. 2010(May); 162(5):1127-31.
- Langan EA, Lisztes E, Bíró T, et al. Dopamine is a novel, direct inducer of catagen in human scalp hair follicles *in vitro*. *Br J Dermatol*. 2013(Mar); 168(3):520-5.
- Langan EA, Vidali S, Pigat N, et al. Tumour necrosis factor alpha, interferon gamma and substance P are novel modulators of extrapituitary prolactin expression in human skin. *PLoS One*. 2013a(Apr 23); 8(4):e60819.
- Langan EA, Philpott MP, Kloepper JE, et al. Human hair follicle organ culture: theory, application and perspectives. *Exp Dermatol*. 2015(Dec); 24(12):903-11.
- Langbein L, Schweizer J. Keratins of the human hair follicle. *Int Rev Cytol*. 2005; 243:1-78.
- Langbein L, Rogers MA, Praetzel-Wunder S, et al. Novel type I hair keratins K39 and K40 are the last to be expressed in differentiation of the hair: completion of the human hair keratin catalog. *J Invest Dermatol*. 2007(Jun); 127(6):1532-5.
- Lechan RM. Neuroendocrinology, Chap. 7. In: Melmed S, et al. (eds.), Williams Textbook of Endocrinology, 14th Edition. Elsevier, 2020, pp. 114-183.
- Lemasters JJ, Ramshesh VK, Lovelace GL, et al. Compartmentation of mitochondrial and oxidative metabolism in growing hair follicles: a ring of fire. *J Invest Dermatol*. 2017(Jul); 137(7):1434-1444.
- Lousada MB, Lachnit T, Edelkamp J, et al. Exploring the human hair follicle microbiome. *Br J Dermatol*. In press (2020).
- Maurer M, Fischer E, Handjiski B, et al. Activated skin mast cells are involved in murine hair follicle regression (catagen). *Lab Invest*. 1997(Oct); 77(4):319-32.
- Meier NT, Haslam IS, Pattwell DM, et al. Thyrotropin-releasing hormone (TRH) promotes wound re-epithelialisation in frog and human skin. *PLoS One*. 2013(Sep 2); 8(9):e73596.
- Meyer KC, Klatte JE, Dinh HV, et al. Evidence that the bulge region is a site of relative immune privilege in human hair follicles. *Br J Dermatol*. 2008(Nov); 159(5):1077-85.
- Montagna W & Ellis RA (eds.). The Biology of Hair Growth. Academic Press, New York, 1958.
- Muneeb F, Hardman JA, Paus R. Hair growth control by innate immunocytes: Perifollicular macrophages revisited. *Exp Dermatol*. 2019(Apr); 28(4):425-431. doi: 10.1111/exd.13922.
- Murphy K & Weaver C. Janeway's Immunobiology, 9th Edition. Garland Science, New York/London, 2017.
- Nicu C, Hardman JA, Pople J, et al. Do human dermal adipocytes switch from lipogenesis in anagen to lipophagy and lipolysis during catagen in the human hair cycle? *Exp Dermatol*. 2019(Apr); 28(4):432-435. doi: 10.1111/exd.13904. Epub 2019 Mar 19.
- Oh JW, Kloepper J, Langan EA, et al. A guide to studying human hair follicle cycling *in vivo*. *J Invest Dermatol*. 2016(Jan); 136(1):34-44.
- Paus R. A neuroendocrinological perspective on human hair follicle pigmentation. *Pigment Cell Melanoma Res*. 2011(Feb); 24(1):89-106.
- Paus R. Exploring the "brain-skin connection": leads and lessons from the hair follicle. *Curr Res Transl Med*. 2016(Oct-Dec); 64(4):207-214.
- Paus R. The Skin and Endocrine Disorders, Chap. 149. In: Griffiths C, et al. (eds.) Rook's Textbook of Dermatology, 9th Edition. Wiley-Blackwell, 2016.
- Paus R, Cotsarelis G. The biology of hair follicles. *N Engl J Med*. 1999(Aug 12); 341(7):491-497.
- Paus R, Foitzik K. In search of the "hair cycle clock": a guided tour. *Differentiation*. 2004(Dec); 72(9-10):489-511.
- Paus R, Arck P. Neuroendocrine perspectives in alopecia areata: does stress play a role? *J Invest Dermatol*. 2009(Jun); 129(6):1324-6.

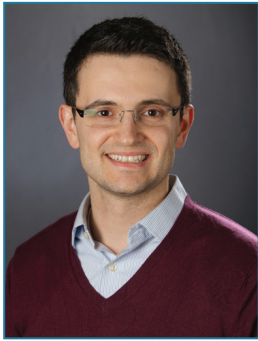
- Paus R, Nickoloff BJ, Ito T. A "hairy" privilege. *Trends Immunol.* 2005(Jan); 26(1):32-40. Review.
- Paus R, Theoharides TC, Arck PC. Neuroimmunoendocrine circuitry of the "brain-skin connection". *Trends Immunol.* 2006(Jan); 27(1):32-9.
- Paus R, Bulfone-Paus S, Bertolini M. Hair follicle immune privilege revisited: the key to alopecia areata management. *J Investig Dermatol Symp Proc.* 2018(Jan); 19(1):S12-S17.
- Paus R, Maurer M, Slominski A, et al. Mast cell involvement in murine hair growth. *Dev Biol.* 1994b(May); 163(1):230-40.
- Paus R, Heinzlmann T, Schultz KD, et al. Hair growth induction by substance P. *Lab Invest.* 1994a(Jul); 71(1):134-40.
- Paus R, Peters EM, Eichmüller S, et al. Neural mechanisms of hair growth control. *J Investig Dermatol Symp Proc.* 1997(Aug); 2(1):61-8.
- Paus R, Botchkarev VA, Botchkareva NV, et al. The skin POMC system (SPS). Leads and lessons from the hair follicle. *Ann N Y Acad Sci.* 1999a(Oct 20); 885:350-63.
- Paus R, Haslam IS, Sharov AA, et al. Pathobiology of chemotherapy-induced hair loss. *Lancet Oncol.* 2013(Feb); 14(2):e50-9.
- Paus R, Langan EA, Vidali S, et al. Neuroendocrinology of the hair follicle: principles and clinical perspectives. *Trends Mol Med.* 2014(Oct); 20(10):559-70.
- Peters EM, Arck PC, Paus R. Hair growth inhibition by psychoemotional stress: a mouse model for neural mechanisms in hair growth control. *Exp Dermatol.* 2006(Jan); 15(1):1-13.
- Peters EM, Ericson ME, Hosoi J, et al. Neuropeptide control mechanisms in cutaneous biology: physiological and clinical significance. *J Invest Dermatol.* 2006(Sep); 126(9):1937-47.
- Peters EM, Liotiri S, Bodó E, et al. Probing the effects of stress mediators on the human hair follicle: substance P holds central position. *Am J Pathol.* 2007(Dec); 171(6):1872-86.
- Philpott MP. Culture of the human pilosebaceous unit, hair follicle and sebaceous gland. *Exp Dermatol.* 2018(May); 27(5):571-577.
- Philpott MP, Kealey T. Metabolic studies on isolated hair follicles: hair follicles engage in aerobic glycolysis and do not demonstrate the glucose fatty acid cycle. *J Invest Dermatol.* 1991(Jun); 96(6):875-9.
- Philpott MP, Green MR, Kealey T. Human hair growth *in vitro*. *J Cell Sci.* 1990(Nov); 97 (Pt 3):463-71.
- Poblet E, Jimenez F, Escario-Travesedo E, et al. Eccrine sweat glands associate with the human hair follicle within a defined compartment of dermal white adipose tissue. *Br J Dermatol.* 2018(May); 178(5):1163-1172.
- Ramot Y, Paus R. Harnessing neuroendocrine controls of keratin expression: a new therapeutic strategy for skin diseases? *Bioessays.* 2014(Jul); 36(7):672-86.
- Ramot Y, Oláh A, Paus R. Cover image: Neuroendocrine treatment of inherited keratin disorders by cannabinoids? *Br J Dermatol.* 2018(Jun); 178(6):1469.
- Ramot Y, Bíró T, Tiede S, et al. Prolactin—a novel neuroendocrine regulator of human keratin expression *in situ*. *FASEB J.* 2010(Jun); 24(6):1768-79.
- Samuelov L, Kinori M, Bertolini M, et al. Neural controls of human hair growth: calcitonin gene-related peptide (CGRP) induces catagen. *J Dermatol Sci.* 2012a(Aug); 67(2):153-5.
- Samuelov L, Sprecher E, Tsuruta D, et al. P-cadherin regulates human hair growth and cycling via canonical Wnt signaling and transforming growth factor- β 2. *J Invest Dermatol.* 2012(Oct); 132(10):2332-2341.
- Schmidt-Rhaesa A. The Evolution of Organ Systems. Oxford Univ Press, Oxford, 2007.
- Schneider MR, Dahlhoff M, Herbach N, et al. Betacellulin overexpression in transgenic mice causes disproportionate growth, pulmonary hemorrhage syndrome, and complex eye pathology. *Endocrinology.* 2005(Dec); 146(12):5237-46.
- Schneider MR, Schmidt-Ullrich R, Paus R. The hair follicle as a dynamic miniorgan. *Curr Biol.* 2009(Feb 10); 19(3):R132-42.
- Van Sinay E, Mirabeau O, Depuydt G, et al. Evolutionarily conserved TRH neuropeptide pathway regulates growth in *Caenorhabditis elegans*. *Proc Natl Acad Sci USA.* 2017; 16:114(20):E4065-E40744.
- Slominski A, Wortsman J, Luger T, et al. Corticotropin releasing hormone and proopiomelanocortin involvement in the cutaneous response to stress. *Physiol Rev.* 2000a(Jul); 80(3):979-1020.
- Slominski A, Wortsman J, Tuckey RC, et al. Differential expression of HPA axis homolog in the skin. *Mol Cell Endocrinol.* 2007(Feb); 265-266:143-9.
- Slominski AT, Hardeland R, Zmijewski MA, et al. Melatonin: a cutaneous perspective on its production, metabolism, and functions. *J Invest Dermatol.* 2018a(Mar); 138(3):490-499.
- Slominski AT, Zmijewski MA, Plonka PM, et al. How UV light touches the brain and endocrine system through skin, and why. *Endocrinology.* 2018b(May 1); 159(5):1992-2007.
- Stenn KS, Paus R. Controls of hair follicle cycling. *Physiol Rev.* 2001(Jan); 81(1):449-494.
- Telek A, Bíró T, Bodó E, et al. Inhibition of human hair follicle growth by endo- and exocannabinoids. *FASEB J.* 2007(Nov); 21(13):3534-41.
- Theoharides TC. Neuroendocrinology of mast cells: challenges and controversies. *Exp Dermatol.* 2017(Sep); 26(9):751-759.
- Tiede S, Koop N, Klopper JE, et al. Nonviral *in situ* green fluorescent protein labeling and culture of primary, adult human hair follicle epithelial progenitor cells. *Stem Cells.* 2009(Nov); 27(11):2793-803.
- Valente LA, Begg LR, Filiano AJ. updating neuroimmune targets in central nervous system dysfunction. *Trends Pharmacol Sci.* 2019(Jul); 40(7):482-494.
- Vidali S, Kneuver J, Lerchner J, et al. Hypothalamic-pituitary-thyroid axis hormones stimulate mitochondrial function and biogenesis in human hair follicles. *J Invest Dermatol.* 2014(Jan); 134(1):33-42. ■



**CONCIERGE SERVICE
FOR ALL OF YOUR
HAIR RESTORATION
INSTRUMENTATION SINCE
1995**

Visit our new website:
ellisinstruments.com

4B Elmer Street, Madison, NJ 07940 • P: 800-218-9082 • P: 973-593-9222
F: 973-593-9277 • E: ellisinstruments.cellis@gmail.com



Hair Sciences

Vlad Ratushny, MD, PhD | Beverly, Massachusetts, USA | vratushny@maderm.org

Does Androgenetic Alopecia Predispose Our Patients to a More Severe COVID-19 Outcome? A Critical Look at the Data

An observation by Goren and colleagues turned into a clinical hypothesis when researchers noted that there was a high frequency of male pattern hair loss (MPHL) among patients admitted for COVID-19.¹ In two Spanish hospitals, 71% of men admitted for COVID-19 were observed to have clinically significant androgenetic alopecia (AGA) as determined by the Hamilton-Norwood Scale of AGA. A limitation of this study was that it just involved 41 patients and was completely observational, without outcome measures or a control group.

A follow-up study from the same group was published on August 20th titled, “Androgenetic alopecia present in the majority of patients hospitalized with COVID-19: The ‘Gabrin sign.’”² The authors evaluated 175 individuals hospitalized with COVID-19 in Madrid, Spain, and found that 67% of the overall patients presented with AGA (79% in men and 42% in women). These rates were significantly higher than the rate of AGA in age-matched men (31-53%) and women (38%) in a similar population. The authors hypothesized that hyper-androgenism, which can lead to AGA, may lead to a more severe course of COVID-19 infection.

The first author on this study, Dr. Carlos Wambier from Brown University Department of Dermatology, told The Telegraph: “We think androgens or male hormones are definitely the gateway for the virus to enter our cells.” The authors suggested that anti-androgen treatments may be useful for prevention and/or treatment of severe COVID-19 infections. In fact, there are several clinical trials using anti-androgens, such as spironolactone, that are currently underway as preventative or treatment options for COVID-19. The authors propose the “Gabrin sign,” in memory of Dr. Frank Gabrin, the first American physician to die from COVID-19, as a visual sign of AGA being a risk factor for severe COVID-19 infection.

Observational studies like these are good for idea generation. However, there are a lot of confounding factors in this study that need to be taken into account before evaluating the conclusions of it. For one, this study was small; it didn't have outcome measures for the hospitalized patients, and it didn't have a control group of age-matched patients who did not have AGA.

Also, there may have been confounding factors such as obesity, Type 2 diabetes mellitus, or coronary artery disease that are more prevalent in patients that have AGA. In fact, early onset AGA has been associated with the metabolic syndrome in men, a condition that predisposes to hypertension, hyperlipidemia, insulin resistance, and obesity.^{3,4}

Thereby, the association of COVID-19 severity with AGA may be fully explained by these known COVID-19 risk factors, rather than a patient's AGA status.

There are other studies that suggest an androgen link to the susceptibility to COVID-19.⁵ A study of 9,280 COVID-19-infected patients Italy found that a subset of prostate cancer patients taking androgen-deprivation therapy (ADT) drugs were only one-quarter as likely to contract COVID-19 than men with prostate cancer not on ADT. Also, males developed more severe complications, were more frequently hospitalized, and had worse clinical outcomes than females.

In addition, a recent Cell paper showed that SARS-CoV-2, the virus that causes COVID-19, enters cells partly using TMPRSS2, a membrane bound enzyme that is produced in the prostate when androgen binds to the androgen receptors.⁶ Although researchers have yet to show that androgens control TMPRSS2 in the lung, the suspected portal of entry for SARS-CoV-2, as they do in the prostate, the above data does suggest an androgen link to COVID-19 infectivity.

Overall, there are a few reported links to androgens being at least partially responsible for infection susceptibility and risk for a worse clinical outcome from COVID-19. These studies will hopefully serve as a foundation of more formalized future studies of COVID-19 risk factors and treatment options for COVID-19 targeting the androgen pathway.

References

1. Goren G, et al. A preliminary observation: male pattern hair loss among hospitalized COVID-19 patients in Spain—a potential clue to the role of androgens in COVID-19 severity. *J Cosmet Dermatol*. 2020(Jul); 19(7):1545-1547.
2. Wambier CG, et al. Androgenetic alopecia present in the majority of patients hospitalized with COVID-19: The “Gabrin sign.” *J Am Acad Dermatol*. 2020(Aug); 83(2):680-682.
3. Banger HS, et al. Is early onset androgenic alopecia a marker of metabolic syndrome and carotid artery atherosclerosis in young Indian male patients? *Int J Trichology*. 2015(Oct-Dec); 7(4):141-147.
4. Swaroop MR, et al. The association of metabolic syndrome and insulin resistance in early-onset androgenetic alopecia in males: a case-control study. *Indian J Dermatol*. 2019(Jan-Feb); 64(1):23-27.
5. Montopoli M, et al. Androgen deprivation therapies for prostate cancer and risk of infection by SARS-CoV-2: a population-based study (N = 4532). *Ann Oncol*. 2020(Aug); 31(8):1040-1045.
6. Hoffman M, et al. SARS-CoV-2 cell entry depends on ACE2 and TMPRSS2 and is blocked by a clinically proven protease inhibitor. *Cell*. 2020(Apr 16); 181(2):271-280. ■



Medical and Professional Ethics

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

Spotlight on Framing, Nudging, and Informed Consent

A colleague recently asked me to review an ethics article he was writing. In it, he talked about framing and nudging. These were not terms with which I was previously familiar but in fact they are relevant to all of us as hair transplant surgeons.

In social terms, framing is about how concepts are presented to individuals and societies to communicate about reality.¹ According to an article written by Donald H. Weaver, framing can select certain aspects of an issue and make them more prominent in order to elicit certain interpretations and evaluations of an issue.² As Steve Rathje said, "It's not always what you say, it's how you say it."³ Framing can be presented in a positive or negative way in order to influence how an idea or, in the case of medicine, a treatment is perceived.⁴

Framing can be looked at in the context of both how a doctor practices medicine and how a patient makes decisions on treatment options available. For ethical doctors, medical practice should be evidenced based as much as possible. If there is clear Level 1 evidence, then the framing will be straightforward.⁵ But what about treatments such as Low Level Light Therapy (LLLT), Platelet-Rich Plasma (PRP) injections, exosomes, or even something as basic as which graft holding solution to use and at what temperature? In the absence of good-quality, reproducible, research-based evidence, many doctors make decisions based on personal experience, from Level 4 evidence publications, or Level 5 evidence endorsements from respected colleagues.⁵

It is interesting to note that the literature investigating the effect of information framing on physicians' practices is small and generally of poor quality.⁶

More and more, the public concept of body image is being framed by the photographs seen on social media, which, for young men, revolve around sculpted abs and pecs as well as having a perfect hairline. For older men, a full head of hair is equated in many societies with youth, good looks, success and happiness. We know that many men who start losing their hair also lose self-confidence and self-esteem. For those who decide to have hair transplant surgery, framing often occurs initially by what they read on the internet and are told by "Dr. Google." With regards to the donor harvesting method, they are generally led to believe that FUE is better than linear strip excision/strip follicular unit transplantation (Strip FUT). The extensive educational content on the ISHRS website, including the information on surgical treatments for hair loss, aims to frame the subject in a more balanced way.⁷

However, ultimately, it is the doctor who is responsible for framing the information with regards to the donor harvesting



Reflective Questions

- Is any of my medical practice influenced by the way information about unproven treatments has been framed?
- Have I ever nudged a patient into making a decision that was influenced by a benefit to me?

method by thoroughly explaining to his/her patients the advantages and disadvantages of both methods without using misleading marketing, phrasing, or biased viewpoints. This is the fundamental basis of "informed" consent.

In the UK, the General Medical Council's document Consent: patients and doctors making decisions together states on page 7: "The doctor uses specialist knowledge and experience and clinical judgement, and the patient's views and understanding of their condition, to identify which investigations or treatments are likely to result in overall benefit for the patient. The doctor explains the options to the patient, setting out the potential benefits, risks, burdens and side effects of each option, including the option to have no treatment. The doctor may recommend a particular option which they believe to be best for the patient, but they must not put pressure on the patient to accept their advice."⁸

This brings up the point about nudging, which is the act of predictably influencing an individual's behavior and choice without necessarily restricting his/her options. There are degrees of nudging. In private practice, we are all running a business that is dependent on patients paying us to operate, so it is in our interest to nudge patients to have surgery. I have been told that some commercially incentivised clinics function under the ethos that every patient who requests a hair transplant should be offered one. The ISHRS Code of Ethics, paragraph III, states: "The member will not take emotional or financial advantage of patients" and clearly an ethical doctor will not recommend surgery where it is not required or not likely to be of benefit to the patient."⁹

However, many doctors have a bias towards FUE or FUT and will nudge patients in one direction or another by downplaying the negative and upselling the positive. If a doctor only does FUE, the degree of nudging might be quite extreme. In fact, he/she may not even mention the alternative or may denigrate it to such a degree that the patient does not even consider it as an option.

Whilst the days of paternalistic medicine, where patients are simply told what to do, should be consigned to the history books, is there a difference between a nudge and a recommendation? William Sinkulet argues in the Journal of Medical Ethics that nudging is incompatible with obtaining informed consent. He argues that nudges aim to alter behaviour through means other than rational discourse, but recommendations and appropriate framing give patients

substantive reasons to consider, and thus fail to constitute genuine nudging.¹⁰

If the patient asks, "What would you do, doctor, if you were me or if you were making a recommendation to a family member?", is it reasonable to guide the patient as long as it is in the context of informed consent, and that all the options have been explained in an unbiased manner, or should the decision on donor harvesting method be left entirely up to the patient?

References

1. [https://en.wikipedia.org/wiki/Framing_\(social_sciences\)](https://en.wikipedia.org/wiki/Framing_(social_sciences))
2. <https://fbaum.unc.edu/teaching/articles/J-Communication-2007-8.pdf>
3. <https://www.theguardian.com/science/head-quarters/2017/jul/20/the-power-of-framing-its-not-what-you-say-its-how-you-say-it>
4. [https://en.wikipedia.org/wiki/Framing_effect_\(psychology\)](https://en.wikipedia.org/wiki/Framing_effect_(psychology))
5. <https://www.cebm.net/2009/06/oxford-centre-evidence-based-medicine-levels-evidence-march-2009/>
6. https://www.researchgate.net/publication/12728952_The_Effects_of_Information_Framing_on_the_Practices_of_Physicians
7. <https://ishrs.org/patients/treatments-for-hair-loss/surgical-treatments/>
8. <https://www.gmc-uk.org/ethical-guidance/ethical-guidance-for-doctors/consent>
9. https://ishrs.org/wp-content/uploads/2018/12/CodeofEthics_lastmodified_2017Prague.pdf
10. <https://jme.bmj.com/content/44/8/536> ■

AtoZ has acquired the HARRIS instrument product line.



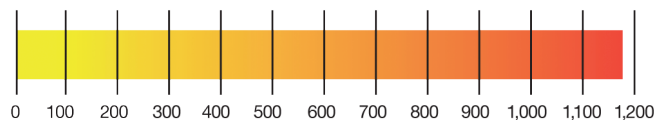
Harris Steel Blunt Punches

THE ADVANTAGES:

- Approved for up to 40,000 grafts with one punch
- New 6 mm depth for all follicle lengths
- HEX vibration separates follicle from skin
- Low transection rate of 2.8%*
- Reusable punch
- Flush port
- Proven for body hair
- Ideal punch for beginners and experts
- Available to FOX Negative® patients



Fast and Efficient Graft Dissection



The Powered Safe System Dissections Per Hour**

To order, contact us:

Kenny Moriarty, VP
Email: kenny@georgetiemann.com

Visit us online:
www.georgetiemann.com | www.atozsurgical.com

* In a clinical study by Dr. Harris in over 150 patients and more than 100,000 harvested grafts. General user transection rates may differ.

** Depending on follicular unit configuration and skin characteristics graft dissection rates up to 1200 grafts/hour are possible. Numbers based upon Jim A. Harris, MD extraction rates





Regenerative Medicine and Hair Loss

Gorana Kuka Epstein, MD | Belgrade, Serbia | Gorana.kuka@me.com

Isolation of Adipose-Derived Stem Cells: A Primer

Since Zuk et al. published in 2002 on their ground-breaking research that human adipose tissue, apart from the bone marrow and blood, is a source of multipotent stem cells, a new journey of modern, regenerative medicine has been underway.¹ Multipotent stem cells are cells that have the capacity to self-renew by dividing and to develop into multiple specialised cell types present in a specific tissue or organ. Most adult stem cells are multipotent stem cells. Physicians have been continually searching for the best way to isolate these cells while maintaining their main properties. Adipose tissue provides a convenient and accessible means by which to harvest these cells for therapeutic approaches.

First and foremost, it is important to understand terms used in regenerative medicine. A joint statement of the International Federation for Adipose Therapeutics and Science (IFATS) and the International Society for Cellular Therapy (ISCT) has defined the two most important terms: stromal vascular fraction (SVF) and adipose-derived stem cells (ASCs).²

Stromal vascular fraction is a heterogeneous, mesenchymal population of cells isolated by enzymatic or non-enzymatic dissociation of adipose tissue that includes not only adipose stromal, hematopoietic stem, and progenitor cells but also endothelial cells, erythrocytes, fibroblasts, lymphocytes, monocytes/macrophages, pericytes, and most importantly adipose stem cells.

Adipose-derived stem cells are mesenchymal stem cells (MSCs) that are obtained from abundant adipose tissue, adherent on plastic culture flasks, can be expanded in vitro, and have the capacity to differentiate into multiple cell lineages. ASCs have been shown to secrete high levels of growth factors such as epidermal growth factor (EGF), vascular endothelial growth factor (VEGF), basic fibroblast growth factor (bFGF), keratinocyte growth factor (KGF), platelet derived growth factor (PDGF), hepatocyte growth factor (HGF), transforming growth factor-beta (TGF-β), insulin growth factor (IGF), and brain-derived neurotrophic factor (BDNF). ASCs vary in their viability, proliferation and clonogenicity, differentiation, and cellular composition. Depending on the isolation system used, yield of ASCs can vary significantly.

These parameters provide a guide for how to find the best system to isolate the cells, and to maintain what is viewed as their “stemness.”

HARVESTING ADIPOSE TISSUE

In order to ensure ASCs, the first step is to harvest the adipose tissue with liposuction. In humans, the easiest areas on which to perform this procedure are the abdomen, waist, and outer thighs. Without going into much detail of the technique itself, a few principles are critical for successful fat harvesting, along with knowing abdominal anatomy:

1. Choosing good donor area
2. Determining proper entry point(s) of the cannula (the author uses umbilical area as the entry point is well hidden there)
3. Determining the size of the cannula (2.4-3mm)
4. Ensuring even quantity of injected tumescence
5. Ensuring even harvesting of fat
6. Staying at the level of subcutaneous tissue while harvesting fat
7. Ensuring even passage of the cannula so no indentations are left behind
8. Ensuring patient safety throughout the procedure

ISOLATING STROMAL VASCULAR FRACTION

Stromal vascular fraction can be isolated by enzymatic or non-enzymatic dissociation, manually, or by being treated in an automated closed system. The most widely used isolation protocol consists of washing the lipoaspirate, enzymatic digestion with collagenase, centrifugation, and red blood cell lysis.³ Most systems out in the market are closed systems and they are preferable systems.

Mechanical (non-enzymatic) isolation involves washing (using Ringer’s Lactate), then shaking and/or vibrating, followed by centrifugation sufficient to concentrate SVF (deemed to be achieved at 3,000rpm for 5 minutes using the Coleman method).⁴⁻⁶ This method is fast, requires small volumes of fat, and has lower risk of external contamination, all making it a preferred method amongst surgeons. However, mechanical isolation typically achieves a lower yield of nucleated cells (NC) per cc of lipoaspirate (10,000-240,000 NC/cc) and a lower number of progenitor cells (<5%).⁷

With enzymatic isolation, washed lipoaspirate is incubated with collagenase (trypsin or dispase are also used) solution, and digestion is typically carried out in a heated shaker to provide constant agitation at 37°C. This method is slower, requires a larger volume of fat (and therefore more advanced surgical skills), and carries a higher risk of contamination. On the other hand, enzymatic isolation provides a higher yield of nucleated cells per cc of lipoaspirate (100,000-1,300,000 NC/cc) as well as a higher number of progenitor cells (>15%)⁷ (Table 1). It is important to mention that in the United States, per the Food and Drug Administration (FDA), enzymatic isolation is viewed as “minimal manipulation” of the tissue and therefore is currently prohibited.

TABLE 1. Cell Composition

	ENZYMATIC	MECHANICAL
CELLS OF HEMATOPOETIC ORIGIN	32%	70-85%
ASCs	60%	6-13%
INFLAMMATORY CELLS (MONOCYTES/MACROFAGES)	FEWER	GREATER
ENDOTHELIAL CELLS	GREATER	FEWER

CELLS AND HAIR

To date, there has been only one clinical study of adipose-derived stem cells in the treatment of hair loss where actual cell count was noted and two separate doses of cells were applied.⁸ This study concluded that a lower concentration of cells (500,000 NC/cc) was more effective than a higher concentration containing twice as many cells. There were increases (mean change from baseline) in terminal hair count for the low-dose ADRC group in the Norwood-Hamilton III subgroup at week 6 (13.90 ± 16.68), week 12 (11.75 ± 19.42), week 24 (16.56 ± 14.68), and week 52 (2.78 ± 16.15). In this study, the cells were enzymatically isolated and injected in their natural environment—which means with adipose tissue.

As many questions as answers remain after this study including the following: How many cells are enough? Could adipose tissue alone with its own properties (anti-inflammatory, anti-androgen, provascularization-inducing, and stem-cell containing) achieve these same results? Are there other ways to enrich adipose-tissue such as platelet-rich plasma (PRP)? The author is currently conducting a comparative study to determine the efficacy between fat grafting and PRP in treating early androgenic alopecia. Although, PRP appears to be easier and less expensive to use, it seems that prolonged effects are seen with fat grafting.

More studies are needed as there is no definitive protocol developed, and in the meantime, it is worthwhile for hair surgeons to familiarize themselves with adipose tissue harvesting and to seek the most appropriate technique for themselves given their skill set and goals. Regenerative med-

icine is not some hazy future; rather, it is our present, and it is encouraging to see more doctors looking for answers to the many questions this therapy poses.

References

1. Zuk PA, et al. Human adipose tissue is a source of multi-potent stem cells. *Mol Biol Cell*. 2002; 13:4279-4295.
2. Bourin P, et al. Stromal cells from the adipose tissue-derived stromal vascular fraction and culture expanded adipose tissue-derived stromal/stem cells: a joint statement of the International Federation for Adipose Therapeutics and Science (IFATS) and the International Society for Cellular Therapy (ISCT). *Cytotherapy*. 2013; 15:641-648.
3. Zuk PA, et al. Multilineage cells from human adipose tissue: implications for cell-based therapies. *Tissue Eng*. 2001; 7:211-228.
4. Baptista LS, et al. An alternative method for the isolation of mesenchymal stromal cells derived from lipoaspirate samples. *Cytotherapy*. 2009; 11:706-715.
5. Condé-Green A, et al. Effects of centrifugation on cell composition and viability of aspirated adipose tissue processed for transplantation. *Aesthet Surg J*. 2010; 30:249-255.
6. Shah FS, et al. A non-enzymatic method for isolating human adipose tissue-derived stromal stem cells. *Cytotherapy*. 2013; 15:979-985.
7. Romanov YA, et al. Mesenchymal stem cells from human bone marrow and adipose tissue: isolation, characterization, and differentiation potentialities. *Bull Exp Biol Med*. 2005; 140:138-143.
8. Kuka Epstein G. Transplantation of cell enriched adipose tissue for follicular niche stimulation in early androgenetic alopecia: a multi-center, randomized, blinded, controlled investigation—the STYLE trial. *Aest Surg J*. 2020; 1-12. ■



WAW - FUE INSTRUMENTS

Simply Efficient

Small punch size with funnel shape and perpendicular cutting edge for deeper dissection.

NEW punch graduation system for very precise depth control.

Lower speed and oscillatory motion that mimic manual work for:

- Fewer missing grafts*
- Much lower transection rate*
- Higher number of hairs per graft*

A substantial savings: use the punch during two to three surgeries!

Already adopted by more than one hundred surgeons worldwide!

*user dependent

+32 2 880 70 64
info@waw-fue.com
www.waw-fue.com

devroye instruments

Hybrid tornado punch & foot pedal



Hear from the Assistants

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

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

Tina Lardner is the Surgery Coordinator for Dr. James Harris in Denver, Colorado. She has been involved in hair restoration for 23 years and has been part of the surgical assistants committee since 2007. Tina took part in developing training materials for the assistants, has written chapters in different books, and is involved in preparing workshops and meetings. She is someone with vast experience and we can all learn from.

When we think about one of the most important advances in the hair restoration field over the past decade, we have to consider the development of the implanters. What are your thoughts on that?

Having done FUE in our office for many years, I know FUE grafts are very delicate and are prone to desiccation and over-manipulation. When placing grafts with forceps, there isn't much tissue near the bulbs, so you need to pick up grafts gently by the bulbs or grasp slightly above and risk follicle bulbs bending. The use of implanters reduces that risk.

I then asked Tina what she is doing now that is different than before.

We have been trying all sorts of different implanters for over 5 years with no consistency. We tried the Shiao implanters in 2012 and the Lion implanters in 2016. About one and a half years ago, we finally tried the dull WAW implanter.

What made you change to the implanters?

As I mentioned earlier, the grafts are so fragile and can be difficult to place with forceps, and we had a few patients with less than stellar growth, so we shifted to the implanters and it made a huge difference.

For me, I know that Dr. Harris has a large team of assistants, so I wondered if telling them that you are incorporating a new tool or technique that can initially slow them down because of the learning curve resulted in pushback from the staff. I asked Tina how her team perceived this change:

Our teams are creatures of habit, and if it slows them down, they tend to resist the change. And they were resistant at first. Dr. Harris decided to do it, but gave us a deadline of 1 year to transition completely to implanters for FUE surgeries. The WAW implanters just made sense, because they were easy to clean and set up, it was easy to learn, and most important, you could load 8-10 grafts into 1 implanter (less back and forth).

We started placing for 1 hour on every surgery for 3 months and then switched to forceps. That way, the team didn't fight us because they were taking longer to place. The next 3 months, we used the implanters for 2 hours and then switched. The next 3 months, we used the implanters for 3 hours and then switched. The next 3 months, we worked towards using them for the entire surgery. The key was using them every day. We were slow at first, but the team got faster since we kept using them. There were times we had severe popping in which

we switched to forceps, but those surgeries were rare. It took us about a year to use them for the entire surgery.

Subsequently, Tina explained how work flows in their office: *I typically schedule assignments for staff. We have a scrub nurse who oversees the patient throughout the day. That*



person gets the patient ready for surgery, scrubs during surgery, counts sites during site making, places grafts, and goes over post-op instructions. I stagger 2-3 staff who count, sort, and inspect grafts under a microscope. After counts are done, the staff clean their microscope stations and surgical instruments and gets things ready for the next day. Some of the staff go home after cleaning. During this time, our afternoon part-time staff arrive to help with the cleaning and load implanters.

So, for the implanters, we have 2 placers and 3 loaders. We used to have 2 loaders and 2 placers, but after a while, the placers became faster and we needed an extra person. Some surgeries, we can get 3 placers on the head if there is a frontal area and crown. We don't have anyone handing off the implanters to the placers. The loaded implanters are put into a cup with holding solution and the placers pick them up one at a time. We don't implant while extracting.

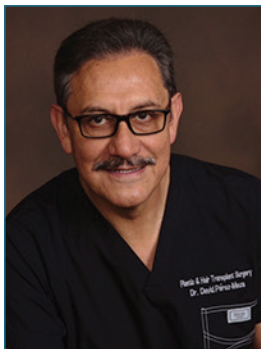
Be flexible with your staff and communicate what you want them to do.

One other aspect of the interview I wanted to note was "staff training." We could sit for hours with someone like Tina who has immense experience in staff training, but we will touch on only a few points.

We have different training levels within our team. Level 1: New staff will go through some didactic training covering basics in hair restoration surgery, counting and inspecting grafts, and loading implanters. Our Exposure Control plan is thoroughly reviewed and they are taught how to clean the OR and instruments, set up trays for surgery, use a microscope, review under a microscope what is a good or transected follicle, enter count sheets in the computer, and practice how to load implanters. Level 2: Once their fine motor skills are developed and they have mastered the above tasks, more didactic training is done. Topics that are covered are graft placement principles, graft removal after physician dissection, and trimming hair for non-shave FUE. They start off practicing on inanimate scalp models and then move to patients with careful monitoring. Level 3: For those who are full time, and all the skills listed above are mastered, they are taught how to scrub. Didactic training is done covering topics such as how to scrub for FUT and FUE surgery, surgery flow, and post-operative instructions. They are initially walked through the surgery flow during a surgery and eventually scrubbing with me guiding them until they can do it on their own. The key to scrubbing is anticipating what comes second, third, and so on.

To keep everyone on board and following the guidelines, Tina and her team schedule team meetings regularly to make sure that everyone is on the same page. This is their chance to discuss things that are being missed, what can be

➤ BOTTOM PAGE 197



In Focus: Global Council Societies

Lt Col Ret David Perez-Meza, MD, FISHS | Benalmádena, Malaga, Spain | drdavid@perez-meza.com

I want to thank current ISHRS President Francisco Jimenez-Acosta for appointing me Chairman of the ISHRS International Relations Committee and Lead Ambassador 2019–20.

It has been a great pleasure to reconnect and work with you my friends and colleagues of the GC during this past year.

This is my last GC column, and I want to thank to our committee members Drs. Ricardo Mejia and Russell Knudsen. Also, a thank-you to Victoria Ceh for assisting me.

Communication between the ISHRS and GC societies is very critical and important, and for that reason, thank you to all the member societies that sent us their agreement and documents required. Though a difficult task, we had a 90% completion rate (20 of the 22 societies). In addition, we updated the emails of all GC members, which hasn't been done in several years.

The current worldwide pandemic has impacted each of us personally and professionally. There is no more important than now for the societies that make up the GCS to strengthen their relationship with the ISHRS and with each other.

In this, my last article, I would like to mention important information about the Global Council Hair Restoration Societies relationship with the ISHRS, including its composition, purpose, and benefits, which all individual societies and their members should know.

The Global Council was created in 2003 with the purpose to create unity in the field amongst the leaders of the national hair restoration surgery societies. It provides a forum to exchange ideas and discuss issues in hair restoration surgery that the various countries face. The Global Council is overseen by the ISHRS and is treated as an ISHRS committee in that it is listed in the ISHRS directory and meets annually at the ISHRS World Congress.

The Global Council is used as a sounding board to ask advice and as a support for the member societies. The ISHRS may use the Global Council to assess specific member needs of a particular country, to assess trends, or to determine ways to attract new members from the various countries. The member societies may wish to work together on future educational programs or help each other in promoting their individual meetings (e.g., swapping mailing lists, promoting each other's meetings in society newsletters and on websites, or exchanging website links). Member societies can also work together to schedule hair meetings, so they do not conflict with one another.

Composition

The Global Council is comprised of the presidents of the national/regional hair restoration surgery societies with the president of the ISHRS serving as the Chair. Presidents of the national societies need not be members of the ISHRS to be included, although it is encouraged. Immediate past-presidents and presidents-elect of the national societies are welcome to attend meetings for overlap and consistency year-to-year.

The benefits to a national society include the following:

- Allows for the sharing of experiences; one national society may have solved a problem facing another national society.
- Helps to coordinate the dates of yearly meetings between societies to avoid overlaps.
- Provides a venue for society meeting information to be published and promoted in the *Forum's* Calendar of Hair Restoration Surgery Events section.
- Provides a uniform educational and certification system.
- Allows for "strength in numbers" for negotiation with other medical societies and government bodies (e.g., restrictions of practice).

The benefits of a national society include the following:

- Promotes awareness of one another.
- Ensures less denigration.
- Promotes the sharing of knowledge and exchanging of ideas.
- Provides an organized voice.
- Assists in the handling of challenges.
- Aids in dealing with practitioners or clinics that continuously produce bad work.
- Offers education/certification for new members.
- Maintains a culture of CME in that country.
- Hosts national or international conferences and live surgery workshops to continuously raise standards.

I hope you'll find the above information useful as we continue to strengthen the ISHRS–GCS relationship.

The engaging ISHRS 28th World Congress Virtual 2020 is around the corner, scheduled for October 17–25. We hope that many of you have already sent in your abstracts and will participate in the Congress. Be sure to register and join us for this highly interactive online event.

We hope you enjoy the picturesque scenic preludes submitted by the member societies, beautifully organized by Dr. Greg Williams, that will play prior to the general sessions. ■

➤ CONTINUED FROM PAGE 196

changed, and good things that are happening; review employee suggestions; and go over amazing patient results.

Lastly, Tina wanted to send two very important messages to the doctors:

Cross-train staff and mix assignments. If you have your staff doing the same thing all the time, it can lead to burnout and repetitive motion injuries.

Don't always assume that your staff is maintaining quality control. We have staff who have been doing surgery for over 15 years and others who are new to the team and both require quality control checks.

We all love, at the end of the day, to see the difference in the patient's appearance and attitude. ■

2020 World Congress Tidbits

Victoria Ceh, MPA, ISHRS Executive Director | *Chicago, Illinois, USA* | vceh@ishrs.org

WELCOME DRINK | FRIDAY/OCTOBER 16, 2020

The Welcome Drink is part of the World Congress. You must be registered for the 2020 World Congress in order to participate in the Welcome Drink. The Welcome Drink will begin in the Virtual World Congress Platform, and then move to a Zoom room so we can all see each other. We ask each attendee to have a small flag of their country that is shown in their camera alongside their face (e.g., a flag on a stick, a print out of your country's flag, or a lapel pin of your country's flag). We will celebrate the international nature of our society! As a scientific society, I remind you to not include political or religious symbols.



ISHRS ANNUAL BUSINESS MEETING | SUNDAY/OCTOBER 18, 2020

There is a separate registration link for the Annual Business Meeting. The Annual Business Meeting will not be in the Virtual World Congress Platform, but rather, conducted as a Zoom meeting. The link was sent in an email to Voting Members. There is no fee to register.

ISHRS AWARDS CEREMONY | SUNDAY/OCTOBER 25, 2020

There will be a separate registration link for the Awards Ceremony (to come). There is no fee to register. The Awards Ceremony will be conducted as a Zoom meeting, and will not be “in” the Virtual World Congress Platform. All are invited—members and their spouses, and office staff. We will be presenting the most prestigious awards in the field: the Platinum & Golden Follicle Awards. ■



ISHRS 2020 Surgical Assistants Program

Sunday, October 18, 2020

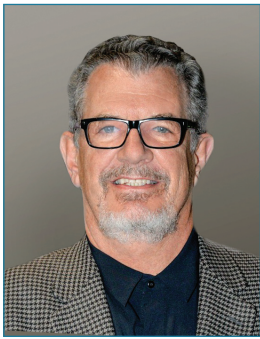
Via Live Zoom Meeting

2 hour program: 9-11AM CT (Chicago)

- Implanters: Options & Implementation
- Gain Practical and Critical Thinking Skills
- Share Experiences with Peers Around the World
- Live Questions & Answers

#ISHRS2020

<https://28thannual.org/surgical-assistants-program/>



Message from the ISHRS 2020 World Congress Program Chair

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

Since this year's meeting is virtual, we can invite many more guests

than usual. We do not have the limitations of travel and other expenses incurred with an in-person meeting; therefore, we have been able to assemble an incredible faculty. Never before have so many well-known lecturers come together for one hair restoration meeting. The ISHRS itself has many members who are internationally known lecturers such as our president, Francisco Jimenez, who has published extensively. He and other accomplished ISHRS members will be presenting at our World Congress. In last month's message, I previewed the four featured speakers who have been so kind to accept our invitations. From Dr. Jimenez's network of colleagues, we have also been able to confirm participation of the following experts:

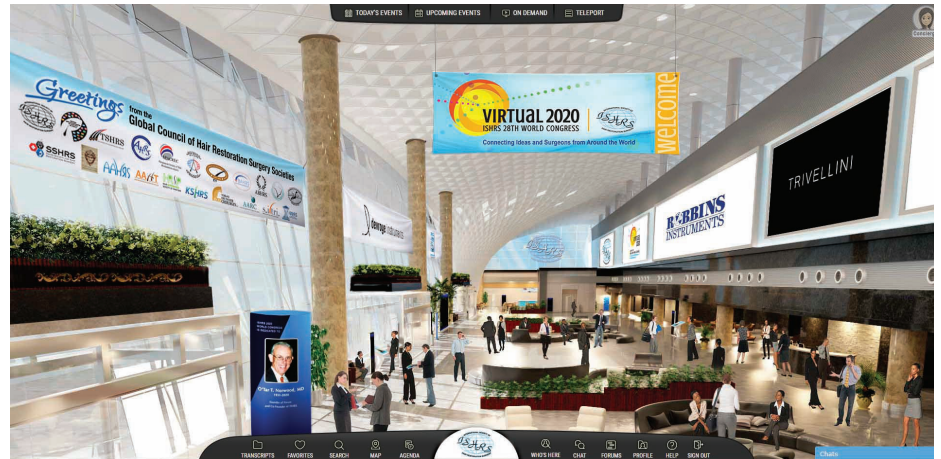
Carlos Clavel, A*Star, Institute of Medical Biology, Singapore. He supervises a group of researchers interested in the regulation of the follicle stem cell niche, hair growth pigmentation, and aging. He writes, "A thorough understanding of how stem cell niche cells become programmed and function is a crucial requirement for future tissue-specific regenerative therapies."

Claire Higgins, Department of Bioengineering, Imperial College, London. The focus of her research is to understand mechanisms of tissue development, and regeneration, using the hair follicle as a model. She has published extensively on hair follicle regeneration and dermal papilla culture.

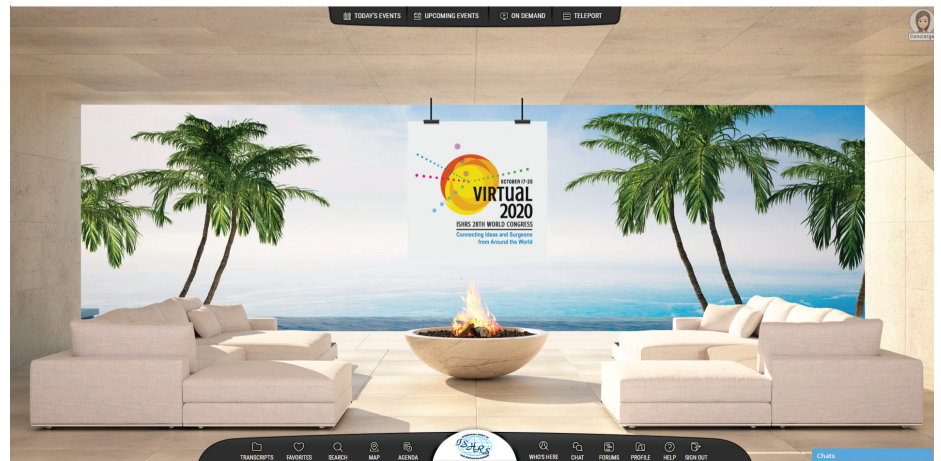
Luis Garza, Associate Professor, Department of Dermatology, Johns Hopkins University. Dr. Garza studies skin stem cells and wound healing with an emphasis on identifying the next generation of wound therapeutics and diagnostics. Dr. Garza discovered the role of prostaglandins in hair follicle regulation.

Ander Izeta, Biodonostia Health Research Institute, San Sebastián, Spain. The aim of his lab is to elucidate the ontogeny, expansion, and differentiation capacity of precursor cells in mouse and human dermis with the ultimate purpose of facilitating their therapeutic use through generation of tissue engineered constructs and to help clarify their possible contribution to carcinogenic processes or other pathologies.

Moonkyu Kim, Department of Immunology, Kyungpook National University, School of Medicine, Daegu, Korea. His



After logging into the Virtual Conference Center, you will enter the welcoming Lobby.



We tried to capture the essence of Panama in our Fireside Chat, a space where you will meet with other attendees in an informal setting to chat (text) about sessions that just occurred. A Fireside Chat is scheduled after each of the Focused Sessions.

presentations include exosomes derived from dermal papilla cells and their role in hair follicle growth.

Daniel Aberdam, INSERM Director of Research at the University of Nice (France) and Visiting Professor at the TECHNION (Israel). His scientific interests include the role of exosomes derived from activated fibroblasts in stimulating hair follicle growth.

If you have a presentation for the Virtual World Congress, please submit it as requested. It is even more important for a virtual meeting than an in-person meeting that we have the video files on the dates requested. This gives us a chance to properly troubleshoot any issues. With enough lead time, the videos can be reviewed and the authors contacted if there are any playback issues. Ultimately, the success of these virtual meetings does require early submission, so the submission deadline is earlier than normal. Please help us make this virtual meeting run as smoothly as possible. And, don't forget to register for the meeting! ■

Classified Ads

Seeking Hair Transplant Physician and Technicians

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

Please email your résumé to jobs@andersonhsc.com.

Seeking Hair Transplant Physician – St. Louis, MO

St. Louis Hair Restoration is seeking an experienced Hair Transplant Physician to perform manual/motorized FUE 3-5 days per month. We also have the ability to utilize a weekend if that is a better fit for your schedule. Excellent compensation.

If you are interested or would like more information, please send your résumé to Info@stlouishairrestoration.com.

For Sale: ARTAS® Robotic System with Chair

2015 ARTAS Robotic System for sale. System includes patient chair and was only used a few times. The system was originally purchased in 2015 for \$250,000 and is in excellent condition. Asking price of \$80,000 or best offer.

Email info@parsamohebi.com for more details or to make an offer.

Hair Transplant Business for Sale – Las Vegas, Nevada

Doctor (seller) will train for limited time, Buyer to lease 2,440 sq. ft. suite. For Sale: website, equipment, furniture, goodwill, supplies. Please keep confidential.

Contact Aaron: 702-533-2780

E-mail: house rental12345@gmail.com.



COWGIRL HAIR LOSS WORKSHOP

So she can tip her hat with confidence

POSTPONED

March 18-21, 2021

March 2022

AN ISHRS REGIONAL WORKSHOP | HOUSTON, TEXAS

COWGIRLHAIRLOSS.COM

Calendar of Hair Restoration Surgery Events

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

DATES	EVENT/VENUE	SPONSORING ORGANIZATION(S)	CONTACT INFORMATION
SEP 26, 2020 & OCT 3, 2020	ISHRS 2020 Advanced/Board Review Course <i>Virtual (online)</i>	International Society of Hair Restoration Surgery www.ishrs.org	www.28thannual.org/advanced-board-review-course/
OCT 18, 2020	ISHRS 2020 Surgical Assistants Program <i>Virtual (online)</i>	International Society of Hair Restoration Surgery www.ishrs.org	www.28thannual.org/surgical-assistants-program/
* OCT 17-25, 2020	28th World Congress of the ISHRS <i>Virtual (online)</i>	International Society of Hair Restoration Surgery www.ishrs.org	www.28thannual.org
JUN 4-6, 2021	Italian Society for Hair Science and Restoration International Conference <i>Florence, Chianti</i>	Italian Society for Hair Science and Restoration	segreteria@SITRI.IT
* JUL 23-24, 2021	12th Annual Hair Transplant 360 Cadaver Workshop & FUE Hands-On Workshop <i>St. Louis, Missouri, USA</i>	Saint Louis University School of Medicine, Practical Anatomy & Surgical Education In collaboration with the International Society of Hair Restoration Surgery http://pa.slu.edu	pa@slu.edu
* OCT 20-23, 2021	29th World Congress of the ISHRS <i>Lisbon, Portugal</i>	International Society of Hair Restoration Surgery www.ishrs.org	www.29thannual.org
* MAR TBD, 2022	ISHRS Regional Workshop: Cowgirl Hair Loss Workshop—Art & Perfection, Female Hair Loss <i>Houston, Texas, USA</i>	International Society of Hair Restoration Surgery Hosted by Carlos J. Puig, DO, FISHRS http://www.cowgirlhairloss.com/	cpuig@hairdoctexas.com

* Meetings that qualify for the ISHRS member educational maintenance requirement

REMINDER

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

ISHRS WORLD CONGRESS SCHEDULE

28TH WORLD CONGRESS

October 17-25, 2020
Virtual (online)

29TH WORLD CONGRESS

October 20-23, 2021
Lisbon | Portugal

30TH WORLD CONGRESS

October 26-29, 2022
Panama City | Panama

31ST WORLD CONGRESS

Dates to Be Determined, 2023
New Delhi | India

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.

2019–20 Board of Governors

President | Francisco Jimenez, MD, FISHRS
 Vice President | Paul J. McAndrews, MD, FISHRS
 Secretary | Nilofer P. Farjo, MBChB, FISHRS
 Treasurer | Kapil Dua, MBBS, MS, FISHRS
 Immediate Past President | Arthur Tykocinski, MD, FISHRS
 Gholamali Abbasi, MD, FISHRS
 Conradin von Albertini, MD, FISHRS
 Jean M. Devroye, MD, FISHRS
 Sharon K. Keene, MD, FISHRS
 Ricardo Mejia, MD
 Marcelo Pitchon, MD, FISHRS
 Paul T. Rose, MD, JD, FISHRS
 Robert H. True, MD, MPH, FISHRS
 Robin Unger, MD
 Bradley R. Wolf, MD, FISHRS

2019–20 Chairs of Committees

2020 World Congress Scientific Program Committee | Bradley R. Wolf, MD, FISHRS
 American Medical Association (AMA) House of Delegates (HOD) and
 Specialty & Service Society (SSS) Representative | Carlos J. Puig, DO, FISHRS
 (Delegate) | Paul T. Rose, MD, JD, FISHRS (Alternate Delegate) | Ricardo Mejia, MD
 (Alternate Delegate)
 Annual Giving Fund Chair | John D.N. Gillespie, MD, FISHRS
 Audit Committee | Vacant
 Communications & Public Education Committee | Jeffrey S. Epstein, MD, FISHRS
 CME Committee | Robert S. Haber, MD, FISHRS
 Regional Workshops Subcommittee | Conradin von Albertini, MD, FISHRS
 Ethics Committee | Gregory Williams, MBBS, FISHRS
 Exhibits & Advertising Review Committee | Robert J. Reese, DO, FISHRS
 Fellowship Training Committee | Carlos J. Puig, DO, FISHRS
 Finance Committee | Kapil Dua, MBBS, MS, FISHRS
 FUE Advancement Committee | James A. Harris, MD, FISHRS
 ISHRS Europe Council (IEC) | Bessam Farjo, MBChB, FISHRS
 International Relations Committee | David Perez-Meza, MD, FISHRS
 Membership Committee | Luis A. Nader, MD, FISHRS
 Nominating Committee | Francisco Jimenez, MD, FISHRS
 Past-Presidents Committee | Sungjoo (Tommy) Hwang, MD, PhD, FISHRS
 Pro Bono Committee | Jerzy R. Kolasinski, MD, PhD, FISHRS
 Scientific Research, Grants, & Awards Committee | Dow B. Stough, MD
 Surgical Assistants Committee | Marwan Noureldin, MSc
 Surgical Assistants Awards Committee | Jana Shafer
 Ad Hoc Committee on Issues Pertaining to the Unlicensed Practice of Medicine |
 Ricardo Mejia, MD
 ISHRS Ambassadors for Patient Safety | Konstantinos Anastassakis, MD, PhD, FISHRS
 Ad Hoc Committee on Regulatory Issues | Paul T. Rose, MD, JD, FISHRS
 Subcommittee on European Standards | Gregory Williams, MBBS, FISHRS
 ISHRS Representative to CEN/TC 403 | Gregory Williams, MBBS, FISHRS
 FUT Guidelines Task Force | Robin Unger, MD
 Task Force on COVID-19 | Paul McAndrews, MD, FISHRS
 Workgroup on Re-entry Protocols: Robert H. True, MD, MPH, FISHRS
 Workgroup on Webinars: Robert S. Haber, MD, FISHRS
 Task Force on Artificial Hair Fibers | Shady El-Maghraby, MD, MSc

Global Council of Hair Restoration Surgery Societies

Membership proudly includes:

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



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

- Articles should be written with the intent of sharing scientific information with the purpose of advancing the art and science of hair restoration and improving patient outcomes.
- If results are presented, the medical regimen or surgical techniques that were used to obtain the results should be disclosed in detail. If intra-operative or immediate post-operative photos are presented, please submit photos that show results (at least 6 months after surgery) of the procedure being presented.
- Articles submitted with the sole purpose of promotion or marketing will not be accepted.
- Authors should acknowledge all funding sources that supported their work as well as any relevant corporate affiliation.
- Trademarked names should not be used to refer to devices or techniques, when possible.
- Although we encourage submission of articles that may only contain the author's opinion for the purpose of stimulating thought, the editors may present such articles to colleagues with experience in the area in question for the purpose of obtaining further opinions to be published alongside the original article. Occasionally, a manuscript might be sent to an external reviewer who will judge the manuscript in a blind fashion to make recommendations about its acceptance, further revision, or rejection.
- Once the manuscript is accepted, it will be published as soon as possible, depending on space availability.
- All manuscripts should be submitted to forumeditors@ishrs.org.
- An Author Authorization and Release form must be individually completed by every author listed on the byline and the Word document (not a fax) submitted at the time of article submission. The form can be obtained in the Members Only section of the ISHRS website at www.ishrs.org. This release is meant to be signed electronically directly in the Word document. Simply open on your computer, fill in the highlighted fields, and return the Word document with your submission.
- All figures and tables should be sized down to no greater than 6 inches in width and sent as separate attachments to your email.
- For the complete list of instructions and downloadable checklist, go to: https://ishrs.org/wp-content/uploads/2020/06/ISHRS_Forum_ArticleSubmission_checklist_Fillable.pdf.

Submission deadlines:

October 5 for November/December 2020 issue

December 5 for January/February 2021 issue

February 5, for March/April 2021 issue

Classified Advertising Guidelines for Submission

To place a Classified Ad in the *Forum*, email cduckler@ishrs.org.

In your email, include the text of what you'd like your ad to read.

You should include specifics in the ad, such as what you offer, the qualities you're looking for, and how to respond to you.

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

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

Submit your Classified Ad to:
cduckler@ishrs.org



Due to the COVID-19 pandemic, the previously scheduled in-person meeting to occur in Panama this Oct. 2020 will now take place virtually. Please mark your calendars and watch for registration details.

INTERNATIONAL SOCIETY OF HAIR RESTORATION SURGERY



OCTOBER 17-25

ISHRS 28TH WORLD CONGRESS

VIRTUAL
2020

<https://www.28thannual.org/>

You Don't Want To Miss the First Virtual Big One!

As always, the ISHRS World Congress will deliver the best education from the top minds in the field of hair restoration surgery. We are introducing exciting technology to achieve a highly interactive, fully engaging congress that will actively promote networking and be entertaining.

Connecting Ideas and Surgeons from Around the World

GENERAL SESSIONS with our featured speakers and other key talks will take place on Saturdays and Sundays for approximately 4 hours per day.

FOCUSED SESSIONS, formerly known as "Workshops," will take place at staggered times during the week.

ORAL AND POSTER ABSTRACTS will have a special featured section.

NETWORKING OPPORTUNITIES, including "Coffee & Cocktails with the Experts" discussion tables and other reciprocal resources.

ADD-ON OPTIONS, such as Basics Course and Advanced/Board Review Course.

EXHIBITORS will have dedicated hours and additional optional office hours. There will be several company-sponsored satellite symposia.



International Society of Hair Restoration Surgery 1932 S. Halsted Street, Suite 413 | Chicago, IL 60608 USA
TEL +1-630-262-5399 | U.S. DOMESTIC TOLLFREE +1-800-444-2737 | FAX +1-630-262-1520 | E-MAIL info@ishrs.org
www.ISHRS.org

HAIR TRANSPLANT FORUM INTERNATIONAL

International Society of Hair Restoration Surgery

1932 S. Halsted St., Suite 413

Chicago, IL 60608 USA

Forwarding and Return Postage Guaranteed

Due to the COVID-19 pandemic, the previously scheduled in-person meeting to occur in Panama this Oct. 2020 will now take place virtually.
Please mark your calendars and watch for registration details.

INTERNATIONAL SOCIETY OF HAIR RESTORATION SURGERY

28TH WORLD CONGRESS

**VIRTUAL
2020**

OCTOBER 17-25

**You Don't Want To Miss the
First Virtual Big One!**

As always, the ISHRS World Congress will deliver the best education from the top minds in the field of hair restoration surgery. We are introducing exciting technology to achieve a highly interactive, fully engaging congress that will actively promote networking and be entertaining.

<https://www.28thannual.org/>

