

IN THIS ISSUE

The Evolving Role for Autologous Adipose Tissue (Fat) in Treating Hair Loss

A Case Report of Subclinical Lichen Planopilaris after Hair Transplantation

Spotlight on Ethical Marketing

Graft Quality Index: A Morphologic Classification of Follicular Unit Excision (FUE) Grafts

Robert H. True, MD, MPH, FISHRS | New York, New York, USA | drtrue@hairlossdoctors.com

GRAFT QUALITY INDEX

Graft quality is a significant component of all hair restoration surgery, especially Follicular Unit Excision (FUE). There is much discussion in our professional community about the impact of graft quality on the cosmetic results of hair restoration surgery, particularly with FUE.¹⁻⁴ The gold standard remains that microscopically slivered and created grafts obtained by strip surgery are ideal. The challenge for FUE harvesting methods is to produce grafts that are similar to or exactly the same as strip grafts. FUE grafts are often characterized as having lower yield than microscopically dissected grafts produced in FUT surgery.

Grafts of high quality, whether produced by strip or FUE, have supportive tissue throughout and contain minimal transections, follicle fractures, and crushed follicles. Transection and stripped and severely splayed follicles are by-products of the punch insertion technique. Follicle fractures and crush injury are consequences of the amount and type of force used to remove the grafts once they have been scored and dissected.

The gold standard remains that microscopically slivered and created grafts obtained by strip surgery are ideal. The challenge for FUE harvesting methods is to produce grafts that are similar to or exactly the same as strip grafts.

Grafts of high quality are amenable to placement without undue manipulation or placement trauma. Grafts of lesser quality present more risk of damage during processing and implantation. In inspecting FUE grafts produced by a wide variety of techniques, one can observe that the grafts have different morphologies. On closer analysis, FUE grafts fall into four morphological types. Although there is general consensus in our field that some graft morphologies produce better yields than others, we do not know what the impact of these different morphologies is on transplant outcomes.

These morphological types are the basis of my novel concept, Graft Quality Index (GQI). I propose that this index can be used in all hair restoration surgeries—including FUE—to grade grafts. The graft quality grade can be used as a quality control tool to 1) predict the difficulty of graft placement, 2) guide the best implantation technique, and 3) relate graft morphology to the results of surgery. Perhaps this will help to answer the question of the effect on graft morphology on outcomes in future studies.

GQI has four grades:

1. **Grade 1:** Grafts have no transections or damaged follicles, a smooth regular border, perifollicular tissue throughout the follicle length, and non-follicular tissue below the bulbs (Figure 1).

FIGURE 1. GQI Grade 1 grafts

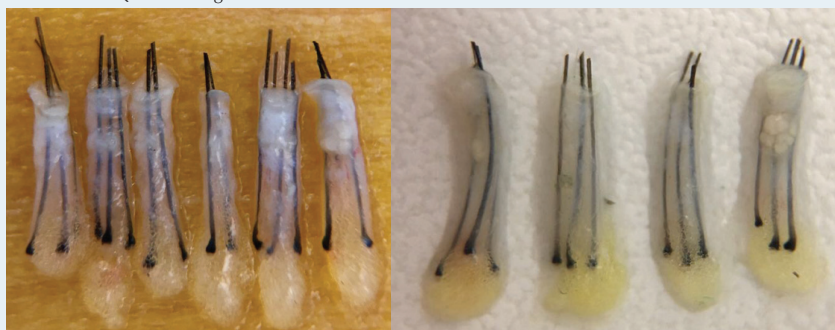


TABLE OF CONTENTS

- 47 President's Message
- 48 Co-editors' Message
- 49 Notes from the Editor Emeritus: Dr. Michael L. Beehner
- 54 The Evolving Role for Autologous Adipose Tissue (Fat) in Treating Hair Loss
- 58 A Case Report of Subclinical Lichen Planopilaris after Hair Transplantation
- 60 Medical and Professional Ethics: Spotlight on Ethical Marketing
- 63 Controversies: The Temporary Hair Transplant: A Novel Idea or Making a Virtue Out of Necessity?
- 64 Cyberspace Chat: A Tribute to Dr. Jim Arnold
- 67 Hair's the Question: Red Hair
- 69 Meeting Review: 2018 WLSW Dubai
- 77 Regional Society Profile: Thai Society of Hair Restoration Surgery
- 78 Message from the ISHRS 2018 World Congress Program Chair
- 79 Message from the ISHRS 2018 Surgical Assistants Chair & Vice Chair
- 84 Classified Ads
- 85 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
303 West State Street
Geneva, IL 60134 USA
Telephone 1-630-262-5399
U.S. Domestic Toll Free 1-800-444-2737
Fax 1-630-262-1520

President	Sungjoo (Tommy) Hwang, MD, PhD, FISHRS president@ishrs.org
Executive Director	Victoria Ceh, MPA vceh@ishrs.org
Editors	Andreas M. Finner, MD, FISHRS Bradley R. Wolf, MD, FISHRS forumeditors@ishrs.org
Managing Editor & Advertising Sales	Cheryl Duckler, 1-262-643-4212 cduckler@ishrs.org
Controversies	Russell G. Knudsen, MBBS, FISHRS
Cyberspace Chat	Robin Unger, MD
Difficult Cases/Complications	Marco Barusco, MD, FISHRS
Medical & Professional Ethics	Gregory Williams, MBBS, FISHRS
Hair's the Question	Sara M. Wasserbauer, MD, FISHRS
How I Do It	Timothy Carman, MD, FISHRS
Literature Review	Jeffrey Donovan, MD, PhD, FISHRS Nicole E. Rogers, MD, 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.

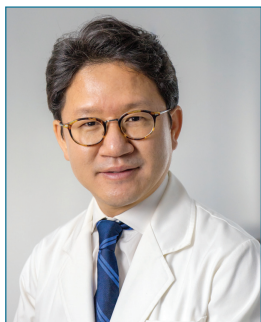
The material published in the Forum is copyrighted and may not be utilized in any form without the express written consent of the Editor(s).

Copyright © 2018 by the
International Society of Hair Restoration Surgery,
303 West State Street,
Geneva, IL 60134 USA

Printed in the USA.



Official Publication of the
International Society of Hair Restoration Surgery



President's Message

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

Dear Colleagues,

As most of you know, we held our second World Live Surgery Workshop outside the United States. On 8th-10th March 2018, I met many familiar and new faces at the WLSW in Dubai. I would

like to thank all those who made the Dubai workshop happen, with special thank-you's to Dr. Conradin von Albertini, Chair, Dr. Bessam Farjo, Co-chair, and all of the ISHRS staff. Also, I would like to extend my thanks to the local doctors and assistants in Dubai. We would not have been able to run the programs smoothly without their help and support. At the Dubai WLSW, a total of 36 international faculties served, with 4 of them being local faculties. I would like to thank them for their contributions and efforts.

On 16th-18th February 2018, I had the greatest pleasure in attending the 10th Annual Conference of the Indian Society (HAIRCON 2018). India is a Global Council member society and has the second most members in the ISHRS after the United States. The Indian society has a total of 300 members and approximately 200 doctors attended this meeting, including many from Iran and Bangladesh. There were 40 speakers who gave 90 talks. Many of the lectures given at this meeting were exciting, with lots of promising ideas. It was truly a tremendous success in all aspects. During my presidency, I am planning to attend meetings held by Global Council member societies such as the Asian Association meeting, which will be held in Beijing, China, in May 2018, and the Korean Society meeting to be held in June 2018. In March 2018, I will also attend the the Taiwan Society meeting. The Taiwan Society will apply to be a member of the Global Council.

At the HAIRCON 2018 meeting, I heard some tragic news. A patient had to have his eye removed as the result of an infectious disease after receiving FUE treatment in India. Recently, there have been reported deaths caused by hair transplantation around the world. We know that hair transplant surgery is just as dangerous as any other cosmetic surgery. Therefore, only physicians should perform the procedure—in no case should an assistant be allowed to do it. Surgeries performed by assistants are likely to create unnecessary complications. At our recent meeting of the Global Council at the World Congress in Prague 2017, the Global Council member societies expressed a strong sense of unity and passion in the fight against unlicensed practice of medicine in hair restoration.

As many of you may know, the ISHRS made the decision to change the term FUE from FU Extraction to FU Excision. The reason for this was that excision is a word involving incision + extraction, and the word extraction has the potential to give the wrong impression to the public, such as meaning no incision, no scar, or no pain. I would like to thank Drs. Bill Rassman and Bob Bernstein, who first proposed the term Follicular Unit Extraction in the field of hair restoration, for agreeing to the use of the new term FU Excision.

In mid-June 2017, the 2017 ISHRS Practice Census was conducted online. The content of the research was developed by the ISHRS Communications & Public Education Committee. The results showed that worldwide the Surgical Hair Restoration market size is \$4.1 Billion USD. This represents a 64% increase since 2014. In addition, we've seen a 60% increase in the number of surgical hair restoration procedures performed worldwide, with 635,189 procedures in 2016. From these results, we can see that more and more hair transplants are being performed globally. With this in mind, I realized that it is imperative for the ISHRS and the Global Council member societies to provide better education for newcomers who are starting their journey in hair restoration surgery. I would like to thank Drs. Sharon Keene (Chair), Ken Washenik (Co-chair), and all the members of this committee for their effort and support in this important survey.

We proposed a call for committee volunteers to members at the World Congress in Prague 2017. Firstly, I would like to express thanks to the many members who volunteered for the development of the society. I have tried my best to provide as many opportunities as possible to all. However, due to a limited number of places, we could not give everybody a chance. As we had so many volunteers, we had to put in place a term expiration for committee members so that other members would have the opportunity to serve on committees. I sincerely thank all who have rotated off the committee for their ongoing time and service to the ISHRS. Currently, there are 22 committees and some have subcommittees under them. There are over 200 committee positions.

We are in the process of preparing for the October 2018 World Congress in Hollywood, Los Angeles (USA). I would like to ask for your active participation in this important meeting. With your help and support, I'm sure that the World Congress will be another successful event. ■

Co-editors' Message

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

This issue features the Graft Quality Index established by Bob True. This classification may be very helpful in daily quality control and should be used in future studies assessing FUE instruments and graft survival rates.

In Controversies, Russell Knudsen focuses on a common problem we face, especially in patients asking for FUE where progression is likely. Harvesting non-permanent hairs from a potentially unsafe zone may be necessary to obtain more grafts. But will these patients really want to shave later or accept the loss of transplanted non-permanent hair? From my experience, most patients with progression will be asking for another transplant. Having hair will stay important for them. When I discuss this during the consultation, many patients will switch to FUT to have a greater donor reserve. The problem is that many surgeons don't offer FUT anymore, so they will either present the transplantation of non-permanent hair as part of their surgical "plan" or not even discuss this scenario with their patients, which is ethically questionable.

The article by Gorana Kuka Epstein and Jeffrey Epstein highlights the potential role of adipose tissue grafting combined with PRP in the treatment of hair loss. Injecting autologous fat has been used as an adjunct in atrophic cicatricial alopecias and the evidence for PRP is increasing. The efficacy of cell-enriched or pure adipose tissue in other types of hair loss is worth investigating in controlled studies with objective measurements versus placebo or PRP alone. If we try such treatments in individual patients, it may be helpful to do before-and-after digital hair counts in a target area.

While minimal inflammation and microscarring may be a normal sign of graft healing, some patients develop destructive inflammation. This may lead to suboptimal surgical results as Tayfun Oguzoglu reports. I just came back from the very instructive 1st World Congress of Trichoscopy in Warsaw (www.hairnails2018.com). It is important to perform trichoscopy before and after hair transplantation to recognize subtle hints for cicatricial alopecia, especially "fibrosing alopecia in a pattern distribution." A trichoscopy-guided biopsy would be the next step.

I thank all authors and columnists. This is a newsletter where members share ideas and concepts. So even if you have something that is not a study but worth reporting, please send it in to forumeditors@ishrs.org. ■



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

I'd like to congratulate Conradin von Albertini, Bessam Farjo, Victoria Ceh, and the ISHRS on the World Live Surgery Wworkshop (WLSW) held in Dubai this past March. It was another wonderful opportunity to travel, sample the food, and learn

about an exotic part of the world. The United Arab Emirates (UAE) is an Arabian Peninsula nation settled mainly along the Persian Gulf and is a federation of seven emirates established in 1971. It was also a chance to meet old friends and make new friends, share old ideas and the latest information concerning the pilosebaceous unit or hair follicle.

While the lectures were informative, the live workshop was the highlight of the conference. This was an opportunity to see all the current FUE devices, punches, and implanters up close and in action. Twenty years ago, who would have anticipated the changes in hair transplant surgery? FUT was king then, and most of us were excited to be offering patients such contemporary and excellent results with microscopically dissected FUT grafts. But as it always has been in our specialty, everything changes. Punches/devices demonstrated at the WLSW included flat motorized, sharp manual, sharp motorized, blunt and sharp serrated motorized, flared rimmed, hybrid flared reactive, hybrid flared serrated, and flared rimmed. It was great to see all these punches in action usually in the hands of their creators. It has been stated many times and I agree, it's important to become proficient using more than one type of device/punch. If one is consistently harvesting unacceptable grafts, something must be changed and most often it is the device/punch.

The goal with every attempt at FU excision and extraction is to get the highest quality graft. Bob True's article on the Graft Quality Index is certainly timely as FUE becomes more advanced and we look (with high magnification) at the nuances of graft quality in relation to the many variables including punch type. I wholeheartedly agree that the highest quality grafts are the easiest to place and least susceptible to trauma. If there was any question before, we now know what we should all shoot for with respect to graft quality.

The hair restoration world just isn't the same without Jim Arnold. He was actively involved until the time of his death and was unique in that while he seemed to think on a plane above us, he tried to relate to each of us at our own level. He was always interested in and asked me about my farm and tractor. Manny Marritt left the field much earlier than he left us but still has had an indelible effect on our ethical standards. May we remember them and their ethos as we look forward and continue to develop our specialty. ■



Notes from the Editor Emeritus, 2002–04

Michael L. Beehner, MD, FISHRS | Saratoga Springs, New York, USA |
mlbeehner@saratogahair.com

My First Hero

I was saddened to hear about the recent death of Manny Marritt. He was certainly one of the giants from the past in our specialty, and one who bowed out of his professional career way too early. He had a great effect on so many people and stimulated them to think and re-think their position on many issues. Speaking for myself, he shaped my approach to hair transplant planning more than anyone else. I'll give a little background history and how it led to my encounters with Manny.

I began practicing hair transplant surgery in 1989, and, although I had read the Norwood/Shiell textbook and Walter Unger's second edition backwards and forward twice, I had never heard of any formal gatherings of hair surgeons at which information was shared or imparted, nor was I aware of any publication or journal concerning the specialty of hair transplantation.

My first two years in hair transplantation were spent in the humble metropolis of Schroon Lake, New York, a small resort community of 1,000 people 90 miles north of Albany, New York, in the middle of the Adirondack Mountains. My family practice satellite office was already located there and, besides, there was the big advantage (over my home base of Ticonderoga, New York) that the Greyhound bus ran through Schroon Lake twice a day and could potentially drop off patients from New York City and Albany who wanted hair surgery, and the Interstate highway going to Montreal ran right through town also. In a short time, I fell in love with the mistress of hair transplant surgery, but at first only considered it a diversion for Friday afternoons, which incidentally would help me get my four kids through college.

Shortly after becoming a member of the American Hair Loss Council around 1993, I learned of an upcoming hair-related convention in Dallas, Texas, scheduled for the fall of 1993. I immediately made a reservation for me and my wife to attend. The faculty members who would be speaking about hair surgery were Marty Unger, Shelly Kabaker, Carlos Puig, and Manny Marritt—none of whom I knew at the time.

On the second day of the conference, Manny was scheduled to give a 15-minute lecture on the isolated forelock concept in hair transplant surgery. Well, as anyone who knows Manny would not be surprised to hear, he went over his allotted time—way over—and finished up around an hour later. He spoke passionately about the frontal forelock and the need to anticipate the future changes our patients may undergo and the awesome responsibility that we as hair surgeons carried on our shoulders. Everything he said made sense to me, and I went home with this newfound “religion” and started using the forelock concept on my young patients and the extremely bald, older ones as well.

Fast forward to the second ISHRS meeting in Toronto, which my wife and I attended. During the three-day convention, I was surprised in that I didn't hear a word about the frontal forelock concept. Incidentally, Manny was not in attendance at that meeting. Back-tracking a bit, I was delighted at the Dallas meeting to learn about O'Tar Norwood starting up the *Hair Transplant Forum International* as a regular journal for hair surgeons to exchange ideas in. So, after I returned home from the Toronto meeting, not knowing who else to call or contact, I phoned the *Forum* editor, O'Tar Norwood, and asked him for his take on the complete absence of any mention of the forelock at the Toronto meeting. To my great surprise, he ended our conversation by asking me to write something about it myself for the *Forum*. This wasn't at all what I had in mind in calling him, but, after a couple of days, I agreed to write the article, and was more than a little stunned to see my article on the front page of the next edition.

At the conclusion of the Dallas meeting, Manny urged me to call him anytime I wanted to talk further about the frontal forelock topic. Before writing the *Forum* article, I did in fact call his office, and his secretary said that she would give me a formal appointment time for 15 minutes on the following Friday, during which we would presumably hold our “talk.” As it turned out, similar to his lectures, we went way overtime and it expanded into a nearly 50-minute conversation; I use the term “conversation” in the loosest sense of the word, because, when you talked with Manny, 90% of the conversation was in one direction from him to me, with me occasionally interjecting a short comment or question between the cracks when I could find one.

A few months later, we had another similar conversation of similar length. I must confess that it was enjoyable to listen to someone expound so passionately and idealistically about his field of endeavor. Besides his strong advocacy of the “forelock” pattern for most of his patients, his other focus was on his total opposition to including scalp reductions in the repertoire of a hair surgeon.

My next contact with Manny was a few months later in June of 1995 in Chicago at a large hair meeting sponsored by the American Academy of Facial Plastic Surgery and chaired by Ray Konior and Ken Buchwald. I believe that was the last hair meeting that Manny ever attended, which was a great loss for our specialty. The spark that blew the doors off their hinges for him was a late afternoon lecture he gave concerning the harmful effects of scalp reduction surgery. He stood up and dramatically pointed to two large white screens in front of him and stated that henceforth he would propose that anyone giving a lecture about scalp reductions should have one screen for his slides and the other screen

for the reading from a lie detector test situated on a nearby table, which would let the audience know if the speaker was being truthful or not. The verbal retaliation that Manny received after that lecture and again the next morning was devastating. Shortly after that meeting he let it be known that he would not be attending any future hair meetings, and he kept his word, as far as I am aware. A few years later, I was heartened to learn of the book for patients that he and Jim Harris had written together. I heard from others that his passions and interest shifted to researching cancer treatments in the years following that Chicago meeting.

Before closing my comments on Manny, I would like to share one other pearl that Manny came up with as a very brief pictorial article for *Dermatologic Surgery*. He some-

how convinced some gentleman with a full head of hair to agree to let him identify two square areas at the edge of the hairline, one which remained as a control, and the other one from which he plucked half of all the hairs that were present. The zoomed-in photos of these two squares showed no difference in apparent density. I never forgot the lesson from that experiment.

So, in closing, I would like to say that Manny was my first hero and role model in hair surgery and I still carry with me many of the ideas that he evangelized on. In his heyday, I once heard one observer say that he was the “David Letterman” of our field. You just couldn’t help but want to hear what he had to say. ■

UN-HAPPY Patient?

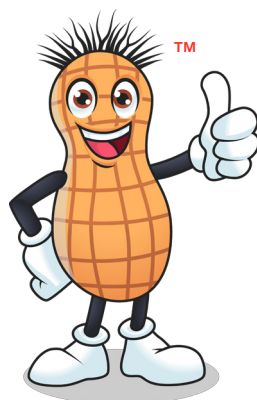
Slow Growth - Poor Results



Try HelpHair® Shake!

Join our Worldwide Network

These products do not treat, diagnose or cure any disease



Mr. Nutty

HelpHair.com presents
Our Latest Product

Nuts4Hair™

“No fish breath”

Peanut Butter Powder with
Marine Collagen, Omega 3’s
Saw Palmetto & Pumpkin Seed

Lactose Free, Tastes Great!
Mix with Help Hair Shake.

To order call
1-561-420-2400

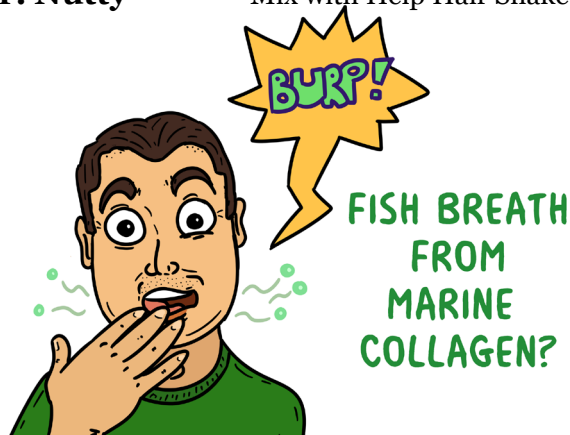


FIGURE 2. GQI Grade 2 grafts



FIGURE 3. GQI Grade 3 grafts

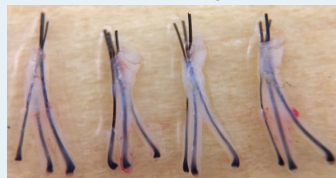


FIGURE 4. GQI Grade 4 grafts



2. **Grade 2:** Grafts are similar to those in Grade 1 but have less perifollicular tissue and no tissue below the bulbs. They also are free of transections and follicle damage (Figure 2).
3. **Grade 3:** Grafts have extreme iatrogenic splay, with the lower third to half of the follicles being denuded of surrounding tissue (Figure 3). The concept of iatrogenic splay will be explained below.
4. **Grade 4:** Grafts contain transections and damaged follicles, the graft margins are irregular and transected follicles may protrude from the graft, and some follicles may be denuded and have iatrogenic splay (Figure 4).

The distinguishing characteristics of the grafts in each GQI class are summarized in Table 1. Table 2 is an example of how to score a case with GQI. To calculate the GQI score, the following method is suggested: one point is assigned for each Grade 1 graft, 2 points assigned for each Grade 2 graft, 3 points for Grade 3 grafts, and 4 points for Grade 4 grafts. The point total is divided by the graft total to get the GQI score. Lower scores indicate more grafts with the most favorable characteristics: easiest to place and more likely to survive. Higher scores above 2 imply more grafts with less

TABLE 1. Distinguishing Characteristics of Grafts in GQI Classes

GQI Class	Splay	Transection	Denuded Follicles	Graft Margins	Supportive Tissue	Tissue Below Bulbs
1	Structural Only	None	None	Smooth and regular	Abundant	Yes
2	Structural Only	None	None	Smooth and Regular	Scant	No
3	Extreme iatrogenic	Some	Common	Bare Follicles	No	No
4	Some iatrogenic	Common	Occasional	Irregular with Protruding Transected Follicles	Irregular	No

TABLE 2. Scoring with GQI

GQI Graft Grade	Graft Number	Point Count	
1	1250	1250	
2	250	500	
3	95	285	
4	45	180	
Total	2640	2215	GQI Score 1.35

favorable characteristics: more difficult to place without risk of trauma and more likely to have lower graft survival rates.

To illustrate the application of GQI, I will give two examples from the Graft Analysis Project conducted as part of the ISHRS Live Surgery Workshop in Polanica, Poland, in 2017.

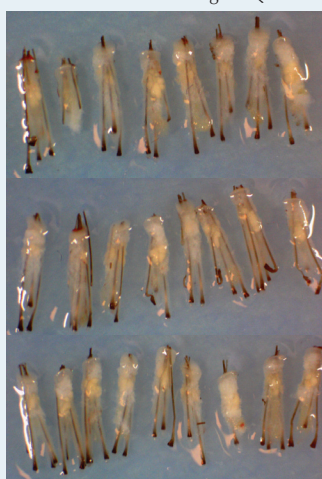
The first sample, shown in Figure 5, had the lowest GQI score among the workshop cases, and the second sample, shown in Figure 6, had the highest GQI score among the cases. In the lowest score case, the majority of grafts fell into GQI Grade 1 and the transection rate was low suggesting high graft quality and the likelihood of a good outcome. In the case with the highest score, all of the grafts were either denuded or contained follicle damage indicating poor graft quality and probability of a lesser outcome.

FIGURE 5. Case with low GQI score



Punch diameter at the tip 1.05
Blunt Punch
Grade 1 – 19; Grade 2 – 1;
Grade 3 – 0; Grade 4 – 5
Total points – 41
GQI – 1.64

FIGURE 6. Case with high GQI score



0.87 outside diameter
Sharp Motorized
Grade 1 – 0; Grade 2 – 0;
Grade 3 – 12; Grade 4 – 13
Total points – 88
GQI – 3.52

I recommend that GQI should be recorded as 1) punch diameter, 2) punch type, 3) count per Grade, 4) total points, and 5) GQI score. All of this information will be needed to interpret the meaning of the score.

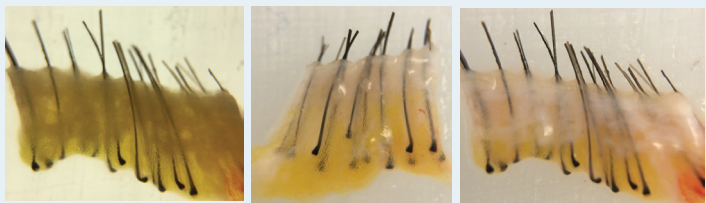
The character of GQI class 3 grafts must be elaborated further. In the standard terminology of FUE (Figure 7), splay is the term used to describe a follicle (or all follicles) within a follicular cluster that diverge from adjacent follicles.⁵⁻⁷ Splay is typically observed in the proximal portion (lower one-third) of the follicular unit,

FIGURE 7. Splay



and it can vary in degree. I want to introduce the concept of “structural” splay and “iatrogenic” splay. Structural splay exists anatomically in the tissue and varies among patients, and importantly varies within the same patient (Figure 8). Iatrogenic splay is defined as follicular splay that is produced by the method of FUE harvesting.

FIGURE 8. Variable structural splay

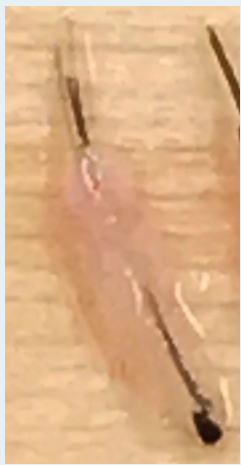


FUE techniques in which the punch is inserted superficially into the dermis may often produce extreme splay of the bulb portion of the follicles. This is a consequence of stripping away the perifollicular tissue during the

FIGURE 9. Iatrogenic splay



FIGURE 10. Crushed bulb



the bulbs and/or fracture the follicles even with light forceps pressure (Figure 10). When placing splayed follicles with

extraction phase of follicular unit excision (Figure 9). Such grafts are more difficult to place without additional trauma and are more amenable to implanter placement. Graft quality problems such as skeletonization typically accompany iatrogenic splay. Sometimes with sharp punches it is difficult to find the exact punch insertion depth that eliminates both transections and iatrogenic splay. This is particularly true for novice surgeons but also can be a challenge in some cases

even for the most experienced surgeons. Dull and hybrid punches can usually be inserted deeper without increasing transections and tend to reduce iatrogenic splay producing the highest percentage of GPI Grade 1 and 2 grafts.

Grade 1 and 2 grafts are of the highest quality and are easy to place without damage by skilled use of forceps. Grades 3 and 4 grafts are of lesser quality and are more difficult to place without damage with forceps. When the grafts have little if any perifollicular tissue, they must be handled very delicately. It is possible to crush

forceps, they must be gathered gently together. If one or more follicles is not contained within the forceps, they may “catch” or be traumatized on the surface of the skin during placement. This may prevent complete insertion, resulting in the risk of additional trauma as the graft may have to be placed again (Figure 11). As a consequence, there is an increased risk of Repetitive Placement Trauma (RPT), as described by Dr. Wolf, to the graft.⁸ A similar problem in graft placement arises when the graft contains transected follicle shafts protruding from its surface. These grafts also have less risk of injury when placed with implanters. The skeletonized, splayed, and transected follicles can be gathered without touching within the implanter and inserted in a single step (Figure 12).

FIGURE 11. Graft failing insertion with forceps

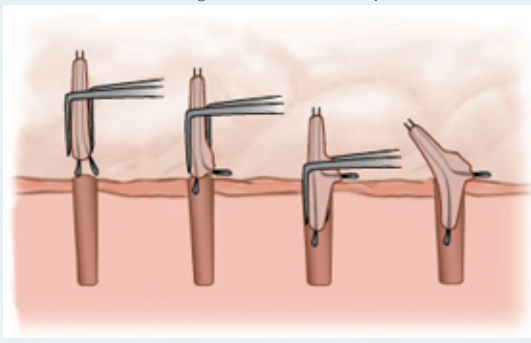
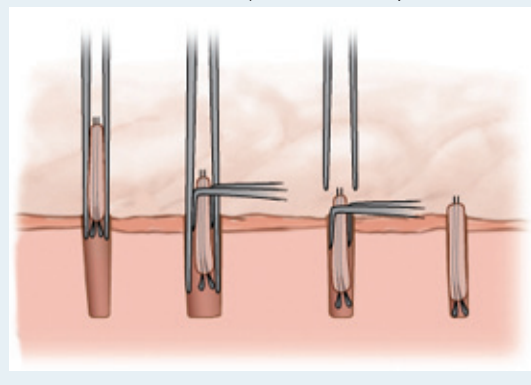


FIGURE 12. Graft successfully inserted with implanter



What sample size should be used in applying GQI?

While all grafts in a case could be scored according to GQI, I believe it is possible to establish a reliable score by selecting a representative random sample of the grafts. I think a 10% sample is adequate. So, for a 2,000-graft case, 200 grafts would need to be scored. To obtain a representative sample, the selected grafts should be based on the proportion of each graft size obtained. In the 2,000-graft case example, let's say 20% are singles, 55% are doubles, 20% triples, and 5% quadruples. Thus, for the 200-graft sample, 40 would be singles, 110 doubles, 40 triples, and 10 quadruples. All of the grafts of each size should be mixed together, and the required number of sample grafts selected from different parts of the pile after mixing the grafts with forceps between selections. In order to minimize selection bias, the grafts should be selected with a naked eye and without trying to look at the detail of the graft. While such an approach is not rigorously scientific, I believe it is a practical approach to GQI grading that can be easily conducted without adding significantly to the time needed to perform the case.

How does GQI apply to strip harvest procedures?

The Graft Quality Index can also apply to grafts produced

by microscopic dissection with strip harvest procedures, but with some modification in explanation. Type 3 GQI grafts characterized by iatrogenic splay and denuded follicles are unique to FUE surgery and unlikely to be produced with microscopic graft preparation. With FUT, Type 1 GQI grafts are produced when FUT dissection style is to produce “chubby” grafts. Type 2 GQI grafts are typical of FUT dissection style that produces “skinny” grafts. Type 3 GQI grafts would be unlikely with microscope dissection, but theoretically could occur if grafts are over-dissected producing denuded follicles. Type 4 GQI grafts occur with strip surgery secondary to follicle damage during strip harvest or microscopic dissection. Applying GQI to FUT procedures could still give useful information in that it would characterize the type of grafts being produced and the number of grafts with damaged follicles.

LIMITATIONS OF GQI

Graft Quality Index is applied only to grafts deemed available and suitable for transplantation. Excluded from GQI

are missing grafts, capped grafts, and grafts with total transections. Therefore, GQI is not sufficient as the only quality control measure in FUE. The best practice is to routinely monitor and count key quality indicators in all surgeries. These are summarized in Table 3 and are explained in detail in the ISHRS Standard Terminology of FUE.^{6,7,8}

TABLE 3. Quality Control in FUE

Comprehensive FUE Quality Control	
Statistical Measurements	Donor Density Punch insertions Capped grafts Pared grafts Broken grafts Partially transected grafts Totally Transected grafts Buried grafts Missing grafts Grafts available for transplantation Grafts unavailable for transplantation
Calculations and Rates	Missing graft rate Follicle transection rate Graft transection rate Average hairs per graft Calculated Follicles per graft expected and achieved
Graft Morphology	Graft Quality Index

CONCLUSION

FUE grafts fall into four basic morphological types. These types are the basis of the GQI. FUE grafts can be graded according to the GQI in order to evaluate the quality of the grafts in relation to the excision process, to tailor placement technique for each type of graft, and as a Quality Control measure in relationship to surgery outcomes. GQI is also applicable to strip harvest procedures.

References

1. Beehner, M.L. Comparison of survival of FU grafts trimmed chubby, medium and skeletonized. *Hair Transplant Forum Int'l.* 2010; 20(1):1,6.
2. Harris, J.A. Follicular Unit Extraction. *Facial Plast Surg Clin North Am.* 2013(Aug); 21(3):375-84. PMID: 24017979. doi: 10.1016/j.fsc.2013.05.002.
3. Cole, J.P. Status of individual follicular group harvesting. *Hair Transplant Forum Int'l.* 2009; 19(1):20-24.
4. Crisostomo, M. Comparison of survival in FUE vs FUT grafts. Italian society of Hair Science and Surgery, Venice Italy, May 2017.
5. Lorenzo, J. Standardization of the terminology used in FUE: Part I. *Hair Transplant Forum Int'l.* 2013; 23(5):165-168.
6. Cole, J. Standardization of the terminology used in FUE: Part II. *Hair Transplant Forum Int'l.* 2013; 23(6):210-212.
7. Cole, J. Standardization of the terminology used in FUE: Part III. *Hair Transplant Forum Int'l.* 2014; 24(3):93-94.
8. Wolf, B.R. The art and craft of recipient site creation and graft placement. *Hair Transplant Forum Int'l.* 2014; 24(2):41,46-49. ■



The New Revolutionary FUE Device

Hybrid Trumpet Punch & Foot Pedal

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

Lower speed and oscillatory motion that mimic manual work for:

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

Fast return on investment.



WAW FUE SYSTEM

devroye instruments

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

*Results vary based on experience of user.