

FORUM

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IN THIS ISSUE

T-Fast Multi-Implanter

Automation for FUE Graft Handling

The Development and Application of the Hair Diameter Index (HDI)

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ABSTRACT

Introduction: A study was presented in New York in 2003 investigating a proposed measurement system, the Hair Volume Index (HVI), for evaluating visual hair density. This was based on the idea that scalp coverage was related to the measured volume of hair in a given area. The study results did not support this contention but rather that visual density was correlated with the number of hairs and the hair shaft diameter, which led to the development of the Hair Diameter Index (HDI). This article describes the study results and the application of the HDI in hair restoration surgery for follicular unit excision (FUE) donor area planning and graft implantation density.

Keywords: Hair Diameter Index, Hair Volume Index, FUE limits, scalp coverage, implantation density

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INTRODUCTION

The concept of the Hair Diameter Index (HDI) was first presented at the ISHRS Annual Scientific Meeting in New York in 2003.¹ The concept did not create any interest to speak of except for some interest by Dr. Bernie Cohen as he was involved in the measurement of hair volume and its impact on visual density. His interest and work in this area resulted in the development of cross-sectional trichometry (CST) and the HairCheck™ device.² There has been a surge of interest in this concept since Dr. Koray Erdogan began discussing his concept of hair coverage, which will be discussed later.

The HDI was an “accidental” development and was formulated after conducting a study to present a rationale and proof for the concept that coverage of the scalp by hair was a result of the total hair cross-sectional area of a group of hair shafts in a given area of scalp as suggested by Arnold³ and other colleagues, such as Cole, in non-referenced presentations

Arnold offered the concept of the “Hair Mass Index” and had a simple methodology to measure this value. He tied a string around a bundle of hair in a given area of scalp, which in effect measured the circumference of the bundle. This value provided an “index” of the volume of the hair contained in the bundle. I felt that the idea could be refined and validated for general use.

Based on Arnold’s work, my working theory was that if I could determine total cross-sectional area of a group of hairs by using the average hair shaft diameter of the hairs in a region, I could develop an “index” with values that would correlate with ranges of visual hair density in either the donor or recipient area.

By using the average hair shaft diameter and the average number of hairs per follicular unit to calculate an index, we could use this information to guide us in two important ways: 1) it could help us in determining how many follicular units could be removed from an area before it would look thin, or 2) in determining how many follicular units would be required to transplant into a given area to provide “thin,” “moderate,” or “thick” coverage in the recipient area, which would be applicable for general hair restoration.

The first step in the process was to determine how many hairs in the safe donor area had to be sampled to give an accurate estimate of the average Hair Shaft Diameter (HSD) in a given area of the donor region. This study was presented in a poster at the 2003 ISHRS Annual Scientific Meeting in New York meeting.⁴ The hair shaft diameters of 100 hairs in each of 64 patients were measured by using a Starrett

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President's Message

Paul J. McAndrews, MD, FISHRS | Pasadena, California, USA | president@ishrs.org

Happy New Year to all my ISHRS colleagues!

I hope all of you had a very blessed and healthy holiday season with your family and office staff. If there is one thing the COVID

pandemic has taught me, it is how important my family and friends are to me. I am so grateful for my family, my friends, and my ISHRS family. Thank you for all the joy you bring to my life.

Even though the COVID cases increased this holiday season, the future looks much brighter for the world and the ISHRS with the arrival of 3 different COVID-19 vaccines. I

just received my COVID-19 vaccine and am left with only a sore arm. The ISHRS staff did such an amazing job in 2020 keeping us virtually connected to our 3 pillars: our members' education, comradery, and research. It looks like the sun is coming back out in 2021 knowing the vaccines will bring us back to "live" education, comradery, and research. I am looking forward to going back to life as we knew it.

I also am looking forward to our Hybrid World Conference in Lisbon that Marie Schambach, the World Congress Committee, and the ISHRS staff are already hard at work preparing. We will have the best of both worlds—live and virtual.

Happy New Year and I am absolutely looking forward to seeing you all in 2021. ■

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Co-Editors' Messages



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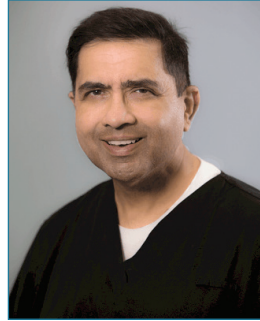
As I write this message, a Bitcoin is over \$33,000, up more than 50% from a month ago. I wish I had in early December at the advice of a numbers-wonk friend of mine bought more than a half a Bitcoin, but fortunately my day job—hair restoration surgery—allows me to

not have to rely on speculative investments to improve my financial situation. This surgery that I perform happens not only to be a vocation but also an avocation, with rewards that far exceed the financial. I am unable to think of any better investment than putting my money on “me”—my knowledge and skills, let alone my overwhelming willingness to work hard, a far better bet than any speculative currency (although I am optimistic about the future of a trustless, decentralized, non-repudiable currency). And like most savings that compound over time, the sooner one builds up his/her practice, the more dividends to be earned over the course of one's professional years in the form not only of money but also satisfaction and respect. Think of how much investing in yourself you undertook just to get you to the point of opening your practice doors in the form of formal education and residency training, and perhaps a fellowship. There is no time like the present to parlay that initial investment into a much bigger payout, not only monetarily but also reputation-wise.

Which brings me to what I share with any doctor who seeks my advice. First, invest in yourself and your practice. Second, seek to become an expert in your chosen field and you will always be recession proof, as well as the recipient of the respect of peers. If there was one conclusion of the ISHRS's Covid Task Force study, it was that those who specialized in hair restoration surgery had the least decline in practice volume and income in 2020. Third, when you love what you do, it is not work you do every day. Finally, particularly for the more “senior” of those who are reading this, avoid complacency. This phenomenon is not limited to doctors, but is a risk in just about every form of work. It can result in a lower level of care to patients, and (for fans of the movie *Seven* or of the bible) it also is related to two of the seven “deadly sins”: pride and sloth (laziness). Approach each day, each surgery, each professional challenge with curiosity and passion.

As with many of the articles that appear in the *Forum*, the author of this issue's cover article, Jim Harris, perfectly exemplifies passion and focus. At the forefront of FUE, Dr. Harris continues to explore the nuances of hair science and its impact on hair procedure outcomes, expanding on the prior work of some exceptional minds in our field including the late Jim Arnold, Bernie Cohen, John Cole, and Koray Erdogan. What started as a passing thought in Dr. Arnold's mind led Dr. Cohen to create a device to help objectively quantify this concept that led Dr. Cole to provide a doctoral-thesis-level of exploration, that in this issue is presented as a refinement of Dr. Erdogan's formula.

➤ CONTINUES ON BOTTOM OF PAGE 5



Aditya K. Gupta, MD, PhD, FISHRS |
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Happy New Year to our readers! I would like to take this opportunity to thank everyone who continues to work through these unprecedented times to bring together this amazing *Forum*. It is because of all your hard work that we continue to have such a diversity of

high-quality articles. I would also like to encourage new contributors to come forward, and for all contributors to use our checklist (https://ishrs.org/wp-content/uploads/2020/06/ISHRS_Forum_ArticleSubmission_checklist_Fillable.pdf) to assist in preparing their article.

This issue highlights the variety of expertise in our field. Editor Emeritus Russell Knudsen discusses the difficult conversations that we sometimes have with patients who regret their treatment. These conversations are rarely discussed afterwards, but are important to share as many other transplant surgeons likely have similar encounters. Such stories are reminders to ensure that our patients, especially younger patients, understand the long-term upkeep and lifestyle changes required after surgery.

Our lead article by Jim Harris, one of the pioneers of FUE, accurately explains how the visual appearance of hair density is correlated with not only hair count but with hair diameter as well. The Hair Diameter Index could become an important tool for surgical planning, especially for new doctors and repeat patients. Other hair transplant innovations discussed in this issue include the dual-needle T-Fast multi-implanter by Roberto Trivellini, and the automation of FUE graft handling described by Pascal Boudjema and William Rassman. Such innovations could revolutionize hair transplant procedures, and we are honored to present them in their development stage here in the *Forum*.

Our newest column, Gregory Williams's “Conversations with the ABHRS Diplomates,” presents the wide array of expertise and experience of the ABHRS Diplomates and offers useful advice regarding common practices. Vlad Ratushny's Hair Sciences column discusses the interesting world of organoid development, where culture-grown skin and hair follicles appear to have come a long way. In “Regenerative Medicine,” Gorana Kuka-Epstein explains what is currently known in the literature regarding microneedling, its potential benefits, and the differences between dermarollers and dermapens. Sara Wasserbauer's Q&A column is, as always, a thought-provoking exercise. In “Hear from the Assistants,” Marwan Noureldin profiles Song Yang from the Shapiro Medical Group in Minneapolis, USA, where she has great advice for assistants and physicians alike. In “ABHRS President's Corner,” Sam Lam and Sara Wasserbauer discuss the merits of the ABHRS exam going online in 2021, thereby enabling participants to take the exam without having to travel, which is especially beneficial during this time of travel restrictions and quarantine. Finally, both our president, Paul McAndrews, and program chair, Marie Schambach, invite us to attend the upcoming World Congress. ■



Notes from the Editor Emeritus, 1999–2001

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The Buyer's Remorse Dilemma

Yesterday, I had one of those consultations with an existing patient that you never want to have. He first came to see me aged

26 years with Norwood 3 pattern of balding. He was commenced on finasteride and eventually decided to proceed to temporal thickening via strip FUT surgery.

He arrived yesterday, aged 33 years, with his pregnant wife to tell me:

1. He wasn't using medication (hadn't for a long time).
2. He had lost the central forelock and was beginning to thin in the vertex.
3. He didn't care about balding anymore and wished he hadn't had the surgery!
4. What were his options?

Luckily, these conversations don't happen very often, but they are distressing when they do occur. The first time it happened to me was many years ago when I had (perhaps foolishly) agreed to operate on a very distressed 19-year-old at his mother's urging. He arrived 10 years later with spaced plug grafts and sadly informed me he wished he had never had the surgery. I felt very guilty about this, and ever since I repeatedly stress to patients during consultation that proceeding with surgery requires commitment to the process as you have to manage the balding for the rest of your life.

Thankfully, my recent patient "owned" the decision to have surgery, and we then proceeded to discuss the possible responses to his dilemma. As I explained it to him, he could either go forward (more grafts) or backward (laser the hairs out). He expressed an opinion that without having had surgery he would have just shaved everything off. This is problematic in that he has a very nice, thin, strip scar in the donor area, but it would be slightly visible and he wasn't interested in scalp micropigmentation (SMP) because it isn't

permanent. This led me to wonder whether FUE would have been a better choice in this young man.

The important lesson to learn here is that patients may change their mind about the significance of their hair loss. When single men are seeking to attract a partner, their appearance has great importance to them. When they are happily partnered up, it is perhaps less so. I always tell my patients they can walk away from medication and the worst thing that can happen is that they bald according to their genes. I tell them they can't walk away from surgery as they now have to care about, and maintain, a normal appearance for the rest of their lives.

Young patients often tell me they prefer FUE because they can decide to shave their head later and not worry about visible scarring. While this is potentially valid, I don't like them to make a decision to proceed to surgery on the basis of a temporary result. After all, they have invested time and money in the decision, and it shouldn't be made flippantly.

When Richard Shiell was teaching me hair grafting, he told me he NEVER operated on men under 23 years of age as they didn't have sufficient emotional maturity to make the decision. We are now told many young men don't intellectually and emotionally mature till age 27. It just reinforces to us all how we should take our time with our younger patients and get them to make their decisions over a period of time with repeated emphasis on the consequences of their decision making.

So, what was the outcome for my patient? He appears to be moving in the direction of having further grafting to even the coverage in the frontal forelock area. We will not attempt to graft the mid-scalp or vertex. This is an expense he will have to wear because of his previous decision to have temporal grafting.

We will never get it perfect, but we owe it to our patients to help them make good decisions that they can live with over time. ■

EPSTEIN MESSAGE FROM PAGE 4

Also in this issue are two articles describing devices designed to optimize the hair transplant process. Roberto Trivellini and Aditya Gupta present the T-Fast multi-implanter and describe how they overcame the problem of popping when using a two-graft-at-a-time sharp implanter. In a more conceptual presentation, Pascal Boudjema and William Rassman describe the steps to automation to facilitate graft handling when using implanters. Personally speaking, the use of dull implanters in my practice has improved my regrowth rate and smoothed out the planting process, allowing me to continue to make my recipient sites by a tiny sharp blade, my preferred approach. The need for an assistant to load the implanters

puts to good work those members of my team who once were kept busy doing FUT graft dissection. Gorana Kuka-Epstein once again achieves her column's goal of cutting through the hype of cell therapies, this time looking at microneedling and exploring whether the pain is really worth it. Editor Emeritus Russell Knudsen looks at the challenges of treating young men, and Vlad Ratushny has an excellent "Hair Sciences" column.

Enjoy your read, and please, all our U.S. members, turn to page 11 where you are requested to join the AMA and help to maintain the ISHRS's seat in the AMA's House of Delegates. And for those who are not ABHRS Diplomates, consider Sam Lam's invitation to sit for the exam virtually. ■