HAIR TRANSPLANT forum INTERNATIONAL

INTERNATIONAL SOCIETY OF HAIR RESTORATION SURGERY

Volume 20, Number 6
November/December 2010

COLUMNS

FEATURE ARTICLES

Optimizing the efficiency of recipient area estimation: a comparative study

Shobit Caroli, MBBS, DDVL, Damkerng Pathomvanich, MD, FACS, Kulakarn Amonpattana, MD, Therasa Marie Cacas, MD *Bangkok, Thailand* shobitcaroli88@gmail.com

Planning of the recipient area requires an artistic hairline design as well as an accurate outline of the thinning area that needs cosmetic improvement in order for each step of the surgery to be as precise as possible. Based on the total area of coverage, the size of donor area that should be harvested can be decided. From the size of donor area, the number of grafts, which depends on the size of the grafts, can be determined. This sequence is very important for planning the surgery (Figure 1).[1]

Figure 1. Preoperative assessment photos. *Left:* Wet hair; *right:* zoning and marking.

In the past, hair transplant surgeons have used different shaped stencils with predetermined areas to superimpose over the proposed recipient zone. Farjo, et al. suggested the principle of measuring the size of the recipient area by dividing it into simple geometric shapes, such as triangles, rectangles, squares, or circles.[2] Cole proposed using the formula for the surface area of an ellipse to measure the total area of the forelock and crown = pi (A)(B), where A is one-half the length and B is one-half the width.[3] Farjo further suggested that if only the forelock needs to be measured, then one could simply divide the total of the above calculation by 2.[4]

Chang, et al. published the use of a polyurethane wrap (i.e., Saran Wrap) on a circular embroidery ring to trace the recipient area and utilize a $1 cm^2$ grid for the area estimation.[5] The method described by Chang is simple and easy to apply.[6] One method is to count the intersections in the grid using the principle of morphometrics,[5] and the number of intersections will closely approximate the area inside the tracing in centimeters squared.[6] However, for a more accurate estimation, counting the actual number of blocks is preferred.[6]

We have adopted Chang's method since 2001, however, we have noted some problems in using this method of calculation:

1. Skin markings are not clearly visible on all skin or hair types, especially with existing hair.
2. Rocking of the Saran Wrap on the three-dimensional scalp curvature limits the ability to precisely trace the marked line and results in poor reproducibility.
3. There is inadequate estimation of the traced area via the $1 cm^2$ grid scale, especially at the periphery of the markings.

All these variables led to variations in area calculation among staff members of our clinic.

It is important that the area estimation be valid, be as precise as possible, and be reproducible at all times. For example, a slight difference of $5 cm^2$ (especially if we are planning dense packing with 50 grafts per square centimeter) could make a difference in estimation of 250 grafts.

To develop an efficient, accurate, and reproducible methodology for scalp recipient area measurement, we have refined Chang's method and compared results with the existing methods of area estimation. Our results were displayed during the free abstract paper presentation at the ISHRS Regional Live Surgery Workshop in June 2010 in Bangkok, Thailand.

⇨ page 183

Hair Transplant Forum International
Volume 20, Number 6

Hair Transplant Forum International is published bi-monthly by the International Society of Hair Restoration Surgery, 303 West State Street, Geneva, IL 60134. First class postage paid at Chicago, IL and additional mailing offices. POSTMASTER: Send address changes to *Hair Transplant Forum International*, International Society of Hair Restoration Surgery, 303 West State Street, Geneva, IL 60134. Telephone: 630-262-5399, U.S. Domestic Toll Free: 800-444-2737; Fax: 630-262-1520.

President's Message

Jerry E. Cooley, MD *Charlotte, North Carolina jcooley@haircenter.com*

It is an honor for me to begin my presidency of the ISHRS. It is also quite humbling, reflecting on my start in this field 15 years ago, training in the office of Jim Vogel. All incoming presidents have their own ideas about what should be their role, what they would like to accomplish, and what changes, if any, they would like to implement. In this opening message, I would like to share some of my thoughts.

When the ISHRS was started almost 20 years ago, Dow Stough and O'Tar Norwood had a two-fold purpose in mind: 1) to create the premier educational arena for accomplished and aspiring hair restoration surgeons, and 2) to promote social interactions and camaraderie amongst its international members. This is still our primary mission today at the ISHRS.

It's also worthwhile to consider what we are not. The ISHRS is not a public relations firm, lobbying group, trade organization, or legally sanctioned specialty board. We cannot drive patients into your office, restrict fair competition, or vouch for the quality of work of each member. Some of our activities may in fact raise public awareness about hair loss and increase business, but they are not our primary goals. Education and social interactions are what we're about.

We strive to provide the best educational platform, through conferences, publications, etc., for surgeons at all levels from beginning to advanced. Of course, our primary focus is our big annual scientific conference. Also, the Orlando Live Surgery Workshop and regional workshops are important as well. The *Forum*, now under the able care of Nilofer Farjo and William Reed, contains practical articles that are so important for presenting new ideas, promoting continuing education, and building a sense of community. I recall in the early days of my career eagerly awaiting the arrival of each *Forum* issue so I could devour every word.

Our other core mission—promoting camaraderie and social interactions—is every bit as important as education. I'm sure that many of you will agree that the friendships you have made through the ISHRS are priceless. While I'm operating alone in my small clinic in Charlotte, I take great comfort in feeling connected to accomplished surgeons throughout the world. This has helped me countless times when confronted with clinical situations and problems where I needed help. But also at a very basic human level, we are a tight-knit community, for example, when our Society came together to mourn the passings of Jim Arnold and Cheryl Pomerantz.

For the newcomer, all that is required is a little initiative. Jump in, introduce yourself at meetings, submit abstracts for our meeting and articles to the *Forum*, volunteer to serve on committees, and make your presence known! Having watched the inner workings of the ISHRS for some time now, I can honestly say that everyone is welcome and we're always interested in fresh faces. With the increasingly international makeup of our membership, we are particularly interested in participation from members outside North America.

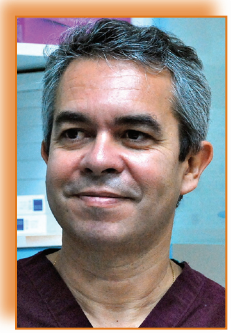
The ISHRS is a great organization. My only goal is to strengthen and improve in small ways our core activities of education and enhancing social interactions. I welcome your comments and suggestions. Please email me at jcooley@haircenter.com.

Jerry E. Cooley, MD

Co-editors' Messages

Paco Jimenez, MD *Las Palmas, Spain*
jimenezeditor@clinicadelpelo.com

Bernard Nusbaum, MD *Coral Gables, Florida*
drnusbaum@yahoo.com

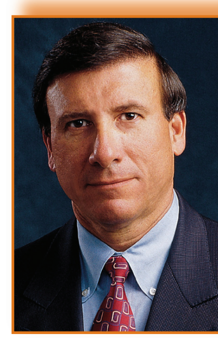


For differing reasons, the following three oral presentations at the ISHRS meeting in Boston particularly caught my attention.

I have always wondered what changes occur in the hair cycle of the hair follicles transplanted to the recipient zone: Will they be in telogen until they grow at 3-4 months? Or are they in catagen? How long does the telogen phase last in transplanted follicles? To answer these question, Dr. Moonkyu Kim (Korea) transplanted human hair follicles into nude immune-compromised mice and histologically analyzed hundreds of follicles at different days/weeks after transplantation. The results showed that the transplanted follicles enter in the catagen phase (involution) in the first week after transplant, staying in catagen for 3-4 weeks; they then remain in the telogen phase for only 1 week and start the anagen phase just 5 weeks after the transplant. Interestingly, at approximately 8 weeks after transplant the hair shafts can be seen coming out of the follicular orifices. I selected this study as it is a good example of an original, labor-intensive study that brings us new knowledge on basic mechanisms of hair transplantation.

The second presentation I chose was given by Dr. Hugh Rushton (England), who studied the efficacy of the laser hair comb therapy (with the dosimetry and parameters recommended in the instructions) in two males with androgenetic alopecia. In this study Dr. Rushton found no differences between the laser treated side and the control side regarding length, density, and diameter of the hairs. The interesting aspect of this study is that I believe it to be the first well-designed blinded study I have come across in which the methods used for hair analysis and hair count-

⇨ page 180



If you attended the Boston meeting, you realized that the science of our specialty continues to move forward at a steady pace. Presentations on, for example, laser therapy, growth factors, and follicle bioengineering certainly were exciting glimpses into what we might offer in the future. A good scientist, however, always responds, with skepticism and researches the methods, calculations, and conclusions presented for possible flaws. The test of time, well-designed studies, and clinical experience will dictate which methods become part of our armamentarium and which are discarded. In the meantime we must continue to practice our beautiful harmony of art and science and not forget the basics, which is to make patients happy through a good surgical experience, consistent growth, the best scars possible, and natural, aesthetic results.

Bernard Nusbaum, MD

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

1. Articles should be written with the intent of sharing scientific information with the purpose of progressing the art and science of hair restoration and benefiting patient outcomes.
2. If results are presented, the medical regimen or surgical techniques that were used to obtain the results should be disclosed in detail.
3. Articles submitted with the sole purpose of promotion or marketing will not be accepted.
4. Authors should acknowledge all funding sources that supported their work as well as any relevant corporate affiliation.
5. Trademarked names should not be used to refer to devices or techniques, when possible.
6. Although we encourage submission of articles that may only contain the author's opinion for the purpose of stimulating thought, the editors may present such articles to colleagues who are experts in the particular area in question, for the purpose of obtaining rebuttal opinions to be published alongside the original article. Occasionally, a manuscript might be sent to an external reviewer, who will judge the manuscript in a blinded fashion to make recommendations about its acceptance, further revision, or rejection.
7. Once the manuscript is accepted, it will be published as soon as possible, depending on space availability.
8. All manuscripts should be submitted to both **drnusbaum@yahoo.com** and **jimenezeditor@clinicadelpelo.com.**
9. A completed Author Authorization and Release form—sent as a Word document (not a fax)—must accompany your submission. The form can be obtained in the Members Only section of the Society website at www.ishrs.org.
10. All photos and figures referred to in your article should be sent as separate attachments in JPEG or TIFF format. Be sure to attach your files to the email. Do ***NOT*** embed your files in the email or in the document itself (other than to show placement within the article).
11. We *CANNOT* accept photos taken on cell phones.
12. Please include a contact email to be published with your article.

Submission deadlines:
February 5 for March/April 2011 issue
April 5 for May/June 2011 issue
June 5 for July/August 2011 issue

Dr. Jimenez's Message

from page 179

ing could not be called into question. Despite the limitation of only two patients, this study is an example of the kind of study that will push manufacturers to press ahead and investigate new and more efficacious dosimetries or change their laser protocols.

The third study I selected was presented by Dr. Marcelo Pitchon (Brazil). The preview long hair technique that he uses allows him to compare the "expected" immediate result of the hair transplant with the "real" result 12 months later. Thus, I believe his opinions on hair growth after transplant are given from a privileged point of view. He mentioned one very interesting new concept, namely that every patient has a particular "personal growth index" (PGI), which is unique for each individual. In fact, most of us have seen that if a patient has poor growth in the first session, he usually has poor growth in subsequent ones, and the same happens when there is good growth. After his talk, Dr. Pitchon told me that, in his experience, about 10-20% of patients have a PGI of 30-70% (less than expected growth), which is a strong reason for not making the first session a megasession. A megasession in a potential low PGI patient will cause inadequate and insufficient growth in an extensively large area, including aesthetically non-strategic areas. With smaller sessions, whatever the reduced growth achieved is, it can be repeatedly added to the strategic areas, like the front, giving the patient the possibility of achieving more density in the aesthetically most important areas of the scalp. If after the first session the patient turns out to be a high PGI patient (70-100% growth), then the patient will be an excellent candidate for a megasession in a second session. I think this rationale based on Dr. Pitchon's observations with the preview long hair technique is thought-provoking, makes excellent sense in my opinion, and certainly challenges current trends.

I hope the authors of these three very interesting presentations decide to explain in more detail their findings by sending a paper for publication to the *Forum*.

Paco Jimenez, MD

Notes from the Editor Emeritus

Russell Knudsen, MBBS *Sydney, Australia* drknudsen@hair-surgeon.com

Dateline Boston

We have just completed the 18th Annual ISHRS Scientific Meeting with more than 400 physicians in attendance, the highest number ever! Outstanding program, quality lectures and hands-on learning with a very high non-US attendance from around the globe.

So, what was my overall impression? The theme for this meeting was "Revolution and Evolution," and both were on display. I was astonished to find that it was possible to plant multi-haired FU grafts into 0.3 and 0.4mm slits! Apparently popping is not a problem, which I guess is logical given the grafts must be held rather firmly in place.

The evolution of low level laser therapy (LLLT) continues with lectures suggesting good results in women with androgenetic alopecia (under a dome device with sessions controlled for both timing and frequency). By way of contrast, a careful analysis over 6 months of a handheld LLLT device (half head treated in a single blind protocol) showed no efficacy at all. Before I hear howls of outrage from our LLLT enthusiast colleagues, it should be remembered that using such a device to the manufacturers' specifications (15 minutes three times a week) only allows 4 seconds in any scalp area during a 15-minute session. I believe that patient compliance issues alone, let alone a 4-second LLLT exposure, guarantees these handheld devices will be mostly ineffective in treating hair loss.

Again, the debate around FUE vs FUT was the hottest topic. I attended a lunchtime symposium on powered FUE and felt I was in a time warp and the year was approximately 1974. We listened intently as earnest lecturers debated for us the advantages of powered rotation devices vs handheld punch devices. Where had I heard this before? Oh yes, when the handheld punches made way for the hand engines with punches in the early 1970s! It seems what goes around comes around (pun intended). I guess the thing that most surprised me is that it has taken 10 years from the first published reports of FUE until now for the debate about powered devices to really ignite. Considering that it took approximately 10 years for this evolution the first time with punch grafting, why has it taken the same amount of time for this evolution this time around with FUE (which is really micro-punch grafting)? History repeating itself in more ways than one.... As George Santayana said: "Those who do not remember the past are condemned to repeat it."

In addition, I was particularly troubled regarding the FUE issue when a well-respected clinic admitted that they evolved to FUE (now their main procedure) for purely marketing reasons in their competitive marketplace. Have our scientific principles been subverted to clever marketing, particularly in the unregulated Internet and its blogospheres, where opinions count more than facts?

The live patient viewing was instructive for me regarding FUE. Firstly, having been told that a recent automated device has been shown to have excellent application and utility in a single office with six different operators scoring similarly low transection rates, the patient presented in the live patient viewing with an automated FUE procedure performed 18 months prior appeared to have a distinctly low growth rate for the graft numbers claimed. Lest you think this is my personal bias, I asked three very experienced colleagues for their assessment and they all suggested growth was significantly less than 50%! This does not invalidate FUE as a legitimate mainstream procedure, but we must always critically assess the claims made regarding its superiority in the cold light of live visual assessment. On this occasion I, and others, were underwhelmed.

In addition, we saw a Norwood Va patient with 7,800 FUE grafts over three procedures whose result, I suggest, might have equally been achieved with approximately 4,000 grafts. It is worth noting the observation of our esteemed Brazilian colleague Marcelo Pitchon who commenced long-hair grafting in 2004 and found the number of grafts required has diminished because he is able to assess the "final" result immediately. Do we really need to perform 7,000+ grafts in any of our patients in order for them to be happy?

Lastly, when FUE only represents a different way to harvest donor grafts, why do some FUE champions seem to believe that previous planning rules no longer apply? I was told by one colleague that he could harvest grafts to within 1cm of the balding margin because his presented live patient was over 40 years old, on finasteride, and therefore "stable"! This surely represents an overly optimistic approach that will likely come back to haunt these colleagues in the not-too-distant future.✧

Rogaine®

Use as Directed.

EXCLUSIVE FOAM FORMULATION

Real Results. Enhanced Compliance.

Visible results after 16 weeks of twice-daily use*[1]

93% of men rated scalp coverage as "improved" or "stayed the same" after 16 weeks

Examples of a good response.

Before treatment | *After 16 weeks of twice-daily treatment* | *Before treatment* | *After 16 weeks of twice-daily treatment*

Not everyone responds to ROGAINE®. Individual results vary.

A tolerability and aesthetic profile that **supports compliance**

- Does not contain propylene glycol, a potential cause of irritation
- Quick drying, non-greasy, non-sticky
- 9 out of 10 men liked applying Foam[2]

**In a clinical study (N=352) of twice-daily use of Men's ROGAINE® Foam vs placebo.*
1. Data on file. McNEIL-PPC, Inc. 2. In an in-home use test (n=300).

www.**ROGAINE**.com

Recipient area estimation
from front page

Material and Methods

We randomly selected 71 patients who consulted the clinic for consultation or pre-operative assessment.

The estimation for the recipient area was performed using our proposed methodology, which was a refined Chang's method, Chang's method, and Farjo's method. Estimation was also done using either loose Saran Wrap or a transparent shower cap for tracing the markings.

Steps of Our Proposed Methodology (Refined Chang's Method)

1. Clear visualization of area of baldness. For the assessment of the recipient area, all the patients were examined with bright illumination with or without magnification, and patients' hair was wet with normal saline or distilled water for better visualization of the thinning area. A hair band and hair clips were used to hold existing hair out of the visual field (Figures 2 and 3).


Figure 2. Examination under bright illumination with magnification and hair wet.

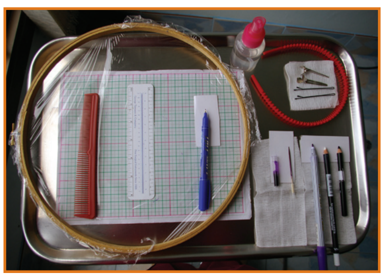


Figure 3. Materials required for hair examination: normal saline, comb, hair band, hair clips, skin marking pencils (black and white), gentian violet marker with Saran Wrap, and 0.25cm^2 grid scale.

2. Skin marking. The borders of the area of baldness were marked with a finely pointed marker. We used white eyeliner on dark complexioned patients, gentian violent on light skin patients with black hair, and gentian violet or black eyeliner for patients with light skin and blond or grey hair; permanent markers were not used (Figure 4).

3. Zoning and tracing. For tracing the area of baldness over Saran Wrap, the bald area was divided into small zones wherever the curvature of the scalp changed sharply. Each zone was traced separately on the Saran Wrap (Figures 4 and 5). The individual quadrants are traced separately as described by Chang but without rocking of the saran wrap on the head.

The individual quadrants are traced separately as described by Chang but without rocking of the Saran Wrap on the head.

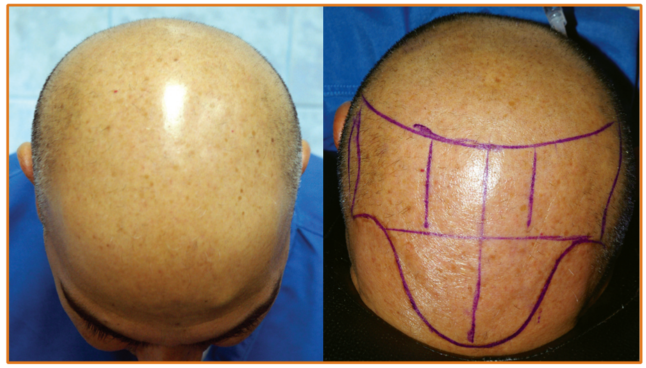


Figure 5. Zoning of the area of baldness around sharp scalp curvatures.

4. Grid for area calculation. Mathematical graph paper having a grid of 0.25cm^2 was used. The total number of small (0.25cm^2), medium (1cm^2), and big (25cm^2) boxes in each zone were counted and the area was estimated (Figure 5). To calculate the total area, the sum from each tracing was calculated. We always try putting the Saran Wrap tracing over the grid scale as tightly as possible with minimal pleating.

For the first 37 patients, we measured the area using the proposed methodology and Chang's method. For 7 cases, loose Saran Wrap and the shower cap method was used (Figure 7). The results were recorded and compared. The area measurement for another 36 patients was done using all three methods. The method of hair examination and skin marking in all methods was the same, only the tracing method and the calculation grid was specific to the method used. One case was rejected because all three methods could not be used. This case required an irregular area of transplant correction, so we were unable to simulate the irregular area into any shape for area calculation via Farjo's method. All care was taken to not repeat the recording of cases in whom both consultation and pre-operative assessment was done. All the decimal values were rounded to the closest number and the results were recorded in a Microsoft Excel sheet and analyzed.

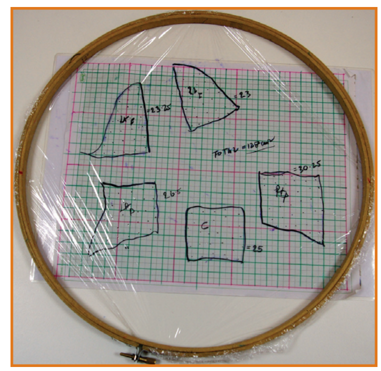


Figure 6. Individual zone tracing on the Saran Wrap with 0.25cm^2 graft paper for calculation.

Results

Patient demographics are shown in Table 1. Sixty-five patients were estimated using the refined Chang's method (our proposed methodology), of which 62 cases were compared with the standard Chang's method, 33 were also compared with Farjo's method, and 3 cases were compared with the loose Saran Wrap method. In 5 cases, the area mea-

page 184


Figure 4. Contrast of the marking material on the skin and hairs. *Left:* White skin with blond/grey hair; *center:* white skin with black hair; and *right:* black/brown skin with black/grey hair.

Recipient area estimation
from page 183

surement was compared between Chang's method and the shower cap method (Table 2).

On comparing our proposed methodology with the standard Chang's method, we found an average of an additional 9.23% area measured with the Chang's method, with the difference ranging from 1.9-24.3%. An average of 17.4% additional area was measured with the shower cap method, ranging from 10-30%. On comparing our refined Chang's method with Farjo's method, an excess measurement of 5.12% was found with the latter. Using the loose Saran Wrap, the area measurement was found to be similar to our method (Table 2). We also superimposed the cut tracing back to the scalp marking, which was found to be an exact match using the proposed methodology but not with any other method.

Discussion

Rassman proposed the concept of "multi-variant" analysis for the assessment of the number of grafts required for the cosmetic fullness of hairs on the scalp with 7 variables: color contrast of hair and skin; hair shaft thickness; hair character; size of the bald area; donor hair density; patient expectations; and the available donor supply that will impact the analysis. He also proposed the corrective aesthetic multiplier for four of the seven variables.[6,7] The area of baldness is the multiplier that is most variable from doctor to doctor, which leads to inconsistent assessment during planning of the hair transplant surgery session.

In our study, the proposed methodology of area estimation minimizes pitfalls in all aspects of area estimation. For enhancing better visualization, we recommend that hair be wet and higher magnification be used under good light. Sarifakioglu, et al. proposed plastic surgeons require skin markers to have a very fine tip.[8] He also asserted that for dark-skinned people, light-colored ink materials (white, green, yellow, red) are more visible.[9] Thus, for better color contrast, we advocate use of white eyeliner for dark skin, gentian violet color on patients having white skin with black hair, and gentian violet or black eyeliner for white skin with blond and grey hair. As our proposed method divides the entire recipient area into zones wherever the scalp curvature is sharp, we are able to eliminate the error produced by rocking the Saran Wrap, which makes you lose your tracing. The grid scale of 0.25cm^2 area used also enhances accuracy.

Table 1. Demographic Data

1	Total Patients	70
2	Sex	
	Male	61
	Female	9
3	Age Group (years)	
	Range	22–67
	Mean Age	38.9
4	Category of Case Enrollment	
	Preoperative Assessment	58
	Consultation	12
5	Number of Patients as Per Hair Loss Classification	
	Norwood II	7
	Norwood III	32
	Norwood IV	7
	Norwood V	9
	Norwood VI	11
	Frontal Fibrosing Alopecia	1
	Diffuse Frontal Alopecia	2
	Ludwig	1
6	Number of Patients for Area Estimation	
	Proposed Methodology	65
	Chang's Method	67
	Farjo's Method	33
	Shower Cap Method	5
	Loose Saran Wrap Method	3

We also reevaluated the proposed method by putting back the cut sheet of traced area to the respective zone on the scalp and found it to match while none of the other methods matched. Below are a few of the interesting findings that we observed while comparing the three methods:

- With Chang's method, tracing the marked line on a Norwood Class V or higher patient results in rocking the Saran Wrap from one side to the back and then to another side of the head, thus, it is easy to lose your place in the tracing and add a lot of area in estimation. Near the hairline or on the flat scalp surface, the measurement was found to be almost the same because the Saran Wrap stretches to a flat shape and eliminates the error of rocking.

Figure 7. Shower cap method.

- For measurement of an irregular area, Farjo's method was found to be very complicated because the zone has to be split into many pieces to conform to geometrical shapes.
- For estimation for the frontal area and the hairline with Farjo's method, using a triangle simulation underestimated the hairline area so we tended to overestimate by simulating the hairline with half of a circle.
- Lastly, the hairline height and the hairline design reflect the art and experience of the hair transplant physician, which is always different. This factor leads to differences of area estimation followed by differences in number of grafts required from clinic to clinic.

We experienced that, with the use of Saran Wrap, the pleats may add to the margin of error because stretching it too much to match the scalp three-dimensional surface can result in failure of the wrap to recoil to the normal two-dimensional shape for accurate grid area calculation.

We have also tried to use a transparent shower cap for tracing the area marked on the scalp. Although this is economic, convenient, and fits well to the scalp curvature, the method has the limitation of moderate pleating that adds to the error in area estimation (Figure 7).

References

1. Stephen, C. Estimate number of grafts and donor area. *Hair Transplant Forum Int'l.* 2001; 11(4):97, 102.
2. Farjo, B. Estimating graft numbers made easy for the recipient site. *Hair Transplant Forum Int'l.* 2000; 10(3):73.
3. Cole, J. Density with follicular units. *Hair Transplant Forum Int'l.* 2000; 10(1):19.

Table 2. Area Difference Among Different Methods of Area Estimation

Methods Compared	No. of Cases	Range of Difference in Percentage Minimum	Range of Difference in Percentage Maximum	Average Percentage Difference
A. Proposed Method with Chang's Method	62	1.9%	24.3%	9.23%
B. Proposed Method with Farjo's Method	33	0	16.2	5.12
C. Chang's Method with Shower Cap Method	5	10	30	17.25
D. Proposed Method with Loose Saran Wrap Method	3	0	1	0.6

4. Farjo, B. Estimating graft numbers made easy for the recipient site. *Hair Transplant Forum Int'l.* 2001; 11(4):101.
5. Parsely, W. Follicular unit instrumentation. In: D. Stough and R. Haber, eds. *Hair Transplantation*. Elsevier Saunders, 2006, p. 99.
6. Pathomvanich, D. The strip: how long, how wide and where. In: D. Pathomvanich and K. Imagawa, eds. *Hair Restoration Surgery in Asians*. Springer, 2010, p. 103.
7. Rassman, W. Doctor's (patient's) guide to estimating transplant grafts. *Hair Transplant Forum Int'l.* 2008; 18(1):13.
8. Sarifakioglu, N., et al. Skin marking in plastic surgery: colour alternative for marking. *Plast Reconstr Surg.* 2003; 112:1500-1501.
9. Sarifakioglu, N., et al. Skin marking in plastic surgery: a helpful suggestion. *Plast Reconstr Surg.* 2003; 111:946-947.✧

Note from Dr. Jimenez

It is so easy and, at the same time, so important to estimate the surface area of the recipient site prior to surgery that there is no reason not to do so with every hair transplant patient. Basically, the measuring method consists of placing a transparent sheet over the head of the patient (e.g., Saran Wrap), drawing the outline of the recipient area, and then placing the wrap over a grid paper with $1cm^2$ boxes. The recipient area to be measured (A) will be $A = n \times a$, where n is the number of points falling onto the structure and a is the area of a single grid box. For example, if we use a grid with boxes of $1cm^2$ and 35 intersection points are counted within the recipient area, the recipient area will be $35cm^2$ ($A = 35$ points $\times$ $1cm^2$). It's as simple as that.

This method of point counting using simple grids made on transparent film or on overhead foils has been used in dermatology for decades, and is still used for measuring the area of leg skin ulcers, which are very often irregular in shape.[1] Dr. Chang reported the application of this method for measuring the recipient area, but counting the number of small squares instead of the crossover points of the square lattice grid.[2] In my opinion, counting the points is preferable because they are representative of the area of the unit cell and eliminate qualitative decisions. In this issue, Dr. Caroli et al. recommend a number of improvements. I find especially interesting the use of 0.5cm × 0.5cm square grids instead of the typical 1cm × 1cm grid. These give a more precise estimation and would be especially useful for small recipient areas. Another fine idea is the division of the recipient area into zones to avoid the error that occurs with the round curvature of the scalp.

References

1. Bahmer, F.A., and J. Smolle. Morphometry in clinical dermatology. *Acta Derm Venereol* (Stockh). 1992; 72:52-57.
2. Chang, S.C. Estimate number of grafts and donor area. *Hair Transplant Forum Int'l.* 2001; 11(4):97.