
Case study.

The article describes a case where a patient underwent an FUE procedure for a 3-in-1 scalp-eyebrow-beard transplantation in a single session.


Guidelines.

This article provides comprehensive guidelines including: patient evaluation for FUE candidacy, donor area evaluation and management, graft harvest, graft evaluation and management, FUE graft implantation, and possible FUE sequelae.


Opinion.

This article suggests surgeons master both FUE and FUT techniques as a combination of both techniques can yield large graft numbers while avoiding overharvesting or a large linear scar. This article also discusses the pros and cons of both FUT and FUE and how these techniques have advanced over the years.


Opinion.

This article encourages hair transplant specialists to consider a combination of FUE and FUT to increase hair yield, avoid overharvesting, and to tailor the technique to the patients’ needs. This article also reiterates that hair transplantation requires professional knowledge
and the issue of unlicensed assistants performing surgery. Additionally, this article describes pros and cons of different punch designs.


Opinion.

This article discusses the challenge of choosing the correct application technique for each individual hair transplant patient. Combinations of both FUT and FUE techniques increases the graft and hair yield while decreasing the risk of overharvesting and a wide scar. Currently, FUT is making a “come back” compared to FUE and is increasingly becoming recognized as an important part of the equation for donor area management. It shouldn’t be forgotten that FUT is unarguably more efficient than FUE. Dr. Wolf recommends no greater than 1.5cm wide strip when performing FUT as it causes less pain, yields at least 2,000-3,000 grafts, and an acceptable scar.


Review.

This workshop focused on general information about hair restorations surgery and FUE. The participants experienced basic hands-on FUE experience with cadaver scalps and live surgery demonstrations.


Clinical Data.

Controversy exists over which technique, or combination of techniques, is best for maximizing donor supply. This study examined the difference in donor supply available with FUE only, FUT only, or a combination of both FUE and FUT using a side-by-side comparison approach. This study concludes that more hair and grafts were obtained using the combination of FUE/FUT compared to FUE or FUT alone.

Clinical Data.

Careful excision and handling of follicular units are critical for successful hair transplants. This study compared FUE and FUT with respect to cellular stress response and growth properties in FU graft cells by quantifying the mRNA expression of compartment-specific hair follicle genes, stress protein genes, and proliferation-related genes. The results from this study indicate no difference in the stress response in cells isolated by FUT or FUE.


Opinion.

The author explores how to reduce transection and capping in FUE and increase multiple graft harvesting. The author shares their experiences and tips and highlights the importance of the donor area regardless of hair type, and scalp skin variety, and the age and lifestyle of the patient. These factors play a major role in how easy or difficult the harvest will be, and can only be determined after the harvest has begun. The author details their opinion about how to reduce transection rates, by using “test” grafts to allow technique adjustment to suit the patient, and extracting the graft using forceps.


Clinical Data.

This paper describes a hair restoration approach in a burn victim with extreme mental distress and depression. Areas for hair reconstruction included eyebrows, frontal and lateral hairline, and 100 cm² surface area on the frontal-parietal-lateral scalp. All hair transplantation was performed using 100% manual FUE. The author describes their approach and the difficulties they encountered due to the skin grafts and how they circumvented these issues. They also note that they needed to modify their traditional approach to accommodate the critical emotional state of their patient.

Portman R. News you should know: malpractice lawsuit involving delegation of FUE. Hair Transplant Forum International. Mar/Apr 2019;29(2):77

News.

This article details an account of a surgical hair restoration procedure using FUE performed by unlicensed technicians (using a NeoGraft device) that resulted in a lawsuit. The
Patient alleges medical malpractice in relation to the performance of the procedure. This situation highlights the risks of this hair transplant procedure.


Review.

In summary, this workshop provided participants with up-to-date information on the latest FUE methods. Topics covered included anatomy, medical treatments for hair loss, planning for less common hair loss patterns, PRP, multiphasic extraction devices, graft harvest principles, black market issues, FUT-FUE combination therapy, extraction and implantation techniques to improve graft survival, a review of circumstances of “mega sessions” for severe cases of hair loss, and pre-surgical and post-surgical medical treatments. The workshop concluded with a live surgery demonstration where attendees were exposed to a wide variety of techniques for both FUE and implantation.


Opinion.

The author describes his experience developing his FUE technique and how the field of FUE has grown and evolved over the past 18 years especially with the recent breakthroughs in devices, punch designs, and technology for surgical planning and execution. He also describes the FOX Test and how it is now outdated due to the wide variety of FUE techniques available to suit a wide variety of patients. However, test grafts remain essential. The author also comments on the rise of unscrupulous practitioners who do not respect the high degree of precision needed for this technique and delegate the procedure to unlicensed technicians resulting in disfigured results.


Guidelines.

This article provides the most up-to-date terminologies and their definitions used in FUE practice. The terms described include various techniques, steps of FUE, graft quality and patterns of graft injury, and ways to measure the quality of FUE surgery. The guide is divided into four parts. Part I focuses on terms associated with anatomy, transection, follicular unit extraction vs follicular unit excision, and motorized and robotic devices. Part II discusses terms associated with characteristics of the techniques, donor area, and punch classification.
Part III focuses on terms involved in the measurement of quality in excision. Part IV discusses terms used in implantation of grafts.


Opinion.

This article describes the down-turn in the “FUE era” due to false advertising of promised results, a growing number of bad results (such as devastated donor areas), and bizarre hairlines due to improper planning. The author details his view of the current state of the hair transplant industry and its future suggesting that using a combination of FUE and FUT might be the way forward.


Opinion.

This article discusses the inevitable crash of the FUE market driven by “black Market” clinics and the importance of the ISHRS’ campaign to stop black market operations.


Opinion.

This article describes how FUE procedures by unlicensed assistants, uneducated physicians, and unethical practices are increasing at a rapid rate. The article details a number of anecdotal accounts of patients visiting these black market operations and the disfigurement and poor results they attained. The author suggests education and counter marketing to dissuade patients from seeking out these black market clinics.


Clinical Data.

Hair transplantation is a clean but not sterile procedure. By comparing the microbiome of the scalp of ten patients during FUE procedures done with clean versus sterile gloves, this study investigates whether using sterile gloves is safer than using clean gloves. The findings indicate that there is no difference in contamination whether using sterile gloves or clean gloves. The authors state that the primary source of contamination was the microbiome of
the hair follicles and other skin structures and that washing the hair with iodine soap ahead of surgery has no apparent aseptic effect.


Review.

This article discusses techniques and approaches to avoid or reduce scarring in FUT and FUE. Topics discussed include the best methods for: minimizing FUT linear scars, selecting FUs for FUE, increasing strip size in FUT without risk of wide scar, producing the least amount of scarring, revising a linear scar for someone who likes to wear their hair short, and improving cosmesis in “Braille-like” scars.


Opinion.

The author encourages all ISHRS members to make an effort to change their terminology on their websites and in practice from “Follicular Unit Extraction” to “Follicular Unit Excision”. A strong and sustained effort is needed to help this change in terminology be successful.


Opinion.

Harvesting donor hair using the FUE method has unfortunately fallen into the hands of non-medically licensed, untrained people that do not have the required knowledge or surgical skills. The availability of the ARTAS robot is furthering this mis-practice as some doctors inappropriately allow it to be operated by unlicensed people with no surgical skill at all.

2018


Review.

Advances in robotic systems used in FUE have led to an increase in speed, accuracy, functionality and artificial intelligence. Robotic systems have improved speed by staying closer
to the scalp while moving between units. Smaller punch sizes have also been incorporated into robotic systems. An arm brake release has been added which means that the operator can easily readjust the patient’s position. The ARTAS software can also detect different hair densities, preventing unwanted regions from being harvested.


Opinion.

The new multi-graft implanter system suggested by Dr. Devroye may help reduce the number of movements associated with implanting. Issues, such as the need for many assistants, fatigue, musculoskeletal injuries and cleaning processes associated with implanters have led to the creation of the multi-graft implanter system. This multi-graft implanter system is loaded in a similar fashion as other implanters through the tip but requires a curve of the graft to be placed down. Only one loader is required with this system instead of the traditional two.


Review.

FUE is a viable option for patients who wish to undertake a hairline lowering surgery. Harvesting grafts from the lower occiput region using FUE can help reduce visibility of hairline scarring. It is recommended that FUE is preformed 3 to 4 months post-procedure so that grafts can be placed more easily near the hairline incision.


Opinion.

The FUE as a standalone procedure has not yet been accepted by everyone. Graft injury, a lack “significant advances”, and the potential for skeletonized grafts have prevented some hair restoration surgeons from accepting FUE as a standalone procedure.


Opinion.

The term FUE has been updated to reflect the two steps it incorporates; incision and extraction. The term follicular unit extraction has been changed to follicular unit excision. This subtle change will hopefully help avoid any misinterpretations. It will also serve as a reminder
that licensed professionals should be performing this harvesting technique.


**Opinion.**

The specialty of hair transplants is facing increasing challenges by unethical providers. The ISHRS/s Black Market Campaign is critical to create public awareness and protect patient safety. There is a need for scientific evidence-based guidelines to ensure high-quality hair restoration. A pit-fall the FUE technique faces is exposure of the extracted follicles and dermal papilla to potential trauma resulting from proximity to the punch and tearing of the graft from the fat. This fact emphasizes the importance of minimizing the black market of rogue clinics staffed by non-physicians.


**Opinion.**

The Graft Quality Index can be a helpful classification system for evaluating FUE instruments and graft survival rates. Potential ethical issues may arise when patients ask for FUE where hair loss progression is likely. Thus, physicians should discuss the potential issue of using non-permanent hair and perhaps offer alternative options like FUT. Trichoscopy should be used before and after transplantations to identify if cicatricial alopecia is present.


**Opinion.**

Evaluating donor area pre-operatively is helpful when considering repeat FUE procedures. There are a number of ways the hair density in potential donor areas can be estimated. The FU density in the untouched area can be compared with the FU density of a previously harvested area. Alternatively, digital imaging can be used to determine hair density, gap density and hair thickness. A HT Pass or Log Book may be of help to record information such as donor area size, number of transplanted grafts and original donor density. Graft calculators and online consultations can create unrealistic patient expectations that may complicate.

Original Clinical Data

Plasma could be an advantageous graft holding solution to accompany FUE procedures. In this small, half-scalp study, six patients received grafts persevered in both plasma and LR solution. The side of the scalp that received plasma preserved grafts had a greater hair count at 3 months post-surgery as compared to the side of the scalp that received grafts preserved in LR solution. The growth factors within plasma can help prevent anagen effluvium, increase hair thickness and enable a better graft yield.


Opinion.

Changes within the field of hair restoration have enabled non-hair restoration surgeons the ability to perform FUE. With the addition of automation, FUE extractions have been delegated illegally to unlicensed personnel. Mid-level practitioners and Physicians Assistants are rapidly gaining complete autonomy to practice without supervision and could open hair transplant practices. These individuals do not currently have a membership category in the ISHRS and could openly compete with no restrictions.


Opinion.

The term FUE has been updated to better represent what it describes. Follicular unit extraction has been changed to follicular unit excision. From both a medical and scientific perspective this change is a welcomed addition.


Opinion.

The potential harm that hair transplantations may cause the patient was point of discussion at the recent HAIRCON meeting. It was reported that a patient had to have his eye removed due to an infectious disease after receiving FUE treatment. Deaths due to hair transplantation surgeries have also been reported. It is strongly encouraged that surgeons as opposed to assistants perform the procedure. The authors also point out that FUE’s name change may help combat any inaccurate impressions (e.g., no incision, no scar, and no pain etc.) the public may have on this harvesting technique.

Opinion.

Physicians should only be performing hair restoration procedures, whereas, technicians should never perform surgery. In countries like Korea regulatory bodies have made it illegal for nurses to make an FUE donor incision and to insert a hair follicle after a physician has made a slit in the recipient area. The ISHRS encourages surgeons to perform surgery not technicians.


Original Clinical Data.

With regards to hair and graft yields, hair mass index (HMI), photography and patient responses, FUE grafts may be equal to FUT grafts. In a half-head study, FUT and FUE grafts were compared in three different patients. FUE and FUT showed very similar graft and hair yields per patient. This study also found that FUE and FUT can produce similar HMI results.


Review.

There are many factors that can influence donor density. Follicular distribution, overharvesting and difficulties measuring variables will affect donor coverage. Harvesting outside the safe donor area can influence recipient density thus grafts are not usually taken from the nape of the neck, superior lateral fringes, and superior aspects of the occiput. Cosmetic donor density can also be affected by follicular distribution. Other factors that affect donor coverage include; hair and scalp color contrast, hair curl, and postoperative hair length.


Opinion.

Big topics at the 7th Congress of the Brazilian Association of Hair Restoration Surgery included “preview long hair” FUE transplants being trialed in Brazil using modern punch technology with impressive results. Additionally, “homogenous” depletion of density in the donor area using FUE was discussed in regard to “safe” and “less safe” donor areas as the progression of balding can expose some of these donor areas.

Opinion.

This article discusses a controversial presentation presented at the 2017 ISHRS World Congress. In this presentation, the use of non-permanent donor hairs in select patient groups was encouraged even though these hairs reside in future balding areas. The only way to harvest these non-permanent hairs with minimal visible scarring would be conducting FUE. Due to the unpredictability of hair loss, this “temporary” transplant may not be wise.


Opinion.

Hair transplant surgeons should respect the service they provide by ensuring the price of their procedures are realistic. With the advent of illegal clinics, non-physicians are performing FUE transplants which have resulted in a price war. Along with these clinics, the internet and social media have made FUE procedures seem like simple common products. Medical tourism has also compounded this issue resulting in limited follow up and a less holistic approach to hair loss surgery. To obtain patient satisfaction and a successful outcome the skill and care of an experienced physician is required.


Review.

FUE was a topic of discussion at the 7th Congress of the Brazilian Association of Hair Restoration Surgery. The potential for donor area depletion and the strengths of FUE were discussed.


Terminology.

To better describe what occurs in FUE, the term FUE has been adjusted. The term follicular unit extraction is a histological description not a surgical term. To better represent what occurs during FUE, the E used in this term represents both incision and extraction. Follicular unit excision is now defined as “the surgical technique that refers to circumferential incision of the skin around the follicular unit bundle or group of hair follicles for the purpose of extracting a full-thickness skin graft containing hair follicle(s), intradermal fat, dermis and epidermis”.

Opinion.

The Mohebi Inserter could help increase space around the patient and make inserting more efficient. Implanters may help minimize injury and increase the speed of the procedure, however, most implanters require one or two technicians to manually load the grafts. As a promising alternative, the Mohebi Inserter could be used. This inserter can be loaded and deployed with only one hand. It should be noted that this inserter does not make incisions and can be used by assistants in most countries.


Opinion.

The ISHRS World Congress will be reviewing ideas that were brought up at the Paraguayan Society of Hair Restoration Surgery’s Latin American FUE Workshop. Other novel ideas and new devices will also be discussed at the upcoming meeting. The meeting will be held in Hollywood, Los Angeles in October 2018.


Opinion.

The board of directors (BOD) on the American Board of Hair Restoration Surgery (ABHRS) has strong views on the use of FUE. FUE should not be performed by unlicensed personnel. ABHRS is hoping that their public education campaign can help encourage consumer demand for board certified hair restoration surgeons. The ABHRS is considering the possibility of transitioning the exam to a computer format that may help improve availability and accessibility.


Review.

FUE was a topic of discussion at the recently held ISHRS Hair Transplant Pre-Congress Course. Talks were given on harvesting methods such as FUE and strip, complications in hair transplant surgeries and how to set up a hair transplant practice.

Oguzoglu T. A Case Report of Subclinical Lichen Planopilaris After Hair Transplantation. Hair
Case Report.

Subclinical lichen planopilaris was observed in a 41 year old patient after undergoing a FUE procedure. Intense itching was noticed 3 months post-surgery. A 30% difference in the number of transplanted hairs and the final result was observed at month 10 and 12. The clinical biopsy suggested the patient had lichen planopilaris. This diagnosis was later confirmed with tissue samples. It is unclear if the patient had lichen planopilaris prior to surgery or if the surgery had triggered it.


Review.

The Thai Society of Hair Restoration Surgery was founded in 2016 and meets several times a year. FUE is a common harvesting technique used in Thailand with some robotic FUE procedures being incorporated. Several members of this society are ISHRS members and have both an international and national presence.


Review.

FUE was among the many techniques discussed at the 2nd Bi-Annual Meeting and Live Surgery Workshop held in May. The techniques and steps involved in FUE harvesting were reviewed in both lecture and live surgery format. FUE terminology and long hair FUE were also highlighted throughout the meeting.


Opinion.

The author shares her experience with multiple FUE device and their common problems including transection, slow extraction, user dependability, and buried grafts. The author describes the Trumpet, Hybrid, and Flat sharp punches, and compares them to her experience with the Trivellini device, which is described in detail. The Trivellini device has significantly decreased her hair transplantation time, increased the satisfaction level of her patients, and has a very short learning curve.

Schamback MA. Using Velcro to Assist with Non-Shaven FUE. Hair Transplant Forum
Opinion.

Velcro can be of great assistance during non-shaven FUE extraction. With the use of Velcro, hairs in the donor zone can be both fixed in place and removed easily. Visualization of the follicular units and their inclination can occur when hair is removed from under the Velcro. This can aid in determining the exit angles of the follicular units.


Review.

FUE was the main focus of the recently held Latin American workshop that occurred in Guatemala City on June 25-27, 2018. A video was presented that compared FUE to FUT and FUE was also discussed in lecture format. It was suggested that FUE may benefit younger patients more than FUT. Surgeons were also invited to observe FUE procedures such as eyelash restoration and the stick-and-place technique.


Opinion.

There a few suggestions that can be incorporated to help combat illegal surgeries. Social media could be used to help bring about awareness and warn patients about the risks of undergoing hair transplant in unlicensed clinics. Advocating recent medical and governmental regulations and working with other experts in the field may also help to eliminate this problem.


Opinion.

FUE was highlighted at the 6th AAHRS Annual Scientific Meeting and 3rd CAHRS Annual Congress held in May 2018. In addition to presentations, FUE was discussed in poster format allowing surgeons to view results from FUE surgeries. It was suggested that, as compared to FUT, FUE may have better wound healing and offers patients a less invasive harvesting method. The applicability of FUE in young patients and those with poor prognoses was also discussed. FUE donor management techniques, punch sizes and the use of FUE in eyebrow and eyelash transplants were also among the topics discussed at this meeting.

Review.

The multiphasic suction-assisted FUE device called the Trivellini system may enable lower transection rates and greater speed. This device was made as an original hair transplantation instrument that has a hollow shaft that can enable visualization of the target. This device also allows for a 3D view of the hair’s exit angle.


Original Clinical Data.

The Graft Quality Index can play a significant role in evaluating the quality of grafts in hair restoration surgeries. This index can help to predict the difficulty level of graft placement, relate graft morphology to surgery results and guide implantation techniques. To interpret the meaning of the score obtained the following items should also be recorded: punch type and diameter, count per Grade, and total points. Grade 1 and 2 grafts are the easiest to place and have the highest quality. This index should not be the only quality control measure in FUE procedures.


Opinion.

In this article, the potential benefits and drawbacks associated with graft storage in the context of FUE was discussed. The out of body time associated with FUE grafts is often longer than FUT grafts which may impact survival rates. Additionally, FUE grafts can be more fragile and therefore more vulnerable. Further research into optimal temperatures for FUE grafts should be undertaken.


Opinion.

In this article FUE was discussed in the context of correcting large defects in children. FUE could be used to help lessen the relative difference in density between permanent hair and hair loss regions. FUE may be an ideal choice for young children who are very self-conscious.

Von Albertini C & Farjo BK. Message from the ISHRS 2018 World Live Surgery Workshop
FUE will be highlighted at the upcoming World Live Surgery Workshop. This workshop will cover a multitude of topics including modern implantation devices, non-surgical treatments and complex cases. In addition to informative lectures, FUE, FUT and implantation techniques will be covered in live demonstrations.


FUE was a point of discussion at the World Live Surgery Workshop held this past March. Shifting our attention to the donor area may have led to the detriment of the hair line. It can be quite difficult to balance punch size to both minimize donor damage and maximize graft size. Familiarity with different FUE devices is advised. For optimum survival and graft, it is recommended that FUE grafts with fat are used.


The ISHRS provides clear guidance with regards to what is considered misleading and inappropriate marketing. Terms such as “no incision”, “no cutting” and “pain free” are prohibited by the ISHRS. Surgeons should refer to individuals undergoing hair transplantations as patients as opposed to customers or consumers.


The frequently used term “transection rate” should be defined more consistently in the context of publications and presentations as it may be misleading. The FUE terminology subcommittee has defined three different types of transection rates; total transection rate, partial transection rate and follicle transection rate. The definitions of these rates can be found in this issue of the Forum as well as previous issues (Volume 24, Number 3).

Opinion.

Hair transplant surgeons should be open and honest with their patients. In the context of FUE, there are a number of occasions where these conservations are especially important. For instance, when the number of grafts predicted to be harvested is not achieved or is underestimated the patient should be made aware and a discussion surrounding the different options regarding fees and graft utility should occur. Transection rates should also be discussed as they may impact the number of harvested grafts.


Opinion.

Only licensed personnel should be performing the surgical steps required in hair restoration surgery. This issue is complicated by the fact that laws from regulatory bodies differ worldwide. The ISHRS does not support the use of non-licensed technicians to make FUE incisions.


Opinion.

The WLSW held in Dubai offered several live surgery workshops where FUE devices, punches and implanters could be viewed in action. Punches used in the demonstrations included blunt and sharp serrated motorized, sharp manual, hybrid flared serrated, flared rimmed, flat motorized, sharp motorized and hybrid flared reactive. It is recommended that surgeons should be proficient in more than one punch. High quality grafts are also recommended as these grafts are less susceptible to trauma and are the easiest to place.


Opinion.

Tumescence in the context of FUE will be a topic of discussion in this issue of the forum. Tumescence can augment the anesthesia and vasoconstriction necessary to perform hair restoration surgeries. The addition of tumescence may help decrease transection rates by firming up lax donor tissue. Input on the use of tumescence has been requested and will be covered in further issues.

Despite the promising results from Dr. Josephitis and Dr. Shapiro's study, Dr. Wolf suggests that results from FUE and FUT studies should only be reported at meetings when they have achieved 6 to 12 months of growth.

Yagyu K. How to Avoid Overharvesting During Repeat Follicular Unit Excision Sessions by Calculating the Number and Density of Previously Excised Grafts. Hair Transplant Forum International. July/August 2018;28(4):142-144.

Original Clinical Data.

Overharvesting FU grafts can be avoided through determining the total number of excisions, excision density and hair follicle transection rates. The number of excisions can be estimated through measuring the surface area of FUE and multiplying it by the excision density. Total transection rates can be determined through obtaining the number of grafts transplanted and estimating the percentage of “lost grafts” during harvesting. This could be useful information to maintain a safe excision density during repeat FUE sessions.

2017


Case Study.

Rare clinical presentations may prevent successful FUE harvesting. In a case study, a dull punch was used to harvest FUE. During the procedure the selected punch would not engage properly, creating capped buried and transected grafts. When the surgeon alternated to a sharp punch, the pressure of the punch cut through the hair causing complete transections. Complications with the punches resulted in over 70% of the grafts being completely transected, partially transected, buried and capped. The procedure was aborted after 200 incisions were made. The reason for this result was not confirmed however Ehlers-Danlos Syndrome was clinically suspected.


Review.

The success of combining FUT and FUE (hybrid harvesting) can be enhanced with the use of the “preview long hair” technique. In order to perform the “preview long hair” technique during hybrid harvesting, hair in the FUT zone is not shaved while the hair in the FUE zone is.
Altering hair trimming in this way can help the surgeon match the direction of the remaining hairs. This is especially helpful in restoring hair loss areas such as the crown, frontal, parietal and temporal regions where hair swirling is present. Blind grafting is avoided when this technique is utilized.


Review.

Improvements in robotic systems such as touchscreen interfaces, locking tensioner tools, and the 4-pong needle have made robotic techniques more user-friendly. Robotic systems can be used to harvest follicles as well as create recipient sites. Halo devices can increase the comfort of the patient, allowing forces to be placed in a lateral direction rather than downward direction. A new sized punch (6 mm) has been added to robotic techniques to help prevent splayed grafts created with long hair follicles.


Review.

Issues associated with the fragility of harvested FUE grafts can be adequately addressed. Improvements in holding solutions and the use of mechanical implanters have helped to protect FUE grafts during harvesting. In addition, the SAFE system and the Trumpet Punch can help decrease transection rates.


Opinion.

This article is in response to a previous ISHRS Forum article; “Examination of the Exit Angle of Hair at the Skin Surface versus the Internal Angle of Hair as it Relates to the FUE/FIT Harvesting Method” (Jan/Feb 2017;27(1):8-10). The authors noted that this referenced study insufficiently categorized their data, forgot to include patient demographics, did not standardize depth during angle measurement, and oversimplified hair follicle growth patterns.


Review.
Scalp microbes may play a role in post-surgery infections. Follicle inhibition caused by *Malassezia* species could lead to minimizing folliculitis. Although infections post-surgery are rare, management of skin environments could be a future avenue to explore. To maintain scalp health it is suggested that chronic therapy is undertaken as *Malassezia* species are extremely difficult to permanently remove.


**Opinion.**

This article is in response to a previous Forum article, “Dealing with a Hybrid Trumpet Punch” (Jan/Feb 2017;27(1):14-16). When using a Hybrid Trumpet Punch, pressure must be exerted, this can be difficult when trying to quickly alter hand movements. To increase the sharpness of the punch, micro teeth can be added.


**Opinion.**

FUE will be a technique discussed at the upcoming World Congress and Live Surgery Workshop held in October. A FUE workshop will be help by Arthur Tykocinski and Jerzy Kolasinski before the Prague Congress. FUE courses with hands-on synthetic material and live patient viewing will be available. Implanters will also be a topic of conversation at the World Congress.

**Devroye J. Message from the ISHRS 2017 World Congress Program Chair. Hair Transplant Forum International. Mar/Apr 2017;27(2):78.**

**Opinion.**

FUE will be featured in the upcoming World live surgery workshop that will take place in Poland. The main FUE event will take place at the World Live Surgery Workshop with only the highlights given at the Congress. For those that are interested, a surgical assistants program will also be available.

**Devroye J. Message from the ISHRS 2017 World Congress Program Chair. Hair Transplant Forum International. May/June 2017;27(3):124.**

**Opinion.**
FUE techniques will be featured at the upcoming World Live Surgery Workshop held in Poland. FUE innovation, research, difficult cases, implanters and long hair FUE are among the many topics that will be discussed. A surgical assistant program will also be available.

**Devroye J. Message from the ISHRS 2017 World Congress Program Chair. Hair Transplant Forum International. July/August 2017;27(4):164.**

**Review.**

FUE, cell therapy and FUT will be highlighted at the upcoming World Live Surgery Workshop. In addition, storage solutions, bioenhancements, implanters and alternative treatments will also be topics of discussion. A live patient viewing will be offered to attendees.


**Opinion.**

The upcoming World Congress will heavily focus on FUE techniques offering courses such as the FUE Mini Course. Workshops will also be available that will cover topics such as eyebrow transplantation, FUE robot assisted procedures, PRP and storage solutions.


**Opinion.**

There has been a shift in focus from the recipient area to the donor zone. FUE and trichophytic closure are frequently used to avoid linear scars. Issues surrounding FUE have arisen as FUE has been incorrectly marketed by some as a noninvasive and scarless procedure.


**Opinion.**

FUE will be the main topic of discussion in the ISHRS Jan/Feb 2017 Forum issue. Comparing transection rates between FUT and FUE techniques, FUE instrumentation and implanters will be investigated in this issue.


**Opinion.**
The benefits of implanters, such as the dull needle implanter, will be covered in the ISHRS Mar/Apr 2017 Forum issue. The author suggests that more studies are needed to compare graft types (FUE, FUT) in order to investigate the advantages of dull needle implanters as compared to manual techniques. An instructive case of an impossible FUE patient from Marco Barusco will also be included in this issue.


Opinion.

Discussion on the possibility of PRP to help fertilize the scalp will be covered in this issue. Robotic graft harvesting and the use of sharp implanters will also be explored.


Review.

This article focuses on the pros and cons of hair cloning. Through the creation of a Hair Cell banking services, FUE grafts can be cryopreserved and banked for future use. This technique is not a replacement for hair transplant surgery but can be used in hair maintenance as an adjunct to hair transplantation.


Opinion.

The ISHRS has played a pivotal role in educating surgeons on FUE and FUT harvesting techniques by adding them into their teaching programs. The combination of the stick and place technique with a dull needle implanter is an interesting technique that will be covered in this ISHRS issue. A culture method to study cell-based therapies will also be covered.


Review.

FUE was the main topic of discussion at the World Live Surgery Workshop held in Poland. FUE nomenclature, anatomic structures and practical tips were covered in the basic course provided. The limitations and advantages of using FUE, patient selection, transection
rates and punch types were also topics of conversation. Live surgery viewings provided at this conference enabled surgeons to learn about the different FUE extraction techniques available.


Original Clinical Data.

FUE was among the topics surveyed at the last ISHRS Annual Meeting. Approximately 78% of members agreed that combining strip with FUE would produce the most donor grafts with 75% of FUE surgeons stating they regularly harvest outside the safe zone. It was also discovered that only 20% of attendees use implaners.


Opinion.

This article is a summary of hair transplant techniques discussed among ISHRS fellows. FUE was a prominent topic of conversation, with fellows discussing how to avoid burying grafts when using blunt motorized FUE techniques as well as candidacy criteria. FUE techniques as they related to patients with African ancestry and expected complications were also discussed.


Opinion.

Dr. Devroye has significantly contributed to the field of FUE. The Hybrid Trumpet Punch technique is among Dr. Devroye’s numerous contributions to the field. His contributions to the field of hair restoration has earned him a Platinum Follicle.


Review.

FUE was a topic of discussion at the ISHRS Orlando Live Surgery Workshop held this past April. Minimizing injury and out of body time was suggested by Dr. Conradin von Albertini when using FUE harvesting techniques. In addition, Dr. Szyferman lectured on how to create FUE
instruments out of inexpensive standard needles. The pros, cons, side effects and complications of FUE were also discussed.


**Review.**

FUE Palooza was held in Denver, Colorado in July 2016. This workshop allowed surgeons to observe colleagues performing FUE surgical procedures, obtain information on FUE devices, and participate in operations. Graft hydration, patient positioning, and the SmartGraft machine were among the additional topics discussed at this workshop.


**Original Clinical Data.**

FUE is a popular harvesting technique used by ISHRS members. Based on the practice census, FUE harvesting was found to be used more often than strip across male and female hair restoration surgical procedures (52.6% versus 44.0%, respectively). Over 90% of ISHRS members have performed FUE on their patients. The most common FUE technique used is the motorized FUE method (hand-held, no suction, 78.5%), followed by the manual FUE method (19.4%), robotic-assisted FUE method (12.5%) and motorized FUE method with suction (hand-held, 11.2%).


**Opinion.**

Compared to 1990, the content of ISHRS scientific meetings has changed dramatically. Donor harvesting was not a topic discussed at the 1990 scientific meeting, whereas today it makes up almost 50% of the program. Topics that were discussed in the 1990 program that are not frequently found in today’s scientific meetings include scalp flaps, minigrafting, and laser hair transplantation.


**Opinion.**
The formation of new societies that focus on specific parts of the hair transplant process such as FUE societies may not benefit the hair restoration field. Time equally divided among all parts of the hair transplant process should be encouraged at educational workshops.


Opinion.

More time should be spent planning FUE sessions to avoid poor execution. Successful FUE harvesting involves both donor and recipient site planning. Long term consequences of large FUE sessions can be difficult to predict as FUE requires a much larger donor area as compared to strip (5-6x). If future-balding grafts are used it is recommended that they are put in regions that are less visually important. Caution should be given as future planning options are limited if low hairlines are used.


Opinion.

The 2016 FUE Palooza gave hair transplant surgeons the opportunity to experience different FUE instruments and devices. A SAFE Hexagonal punch, a blunt punch with a hexagonal shaft that helps to shake the follicle loose, and a Vortex engine were among the several devices and instruments available to experience at this conference.


Review.

The debate between performing FUT and FUE still continues. Although FUT has strong support, the majority seems to be in favor of FUE. Advancements in pharmaceuticals may make hair transplantations a last resort by encouraging hair regrowth.


Review.

This article reviews the basic anatomic variations and steps involved in performing FUE. The anchor system, splay and skin immobilization are key anatomic features that can influence the success of FUE harvesting. Using a two handed technique, FUE grafts can be removed using
a perpendicular force to decrease the possibility of tethering. Inspecting and testing graft quality one at a time, three at a time and during extraction is encouraged to ensure optimal graft quality.


**Opinion.**

With a rise in technology dependent techniques, manual FUE techniques have been neglected. Dr. Oguzoglu suggests that more training in FUE and FUT+FUE should be encouraged. As FUE involves removing human tissue a physician should always be present regardless of the technology.


**Review.**

FUE was among the topics covered at the 25th ISHRS World Congress held this past October. FUE and other harvesting techniques were included at the hands-on training stations, allowing attendees a chance to practice FUE techniques. Specialized courses, such as the FUE Mini Course, also provided surgeons the chance to learn technical aspects of FUE using a hands-on approach. The use of FUE mega sessions (3,000 FUs in a day), graft injuries typically associated with FUE, and novel approaches to FUE were among the topics discussed.


**Opinion.**

FUE was a major topic of discussion at the 25th World Congress of the ISHRS. Jean Devroye, a valuable contributor to the FUE toolbox, was among those that achieved Follicle awards this past year. In addition, the FUE results shared at the conference showed that this harvesting technique may actually rival those found with strip. Arguments surrounding when to use FUE, how to properly harvest grafts from the donor area and graft survival were among the controversies discussed. The use of implanters during the FUE procedure may become necessary as implanters can dramatically reduce placing trauma.
FUE was a popular topic of conversation at the 1st Congress of the Sociedad Ibero-Latinoamericana de Trasplante de Cabello held this past September. Modules based on harvesting techniques such as strip and FUE were available to provide educational opportunities to hair transplant surgeons. Alternative treatments and autologous fat transplantations were also featured at this event.

This article seeks to define the term megasession in today’s context. The term megasession depends on the transplant procedure (e.g., FUE vs strip) and overall donor density (number of hairs/follicular unit). The following calculation was proposed to aid in defining the term megasession; strip megasession = KD^2 where D is density and K is a constant of 800, assuming an average scalp has 50,000 follicular units. Issues can arise if surgeons regularly exceed twice the above megasession numbers. Repeated FUE sessions could produce visible punctate scarring that could alter directional growth of the follicular units in the donor region.

Optimal yields may not be found with FUE. During FUE only the hair is removed, resulting in bald interfollicular skin. During strip harvesting, this bald interfollicular skin is removed. Skeletonized grafts and high transection rates associated with FUE may lead to decreased or miniaturized growth.

In Garg et al.’s study, PRP was conducted in 40 FUE patients (Garg et al. JCAS 2016;9:157-164). PRP treated patients experienced higher hair regrowth (>75%) as compared
to non-PRP treated patients (at 4 weeks: 12 patients and 0 patients, respectively). For PRP treated patients, new hair growth began at 8 weeks.


Original Clinical Data.

Understanding hair follicle pathways may help decrease transection rates during FUE harvesting. Across hair types (straight and curly), there was an average angle change of 6.43⁰ amongst hair follicles, with hairs in the same follicular unit travelling different routes. Therefore, the hair exit angle is actually more acute than the path inside the skin. Assuming insertion occurred in the papillary dermis, a punch size of 0.75 mm was estimated to have a greater likelihood of damaging hair follicles as compared to a punch size of 1mm.


Opinion.

Simply following the direction of the exit hair may not produce suitable grafts. Understanding that hair angles can vary as they course through the skin is required to successfully perform FUE. It may be necessary to alter punch direction once the epidermis is pierced to accommodate the change in hair direction.


Opinion.

The KD spreader may help with FU extraction and implantation. The KD spreader can help assistants and surgeons avoid fatigue caused by forceps during implantation. The spreader can release and position the graft allowing several implanters to work together. During harvesting this spreader can help achieve desired stretching and lateral traction that are required for graft removal.


Opinion.
There is an increasing trend of visible scarring following FUE and FUT procedures, even when new surgical techniques are incorporated. If donor or recipient site stress is detected, it is wise to make appropriate changes to the technique used. To avoid patches, reducing the number of units per session or reducing the graft size is advised as this can elevate the strain on scalp blood supply.


Review.

This article reviews the history of hair transplantation and ISHRS’ impact on the field of hair restoration. During the rise in FUE’s popularity, the ARTAS robotic machine was developed to help select and cut grafts to pre-set specifications. The ISHRS has incorporated harvesting methods such as strip and FUE into their teaching agendas helping surgeons worldwide.


Review.

FUE was a topic of conversation at the 16th Annual Meeting of the Russian Trichologists Union held in November 2016. In Russia, hair transplant operations can only be performed by plastic surgeons. Promoting hair transplantations among professionals will be the goal of the next upcoming meeting.


Review.

FUE was a topic of conversation at the 6th Annual Congress of Brazilian Association for Hair Restoration Surgery held in August 2016. The anatomy of FUE grafts, optimizing ergonomics during harvesting, robotic FUE surgery, and instrumentation were among the topics discussed at this meeting.


Review.
This article outlines the steps involved in selecting, maintaining and using an implanter during hair transplants. The dull needle implanter (DNI) technique can allow for less traumatic graft placing as compared to manual techniques. The needle can be modified for easy loading using either a diamond drill or a 2mm-thick diamond disc. Using this technique, the incisions are premade with needles or chisel blades.

**Szyferman BA. Argentine Association of Hair Recovery (AARC). Hair Transplant Forum International. Mar/Apr 2017;27(2):76.**

**Review.**

The Argentine Association of Hair Recovery was founded to help unite concepts and experiences among colleagues. In Argentina, there are approximately 100 hair transplant professionals who conduct hair transplants full time, 30 of which are Argentine Association of Hair Recovery members. Of those professionals, FUE is more commonly used as compared to FUT.


**Review.**

This article reviews the new Hybrid Trumpet punch created by Dr. Jean Devroye. Its flat design allows the punch to go 1 mm deeper than sharp punches. The punch is sharpest on the external square edge corner thus it will need to be pressed on the skin surface at 45° in order for the skin to be pierced. The controlling unit is a foot pedal which has three dials that adjust the arc of oscillation, the speed of oscillation and the initial speed of the punch. To avoid missing grafts, specific hand movements (e.g., swing) can be used during the cutting phase to prevent burying grafts.


**Opinion.**

FUE will be a featured event at the upcoming World Live Surgery Workshop. FUE immersion will occur just before the World Congress and will be held at a hospital with six full-size surgical rooms.


**Opinion.**
At the upcoming FUE Immersion WLSW there will be opportunities to try and test different FUE instruments, allowing surgeons hands-on experience. This workshop will showcase manual, motorized, analog, digital, hand-controlled, foot-controlled, portable FUE devices, instruments and implanters.


Opinion.

The upcoming FUE Immersion program is packed with surgeries and multiple demonstrations that solely focus on FUE techniques. Advanced and basic course are available to help surgeons master this harvesting method.


Opinion.

The upcoming World Live Surgery Workshop will highlight FUE techniques, punches and machines. Top surgeons will be invited to share their techniques and innovations in a live surgery format to educate surgeons on the techniques they use in hair restoration.


Opinion.

The World Live Surgery Workshop will highlight the use of implanters during FUE procedures. Implanters are ideal as they are well suited for the fragile grafts created using FUE techniques. These implanters can also successful accompany the stick-and-place method. The implanter ramp can be used to help reduce fatigue and increase speed.


Original Clinical Data.

FUE harvesting may have higher transection rates as compared to FUT harvesting. In response to a challenge given by Dr. Cole, the authors compared the transection rates between FUT and FUE. The average transection rate found with FUT was 1.25%. Comparatively, FUE was
estimated to be 6%. Factors that may have contributed to higher transection rates include high donor densities and deeper routes.


**Opinion.**

This article is a based on Dr. Uebel’s recollection of the first ISHRS meeting. Dr. Uebel frequently (70% of the time) uses strip but will occasionally use FUE on his patients (30% of the time). As FUE techniques are improving an improvement in scarring might follow.


**Opinion.**

This article focuses on the use of implanters. Graft trauma is a potential problem for FUE harvesting as FUE grafts are typically skeletonized with limited protective tissue. Implanters can help minimize trauma and decrease the time required to train assistants in manual techniques (e.g., forceps). Implanters can decrease the chance of a puncture wound when transferring from loader to user.


**Opinion.**

This article discusses postoperative care and evaluation within different surgical techniques such as FUE and PRP. ACell may add value to FUE extraction sites as it enhances angiogenesis, inhibits fibrosis and increases follicle regeneration. Dressing the donor area with gauze, saran wrap and coban sprayed with ATP is an example of FUE postoperative care. An antibacterial spray containing Microcyn is a suggested alternative to ointment as it has a broad antimicrobial coverage.


**Opinion.**

The Surgical Assistant Core Skills Workshop will offer information on graft removal after FUE harvesting. In addition, opportunity to practice tissue slivering, graft dissecting, and graft placing will also be available to attendees.

Opinion.

The Surgical Assistant Core Skills Workshop is an opportunity to learn more about FUE/implanteers, slivering, dissection and implantation. This workshop will provide assistants with an opportunity to try new innovative techniques and instruments.


Opinion.

The upcoming Surgical Assistants Core Skills Workshop will provide an educational opportunity for assistants and physicians to learn more about FUT and FUE techniques. This workshop will be followed by the Surgical Assistant Program, another great educational resource for assistants.


Technique.

The stick and place technique using a dull needle implanter can be very advantageous. These advantages include minimal incisions, angle control and maximum needle optimization. This method is slower and requires the surgeon to use both hands, requiring delegation under supervision. Small sagittal incisions at an angle of < 30⁰ are suggested to help avoid bleeding and popping associated with implantation techniques.


Original Study.

A recently conducted study suggests that implanters protect denudated FUE grafts. This study was conducted using 7 Caucasian men who on average had 2,009 grafts transplanted using sharp needle implanters. The results of this study suggest that implanters leave extracted grafts intact as only 0.5% of the hair follicles transplanted displayed damage not previously present prior to implantation. This implantation process averaged 1,019 grafts per hour however hooking was observed.

Opinion.

There will be three ISHRS live surgery workshops conducted in 2017 that will feature FUE. The first is the Orlando Live Surgery Workshop. The second will be the FUE live surgery workshop, an intense coverage of FUE surgery. The last ISHRS live surgery workshop, hosted by Dr. Umar will cover topics related to advance FUE techniques.


Questions

FUE was one of the topics covered in the questions proposed to ISHRS members. The questions asked were based on calculations encountered in the hair restoration field.


Opinion.

The need to increase FUE coverage in ISHRS forum articles was one of the many topics suggested in the ISHRS Needs Assessment survey conducted in 2016. Thus, the Jan/Feb ISHRS 2017 forum issue will cover FUE incorporating a discussion on the new Hybrid Flat FUE punch and the important angles required for a successful FUE harvest.


Opinion.

An IRB-approved study is currently being conducted by the FUE Advancement Committee (FUEAC) to obtain more information on FUE harvesting. This study focuses on comparing the quality and survival of grafts placed with implanters versus forceps. This study is not yet completed and interested members are encouraged to become involved.


Opinion.

Within this article, the author compares FUE to FUT, stating that both may produce a similar amount of scarring. The author also points out that the donor area is a nonrenewable resource of grafts irrespective of the harvesting method chosen (e.g., FUE vs FUT).

Opinion.

Innovative FUE techniques will be discussed in this issue. Experience, skill and an innate desire for perfection can help hair transplant surgeons to obtain quality results. Case reports and complications will also be covered in this issue.


Opinion.

FUE has surpassed FUT in terms of popularity and availability. FUE is used more often than FUT (53% versus 44%) and is offered in most practices. Combining FUT with FUE can be an effective way to treat extensive hair loss. Despite its success, FUE is not the ideal choice for women with severe hair loss as they may not want to trim their donor hair. Hair restoration practices should be proficient at both FUE and FUT in order to allow patients the opportunity to choose between two acceptable harvesting techniques.


Review.

There are some limitations to the design and mechanisms of implanters. If grafts are not trimmed appropriately the graft can become crushed when placed into the implanter. When over trimmed or extremely skinny grafts as required in FUE; dehydration, desiccation, and trauma can occur. The double movement created by the implanter mechanism can result in desiccation when the grafts are fitted into the channel.


Opinion.

Surgical details, techniques and modifications to strip surgery might be loss to surgeons that narrowly focus on FUE. Using the old strip method viable hair follicles might get lost or
wasted when a scalpel blade is used to cut through the skin. To avoid this issue a new technique can be used. During this technique the skin is hyper-inflated with the incision made with a No. 10 or 15 blades and a scissors used to separate the incision margins.


**Case Study.**

Trigeminal Neuralgia, a rare side effect, was found after FUE was conducted in a 70 year old male due to tumescence fluid. Shift swelling, edema, shooting pains and heat were all symptoms felt several days after the hair transplant. These symptoms could have been caused by the pressure created as tumescence fluid traveled from his scalp to the side of his face. Symptoms resolved 2 weeks after starting gabapentin.


**Review.**

FUE was a popular topic at the II Workshop Latinoamericano de Transplante Capilar held in March. FUE terminology, devices, procedures and complications were discussed by experts in the field. Special situations like reconstructive surgery, beard and eyebrow transplants as they relate to FUE were also covered in the lectures provided at this workshop.


**Opinion.**

Scarring is not just limited to strip harvesting; scarring is also produced using FUE. Disfigured scarring can occur through the removal of an excessive number of FUE grafts. To create better donor scars (for both strip and FUE) use a single blade to separate the two sides of the donor strip, leave the sutures in for 2 weeks, avoid undermining unless it’s absolutely necessary and develop the ability to determine scalp laxity. Additionally the use of multiple small towel hooks, temporary moist dressing and delaying wound closure can help bring the wound together and allow for visualization of the closure.

Original Clinical Data.

Two donor harvesting methods (FUE vs. strip) were used in four patients in order to establish which method produced better results. FUE grafts were harvested using the SAFE II System and the donor strips were harvested using the “one blade” Limmer method (FUT-MD). Overall, graft survival was highest using the FUT-MD method (86% survival rate) as compared to the FUE harvesting method (61.4% survival rate). Higher rates of miniaturized hairs were found with FUT-MD (48 grafts) as compared to FUE (27 grafts).


Case Study.

An “open punch” technique incorporates both direct non-shaven FUE and “preview long hair” concepts. It allows for an oscillatory punch movement avoiding hair wrapping issues normally associated with a rotational punch movement. In a case study using this technique a 12.7% transection rate was found.


Review.

A specialized hand-piece that utilizes all three dimensions can decrease partial or complete transection rates and can ease the FUE learning curve. A 3D cutting cylinder equipped with touch screen activation and a foot switch can allow for correct positioning of the punch and create a linear path. This can also allow for better directional aim.


Review.

FUE, FUT combined with FUT and the use of implanters were topics of conversation at the European Hair Transplant Workshop held in June. FUE punches, robotic advances, how to minimize white dots and complications were also topics of conversation at this workshop.


Opinion.
To obtain a good quality graft using the FUE method some common hurdles need to be overcome. Splay and tethering can create differences in FUE results and can be influenced by ethnicity. The number of hairs per graft, the size of scar and time of donor harvesting need to be regulated as they can deplete the donor area and deform the surrounding follicles. The use of motorization and flat punches can help avoid these issues.


Opinion.

This article focuses on answering FUE related questions. Questions on punch insertion depth, long term management of donor area, what FUE grafts should look like, graft splitting, and less traumatic ways of graft removal were all address by experts in the field. Minimizing extraction evidence, contributing factors of poor growth, quality control, mistakes and the role of assistants in the FUE surgery were also topics discussed.


Review.

Hair Transplant surgeons experienced more pain and fatigue performing the FUE procedure as compared to strip. Pain severity also differed between these two harvesting techniques with 69% of surgeons reporting moderate to severe pain during FUE procedures. These results were found through an electronic survey completed by 38 hair transplant surgeons.


Review.

The frequency of hidden transection rates differ between expert and beginner FUE surgeons. Hidden transection rates are transections that occur in follicles surrounding the punched hole. Hidden transection rates were lower with expert FUE surgeons (2%) as compared to beginner FUE surgeons (8%). The majority of transections occurred along the superior side of the punch site.

Opinion.

FUE will be a topic of conversation at the upcoming World Congress. Topics such as long hair FUE, non-shaven FUE and the latest FUE research will be discussed at the 2017 World LSWS and Congress. Covering these topics, mini-courses, workshops, and symposiums will be offered to provide insight into new hair transplantation techniques.


Commentary.

Dull implanters are more suitable for graft placement into premade sites. Sharp implanters are ok in a limited capacity, for implanting grafts in the eyebrows and temple peak areas. However, the tip of the implanter can catch on the inside of the premade slits during insertion. Also, sharp implanters can create a new path, altering the insertion angle of the graft. Dulling the implanter can decrease the risk of injury, cost effective, and limits risk of site angle changes.


Review.

FUE was a popular topic at the 9th World Congress for Hair Research held in November. Dr. Wolf’s study of the genomic comparison of follicles from FUT, FUE and Plucks was a highlight. Dr. Wolf found no differences between FUE and FUT grafts during the genomic comparison and both FUE and FUT grafts contained more stem cell makers than plucked hairs.


Original Clinical Data.

Participant feedback, post-meetings, and gap analysis help structure future ISHRS’ Annual Scientific Meetings. Conflicting suggestions in regards to FUE have been found in participant feedback. An increase in live surgeries, number of workshops and evidence based talks were also suggested.
Opinion.

A depleted donor area can be managed by harvesting body hair using FUE, scalp micropigmentation and medical therapy. Possible reasons for decreased hair yield rates can include trauma, using FUE rather than strip harvesting, large manual FUE sessions allowing for longer out-of-body time, and harvesting from regions of high miniaturization.


Review.

FUE was a popular topic at the 17th Annual European Hair Research Meeting held in June. The combination of FUE with strip surgery, robotic assisted-FUE and insertion techniques were also topics of conversation at this meeting.


Review.

FUE was a popular topic of conversation at the 20th Anniversary of the Italian Society for Hair Science held in April. The advantage of the FUE ARTAS Robotic System was discussed by Dr. Farjo using video format. Other topics covered at this meeting included laser therapy, effluvium and scalp micropigmentation.


Opinion.

Good transplant results, donor scarring and happy patients may persuade physicians to keep using strip surgery (FUT) as opposed to FUE. FUE is a great harvesting technique when properly performed but if physicians are able to fill their time with strip patients and get good results there may not be any advantage to adding the FUE technique to their practice.

Harris JA. Message from the FUE Research Committee Chair. An Invitation from the FUE Research and Committee Chair. Hair Transplant Forum International. Mar/Apr 2016;26(2):57.

Review.
The goal of the FUE Research Committee is to; standardized FUE terminology, catalogue literature concerning FUE and study the most pressing FUE research questions. In order to do so more volunteers are needed to investigate and initiate studies that address high priority FUE questions.


Review.

The main goals of the FUE Research Committee is to standardize FUE terminology, catalogue FUE literature and study the most pressing research questions as they relate to FUE. Interested and experienced ISHRS members are invited to be investigators in ongoing multicenter studies or to initiate study protocols.


Opinion.

The FUE Research Subcommittee has completed a comprehensive FUE literature review and is currently finalizing the corresponding annotated bibliography. ISHRS members are still encouraged to contribute protocols for a multi-center FUE study and will be provided with advice, guidance, study design evaluation and support.


Opinion.

This article focuses on state laws surrounding the delegation of surgery during hair transplantations. Florida and Virginia both oppose the use of unlicensed individuals performing FUE and have stated so in declaratory statements and disciplinary proceedings. In line with these state laws, the ISHRS Position Statement on Qualifications for Scalp Surgery also discourages unlicensed individuals from performing hair transplants. This belief is also shared globally, as Istanbul has also taken a stand against individuals performing hair transplant surgeries without direct supervision by a licensed professional.

Josephitis D. A side-by-side study of 20 consecutive FUE patients comparing the use of a 0.9 mm sharp vs. 0.9 mm blunt punch. Hair Transplant Forum International. Nov/Dec 2016;26(6):256.

Original Clinical Data.
Sharp and blunt punches differ in hair transection rates, yield, speed, graft quality and scarring. A greater transection rate was found with sharp punches as compared to dull punches. Conversely, the amount of hair per graft was similar across punches, when all hairs in each graft were weighed equally. The blunt punch had more missing grafts as compared to the sharp punch. The overall time required to punch and pull the graft was similar across punches. Blunt punches may result in higher quality grafts but produce a patchier appearance as compared to sharp punches.


Review.

FUE was a popular topic at the ISHRS FUE Workshop held in Istanbul in April. FUE techniques that minimize transection rates and maximize efficacy were topics discussed. It was discovered that in Turkey there are many additional hurdles to overcome to be a hair transplant surgeon. Only plastic surgeons, dermatologists and a few specially certified doctors are allowed to practice hair restoration surgery with all procedures restricted to hospital settings only.


Opinion.

The popularity of FUE may be leading to ethical concerns. FUE is becoming more and more popular with almost 50% of FU transplants using the FUE technique. New FUE providers may not be physicians and as such the unmet demand for training has never been greater. Learning on patients is not an adequate solution as suboptimal outcomes can result. An honest evaluation of skills and communication with patients are key steps to successful FUE harvesting.


Review.

FUE was a popular topic at the 5th Annual Meeting of FUE Europe Society held in June. Computer-assisted FUE devices, manual FUE, FUE candidacy and beard FUE were topics of conversation. The safe zone as it relates to the FUE procedure and how to optimize donor area supply were also discussed at this meeting.

Review.

FUE was a topic of conversation at the ABCRC Controversies Workshop held in May. FUE was compared to FUT through an enlightening discussion between Drs. Muricy, Lemos, Muricy-Sanseverino, Leao and Rogerio Regis. Other topics that were discussed included finasteride, hairline design, harvest method and graft estimation.


Review.

FUE was a popular topic at the 20th Annual Meeting of Japan Society of Clinical Hair Restoration held in December. FUE techniques and using motorized FUE punches were covered in lectures and video format.


Opinion.

Recently there have many different sub-societies that have branched off from the ISHRS. The International Recipient Site Society (SRSS) focuses on making the incisions where the extracted donor hairs will be placed and the FUE society encourages patients to choose FUE. However these societies should not be the go to site for information and education, the ISHRS is. The ISHRS covers all aspects of surgery giving surgeons the ability to obtain well rounded information without specializing in one method or technique.


Opinion.

FUE is becoming popular among patients as it allows for minimal scarring, minimal pain and minimal time off. Even when patients are told that there might be a decreased survival rate when using FUE, patients are still choosing FUE.

Opinion.

This issue includes a description of Dr. Parsa Mohebi’s FUE technique including clear photographic evidence of the results achieved. Scalp micropigmentation is another highlighted topic in this issue.


Opinion.

Scalp micropigmentation (SMP) is similar to FUE in that unlicensed technicians with poor training and no supervision seem to be in the driver’s seat. Disfigurement can be a result of an improperly performed SMP procedure. The inappropriate use of blue pigmentation and the creation of flat low hairlines in young patients are issues frequently seen when non-experts perform SMP.


Opinion.

As popular as FUE is there are downsides to this technique. FUE is gaining popularity within the literature, as well as with surgeons and patients. This harvesting technique produces minimal scarring, is less painful, and enables a quicker recovery. However with the possibility of “hair transplant factories” in the Middle East and unlicensed technicians performing most of the work we should be weary of this technique.


Review.

The Serial Extraction – Placement Technique can minimize out-of-body time and improve graft survival rate. During this FUE method, sites are pre-made, and the chasing technique and accelerated graft processing techniques are incorporated. Any FUE instrument such as manual, motorized or robotic techniques can be utilized with this method allowing collaboration between surgeons and other team members. Patient position is constantly altered during this method which can allow for less ergonomic complications.

Opinion.

The dull needle FUE implanter published in a previous article by Dr. Speranzini is not the first of its kind. In 1994 and 1995 similar more rudimentary devices were presented. As more complex and sophisticated devices emerge it’s quite an informative to look back and trace the history behind the idea.


Review.

Short-acting scalp micropigmentation is a semi-permanent cosmetic procedure that is suitable for patients presenting with female pattern baldness, FUE/FUT scars, scarring alopecia, damaged scalps and male pattern hair loss. Colored pigments are implanted using needles that help penetrate the dermis and allow for desired pigment dispersion. The less permanent aspects of inorganic pigments allow for natural fading.


Opinion.

Technical skills (e.g., microscopically dissected follicular units, FUE), which dominate meetings and significantly contributed to the hair restoration landscape, are not all that is required when being a hair restoration surgeon. Knowledge, wisdom, compassion, and most importantly judgment are all qualities that make a good surgeon.


Review.

FUE was a popular technique discussed at the International Congress of the ISHRS held in May. Live surgery workshops were offered and included eyebrow transplantation, the non-shaven FUE technique, beard transplantation and classic strip and implanter techniques. Dr. Park gave an informative lecture on his non-shaven FUE method that is aided by using his specifically designed FUE chair. Other topics of conversation included graft survival and scalp dying in white-haired FUE procedures.

Opinion.

FUE might have caused the increase in the number of beginners entering the hair restoration business. These new doctors learning FUE should take ISHRS’s basic FUE course, attend complications panels and M&M conferences. Education is the key for new doctors learning FUE.


Opinion.

FUE will be focused on in the upcoming World Congress meeting. Basic, intermediate and advanced FUE lectures will be delivered by experts in the field to help educate surgeons on the FUE methods and devices available.


Opinion.

FUE will be a popular topic at the upcoming ISHRS meeting later this year. FUE basics, devices, complications and comparisons with other methods will be discussed at this meeting.


Opinion.

FUE will be a popular topic of conversation at the upcoming ISHRS meeting being held in Las Vegas. Workshops will offer a wide range of FUE topics including implanters, basic concepts, advanced topics, and devices. FUE mini-courses are also available for those that would like to know more information.


Opinion.

The upcoming ISHRS World Congress of Hair Restoration Surgery will provide an excellent opportunity to learn more about FUE. FUE will be covered in 3 mini-courses and in lectures provided by advanced-level surgeons. Despite the advantages of FUE this method has opened the floodgates to public seduction, misinformation and medical incompetence.
Attending ISHRS meetings can be a great way of recalibrating and preventing some of these issues.


**Review.**

ABCRC hosted a workshop this past October that was primarily focused on FUE. Presentations on the basics of FUE, partial extraction of FU, and body hair removal were conducted at this workshop. FUE performed in shaven and non-shaven areas were also covered in talks given by Dr. Cole.


**Opinion.**

Due to an unmet market demand for FUE, commercial companies help new doctors with no hair restoration background join the FUE business. A lack of surgeons adapting to FUE due to its difficult learning curve has led to the creation of automated and robotic FUE technology. This technology can enable new doctors or unlicensed personnel to easily perform FUE.

**Rassman WR. Combining Scalp Micropigmentation (SMP) and Hair Transplantation. Hair Transplant Forum International. May/June 2016;26(3):85,91-95.**

**Review.**

Scalp Micropigmentation (SMP) can be a great tool to add to the hair restoration field. SMP can help camouflage scars made by FUE harvesting, individuals with see-through donor areas, and those that have low donor densities.

**Roberts S. Message from the 2016 Surgical Assistants Program Chair. Hair Transplant Forum International. May/June 2016;26(3):121.**

**Opinion.**

The Surgical Assistant Program is an exciting educational experience that will be offered at the upcoming ISHRS meeting held in Las Vegas. Experts in the field will be presenting talks concerning the latest cutting and placing techniques as they relate to both FUT and FUE. Physician expectations will also be a topic of conversation during this meeting.
**Review.**

FUE was a popular topic at the 7th Annual Hair Transplant 360 Workshop held in November. Cadaver harvesting and 3D demonstrations allowed hair transplant surgeons to view graft separation as well as FUE harvesting techniques. FUE complications and FUE performed in African patients were also included in lectures given.

**Opinion.**

This article focuses on advice given by experts in the field. Here are some tips suggested by these experts as they relate to FUE. Body hair using the FUE harvesting technique can be a successful option for eyebrows transplants with kinky or coarse hair. Stretching the skin before extraction or combining FUE with FUT can help the follicle extraction in lax scalps. Limiting FUE mega sessions to 2,000 or 2,500 grafts can allow for follicles to be harvested in the safe donor area, decrease patient fatigue and decrease out of body time.

**Opinion.**

The amount of harm (wounding) FUE inflicts can influence how many grafts should be harvested. FUE scars can heal larger than the original punch which can be an issue if trying to avoid a 2 FU void during harvesting. If a patient has an alopecia area greater than 6 mm², FUE scarring may become noticeable. Other factors such as hair characteristics and aging can also impact the appearance of hair density.

**Opinion.**

FUE techniques that are advertised as new may not be novel. In a recent Forum article, a new slotted punch technique was advertised for FUE harvesting in long haired individuals. This may not actually be novel as a similar idea was mentioned years previously at an ISHRS meeting in 2007. To ensure that credit is given to original inventors, a literature review is advised.
Opinion.

Dr. Devroye’s WOW motor and flat punch method incorporate all the best qualities of manual FUE, motorized FUE, sharp punches and dull punches. This method can allow the motor to oscillate for you and enables the punch to go deeper with little risk of transection. Trauma can also be avoided using this method as the wall thickness of the flat punch is very thin decreasing the force and speed needed to enter the skin.


Review.

Dull implanters can decrease trauma, cost and increase growth of FUE grafts. The ability to delegate work, minimize trauma (resulting in optimal growth), shorting learning curve, decrease cost (e.g., no need to replace during surgery), and increase accuracy are advantages of these implanters. Drawbacks of this implanter can include a decreased speed and increased bleeding.


Review.

FUE was a common technique discussed at the ISHRS World Congress held in September of 2016. FUE was covered in workshops covering basic concepts, new devices, and advanced topics. FUE was also covered in additional courses such as the surgical assistants program and mini courses (e.g., FUE mini course, SMP mini course).


Review.

Increased safety margins and better control can be found with suction assisted FUE devices. The suction assisted FUE device can create elastic buckling instability through flexible punch movements and suction. Deeper punches can also occur without increasing the risk of transection with these devices.
Opinion.

This issue contains a very interesting discussion surrounding FUE limitations and donor management. Dr. Wolf did an excellent job and it is well worth reading.

Opinion.

Freshly frozen cadaver tissues are great to use when teaching the FUE method. This was an opportunity given at the Saint Louis 360 Hair Transplant Workshop, providing the feel of live FUE without the need of live patients.

Opinion.

With the addition of novel and effective technological ideas, FUE has entered a new era. Dull implanters can now be used to transfer FUE grafts into premade recipient sites. Additionally, using a newly invented Mega FUE motor, an increase in accuracy and efficacy of FUE extraction can occur.

Opinion.

This issue focuses on a conversation between 12 ISHRS members as they discuss their opinions and experiences with FUE. Important issues and complications surrounding FUE were discussed with a focus on minimizing trauma, mistakes and quality control.

Opinion.

FUE is not ‘phooey’. The misapplication of FUE may have led to the assumption that FUE is inherently flawed. Over aggressive applications, through FUE mega sessions and overharvesting can result in depleted donor zones. With recent innovations this technique can become more effective however thoughtful application is still required.

Opinion.

The upcoming Live Surgery Workshop will provide participants the opportunity to interact with surgeons during live hair transplants. This workshop will provide an opportunity to learn and speak with experienced FUE surgeons. This workshop is highly recommended for beginners as well as experienced surgeons.


Case Study.

This article provides a guideline for critical thinking; outlining standards, characteristics and actions that can uphold gold-quality standards within the hair restoration field. Desiccation, transection, and physical injury all affect graft survival and naturalness of the results. Through case studies causes of poor growth can be analyzed and avoided.


Review.

FUE was a popular topic at the ISHRS Regional Assistant Training Workshop held in May. Strip and FUE harvesting, recipient site creation, graft placement and post-operative instructions were all aspects of the hair transplant procedure that students were able to observe. Students were also taught proper tissue handling through the use of inanimate models and cadaver skin at this workshop.


Opinion.

A recipient site focused society would be of interest to doctors that are focused on recipient area results. Since FUE is such a unique and effective technique a society focusing on this harvesting method could meet unmet needs that the general ISHRS conference may not cover.

BAHRS members have outlined common practices for FUE that allows hair transplant surgeons to benchmark their practices. The majority of BAHRS members use motorized FUE, use sharp punches and would not harvest more than 3,000 FUE grafts in one session. A 5 to 10% transection rate was deemed acceptable when performing FUE and members routinely harvested grafts from the safe donor zone.


This article highlights recent updates in European hair restoration surgery standards. Two standards have been generated by the CEN403 Committee on Aesthetic Surgery and Aesthetic Non-surgical Medical Services; one for surgical procedures and one for non-surgical procedures. Wording to ensure that hair transplant surgical assistants are licensed or are under direct supervisor of a practitioner has been suggested by the ISHRS. However, in countries like France, hair transplantation is not considered a surgical procedure so direct supervision is not required.


Since FUE requires a large donor region to harvest from, FUE harvesting can be complicated in younger patients. In order to ensure harvesting is only taken inside the safe donor area, accurate boundaries are needed. Hair transplants, conducted by minigrafts, FUT or FUE are not permanent and can thin over time despite multiple hair restoration surgeries. FUE might also inflict damage to the glandular area and piloerector muscles.


This article focuses on a discussion surrounding possible causes of post-operative inflammation. Increasing the site size and decreasing the amount of graft trimming may help decrease out of body time. Chubbier grafts may lead to better growth rates and using implanters could help decrease the amount of J hairs.

Opinion.

This article is a continuation of the topics discussed in the FUE Roundtable Questions & Answers article published earlier in this issue. Graft removal, punch depth, role of assistants, poor growth and beginner mistakes were some of the topics mentioned.


Opinions.

This article focuses on a discussion surrounding FUE limitations and donor management. Experiences and opinions were provided by several experts in the field covering topics like safe donor areas, graft survival, and frequency to which FUE is performed.


Opinion.

The Japan Society of Clinical Hair Restoration (JSCHR) is a medical society that encourages knowledge of the latest clinical treatments and hair restoration research. Currently half of the JSCHR members conduct FUE and several robots across Japan to aid FUE harvesting. FUE popularity is expected to increase in Japan even though hair transplant advertisements in Japan are strictly limited to websites.


Opinion.

Educational opportunities at ISHRS meetings can help fill any gaps in knowledge surrounding FUE and FUT procedures. Best FUE practices can be gained by attending ISHRS workshops as well as meetings. Clinical experience and knowledge can also be gained at regional sponsored workshops.

Review.

Hair transplants can be performed safely in patients taking antithrombotic therapy for a mechanical heart valve, a coronary artery stent or an atrial fibrillation. Patients taking low doses of aspirin can still undergo FUE as hemorrhagic tendencies are not associated with low-dose aspirin.


Opinion.

The ISHRS is against misleading advertisements and unlicensed individuals performing hair transplants. Even though hair transplants are relatively safe, only qualified physicians should be performing FUE and FUT. Additionally, hair transplants should not be advertised as painless and scarless procedures.


Case Study.

A recipient site infection was found in a 34-year old male who had undergone two separate FUE procedures. Within 3 days of surgery this individual’s recipient site was covered in pus and scabs with several dislodged grafts. After disinfecting lesions, rearranging dislodged grafts and followed by a course of antibiotics the patient did not experience any further abnormalities. A second surgery was performed 10 months later with most grafts producing hairs at four months post-surgery.

2015


Case Study.

After a large FUE session, diffused alopecia areata occurred in a 55-year old, Norwood V patient. Emotional distress was a possible trigger of the diffused alopecia areata. Minoxidil and laser therapy were used to successfully treat and patient satisfaction occurred 2 years post-surgery.

Review.

Physician and assistant programs held at the 6th Annual Hair Transplant Workshop covered every aspect of both FUE and strip. Hairline design, donor hair removal, and recipient site creation were also covered in lectures and hands on activities.


Opinion.

Hesitation towards FUE in a previously published Forum article (MFU Grafts and Strip Harvesting – We hardly Knew Ye) was echoed by several other physicians. False advertisement and public opinion encourage FUE to dominate the hair transplant landscape. Judgment of FUE effectiveness should be withheld until more scientific and clinical studies have been conducted.


Opinion.

Most physicians agree that both FUT and FUE are acceptable options for hair restoration. Both techniques offer equal benefits to patients and neither should be abandoned. The possibility of harvesting outside the safe zone has made some physicians hesitant to introduce or recommend FUE to their patients.


Opinion.

This article focuses on answering clinical questions not covered in the recent ISHRS meeting held in Kuala Lumpur. A general summary of the answers to these questions are as follows. FUE is a preferred method for hair restoration as more patients can be considered candidates. Professionalism is needed when dealing with new patients who have a history of unsatisfactory FUE procedures performed by fellow surgeons. Robotic systems, patient selection and punch sizes are just a few of the many effective ways of decreasing FUE transection rates. FUE mega-sessions can be performed with both manual FUE and robotic FUE. FUE can be successfully combined with medical therapy in patients with diffused unpatterned alopecia as evidence in a case study.
Review.

ISHRS has taken the lead in FUE education, providing programs and workshops to surgeons. Hands-on workshops held by ISHRS help train surgeons and their staff to refine FU mega-sessions. Knowledge and training for FUE are also available through ISHRS meetings and conferences.

Case Study.

Completely transected follicles are able to grow back as found through a case study. The protocol used in this study was performed as close as possible to a regular FUE procedure with all harvested follicles transected. Sixty percent (n=84) of completely transected follicles were able to grow back and in 34 implanted transected follicles, no hair was produced.

Review.

Facial hair transplants are slowly growing in popularity. These transplants follow similar steps as traditional FUE methods however the distribution of grafts and the creation of recipient sites differ. The scalp as a donor region is preferred when reconstructing beards or moustaches using FUE.

Review.

The Asian FUE Workshop held in February 2015 contained lectures on the basics of FUE, FUE terminology, and devices used. Clinical experience with FUE, ARTAS, and donor site selection were also topics of conversation. Additionally, live surgery was used to educate surgeons on new FUE methods.
Opinion.

A disposable cordless FUE handheld unit can be a great addition to the FUE toolbox. This unit can decrease hand fatigue and has a low cost. This unit does meet sterilization requirements without requiring maintenance and can be used for special populations (e.g., HIV).


Opinion.

This article focuses on answering clinical questions that went unanswered at the 22nd Annual meeting at Kuala Lumpur. This is a summary of the answers as they relate to FUE. Using dye or increasing illumination can help in FUE mega-sessions in patients with white hair. Transection during FUE or strip harvesting can contribute to poor hair growth. FUE transection rates can be minimized through better patient selection, motorized devices, and adding tension. When using tumescence in FUE surgeries, the minimal amount of fluid is needed to reduce the amount of bleeding is recommended. FUE can help camouflage scaring and helps avoid misalignments from occurring along the donor scar.


Review.

FUE and the ARTAS robotic system were discussed at the 19th Annual Scientific Meeting held in November. Lectures and live surgeries were used to educate fellow surgeons on therapeutic options, cellular components of hair follicles and surgical approaches to hair restoration.


Review.

The anatomy of follicular units, terminology, tools, and implanters were all topics of conversation at the 3rd annual Mediterranean FUE workshop held in June 2015. Lectures also covered FUE mega-sessions, manual sequential methods, and surgical cases.

A majority of physicians (85%) that attend annual meetings are occasionally performing FUE in their clinical practice. Motorized sharp punches are more popular than both motorized dull punch and the utilization of the ARTAS robotic system. All attendees stated that FUE does leave scars and most attendees (68%) respect the safe zone.


Hair transplant roles and task assignments within current clinical practice are similar to ISHRS best practice guidelines as evaluated through an online survey. Graft dissection was rarely done by physicians with creation of recipient sites a task both expert and general physicians perform. Incorporating FUE into clinical practices did not differ between general and expert physicians with over 70% of physicians performing manual FUE. It was found that motorized FUE is sometimes delegated to other staff members with 48.9% of physicians always performing this task. Motorized suction FUE is always (94-100%) performed by physicians. It is ISHRS’ recommendation that manual FUE, motorized FUE and motorized suction FUE should be performed only by physicians.


ISHRS supports the use of FUE using best practice standards and encourages only licensed individuals to perform FUE. There is legislation in most states that clearly defines who can and can’t perform FUE. All surgeons should comply with corresponding policies. Through proper training, education, and skill, FUE can be done properly and successfully.


ISHRS has taken many steps to honor the pioneering works of Dr. Okuda who developed FUE as well as promote best practices. ISHRS does not promote unlicensed technicians to run medical devices that assist in donor harvesting. Members are encouraged to perform all donor harvesting and recipient site incisions.
Opinion.

Incentive-based marketing is not appropriate in the hair restoration field. Any promotions linked to purchasing automated or robotic devices can promote one technique over another (FUE/Robot vs strip) without taking the patient into account. These promotions should be avoided.

Opinion.

Conservative FUE planning is necessary if finasteride or other hair stabilization products are refused by patients. Rates and amount of hair loss can exceed predictions, impacting the surgical plan, especially if large FUE harvesting is the goal. Caution should be given if harvesting needs to occur close to the hair margins to obtain promised graft numbers.

Opinion.

FUE is gaining popularity in Poland with several SAFE machines in use across the country. New practitioners and older clinics have started to use FUE within their practices. With the Polish Society of Hair Restoration Surgery and Trichology Clinical Education, more research, presentations and workshops are being used to educate Polish practitioners.

Review.

Topics of conversation at the 23rd ISHRS Annual Scientific Meeting included the FUE research committee, FUE scaring, and the combination of FUT with FUE. In addition, growth of FUE harvested follicles, problems with FUE and the sequence of events during FUE were also discussed. Live patient viewing sessions, extra courses, mini courses, and workshops were also used to educate surgeons on the latest FUE techniques.

Review.

FUE was a popular topic at the 4th AAHRS Annual Scientific Meeting held in March. Body hair FUE, FUE as compared to FUT, and ultrasound-guided FUE harvesting were discussed using lectures and live surgery workshops.


Opinion.

Hair restoration surgery is common in Germany with 20% of procedures using FUE to harvest follicles. Robotic systems (ARTAS) are slowly being introduced within Germany with 3 to 4 systems estimated to arrive in 2015.


Opinion.

Non-shaven FUE technique (NSFUE) is a promising technique as outlined in a previous Forum article by Dr. John Cole. ATOE forceps, clips and tumescence can be helpful additions to this procedure. Performing NSFUE in a seated position can also help improve results.


Opinion.

FUE may not be superior to FUT. The number of grafts harvested from FUE can match FUT. FUE harvesting might be taken from unsafe zones and is quite time consuming. FUE is commonly performed by a single surgeon, leading to fatigue while FUT involves a full team. Linear scarring does occur with FUT but FUE can result in diffuse thinning in the donor area. Very limited amounts of FUE surgeons can perform successful mega-sessions unlike strip surgeons who perform large sessions on a regular basis.

Opinion.

FUE might be the future of hair transplantation. Through using technology, FUE can become more cost effective. Patients already desire FUE over strip, and with the integration of robotic systems and implanters, surgeons may not be needed to perform FUE. New physicians may start to enter the field from different backgrounds (e.g., dermatology) if future technology continues in this direction.


Review.

FUE is a harvesting technique whose methods and guidelines are still in the developmental stages. FUE can be successfully used in eyebrow transplants using donor areas such as the nape of the neck and along the hairline. In a large session, hair harvested outside the permanent donor zone should be mixed in with the other grafts before implanting. Guidelines that still need to be established include how many follicular groupings should be taken from the donor region as well as short to long term consequences of FUE.


Review.

A FUE device can deviate 14 degrees from the exit angle without transecting the hair follicle. This finding has implications in pre-operative planning of manual FUE as well as robotic FUE.


Review.

In the USA, FUE is becoming increasingly popular and the ARTAS Robotic System is frequently being used. Advertising has convinced the American public that strip harvesting is a poor choice and that FUE is a minimally invasive procedure. This has possibly led to overharvesting, poor hair growth and dermatologic disorders.

Review.

3D printing can be applicable to hair restoration surgery and can decrease developmental costs. Some applications of 3D printing can include creating polarizing lens caps, scalp tensioning clips for FUE and hand pieces for recipient site multi-counters.


Opinion.

FUE is not a scarless non-surgical procedure. Hair length of 2-3 mm is needed to help conceal FUE or FUT harvesting. Correctly informing the patients of the realities of FUE is necessary to avoid misunderstandings and unmet expectations.


Opinion.

Many benefits are associated with ISHRS memberships. Meetings include live surgeries, workshops and lectures on topics like FUE and androgenetic alopecia. Current research is also discussed at these meetings such as causes of hair loss and alternative treatments.


Opinion.

FUE donor healing was a highlight at the 23rd Annual Scientific Meeting held in Chicago. FUE was found to contract the donor area while the combination of FUE and strip widens the donor scar.


Opinion.

Even though FUE is popular, FUT sessions are showing impressive results. Patients are willing to travel great distances in order to have large FUT sessions conducted by experienced doctors. Only the future will tell if FUE can reach the same heights as FUT. State-of-the-art FUE can be done just as well as if correct punch sizes are used.

Review.

FUE was a popular technique discussed at the 22nd ISHRS Annual Scientific Meeting. Handheld and robotic devices, benefits of FUE, clinical experience with FUE, methods, and genomics of FUE hair follicles were common topics of conversation. Additionally, hidden transection rates, possible donor damage due to FUE and combining FUE with strip harvesting were also discussed. White hair removal using FUE, the non-shaven FUE technique and using FUE to extract Afro textured hair were also topics covered at this meeting.


Review.

FUE was a popular presentation topic at the ISHRS Regional Workshop for Assistant Training held in May. FUE harvesting, recipient site creation, graft placement and post-operative instructions were discussed. Surgeries were also observed for training purposes.


Case Study.

The combination of strip and FUE was successfully performed in a 65 year old man who had a history of previous hair transplants. FUE was used to remove previously implanted plugs and these plugs were reused where possible. An infection was noticed 6 days post-surgery but did resolve itself. The patient was pleased with results as evaluated 1 year post-op.


Review.

Common practice guidelines and principals for FUE have been established by the British Association of Hair Restoration Surgery. These guidelines state that advice to patients for post-operative donor care should be given by a hair transplant surgeon. Hair transplant surgical assistants should not be allowed to make FUE incisions and should be supervised when extracting FUE grafts.

Original Data.

Musculoskeletal symptoms, that impact the quality of life, are more common in hair restoration surgeons that perform FUE than single strip procedures. Approximately 50% of hair restoration surgeons reported they had musculoskeletal symptoms with 60% experiencing moderate to severe pain during FUE. Pain, fatigue and discomfort were also greater after FUE as compared to single strip procedures.


Case Studies.

This article focuses on several successful facial transplant case studies conducted using FUE. FUE has been used to restore beards, mustaches, and sideburns on patients with histories of regional hypertichia, facial atrichia, hypotrichia, cleft lip and burns. The scalp was the common donor region used during these procedures.

2014


Opinion.

With the introduction of FUE older techniques should not be replaced. Medium sized MFU grafts, an older strip technique, might still be helpful today as they do offer several advantages (e.g., lower cost, scalp protection). Patients should be informed that strip does allow for microscopic dissection of the grafts while the FUE technique simply plucks the graft from the scalp. A more appropriate application of FUE is in donor scar camouflage, and body hair harvesting.


Case Study.

Robotic recipient site creation translates the design made by the physician into a computerized algorithm that creates recipient sites by using image-guided technology. In a case
study, the ARTAS system was used successfully for FU dissection and recipient site creation. The ARTAS system allowed for consistency in recipient sites and avoided existing hair as specified by the physician. This method should only be used in large sessions and the ARTAS system is not currently capable to reproduce the natural swirl found in the crown.


**Review.**

As advantageous as the non-shaven follicular unit extraction (NSFUE) technique is patient complaints have led to alterations in the procedure. The learning curve for NSFUE is steep but it does allow for the appearance of scarring even before harvesting begins. Complications like over trimming and unintentionally plucking non-target hairs can led to patient complaints. Tailored wigs and using non-rotating depth stops can help address these patient complaints.


**Opinion.**

The safe donor area should be defined as a “relatively risky” area and should not be considered permanent, as hair loss in that area could occur. There is controversy on how many grafts are available for harvesting in the donor area with several published FUE articles showing harvesting outside the safe donor area. Goals to strive for is naturalness and appropriate hair density in the recipient area.


**Opinion.**

Surgical hair loss is common in all types of hair transplant techniques including FUE. Transection of hair follicles do occur with FUE and it is possible that some follicles are killed during this technique. Surgical hair loss should be a considered before preforming hair transplant surgeries.


**Opinion.**
The definition of a follicular unit may need to be revisited. Historically, follicular units have been defined as a pilosebaceous unit structure located at the mild dermis of the scalp with a distance of 1 mm apart. Today follicular units are now being used to describe a small graft containing 1 to 4 hairs without biopsy verification. This inaccurate definition is now used in follicular unit transplantation and follicular unit extraction procedures. Follicular isolation technique (FIT) might better describe what we are actually performing.


Opinion.

There are several contributing factors and treatments that encourage optimal graft growth. Holding solutions containing HypoThermosol/ATP can be a good option to store grafts if a large session of FUE could not be fully completed. Extracellular matrix can be used in the FUE donor site to promote regeneration, preventing fibrosis and can make sequential FUE sessions easier.


Review.

A workshop was held in June that educated surgeons on the ever popular FUE technique. Opinions on FUE, FUE techniques and experience with FUE automation was shared by experienced surgeons. In addition the FUE technique was observed in live surgeries, and combining FUE with strip was discussed. The applicability of harvesting body hair, FUE in women and alterations in instrumentation and implantation techniques were also evaluated.


Review.

The Untouched Strip Technique, a combination of strip and FUE, can allow for more coverage and hair density to occur. Using the untouched strip technique, above and below the strip border in the donor area is left unshaved. After the strip is excised and implantation occurs, FUE is used above the strip suture and below the untouched strip. It is these FUE FU that allow further coverage and increase hair density. This method can also allow for more productive strip surgeries in the future.

Original Data.

Then main attendees at the 22nd ISHRS annual meeting were dermatologist with more than 3 years’ experience with half devoting all or most of their practice to hair restoration. The main technique performed by attendees is strip however 90% perform FUE occasionally. Close to half of the attendees used a motorized sharp punch when performing FUE and only 11% used the ARTAS robot. Punches 0.99 mm or smaller are used by majority of attendees when performing FUE (60%).


Opinion.

ISHRS is a medical society that strives to adhere to best practice policies by providing educational opportunities for members and promoting novel research. This is evident in the meetings provided, where FUE and follicular unit micro-dissection strip harvesting are discussed. With the aid of ISHRS’s FUE Research Committee, IRB-approved studies will be able to help answer any questions concerning new techniques, methods and patient criteria.


Opinion.

Implanter pens can help with graft insertion. Forceps, typically used to insert grafts, can be autoclaved or disposed of after a single use however skill is needed to avoid crushing the bulb region or traumatizing the graft. The implanter pen can avoid bulb trauma and depth is controlled when inserting. This implanter can increase speed and can be easily used during the FUE technique. Some disadvantages of this implanter can be cost and the needed to train staff.


Opinion.

Women may not be suitable for FUE as significant graft numbers may not be possible. Extensive shaving is not preferred by women, which is also a requirement of FUE. Strip harvesting might be a better option as women can vary their hairstyling to cover scarring.

Opinion.

Due to FUE, our hair restoration goals may have been shifted in the wrong direction. The focus now is on short term goals, making sure the patient has hair when they need it. The goal of the donor area now is to look as good as the recipient area.


Opinion.

Results given in a previous article comparing a single FU case to a divided FU case may not accurately depict the survival rate of FUE grafts. The hairs were not assessed after an appropriate span of time that would allow for hair growth. Also, patients’ ethnicity may influence hair growth which could alter the results found. Lastly, when the study was reproduced the results yielded no differences between the single FU case and the divided FU case.


Review.

A practitioner can assess the quality of their technique through observing and recording specific measurements such as the number of intact grafts, completely transected grafts, and punch attempts. Calculations using these measurements can provide information on their technique such as follicle transection rate, follicles per graft achieved and completely transected graft rate.


Opinion.

Previous articles written about FUE terminology were missing the definition of a graft. In Hong Kong and Mainland China, the numbers of hairs harvested with FUE are advertised instead of the number of grafts. This purposely misleads patients and they end up choosing surgeons based on incorrect information.
FUE was a popular topic discussed at the 4th Annual Scientific Meeting of Korean Society of Hair Restoration Surgery held in May. An escalator technique applied to the FUE technique to decrease transection rates and increase yields was discussed. Additionally a surgical video session with FUE was provided at this meeting.

FUE can be successfully performed using non-shaving shaving techniques. Partial or micro-strip shaving can lead to linear scars and decrease density thus non-shaving techniques are preferred. The main steps include cutting the target hair short then punching these follicular units out. To expedite this procedure, a 1 step non-shaven FUE technique can be used. This technique simultaneously punches and cuts the hair follicle using a motorized FUE machine. Limitations associated with this technique include longer operating time and follicle transection.

Technicians have been using the automated suction device machine for FUE and preforming other parts of the hair transplant procedure which they are not licensed for. This behavior is unethical and unlawful. The number of assistants is dramatically less with FUE as compared to strip and with automation it is tempting to think that skill and licensing is no longer needed. As valuable as assistants are they should not be preforming the role of the physician.
with manual, motorized and robotic FUE techniques. Punches, hairline corrections and use of body hair for FUE harvesting were also discussed.


Review.

FUE was a popular topic discussed at the 20th Orlando Live Surgery Workshop held in April. FUE instrumentation, techniques and equipment were displayed and discussed. Additionally, FUE complications, robotic systems, mechanical FUE cordless devices, case studies, donor harvesting, single donor strip excision-FUE combinations were also discussed.


Review.

Trichology, platelet rich plasma, micro-tattooing and FUE surgery were the main workshops presented at the Italian Society of Hair Restoration International Meeting held in June. Cordless FUE machines, strip versus FUE, personal experience, and clinical data were topics of conversation at this meeting.


Case Study.

A rare complication (donor site ischemia and necrosis) was seen after FUE was performed in a case study. After extraction, an ischemia area was noticed in the right temporal region. This ischemia area did reduce 2 months post-surgery however the necrotic area left scaring. Possible factors that lead to this could include his history of smoking, thin tissue and/or prolonged compression.


Opinion.

Implanters do not necessarily decrease operating time nor do they increase quality. Using implanters can be time consuming and incisions should be made by doctors not
technicians. Splitting the surgery over two days can help with fatigue but a well-trained team could finish FUE surgery using forceps in 6 to 7 hours.


Review.

FUE was a popular topic at the ISHRS Meeting held in October. A comprehensive review of extraction harvesting was discussed along with the need for evidence-based FUE research. Donor management and preservation were mentioned as possible future focuses of FUE. Comparison to FUT, body hair FUE, follicular regeneration, and HRS training were also discussed. The necessity of completely shaving is a drawback of FUE and piloscopy was discussed as a future replacement.


Interview.

FUE is a common technique used in hair restoration surgeries in India, making up 40% of surgeries. With newcomers to the field preferring FUE combined with an increasing demand of FUE from patients, it is steadily becoming a popular technique. Robotic FUE is not common in India but section-assisted devices are prevalent.


Opinion.

Comments made by Dr. Knudsen in a previous article may not give an accurate representation of FUE. Approximately 90% of harvested follicles are actually extracted from the safe zone during FUE and most remaining follicular groups are left intact.


Opinion.

The size of the punch site may not be the only factor contributing to the patchy appearance in donor areas when FUE is performed. If follicles are better selected (e.g., extracting a follicle adjacent to a group of follicles) the areas devoid of hair in the donor area
might be improved. Also partial harvesting might better preserve the donor region’s appearance.


Review.

FUE was a popular topic at the 5th Brazilian Meeting of Hair Restoration Surgery Meeting. FUE using body hair, Norwood V/VI patients, and techniques were all discussed at the meeting. FUE complications, controversies and the combination with FUT were covered as well.


Opinion.

The Surgical Assistants Program is an educational opportunity for assistants to learn more about established practices and how to effectively communicate with patients. In addition workflow management, instrumentations and handling of grafts in the context of FUE will also be covered in this program.


Opinion.

Meetings, such as the Annual Scientific Meeting, provide valuable educational experience for surgical assistants. In the upcoming Annual Scientific Meeting the role of assistants during FUE procedures, hair science and infection control will be discussed. Writing articles for the Forum and volunteering are highly encouraged and appreciated.


Review.

FUE was a popular topic at HAIRCON. Anesthesia, manual punches, and motorized punches for FUE procedures were discussed. Caution with overharvesting and remaining in the permanent donor zone was suggested when performing FUE. Rotating surgeons, assistants and implanters when FUE is preformed using body hair is advised. The combination of FUE with strip harvesting and using FUE in cicatricial alopecia was also discussed at this meeting.

Review.

In the UK, Hair Transplant Surgical Assistants are not interchangeable with Surgical Assistants. These assistants have no official formal qualifications required but are included as members in the BAHRS. Currently within ISHRS, our assistants do not have memberships and are referred to as surgical assistants. As it relates to FUE, the BAHRS has stated that hair transplant surgical assistant should not make FUE incisions and should only extract FUE grafts under the direct supervisor of a hair transplant surgeon.


Opinion.

Treating hair transplantations like arts and crafts should be avoided. Only licensed surgeons should be preforming specific duties during the procedure (e.g., make recipient sites) as per governing laws. Non-volumetric expansions and incisions (instead of punches) should be used in the recipient sites as they create far less damage. When creating the recipient site, ensure that the incisions are not too close to existing hair and the angle is parallel. A placement trial in the recipient area and differential graft placement are recommended.


Opinion.

This article focuses on important issues and research brought up at the annual ISHRS meeting held in Kuala Lumpur. During this meeting it was found that 47% of FUE physicians used motorized assistance. The authors suggested that using 0.88 mm punch to isolate single-hair grafts using FUE might be a preferred option when using the ARTAS system. The authors concluded that ARTAS is efficient but can lead to overharvesting.


Review.

Asian Association of Hair Restoration Surgeons (AAHRS)'s main goal is to provide high-quality meetings that are affordable to allow the most amount of surgeons to attend as
possible. These meetings will hopefully address bad results that might stem from the steep learning curve associated with FUE.

2013


Opinion.

Donor depletion is not only associated with FUE but is an important concept for any harvesting technique used. FUE has gained popularity at the Bauman Medical practice and is a shorter, more comfortable and less invasive surgical option. Over 50% of the available donor density can be removed by FUE without any significant change in optical coverage of the donor area. There are several ways to help protect patients’ donor supply such as diminish demand, minimizing donor scarring, minimizing donor follicle loss, maximizing yield during transplant and harvesting in the safe zone.


Opinion.

Age and permanence of the donor area are critical variables in determine a good candidate for surgery. Strip and FUE harvesting methods impact the donor zone very differently, but both create scarring that can become visible over time. Since the donor area for FUE is much larger than strip it may not be an advantageous technique if the donor area turns out smaller than anticipated. Assessing the fate of the donor zone is critical to the planning of the surgery and this can be quite difficult if the patient is young. Miniaturization needs to be reliable to accurately predict future hair loss. In some cases, such as the case study mentioned, surgical options might be very limited due to instability of the donor area making both strip and FUE ineffective procedures.


Opinion.

Follicular unit transplantation (FUT) as we know it as today is better described as follicular isolation technique (FIT). This term incorporates the fact that the harvested graft may
not have all the follicles of a follicular unit or it could include more than one follicular unit. FUE is a term used today that describes the harvesting of anatomic structures (follicular units).


Opinion.

Hair transplant surgeons should avoid adding robotic surgery to their practices. Clever marketing, lack of the required FUE skills, and have no desire to perform the procedures are common reasons why surgeons add this device. Alternatively there are many FUE methods that could be used instead that offer lower follicular transection rates and higher quality grafts. These alternative FUE methods can be less expensive, allow grafts to be cut and placed simultaneously and still offer the ability to harvest large amounts of grafts.


Terminology.

Definitions surrounding the characteristics of the FUE technique and punches used are covered in this article. Additionally the safe donor area, donor area template, donor area region are also defined as they relate to FUE.


Review.

FUE was a popular topic at the 4th Annual Saint Louis University Hair Transplant 360 Cadaver Workshop held in November. FUE harvesting was mentioned in lectures and physicians were given the opportunity to practice FUE and strip on cadaver heads, foam models and live participants.


Review.

FUE was a topic of conversation at the Manchester Live Surgery Workshop held in April. FUE techniques as it relates to anatomy, hair density and how to minimize transection rates were discussed by experts in the field. Additionally Dr. Jose Lorenzo discussed size, sharpness
and cutting edges of punches needed for FUE. Live surgeries using the FUE technique were also featured at this meeting.


Opinion.

The popularity of FUE might be due to the lack of linear scarring, a convincing factor for some patients. This harvesting technique is not a replacement for our “old” standard and still needs to be critically evaluated.


Opinion.

There are several educational opportunities available for ISHRS members. These education opportunities include FUE techniques, strip surgery and hairline design. The World Congress for Hair Research is an upcoming event that promises to be enlightening as world’s experts discuss hair science as it relates to genetics and follicle model systems.


Opinion.

Complications are rare but do occur during FUE procedures. An example of such complication occurred a few weeks ago. In this case persistent hiccups were found during a 2,500 graft harvesting FUE procedure. This side effect has also been published in cases of strip surgery.


Opinion.

Assistants are irreplaceable when it comes to hair transplant surgeries. During strip harvesting 10 or more assistants are needed and FUE usually requires at least 4 assistants. Assistants therefore need to be educated about patient care, improvements of techniques and morbidity / mortality cases.


Opinion.
FUE may be more technical than artistic enabling easy use of robotic techniques. The ARTAS robot may not replace highly experienced FUE experts but does allow less experienced surgeons high quality FUE grafts. These robots can also help decrease the time required for harvesting.


Review.

Surgeons should be aware that their clinical practices will be dramatically altered when integrating FUE. Physician experience, scheduling and defining roles are some of the key steps that are required when adding FUE to a clinical practice. FUE requires more physician time as compared to strip so time management between surgeries will need to be altered. Special considerations should be considered when assigning tasks to surgical assistants during the FUE procedure as grafts are more prone to injury and desiccation than strip.


Opinion.

The risks associated with FUE are no different than the risks involved in hair restoration surgeries. Through proper risk management and management of patient expectations the issue of donor depletion and encroachment into unsafe donor areas can be addressed. In reality there is no way of knowing how much hair loss will occur in the future and the risk is only mitigated through medications and harvesting from central regions. Since there is no hair mass data to suggest how much hair should be left there is no calculation that can be done to avoid the see-through-look found with both strip and FUE. If patients want FUE harvesting they will have to accept the possibility that there might be limited grafts that can be obtained.


Opinion.

The planning of donor harvesting and recipient areas needs to change when using FUE. FUE partially removes hair from the donor region with overharvesting a possibility with extreme balding cases. Compared to strip, FUE requires approximately 4 times more donor area if harvesting at 25%. This will result in harvesting in less safe donor areas if large graft numbers are required. Younger patients should maintain long term medical therapy to limit any further hair loss. “Non-safe” hair grafts should not be placed into cosmetically significant areas.

Opinion.

There are certain instances where hair transplant surgeons must say no. A young patient that is panicked and refuses medical stabilization therapy is a common situation that is frequently seen with patients interested in FUE. These young patients may not actually be fully informed and assume FUE has no downsides or visual consequences associated.


Opinion.

In terms of overharvesting and unsafe donor area harvesting FUE is no different than harvesting with standard punches. Future loss of grafted hairs and scar visibility are the direct result of unsafe donor area harvesting. Clinical practices with only FUE harvesting available may have a hard time with young patients that have extensive balding or thinning.


Original Clinical Data.

Practice censuses have been conducted since 2005 and give a brief look into clinical practices across the world. The ISHRS Communications & Public Education Committee reports that hair restoration has dramatically increased, especially in Asia and the Middle East. Based on this report most harvesting is being performed using the strip technique as opposed to the FUE technique.


Opinion.

Harvesting in unsafe areas and over-depletion of the donor site are not the same. The unsafe area is less than 10% of the harvestable zone and with the use of small punches scarring may not be visible in the future. Large punches might exhaust the donor area and might prevent future hair transplant surgeries.

Review.

In order to help standardize the language surrounding FUE, the FUE Terminology Subcommittee has outlined definitions of FUE terms. The article includes definitions of terminology in the following categories; anatomy, transection, techniques employed, motorized and robotic devices.


Opinion.

All techniques can lead to overharvesting but overselling and overpromising seem to frequently follow new techniques including FUE. Bigger numbers seems to be the goal with FUE now-a-days with a concern of straying into the unsafe zone. With a robot to assist, the objective to achieve numbers might be driven even further. Through education physicians can be better aware of the complications that can occur with these techniques.


Review.

The FUE Research Committee has been established by the ISHRS and focuses on the understanding the different aspects of FUE. This committee will focus on traditional and modern methods with studies comparing FUE to other hair restoration procedures. Within this committee there are subcommittee (e.g., literature review subcommittee, terminology subcommittee, future studies subcommittee) that will help to establish these goals.


Opinion.

The FUE Research Committee was established to find answers to critical questions surrounding FUE. One step towards this goal is standardizing the language related to FUE. This has be addressed using the FUE terminology Subcommittee and will be published in the Forum in two parts.

Review.

FUE was a popular topic at the 2nd Mediterranean Workshop held in May. FUE anatomy, tools, terminology and techniques were discussed and demonstrated by several experts in the field. Panel discussions included FUE selection criteria, complications, disadvantages and partial FUE transection rates.


Opinion.

When encountering East Asians patients, a few considerations need to be considered if using the FUE procedure. The face shape, hairline design, hair type and scalp of East Asian patients may create difficulties using this harvesting method.


Opinion.

The ARTAS Robotic System can allow for shorter operation time and less fatigue for the surgeon. The operation time using the ARTAS system can be altered by skin tension and patient position. There is still however a time gap between harvesting and implanting. This gap can be filled using a first-come first-served system, slit creation before harvesting, and the “Cubby No-Touch Technique”. This technique allows for low transection rates through combining the slit method with the use of an implanter. The disadvantage to this approach is cost.


Opinion.

A shift to evidence based medical studies is a direction the ISHRS is undertaking. Establishing and maintaining the FUE Research Committee is an encouraging step towards this goal. Within this committee, protocols are being created in the context of evidence based studies that compare FUE with strip in terms of graft injury and survival. Additionally PRP injections for Female Patterned Hair Loss are also being evaluated in double-blind, placebo-controlled studies.


Opinion.
Technicians should not be replacing or instructing physicians. During the FUE procedure technicians should not be harvesting the grafts as that is the physicians’ role. Compensation should not be the only driving factor for a surgeon. Strong character and ethics are needed to avoid suboptimal outcomes. Through a survey of its members it has been noted that the ISHRS community has a strong position against technicians harvesting tissues and other critical-to-quality parts of the hair restoration procedure.


Opinion.

To stay involved in the management and care of patients, critical-to-quality tasks should performed by surgeons. Examples of these critical-to-quality tasks include recipient site creation and FUE graft harvesting. Ensuring physicians are doing these tasks will prevent unnecessary risks for the patients.


Review.

FUE was a popular technique discussed at the 20th Annual Scientific Meeting held in October. A hands-on workshop and sessions educated surgeons about the differences between strip harvesting and the FUE technique. Instruments, donor area safety, hair growth and complications as they relate to FUE were also topics of conversation at this meeting.


Opinion.

There are several advantages and disadvantages of FUE. High transection rates associated with FUE should not be considered acceptable. Surgeons should refrain from harvesting outside the safe donor area as scarring can be revealed.


Opinion.

The purpose of the ISHRS is to promote physician education, collegiality and dialogue. Therefore defining the standards of practice is not the purpose or intent of the ISHRS. For instance, the ISHRS Executive Committee does not want to advocate using surgical assistants
for graft removal during the FUE process. However, the standard of care reflected by ISHRS member surveys shows this unsupported practice is quite common.


Opinion.

An increased risk of overharvesting should not be associated with the FUE technique. How to avoid over-depletion is easier to teach with strip as compared to FUE. FUE is a very different technique and as such many variables can impact the procedure such as donor density, fiber diameter, curl, and color contrast and hair styling.


Opinion.

There are still many unanswered questions surrounding techniques offered by hair transplant surgeons. Questions as they relate to FUE include; when should a strip or FUE harvest be performed in lieu of the other? Is the number of grafts available in the donor area comparable in FUE vs. strip? Is FUE better with implanters?


Opinion.

The Surgical Assistants Program held at the 20th Annual Scientific Meeting was of great benefit to those that attended. Educating patients, how to properly document and how to store grafts were some of the topics of conversation. The role of surgical assistant’s during the FUE procedure, patient positioning, shaving and counting follicles were also discussed.


Opinion.

This article focuses on a previous article published in an earlier Forum issue. Like the learning curve needed to master a FUE extractor, products that help with regrowth such as Help Hair Shake will need some time to adjust to. Adherence to instructions are necessary to get obtain the full benefits of the product.
Opinion.

Many changes in the hair restoration field have occurred in the last 45 years however blood supply and human nature have remained constant. Over the last 45 years there have been alterations to graft preparation, density of hair growth, donor area scarring, FUE, drugs and patient attitudes / demands. Despite these changes a great deal still depends on the suitability of the patient’s donor hair and a skilled operating team.


Review.

FUE was a popular topic at the 19th Annual Orlando Live Surgery Workshop held in April. FUE techniques, robotic systems, female cases, and corrective cases were topics of conversation at this meeting. Combining FUE with strip and using FUE in eyebrow cases were also discussed and evaluated.


Review.

FUE was a popular topic at the ISHRS Beautiful Brows Workshop held in October. “Stick-and-place” techniques, use of FUE and eyebrow tattooing were topics of lectures held at this workshop.


Opinion.

A 2-day FUE session is recommended if the aim to extract as many grafts as it is safety possible from the donor area, if > 1,600 grafts are required, or when a difficult extraction is anticipated. During pre-operative preparation the patient’s hairline is traced and the recipient area is split in half. Grafts are extracted from the donor area evenly amongst the two days. Along the hairline single hairs are equally extracted and implanted each day.

Opinion.

In the upcoming annual scientific meeting, FUE will be a topic of conversation. FUE workshops will be used to educate surgeons on current techniques and live patient viewing might also benefit attending surgeons.


Opinion.

The upcoming San Francisco Annual Scientific Meeting is a great opportunity to learn about FUE. FUE will be covered in the basic course provided for newcomers to the field. Mini workshops will also be available enabling hands on experience with FUE devices. The hairline design panel will also provide topics and strategies for both FUE and FUT.


Opinion.

There are many interesting workshops and symposiums planned for San Francisco. Three non CME FUE mini-courses will be offered that include utilizing the SAFE system, the Programmable Cole Isolation Device and manual non-powered techniques. Additionally workshops on corrective surgery, hairline design and body hair FUE will also be offered.


Opinion.

FUE harvesting should occur only in the safe donor area. When harvesting outside the safe donor area cosmetic consequences could occur including over depletion and scar noticeability. This has been a previous mistake made in the past and should not be repeated.

Review.

FUE has several advantages and can be a great addition to the hair restoration field. Caution should be given as harvesting large number of grafts from young men in areas outside the safe donor area is tempting but not acceptable. Additionally, not all individuals meet FUE candidacy criteria.


Opinion.

In large hair transplantation cases, donor area management can be challenging no matter the harvesting method used. The FUE “stair-cased” method of harvesting only in clipped strips can force harvesting to occur in a small space. This method should only be used in small procedures where <1,000 grafts are harvested. Noticeable scarring can be a result of this method so patients should be made aware. Punch sizes also play a role in donor appearance. Safe donor zones may not actually exist as these zones can change over time and hair loss will occur as most men age.


Review.

Members of the British Association of Hair Restoration Surgery (BAHRS) adhere to the BAHRS Professional Standards for Hair Transplant Surgeons. This document outlines that any hair transplantation (including FUE) should be considered a surgical procedure and as such only a BAHRS Hair Transplant Surgeon should make FUE incisions. Hair Transplant Surgical Assistants are allow to extract FUE grafts under direct supervision. Additionally, BAHRS Hair Transplant Surgeons are encouraged to attend at least one ISHRS Annual Meeting and at least one ISHRS-sponsored surgical workshop every 5 years.

Opinion.

Globally there are varying definitions of hair transplant techniques and procedures. In Belgium follicular hair transplants are considered non-surgical acts. However, the British Association of Hair Restoration Surgery considers follicular unit extraction to be a surgical procedure.


Review.

At the British Association of Hair Restoration Surgeons’ Annual General Meeting several fundamental changes were made in order to take into consideration documents published by the Department of Health and the Royal college of Surgeons of England. As decided through an informal debate the BAHRS agreed that they would not endorse incision making by Hair Transplant Surgical Assistants. These assistants would be allowed to extract FUE grafts if done under the direct supervision of a Hair Transplant Surgeon.


Opinion.

The Help Hair Shake has shown growth in many patients at a hair transplant clinic in Hungary. Additional supplements can hinder shake-induced hair growth. Improvement in texture can be obtained by using this product and the Help Hair Shake can impact FUE results.


Review.

Graft survival using the FUE method can be increased with several additional manipulations. Some specific issues that can affect graft survival include out of body time and injury inflicted during placement. To help avoid this change the sequence of FUE steps (e.g., site creation first) or create a follicle placement delay (up to 24 hours).

Opinion.

Robotic FUE can provide many benefits and can easily be added into clinical practice. Advantages of robotic FUE include minimizing human error, the ability to incorporate sharp punches with blunt dissection and can allow removal by forceps. Decreasing the sharp punch diameter, re-designing the operating table and creating a larger tensioner can be helpful modifications to the robotic FUE system. Robotic FUE is limited as it does not have the inability to create implant sites and graft placement at the same time and can increase out of body time.


Review.

Donor harvesting as it relates to FUE was the main focus at FUE Palooza. Devices, methods, advantages, disadvantages and techniques were discussed during morning lectures. The SAFE system, ARTAS system, NeoGraft system and true motorized sharp FUE devices were also discussed and critiqued. Live surgical demonstrations were also available allowing hand-held motorized FUE units to be viewed.


Review.

Comparison between holding solutions for hair grafts is rarely found in the literature with most studies evaluating holding solutions for organ transplants. Based on current studies, no ideal temperature or holding solutions have been found for hair grafts. Prevention of anagen effluvium has not been conclusively shown using holding solutions or the FUE technique.


Opinion.

The shaven FUE patch method should be avoided and be replaced with smaller grafts scattered throughout the entire donor area. In the shaven patch method, only small patches of hair is shaven, leaving high density rows of white dots. This can also occur when FUE is used to cover a strip scar. In both situations, scarring will be noticeable in patients with short hair.
Traditional FUE harvesting does a better job at preventing noticeable scarring and can be less time consuming than non-shaven techniques.


Opinion.

As informative as properly designed scientific studies are, they may not be as valuable to the hair transplant field as the techniques and experiences from experienced surgeons. An appropriate understanding of how study design (e.g., bias or chance) plays a role in the results found should be understood by hair surgeons. In addition, more emphases may need to be given on the clinical experience of a skilled surgeon, this can allow for better practical applications in the hair transplant field.


Review.

When using the combination of strip and FUE techniques it is wise to create an untouched strip (1 to 1.5 cm) below the strip suture. This strip will allow for unaltered follicles to be used in future hair transplants. This technique is ideal for patients with a limited donor region or in those with advanced balding grades.


Review.

FUE was a topic of conversation at the XIV International Congress of the Italian Society of Hair Restoration. Combining FUT and FUE to improve the number of grafts per surgery was discussed. In addition, FUE techniques, candidacy, scarring and robotic development were also topics addressed in lectures.


Review.
FUE was a topic of conversation at the Saint Louis University School of Medicine Annual Hair Restoration Surgery Cadaver Workshop held in October. The process and the operational method used with the ARTAS system were discussed. FUE transection rates, demonstrations and techniques (e.g., powered FUE, manual FUE etc.) were also examined at this workshop.


Review.

FUE was a topic at one of the sessions given at the first annual Korean Society of Hair Restoration Surgery held in October. Sessions and lectures held at this meeting focused on topics like FUE, ISHRS, female pattern hair loss and beard transplantation.


Original Clinical Data.

In a study conducted with 134 male pattern hair loss patients, it was discovered that 1-hair follicle units among most of the Korean patients studied showed difference of 1 to 1.5 mm. Preliminary results show that when depth is controlled based on the length of the hair, higher graft survival rates can occur. These results should be applied to FUT and FUE graft preparation.


Opinion.

A hands-on FUE course might be included in the upcoming 20th Annual Scientific Meeting. New trends in hair restoration surgery and science will be the main focus of this annual meeting. This meeting will cover a wide range of topics including hair growth strategies, scalp micro-tattooing and harvesting methods (e.g., FUE).


Review.

FUE was discussed at the 16th Annual Meeting of the European Hair Research Society held in June. At this meeting Dr. Nilofer Farjo deliberated the indications of FUE as well as the
advantages and disadvantages of this harvesting technique. Strip harvesting, FU dissection and genetic hair dysplasia were also topics of conversation at this meeting.


Opinion.

FUE will be one of the main harvesting techniques focused on at the upcoming ISHRS meeting. A hands-on FUE workshop will allow surgeons to experience FUE equipment and techniques. Safe donor harvesting and robotic harvesting will also be covered at this future meeting.


Opinion.

There are several ways to master the craft of hair restoration. Coaching and practice can help achieve better results. As surgeons get more practice, perhaps FUE results will be more encouraging.


Opinion.

Further research is needed before FUE is widely commercialized. Meetings recently held in Rome and Orlando show hair transplant surgeons are interested in learning and investigating FUE and the ARTAS system. With transection rates still being high with robotic systems like ARTAS (7%) more refining of the technology is still required.


Opinion.

FUE will be focused on in the upcoming ISHRS meeting. Presentations will include comparing harvesting techniques, body hair transplants and robotic FUE.


Opinion.
Hair restoration surgeons are more than just technicians. Despite major difficulties (e.g., limited hair growth etc.) surrounding FUE the ISHRS does not disregard this harvesting technique and will include FUE in several presentations at the upcoming meeting. Since there are several misleading promotions out there, further FUE education is needed for inexperienced surgeons and potential patients. FUE sub-committees will also aid in establishing research available for interested surgeons on the topic of FUE.


Case Study.

Subdermal cysts, containing coiled hairs, can be a complication of FUE. In a 32 year old male, strip FUT was used to correct a hairline previously created using FUE. When donor harvesting was performed, cysts containing curled hairs was found in the subcutaneous layers. In order to prevent this from occurring in the future; motorized punch FUE procedures, transection avoidance and removal of submerged tissues is required.


Opinion.

Automated FUE may not be the best procedure to use. In countries like China, FUE mega-sessions are common but does not necessarily mean the patients’ best interest is being considered. With automated FUE it is tempting not to check the graft integrity throughout the procedure as the follicles are immediately placed into a reservoir. This could lead to higher transection rates. With little training offered with automated FUE machines, unskilled surgeons could be preforming hair transplants for personal gain without the knowledge needed to perform the surgery.


Review.

FUE was a popular topic at the 2nd AAHRS Annual Scientific Meeting held in May 2012. FUE techniques, implanters and candidacy were discussed by experienced surgeons. Additionally difficulties that face FUE surgeons, FUE punches and transection rates were also topics of conversation. Eyebrow and beard transplantation techniques using FUE and surgery workshops also gave surgeons the knowledge needed to effectively perform FUE.

Original Clinical Data.

Extensive fibrosis in the subcutaneous tissue can create difficulties in graft removal in both strip and FUE harvesting methods. The arrector pili muscle needs to be dissected in order to free the follicle. Harvesting issues can occur when the punch is not appropriately set to the correct depth. Re-insertion should not be seen as a solution as it can lead to root transections. Test extractions, technique or treatment alterations are recommended to be used to avoid this issue.


Review.

FUE was a popular topic at the Orlando Live Surgery Workshop held in April. Techniques, instrumentations, and complications concerning FUE were discussed. Sessions were also dedicated to the side effects of FUE, FUE punches, advantages and disadvantages associated with FUE. Additionally, powered, suction-assisted devices, and the ARTAS systems were mentioned as aids for FUE harvesting.


Opinion.

The ISHRS can be a place where new therapeutic interventions can be learned. ISHRS, as a recognized medical society, can help with patient care issues surrounding finasteride, FUE vs FUT, and preservation of hair grafts. It can also be a society that encourages critical thought and can be a safe place to discuss controversial topics surrounding the hair transplant field.


Opinion.

Young patients are not ideal FUE candidates. In these individuals, FUE harvesting will be more noticeable as the safe zone can be narrower. With the temptation to harvest outside the safe zone, strip harvesting may need to be considered as an alternative option for these individuals. Further research is needed to discover donor depletion as it relates to FUE.
FUE can be considered another generation in the progression of hair transplant procedures explored by ISHRS members. Depletion of the donor area and hair mass superiority found with FUE as compared to other hair transplant procedures still needs to be addressed in future research.

Leg hair was successfully used to soften hairlines in two case studies. Approximately 1,000 follicular units were harvested using FUE and implanted along the hairline. Patients were satisfied with results with 75-80% of follicles grown in. The texture and length differences of the body hair help create a soft hairline. This technique can be used in patients with limited donor hair and allows for a more natural hairline appearance.

FUE was a common harvesting method found within reflections given from past-presidents. FUE could be a great harvesting solo method as well as an additional method to accompany strip harvesting. With robotic and motorized FUE techniques popularity of this harvesting method is on the rise. When comparing FUE with strip, FUE grafts will always be seen as denuded.

FUE was a popular topic at the 5th Annual Brazilian Workshop held in July. With over 70 physicians in attendance this workshop was a success. Advantages and disadvantages to FUE, FUE compared to FUT and FUE instrumentations were common topics covered by the presentations offered.

Review.

FUE was a topic of conversation at the third annualHAIRCON conference held in November. Strip harvesting, FUE harvesting, silvering, graft dissection and implantations were the main focus of the demonstrations provided. This conference also contained lectures given by experts in the field such as Dr. William Parsley and Dr. Jerry Cooley.


Review.

Miniaturized punch grafting (FUE) has been previously used in the field but with today’s technology it is much more refined. Automation has decreased the amount of time required for this procedure but when pushed to the limit it can also cause tissue trauma and fibrosis. Other serious complications of this technique can also include poor growth and tissue necrosis. Caution should also be given as automation and computer driven machines may not take into account individual differences among patients.


Review.

To refine hairlines, leg hairs can be successfully harvested using the FUE technique. In two case studies, 1,025 leg hair follicles were used to soften the patient’s hairlines. At their 3 to 4 year follow up the results were sustained. In a follow up comment by Dr. Jones, caution was advised as these results may not occur in all patients, with growth inconsistencies a possible side effect. If the goal is to use finer follicles, scalp hair above the ears and above the neck could also be another source to harvest from.


Opinion.

This article focuses on comments made in a previous Forum article. Excuses given to account for visible scarring may not be as forgivable in the future. With the knowledge we now know about safe donor areas, taking hair too high or too far below the fringe area should not be acceptable. To avoid this only one scar should be created in the donor region. Alternatively FUE could be used to camouflage linear scarring. FUE may not be appropriate in younger
patients that need a large number of FUs despite the advantages Dr. Cole had described in his earlier article.


Case Study.

Psoriasis patients might make suitable scalp hair transplantation candidates. In a study with 7 psoriasis patients, most (5/7) found that their scalp hair transplant (strip method or FUE) did not aggravate their psoriasis located in their donor or recipient regions. One of these patients did undergo an eyelash transplant with no psoriatic lesional development occurring on their eye lid.


Review.

Wound healing can be optimized in both the donor and recipient areas. Wounds found in the donor area take longer to heal as compared to the recipient area with scalpel incisions healing the quickest. Full-thickness healing occurs with FUE, creating a full-depth scar. Healing is quicker with FUE as compared to sutured wounds and an occlusive dressing can work perfectly for FUE patients as they are typically shaved.

2011


Opinion.

Even though experienced technicians are available for hire they should not be performing entire hair transplant procedures. Extracting follicles as defined by the ISHRS standard of care is considered a medical performance. Delineated roles based on legal requirements and ISHRS’ high standard of care should be incorporated into clinical practice.


Opinion.
Despite some of the criticisms, it is suggested that FUE could be used in larger cases. Common criticisms and resistance given to FUE are not unique. These criticism are commonly mentioned with other hair transplant techniques (e.g., plugs and alopecia reductions). FUE does provide the possibility of re-growth of transected grafts in the donor area. FUE, when properly performed, is not blinded and can produce less scarring when harvesting is spread out.


Opinion.

With new technologies there is always the temptation to have physicians with no experience enter a new field. FUE is not an easy-to-do procedure and a skilled surgeon is required. Technicians and surgeons should also be aware of the legal ramifications and responsibilities.


Opinion.

This article focuses on using ACell powder to enhance FUE punch harvesting, strip scaring and follicular unit grafting. De novo hair follicle neogenesis was not found in ACell-treated sites in a study ran by Cole et al. However ACell might help to enhance regeneration of follicles after transection.


Opinion.

Automated FUE is a hot topic that has frequently been discussed with appointed committees dedicated to its study. With pending regulation changes in Europe, ISHRS has been allowed to liaise to ensure standard level of care is considered.


Opinion.

European hair transplant regulations, as determined by representative delegates, will be finalized within the next two years. The current worry is that these recommendations will become law. Detailed descriptions of a doctor’s qualifications and good representation at the ISHRS meetings are suggestions to help build the gap in the creation of these regulations.

Opinion.

ACell and NeoGrafting may have a lot of fanfare but do need more evidence before they should be incorporated into clinical practice. As per the clinical experience of JS Epstein it was found that soaked ACell grafts did not produce noticeable differences in regrowth rates. Epstein also experienced low regrowth rates with FUE as compared to the strip procedure. Obtaining a competitor edge with these new additions (e.g., ACell, neograft device etc.) may not put patients’ interests first.


Review.

FUE was a popular subject at the Istanbul workshop held in May. The demand for FUE in Turkey was discussed and FUE was found to make up 70% of the procedures performed. FUE procedures were available for viewing at this workshop with hairline design and recipient site creations also observed.


Review.

Due to the current public interest for hair transplantations, the British Association of Hair Restoration Surgeons (BAHRS) and its members seek a more active role. In the 2011 business meeting, FUE automations, implanters, and topical FPHL were discussed. With the possibility of the licensing body auditing doctors, private practice and hair transplant physicians might be impacted.


Review.

This article is a continuation of a previous forum article, outlining the steps of powered blunt dissection with the SAFE System using FUE. Grafts can be removed easier and quicker using powered blunt dissection as compared to manual dissection. Micro-strip shaving can be an effective alternative to a total shave extraction. Graft inspection and insertion into the recipient area are the next concluding steps to this process.

Opinion.

Auto-cloning may be an excellent tool to use during hair transplantations however it has not yet been conclusively shown to occur in clinical trials. Plucked hair from any source has not yet shown the ability to grow or regrow at the recipient or donor regions. There are however new and upcoming studies that will examine how ACell could play a role in hair growth.


Review.

FUE is better suited to be a repair or used in a small case technique. FUE creates higher follicle transection rates as compared to other harvesting options, is a slower technique when manually performed and requires a large donor area. This technique can also produce white dot scarring.


Opinion.

‘Re-dos’ are not a desired procedure in the hair transplant field. The reason to re-do a FUE or strip procedure should be critically evaluated, especially if the reason is due to physicians’ skill or patient’s satisfaction. Complains concerning re-growth or patients’ expectations could also be a source of re-dos but can easily be avoided with proper counselling prior to surgery.


Opinion.

Implanters can be indispensable tools that can incorporate different hair units (e.g., 1, 2 or 3 hairs etc.). Positioning of the table and technicians can allow a team to have delineated responsibilities and tasks. Implanters can be very effective to place units as depth is controlled, there is a lack of bleeding and can be combined with FUE seamlessly.

Opinion.

Implanter technology works best with a skilled surgeon, correct communication with technicians, strategic positioning of units, and unified incisions. The key to direct insertion is to separate the tissues instead of cutting them, minimizing trauma and shock. The implanter should be held in a specific way when learning this technique or when a difficult case is encountered. To get desired firmness when inserting, tumescence is not need, as pulling and pressing in the anterior and posterior scalp can produce the same desired effect. Complications (e.g., bleeding, popping) can occur but with proper precautionary steps they can be avoided.


Review.

FUE was a popular topic of conversation at the OLSW 17th Annual Orlando Live Surgery Workshop. Transection rates, FUE history, robotics and benefits of FUE were discussed at great lengths in a panel format. FUE was compared side by side with strip during surgical cases explored with cadaver tissue.


Case studies.

FUE and scalp micro pigmentation could be great options for patients who are not ideal hair transplant candidates and prefer short hair. FUE can aid in spreading previously placed plugs into other thinning areas. Scalp pigmentation could aid in covering any hypo-pigmented scarring from past FUE procedures.


Review.

FUE was a popular topic at the ISHRS 19th Annual Scientific Meeting held in September. Case studies, using FUE to cover donor scars, as well as robotic FUE were explored. In Dr. Knudsen’s presentation, FUE’s role to correct hair loss was discussed through weighing the costs and benefits of this technique. Additionally, the idea that physicians could be moving into supervisor positions during mechanized FUE techniques was discussed. FUE was also discussed
in the context of other harvesting techniques like the strip method. FUE definitions, scarring, suction-assisted devices and complications were also topics of conversations.

Tsilosani A. Letters to the Editor. Re: Dr. Unger’s comments on combining strip and FUE. Hair Transplant Forum International. Mar/Apr 2011;21(2):50.

Opinion.

The combination of strip with FUE might be ideal for patients with poor skin laxity and require a large amount of grafts. Caution should be given as this combination may not take into account what the safe donor area might look like as the patient ages.


Opinion.

The intruder, a new instrument to use in hair transplantations, is a welcome addition to the FUE era. This instrument needs less effort than the Mosquito or the Haber Spreader in the creation of perforations. Only minimal trauma has been associated with this new instrument.


Review.

FUE can be a great tool to use in early staged male pattern baldness. FUE can also be used to cover donor scarring. Wide and/or visible scarring can be hidden with FUE in patients of any age. Some possible consequences of adding FUE to the hair transplant field could lead to surgical minimalism of FUT, alter patient candidacy (e.g., age) and minimizes worst case scenarios.


Opinion.

With the creation of a transplanter, the ability to use the same instrument during FUE harvesting and implantation can occur. This implanter is small and lightweight, requiring no maintenance. It is ideally suited for all types of hair, different sized grafts, body hair transplantations and mega sessions. This instrument has yet to show acceptance in the field.

2010

Case Study.

There are differences in FU graft survival rates when grafts are trimmed differently (e.g., “chubby” or “skinny”) after being harvesting using the FUE technique as evident in a case study. “Skeletonized” grafts had the worse survival rates after 19 months with the highest survival rates achieved in the “medium” (1 hair FU) trimmed grafts. Differences became evident between months 14 and 19, suggesting that longer follow up durations should occur if examining hair transplant yields.


Case Study.

Transplanting hair follicular units onto a vitiligo affected area can allow for an increase in hair density. After 7 years hair grafts implanted onto vitiligo affected eyebrows were able to retain density however de-pigmentation did occur in half of the grafts. These de-pigmented follicles could be replaced effectively by FUE with minimal donor scaring.


Review.

ISHRS’s conducted its first Mediterranean Workshop for Hair Restoration Surgery, educating physicians through observing live surgeries such as crown/vertex transplant and a FUE procedure. Examples of topics covered include FUT/FUE instrumentation, complications, donor harvesting, and hairline design.


Case Studies.

Patients currently on Plavix can still undergo successful FUE procedures using the Cole Isolation Technique method as evident in a case study. No significant bleeding occurred in a patient currently taking Plavix, when FUE was performed to hide his previous hair transplant surgery scars.
FUE was a popular topic at the ISHRS annual scientific meeting held in October. Videos of FUE extractions, FUE harvesting tricks and sequential strip harvesting were viewed and discussed. Applications were drawn from FUE studies discussed such as; paring a 2-hair with a 1-hair FU to increase survival rate and using an unconventional orientation of the scalp hair axis to reduce transection rates. The applicability of using FUE to disperse already transplanted hair follicles and the use of body hair were also covered within the lectures given.


Case Studies.

To fix unsatisfactory hair transplants linear excision, FUE punch removal and fusiform-shaped scalp reduction can be used. Partial or full hairline excisions can allow for replanting into more appropriate scalp regions that allow for better aesthetic hairlines. FUE punch can enable large amounts of previously implanted hair to be successfully extracted for reinsertion in alternative scalp regions. Scalp reduction behind the hairline can also improve hairline position through frontotemporal recessions. All these techniques were found to be successful in several individuals with previous unsatisfactory hair transplants.


Opinion.

Automated FUE machines should not be perceived as replacements of well-trained surgeons. Proper training is still required for newcomers. “Stealing” trained assistants or having a newcomer stumble along during procedures are not appropriate actions to undertake.


Review.

FUE was a popular topic at the Asian Regional Live Surgery Workshop held in June. FUE was discussed in the context of donor site selection, harvesting, and applicability in Asian patients. FUE was also compared to strip in two of the lectures with the advantages of FUE
(e.g., automation, decreased scaring, less invasive and decreased transection rate) outweighing the benefits of strip.


Review.

FUE was a popular topic of conversation at the OLSW Annual Orlando Live Surgery Workshop held in April. The ability of motorized tools and machines that make FUE more predictable as well as provide depth control were discussed. Live surgery was conducted with FUE and FUT transplants.


Opinion.

To advertise hair transplants correctly, both the product and service need to be taken into consideration. The perceived value needs to incorporate surgeons as giving the primary service, the movement of FU grafts from the donor area to the desired area. The main product of hair transplants are the FU graft and success can be defined based on patient satisfaction and quality outcomes.


Opinion.

Even though FUE might be a mainstream procedure, it is not as new or successful as it may seem. Handheld punch engines are not a new technology, as they were invented in the 1970s. Reasons to switch to FUE may need to be more than just clever marketing. To successfully advertise FUE results should not be exaggerated and realistic planning needs to be considered and communicated.


Review.

The ISHRS Regional Workshop held in October focused on FUE, educating physicians on the latest FUE techniques and providing hands-on opportunities. Some FUE improvements discussed were; dull punch dissection (manual and powered systems) allowing required steps
to be minimized and the use of sharp punches or powered instruments for better extraction. Test sessions were also available to explore patient candidacy in African-American patients.


Review.

Critical steps need to be followed in order to successfully use the powered SAFE system. Before the procedure is commenced, adequate lighting, magnification, trimming and correct positioning are required. The following steps are then followed; injections of both saline and anesthesia in the donor area, traction is placed on the skin and followed by punch placement and engagement. A few grafts (5 to 10) should be evaluated to ensure the angle, direction and speed are accurately set.


Review.

Hair loss and hair restoration as it relates to Latin countries was the main focus at the FILACP meeting held in June. Lectures and panels covered the importance of protecting follicular unit integrity, eyelash transplantation, hairline design, donor closure techniques, hair stimulating complexes, recognizing patient’s goals, and complications. Additionally, FUE was discussed, outlining the pros, cons and transection rates associated with this technique.


Original Clinical Trial.

Super-bright LEDs should be used during FUT and FUE sessions. LEDs emit low heat, low power consumption, high luminance, can enable higher contrast between slits and skin and is less reflective. Promising modifications can include custom built goosenecks and the addition of polarizing film. These modifications can be inexpensive and can provide additional benefits like cross-polarization.


Review.
Fully automated FU extraction and insertion could occur in the near future. Using automation FUs can be created using a blunt or sharp instrument and collected into a catch chamber. Gaps in the literature still surround automated FUE as efficacy, safety and outcomes have not been examined in an unbiased clinical trial. Automation does not replace the learning curve associated with FUE and should be performed by surgeons only.


Original Clinical Data.

A combination of FU strip excision (FUS) and FU extraction (FUE) can allow for a reduced strip width without compensating the number of grafts in individuals that have low donor density and poor laxity. When more grafts (30%) were collected through combing FUE with FUS, compression forces decreased (50%). Using FUS and FUE in combination only one session would be required. This allows for a better looking donor scar and produces less risk to nerves and arteries. There are difficulties associated with increasing session length such as decreased graft survival, an increase in staff requirement and graft dehydration.


Opinion.

There are serious drawbacks when combining strip and FUE in the same session. These drawbacks were not mentioned in a previous forum article (Jul/Aug 2010;20(4):121). A possible consequence Harvesting from areas of high risk might increase the likelihood of hair loss.

2009


Opinion.

FUE follicle replacement could be the solution to acne scarring in beard regions. Matching the graft implantation technique with an existing scar can allow for minimal noticeability.

Opinion.

A new handle for FUE punches can be a great addition to the FUE toolbox. Alterations in directionality during skin penetration can be done with this new handle. If grafts are blocked, easy and quick evacuations can occur. In clinical practice this addition has been found to save time and increases accuracy.


Original Clinical Data.

FUE has increased in efficiency over the years and is comparable to the strip method. A more distinct and accurate name for FUE is individual follicular group harvesting (IFGH). During the development of IFGH many different names and definitions have been used with transection rates decreasing over time. Using the Cole Isolation Technique (CIT), FUE yields can be comparable to strip.


Review.

FUE was a common topic of conversation at the 2009 ISHRS Annual Scientific Meeting held in July. FUE techniques in Korean patients and the comparison of FUE to strip were discussed. Additionally harvesting beard hair for scalp transplantations was also a topic covered at this meeting.


Original Clinical Data.

This article focuses on FUE instrumentations, FUE candidacy and additional research areas. Transection, physical trauma and “out of body” time needs to be considered as they are contributing factors of graft loss. Patients who have limited or localized areas of hair loss, need corrective surgery or want body hair transplantation are ideal FUE candidates. The 3 step technique is the fastest technique but does have high transection rates. Further research in the amount of grafts safety harvested from the donor area is an area for future research.

Opinion.

More FUE research is needed before concluding that eyebrow transplantation and the NeoGraft System are successful. The lack of evidence based research for FUE using the NeoGraft System has led to premature judgements on success rates. With only one previously published study examining eyebrow transplantation limited information can be accurately obtained.


Opinion.

MEGA and GIGA FUE session may not be in the patient’s best interest. With mega-sessions more time, a more experienced team, more scaring and more money are needed. This can lead to patient discomfort and dissatisfaction of results.


Opinion.

FUE may be a popular technique but lacks scientific evidence as only one peer-reviewed article has been published so far. Controversies and conflicting results found with FUE are covered in the January/February 2009 Forum issue.


Opinion.

Some exciting new FUE terminology and techniques have recently been presented at the Montreal meeting. The FU Flap is a procedure where 72 grafts/cm² are transplanted in Norwood II and III patients. When followed by a ‘hair multiplication’ procedure, full re-grow of donor hairs can occur. Large harvesting sessions can be conducted using the la fue procedure or robotic FUE devices.


Opinion.

FUE has been shown to be a great harvesting procedure for repairs, hiding donor scars, eyebrow and eyelash cases and in donor depleted patients. However, transection rates for FUE cases that have been reported are limited to “skeletonized” grafts.

Original Clinical Data.

Subpopulations might require alternative FUE techniques in order to be successful. With the addition of temporal areas and the ear-to-ear donor areas in Chinese clients, an increase in yields can be obtained. Using a larger punch size, decreasing the amount of shaved hair, and deep scoring may be necessary in Chinese individuals.


Opinion.

FUE is a procedure that is here to stay. With the addition of automation an improvement in FUE efficiency can be obtained. Future research should address graft survival rates and transection rates associated with FUE.


Review.

FUE was a popular topic at the Orlando Live Surgery Workshop held in April. During a panel discussion, the 2-stage punch system and the 2-layer donor closure technique were discussed. A FUE surgical case and possible FUE complications (e.g., poor growth, overharvesting etc.) were also discussed.