

FOLÍCULO

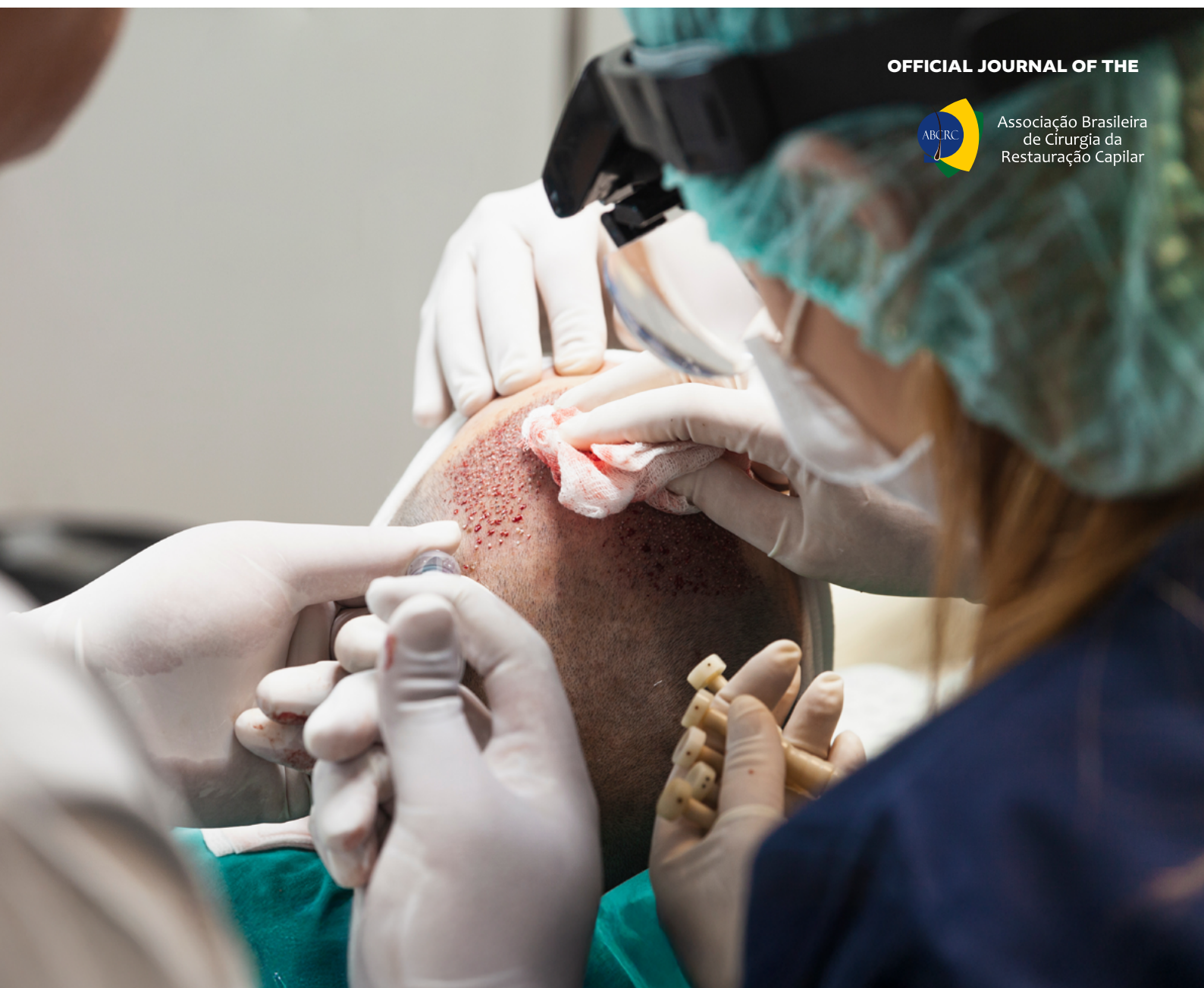
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SCALP NECROSIS FOLLOWING A HAIR TRANSPLANT

Experts discuss the condition and the use of hyperbaric oxygen therapy in the column
Complications

33RD ISHRS WORLD CONGRESS

Berlin hosted the event, which focused on bringing together surgeons from different countries, backgrounds, and career stages

PROLONGED INTERMITTENT FASTING ON HAIR HEALTH

Study shows that fasting can compromise follicular regeneration through dermal lipolysis and stem cell apoptosis

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Editorial

For the first time in 33 years, the International Society in our area, ISHRS, will hold a congress in South America, and the chosen city could not be other than Rio de Janeiro. Known worldwide as a “Marvelous City,” Rio de Janeiro will make international congresspeople dazzled by its beauty. ABCRC will be the host, and its members will have a special participation!

To honor Brazilian hair restoration, *O Folículo* will invite, in each future edition, an eminent colleague to write some sentences about his relationship with Brazil and his Brazilian colleagues. In this edition, we invited Australian Russell Knudsen to share his thoughts.

Dr. Knudsen has been doing hair restoration surgery for 40 years. He works in Sydney, Brisbane, Canberra, and Melbourne in Australia and in Auckland in New Zealand. He is a former president of the Australian Society for Hair Restoration Surgery, the Australian College of Cosmetic Surgery and Medicine (ACCSM), and ISHRS. He is currently the emeritus editor of the *ISHRS Hair Transplant Forum International newsletter*, and the author of articles published in the journal *Dermatologic Surgery*. He also wrote several chapters for several books on hair restoration surgery.

Russell Knudsen, known to several generations of Brazilian colleagues, engages in teaching hair restoration. In addition to always receiving visitors, he is the ISHRS *fellowship* training director and ACCSM preceptor for hair transplantation.

Among other honors, he received the ISHRS Golden *Follicle* Award (2000) for his clinical and teaching contributions and the ISHRS *Manfred Lucas Lifetime Achievement* Award (2014).



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Dr. Henrique Radwanski
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In addition to this Guest Editorial, check out the other content we have prepared with our colleagues for this 35th edition:

- **Coverage of the 1st ELARC:** a comprehensive summary of our Congress, by Bruno Sifuentes, Márcio Volkweis and Marta Zollinger;
- **ISHRS Congress coverage:** Maíra Merlotto and Elson Viana bring us the highlights of the 33rd ISHRS World Congress in Berlin;
- **Current Articles:** reviewed by Isaura Fasciani, with an introduction by Flávia Dias, addresses a study on the “Effects of Prolonged Intermittent Fasting on Hair Health;”
- **Classic Articles:** Henrique Radwanski revisits the “scalp reduction” technique from the 1970s;
- **Chronicle:** Carlos Eduardo Leão satirizes, with good humor and in a strategic way, the most common phrases spoken by patients in offices;
- **Marketing:** Márcio Volkweis deals with the evolution and future of marketing and advertising in

medicine, emphasizing the shift in focus from mass communication to direct and personalized interaction with the client;

- **Tip from O Folículo:** In his debut column in our publication, Francisco Le Voci discusses highlighter pens for coloring gray hairs in surgeries;
- **Ricardo Lemos Forum:** Solon Eduardo Gouveia Souza brings the details of the online event held in September, which dealt with “Artificial Intelligence Applied to Hair Transplant Planning”;
- **Complications:** the article on “Scalp Necrosis After Hair Transplantation”, by Flávio Giardiello, Solon Eduardo Gouveia Souza and Henrique Radwanski, is a review of this rare and serious complication;
- **Trichology:** Karen Fernandes discusses “Hair health in the era of GLP-1 inhibitors” (such as Semaglutide and Tirzepatide).

Have a good read!

Henrique Radwanski
and **Maria Marta Zollinger**
Editors *O FOLÍCULO*

Credits:

The Brazilian Association of Hair Restoration Surgery (ABCRC) is a nonprofit association composed of doctors Dermatologists and/or plastic surgeons who perform hair restoration surgery.

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O Folículo

A quarterly publication of the ABCRC, launched in 2014. The mission of "O Folículo" is to promote the dissemination of high-quality scientific knowledge, encourage debate and innovation in hair transplantation.

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My Brazilian Connection



Russell Knudsen
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I have had a long fascination with Brazil, both professionally and personally. A spectacular country that is home to the world-famous Amazon River and the amazing Rainforest. I have visited Brazil four times so far and am excited to be returning next year for the 34th World Congress of ISHRS in Rio De Janeiro.

Brazil is famous in the medical world of hair restoration with a rich history of innovation. Carlos Uebel with the development of micrografting and Marcelo Pitchon with his Preview *Long Hair* FUT are but a few examples of Brazilian ingenuity.

Brazil has so far supplied two ISHRS Presidents (Marcelo Gandelman and Arthur Tykocinski), two Platinum Follicle Awards and one Gold Follicle Award. I had the honour of receiving my Gold Follicle in the year 2000 and my Platinum Follicle Awardee that year was Carlos Uebel! What an honour that was for me to stand next to him.

I first visited Brazil at the invitation of Marcelo Pitchon in his home town of Belo Horizonte. So far, I have visited his office and the offices of Arthur Tykocinski, Antonio Ruston and Mauro Speranzini. What distinguishes these surgeons and my other close Brazilian colleagues such as Marcio Crisóstomo and Henrique Radwanski is their meticulous attention to detail both in surgical planning and execution of their craft. Not to mention their willingness to both write about and teach their skills. In an era where others seem intent on pushing the boundaries of what is both safe and sensible in terms of aggressive harvesting, it is reassuring that these excellent surgeons continue to stress the importance of precision in both planning and execution.

I have learned so much from my Brazilian colleagues and have no doubt that will continue to be the case well into the future. Obrigado, Brazil!

Russell Knudsen
MB BS FISHRS

Innovation, Scientific Integration and High-Level Demonstrations

The 1st Latin American Hair Restoration Meeting (ELARC), promoted by ABCRC, brought together national and international experts in São Paulo for two days of scientific immersion, exchange of experiences and live demonstrations that highlighted the constant evolution of trichology and hair transplant.

The program combined therapeutic updates, surgical practices, and discussions on contemporary challenges in the specialty, reinforcing the innovative nature of the congress.

Check out the highlights of the event!



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Day One

Therapeutic Advances and Technical Depth

The first day of the congress was marked by an intense and enriching program, bringing together experts from Brazil and abroad to discuss the main innovations in trichology and hair transplant. Therapeutic updates, surgical demonstrations, and practical discussions highlighted the dynamism and growing sophistication of this rapidly evolving field.

The morning began with an up-to-date overview of the main therapeutic strategies for alo-

pecia. The initial highlight was the use of oral and sublingual minoxidil, which has been consolidated as a practical and effective alternative, especially in patients with poor adherence to topical formulations. Their mechanisms of action, dosing protocols, and the growing body of evidence on safety and clinical outcomes were discussed. The role of MMP (Microinfusion of Medicines into the Skin) as a complementary tool, capable of enhancing therapeutic responses and delivering active

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ingredients in a more targeted way, was then discussed. Technology was also in focus, with the presentation of evidence on laser treatment for alopecia, which stimulates regenerative processes in the hair follicle and expands the range of non-invasive resources.

Finally, nutraceuticals were revisited from a scientific perspective, with emphasis on the importance of personalized approaches that consider nutritional deficiencies and constructive collaboration with pharmacological therapies.

The second block presented a challenging topic: transplantation in healing alopecia, such as fibrosing

frontal alopecia and lichen planus pilaris. The presentations highlighted the need for a thorough assessment of disease activity and extremely careful surgical planning. The final debate reinforced an essential message: surgery under these conditions is possible, but it requires technical expertise and precise clinical timing.

The next topic was eyebrow surgery, considered one of the most delicate procedures in hair transplant. Anatomical aspects, aesthetic design, direction, and angulation of the strand, as well as execution details that ensure naturalness and symmetry were addressed. It became clear, both in the presentations and discussions, that the success of this type of procedure



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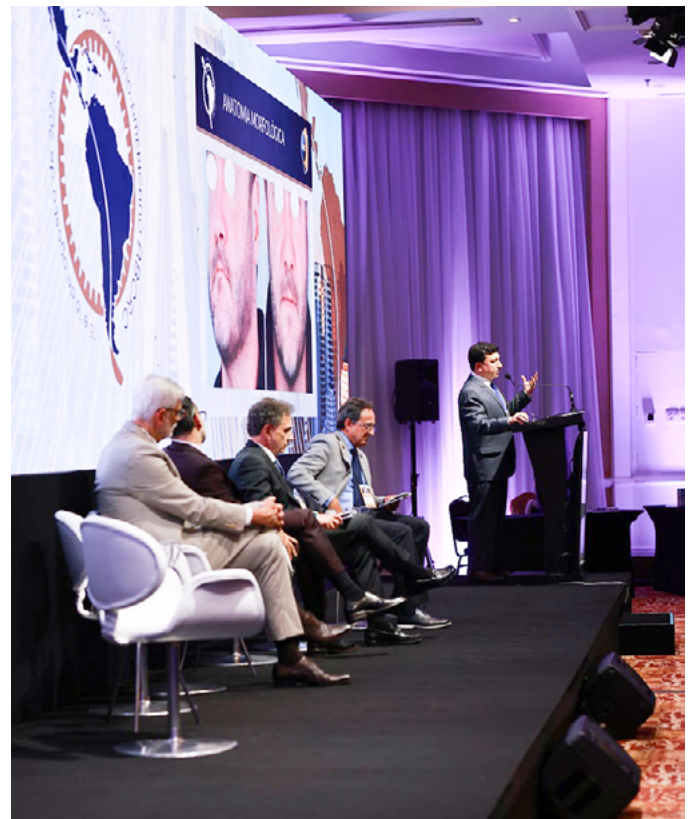
depends on the combination of technical precision and artistic sensitivity.

The afternoon was dedicated to the FUE technique, which was explored in depth from different perspectives. The first section covered everything from optimizing drug treatment with 5-alpha-reductase inhibitors to the detailed planning of each case, which begins long before the actual extraction. Concepts for mapping the donor area, evaluating density, and strategies to ensure balanced and natural distribution of the hair follicles were presented.

The presentations then moved on to the management of complex cases, with emphasis on the use of body hair as a complement in patients with limited donor areas, the specific approach to afro hair (which requires adaptations to the instruments and extraction angles) and the treatment of extensive baldness. The consensus among the speakers was that technical expertise must go hand in hand with aesthetic understanding and a long-term vision.

The following session dealt with beard surgery, an area that has gained increasing demand in recent years. The presentations covered topics ranging from anatomical analysis and classification of beard patterns to the secrets of achieving a natural look, respecting the natural direction and density of each facial region.

At the end of the day, the focus was on long-strand FUE, one of the most talked-about and sought-after techniques today. Increasingly sought after by patients



who wish to undergo a hair transplant without having to shave their hair, this approach preserves aesthetics during the postoperative period and offers an immediate visualization of the result. Technical aspects such as careful extraction, precise graft placement, and control of hair curvature were discussed.



Day Two (Morning)

Three Live Surgeries and Integration with the Plenary



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On the second day of the ELARC, three live surgeries were performed and transmitted to the auditorium so that the participants could follow the procedures. The surgeries were performed at the Procedure Center of the Brazilian Society of Dermatological Surgery (SBCD) in São Paulo, with the participation of doctors, professors, and course participants.

The three procedures began in the morning, with the initial steps of outlining the areas to be treated, surgical strategy, equipment selection, team positioning, preparation of the patient's hair, and harvesting the grafts. Secondly, the harvested grafts were inserted into the areas to be treated. The doctors relied on a team of instrumental nurses and state-of-the-art equipment, the most modern on the market, to perform the surgical procedure. Surgeries were performed under local anesthesia.

In the first case, a female patient was looking to improve density in baldness. The surgery was performed by Dr. Maria Angélica Muricy and Dr. Otávio Boaventura. Dr. Maria Angélica Muricy started the procedure using the *pre-trim* technique (cutting the hair strands



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before harvest), in which the hair is not shaved. The donor area is prepared in advance before the surgery, where the hairs are cut with small scissors, close to the skin, leaving a millimeter, at most two, between the other hairs, which are preserved at normal length. In this way, during surgery, these strands that have been cut are removed and chosen among the *long hair*. Thus, harvesting in the immediate postoperative period is not apparent. Therefore, it is considered a no-shaving technique, in which the patient can preserve the appearance of her hair. It is a beautiful technique in which the main task is to find the short strands that have been prepared in advance among the *long hair*. She demonstrated to the audience the extraction of these grafts using the Mamba equipment (Trivellini) and how this preparation is done, the *pre-trim*, the cutting of these threads that precedes the surgery. This was shown during the recordings and filming, demonstrating how she cuts and how her team prepares these strands before performing the procedure.

In this same case, Dr. Otávio Boaventura used Seson Medical's Grammax device from South Korea, with a *punch window* of 1 mm, developed by his Korean colleague Dr. Parker. He used this device with a fenestrated *punch* so that grafts could be harvested with the *long hair*, without cutting the stem - the so-called *long hair*. This is also a hair extraction technique without scraping, but this time the hair is longer, as the shaft is preserved most of the time. In small situations, of course, the wires end up being transfixed. He showed us the device, which is not very well known in Brazil, but performs very well. The harvesting was smooth,

easy - much easier than the Mamba technology when used for the same purpose of harvesting long strands. Dr. Maria Angélica Muricy also evaluated the device, just after Otávio performed the harvest. She evaluated the device and found it amazingly easy to harvest these strands, even though it was the first time she had used it. Of course, Dr. Angélica Muricy is a very skilled surgeon, and this can mislead us into thinking that it is easy to use, but she really liked it and approved the equipment after the first use. In this case, approximately 300 grafts were harvested with short thread, in the *pre-trim* technique, and another 300 grafts with long thread. Both techniques are performed without shaving, on a female patient. Then, these grafts were implanted in her rarefaction area, which has androgenetic baldness. Deployment was done using sharp implanters.

In the second surgery, the doctors acting were Dr. Francisco Le Voci, with Dr. Flávio Abboud,



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using the conventional FUE technique on a male patient. The surgery was performed using Mamba equipment, and the patient had undergone previous surgery. So, the goal for this patient was to improve density at the hairline, on top, and a little at the vertex as well. The removal of the grafts with the hair shaved was shown, and this insertion was also done with cutting implanters. This surgery was performed while demonstrating to colleagues present in the plenary session the extraction in an area that already had scars from a previous FUE. The patient already had reduced density, with fewer grafts and multiple threads (2, 3, and 4 units) due to a previous surgery. The donor area was divided into two sections, with Dr. Le Voci harvesting in one half and Dr. Abboud doing the other half. Dr. Flávio also showed us how to extract some follicles using the manual extractor, which is a technique in which motorized equipment is not used. The cutting *punch* is attached to a surgical pen, which is managed with the surgeon's fingers in circular motions, leading to the cutting of the skin and subsequent removal of the harvested grafts. It is a technique that is rare to see and that has been shown to the spectators.

In the third surgery, the patient was a woman who was to undergo an eyebrow transplant, removing hair follicles from the back of her scalp without shaving the hair, using the FUE technique, and then these follicles would be implanted in both eyebrows. The eyebrow design was done by Dr. Christine Grafi Guimarães, together with her



team of assistants and Dr. Veruska De Biagi. Also participating were Dr. Maria Marta Zollinger and Dr. Alex Gonzalez, from Mexico. The strands were harvested using two different pieces of equipment. One of them is a device like the Mamba, launched by Doctus in Brazil, which features *punch* firing with rotation, oscillation, and vibration, in addition to suction. This equipment was used to harvest the first strands of hair, leaving them about one centimeter long or slightly less, allowing them to be cannulated inside the *punch*. The strand is placed inside the *punch*, which cuts through the skin while retaining this small stem, which will help to insert it into the eyebrows to show the correct curvature. Some grafts were harvested in this way initially. Then Dr. Marta and Dr. Alex extracted some grafts with long strand, using the American equipment Zeus, with an 18G *punch*, developed by Dr. Alex. Umar, from the USA. The insertion technique used was pre-incisions, using a curved needle. Dr. Guimarães made these incisions using a needle with a curvature so that the strand grew at an angle close to the curvature of a normal eyebrow strand. The grafts were inserted by the doctor's assistant with a blunt, non-cutting needle *implant* inside these pre-incisions performed.

The event was very good, everyone was very satisfied, and the colleagues in the auditorium were able to follow up and answer their questions. In the plenary, Dr. Ruston, Dr. Henrique Radwanski and Dr. Solon spoke to the audience, answering questions, explaining procedures, adding knowledge to the event, sharing their personal experience, questioning, and discussing what was being done and the surgical decisions live. It was an enriching event that allowed all the participants to ask questions live and follow the procedures.



The film crew that recorded and filmed the procedures also managed to get great images and takes so that everyone could see in detail how the procedures are performed, as well as the secrets of each of the surgeons who were in the field. I, Dr. Márcio André Volkweis, also conducted the transmission of the surgeries directly from the

operating room to the event, helping colleagues to answer their questions and follow what was happening that was most important in the surgeries. Registered medical students also participated on site, who were able to participate in the event in person, following up on site and interacting directly with the surgical team at the SBCD headquarters.

Day Two (Afternoon)

High Impact Scientific Sessions

*Dra. Marta Zollinger,
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During the afternoon of the second day, we had three sessions with high scientific content. They were as follows:

- ABCRC selection, moderated by Dr. Nicolas Lusivic;
- Anabolic steroids and androgenetic alopecia, moderated by Dr. Vanessa Mutton;
- Learning from the Experts, moderated by Dr. Gustavo Mello.

All the classes were interesting. I am going to highlight some of the presentations that aroused the most interest in the audience.

In the first module, Dr. Brigitte Castillo spoke about the visagism technique to recreate eyebrows, their importance in facial contouring, and how to perform the best technique.

Dr. Baltazar brought his experience about giga-session with long strands. He showed cases of 4,000 to 5,000 UFs with long strands in a single session and discussed the advantages of the technique.

In the following session, which was about anabolic and AAG, we were pleased to hear the experience of Dr. Otávio, who is an endocrinologist, talks about the effects of the main anabolic steroids on

the body. He brought us a spreadsheet separating anabolic steroids and their effects. It was very enlightening and highly relevant, as the population makes indiscriminate use of these hormones, and we need to know which ones cause the most harmful impacts. Dr. Leandro Maia held an excellent debate on this topic. He brought us the impact of the use of hormones in the context of hormonal modulation by nutrologists and on the results of patients with androgenetic alopecia and hair transplant.

During the discussion with the audience, the effects of hormonal modulation in the dermatological context were debated, highlighting that the increasing use of hormones prescribed by other specialties is directly interfering with the therapeutic outcomes for patients with alopecia.

Dr. Leandro mentioned the following reflection:

- How do your colleagues deal with these cases?
- Do you prohibit, release, or accompany your patients who use hormones?

Dr. Leandro presented his own case - he was the patient in question:

- He showed his personal evolution: from the age of 24 to 33, during which time he used hormones continuously for 8 years, with photographic documentation of the progression of his baldness;
- His own post-transplant results as a patient. He reported his own surgery and observed clinical cases in which patients, after hormonal modulation, experienced an increase in baldness in the transplanted area, in regions with active androgen receptors.

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Dr. Marcio Volkweis spoke about hair transplant for transgender patients. He showed cases of rounding of the anterior hairline in trans women and beard implantation in trans male patients. He highlighted the importance of increasing self-esteem after these procedures.

In the session Learning from Experts, Dr. Maria Angélica Muricy spoke about the challenging case of a patient over 70 years old, who had undergone two liver transplants, and who also underwent a hair transplant. She warned that these cases of elderly patients with comorbidities are operable after proper evaluation and clearance by specialists, in a hospital surgical setting, with appropriate monitoring and support during and immediately after surgery.

Dr. Arthur Tykocinski issued warnings regarding the safety limits for the use of local anesthetics in hair transplant, as this is the most significant complication, including fatalities, in our specialty; Dr. Ricardo Mejia, current

president of the ISHRS, spoke about how to avoid poor planning in hair restoration; and Dr. Ruston illustrated his class with beautiful solutions for corrective cases and warned about the causes and how to avoid them.

This was a brief overview of our event, and I conclude by stating that ELARC was an innovative and successful model, a congress marked by the intense participation and interaction of professors and attendees.

CONCLUSION

ELARC has established itself as an innovative, dynamic, and highly participatory congress, combining innovative science, practical demonstrations, and constant interaction between speakers and attendees.

The diversity of the topics, the technical depth and the interactive nature of the event reinforce ABCRC's role as a reference in the training and updating of hair restoration specialists in Latin America.

Highlights of the 33rd ISHRS World Congress Berlin Unity 2025



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The 33rd World Congress of the *International Society of Hair Restoration Surgery*, held in Berlin between October 22 and 25, 2025, highlighted the theme “Unity,” reinforcing the importance of unity among surgeons from different countries and levels of experience. In his message, the president of the ISHRS, Dr. Ricardo Mejia, recalled that the strength of the society lies in the diversity of its members, while the president of the congress, dr. Sam Lam emphasized that the meeting was planned to foster genuine collaboration, honest exchange of knowledge, and mutual learning.

The program began with the Basic Course, organized by Dr. Francisco Le Voci and Guillermo Guerrero, who delivered an exemplary structure. The opening was given by Dr. Henrique Radwanski, with the *History of Hair Restoration Surgery* class, and was widely praised for the clarity, historical depth, and contextualization of the technical evolution of the area. The combination of theory and practical demonstrations offered participants the opportunity to revisit essential fundamentals and discuss nuances of the surgical routine with precision. For beginners, it was a solid foundation; for the more experienced, an opportunity for technical refinement.

Among the most talked-about moments of the congress was the Master Class led by Dr. Gabriel Fachini, whose detailed presentation covered all the steps of the advanced FUE technique. His insights on ergonomics, surgical workflow, graft management, and naturalness strategies were widely recognized. In the same session, with excellent moderation by Dr. Márcio Crisóstomo, the Bulgarian surgeon Dr. Zarev presented his vision on gigassessions, showing impactful results. *However, the absence of full explanation of his technique generated a constructive debate about scientific transparency, an especially relevant discussion at a conference dedicated to the Unity theme.*

The first official scientific day featured in-depth discussions, most notably the panel on allogeneic hair transplantation, which included the participation of Dr. Thalita Carlesso. Case reports and relevant questions were presented regarding the immunological, ethical, and biological challenges of this approach, which is still experimental but increasingly present on the international agenda. At the same time, topics related to biotechnology and regenerative medicine gained strength, with presentations involving exosomes, stem cells, secretomes and new applications in follicular biosti-

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mulation. The growing relevance of microbiomes in hair health was also discussed, highlighting the intersection between molecular biology, inflammation, and clinical practice.

In the following sections, studies focused on medical therapies and personalized medicine demonstrated the evolution of trichology towards a more integrative approach. Dr. Gustavo Souza presented data on pharmacogenetics in androgenetic alopecia, demonstrating that genetic variations can help predict therapeutic response. Also in this session, Dr. Maira Merlotto presented the excellent study *Sublingual Minoxidil 5 mg versus Oral Minoxidil 5 mg for Male Androgenetic Alopecia*, conducted by Brazilian authors (Drs. Baltazar Sanabria and Paulo Müller), which showed equivalent efficacy between the two routes, but with a lower incidence of cardiovascular effects when administered sublingually.

Other studies have attracted attention for their originality and clinical potential, such as the study by Dr. Gorana Epstein on the impact of vitamin D, ferritin, and metabolic parameters on hair recovery. And other research involving nanofat, stromal vascular fraction, PRF and umbilical cord-derived cells as ad-

juvants in hair transplants. The sum of these findings reinforces the idea that regenerative biology is advancing rapidly, although it still requires more robust, randomized, and controlled trials.

The congress also dedicated significant space to the advancement of artificial intelligence, with demonstrations of software for automatic density analysis, digital mapping, progression tracking, and identification of dermatoscopic patterns. Debates included ethical issues, data protection, and photographic standardization, reflecting a trend of integration between technology and medical practice.

Brazil's participation was significant and widely recognized. Also contributing to the scientific program were colleagues Dr. Amanda Rodrigues, Arthur Tykocinski, César Villareal, Daniel Barazzetti, Flávia Basilio, Flávia Dias, Fernando Basto, Christine Graf-Guimarães, Gustavo Setogutti, Hudson Lazaro, Igor Bottura, João Pereira, Leonardo De Medeiros Quirino, Laila Rozemberg, Marco Barusco, Marcelo Pitchon, Márcio Crisóstomo, Mauro Speranzini, Otavio Boaventura, Pablo Cirino, Rodrigo Pirmez, Solon Souza, Teilhard Barros, Thiago Legal and Vinicius Lima. The presence of all

of them reinforces Brazil's strength and relevance in the international community, both in scientific production and in the ethical and transparent sharing of knowledge.

At the end of the event, the venue for the next ISHRS meeting was announced: the 34th World Congress, which will take place in Rio de Janeiro from October 15 to 17, 2026. The news was received with great enthusiasm by the Brazilian community, which celebrated not only the honor of hosting the largest hair restoration congress in the world, but also the ISHRS' recognition of Brazil's scientific, ethical, and collaborative strength. The expectation is for a vibrant, technically rich, and culturally significant congress, which should further consolidate the country's leading role in discussions on cell therapies, advances in FUE, artificial intelligence, ethics, and new regenerative frontiers.

The meeting in Berlin reaffirmed the essence of the *Unity* theme and consolidated Brazil's role as a world leader in hair medicine. It was clear to see the technical, scientific, and collaborative evolution of our community, which is growing together, sharing knowledge and continually raising the international standard of hair restoration.

Effects of Prolonged Intermittent Fasting on Hair Health: Evidence of Impaired Follicular Regeneration and Stem Cell Depletion in a Murine Model



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INTRODUCTION

The study by Chen and colleagues, reviewed by Dr. Isaura Fasciani makes an original contribution by showing, in a murine model, that intermittent fasting can compromise follicular regeneration through mechanisms related to dermal lipolysis and stem cell apoptosis. Although the results are relevant, interpretation in humans requires caution, given that there are interspecies differences and great variability in fasting protocols adopted in clinical practice. Nevertheless, this is a valuable warning: popular metabolic interventions, when maintained chronically, can impact tissues that are highly dependent on energy availability, such as the hair follicle. This finding reinforces the need for interdisciplinary approaches that recognize the interdependence between metabolic state and tissue regeneration and maintenance processes.

Effects of Prolonged Intermittent Fasting on Hair Health

Dr. Isaura Azevedo Fasciani
Dermatologist at HSPE/IAMSPE
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The metabolic effects of intermittent fasting are widely documented in scientific literature. Among the main benefits, weight loss, improved peripheral insulin sensitivity, and reduced cardiovascular risk stand out, in addition to other potential benefits still under investigation. With the increasing adoption of calorie restriction strategies and the use of drugs such as semaglutide (Ozempic) and tirzepatide (Mounjaro), it becomes equally necessary to understand the less obvious physiological costs of these practices, especially when maintained chronically.

In this context, a study published by Chen and colleagues in January 2025 in *Cell Metabolism* offered a novel perspective: the deleterious effects of intermittent fasting on hair regeneration in mice. This work reinforces the importance of interorgan communication in the regulation of follicular stem cells (FSCs), pointing to potential implications for hair maintenance in humans.

In the experiment, the authors divided the mice into three groups: *ad libitum* feeding (control group), 16:8 intermittent fasting (16 hours of fasting followed by 8 hours of feeding), and alternate-day fasting (24 hours of free feeding interspersed with 24 hours of complete fasting). To evaluate hair regeneration, the animals' dorsal region was shaved, and hair growth monitored over 96 days. Only the animals in the control group showed complete coat regeneration. In the two groups undergoing intermittent fasting, hair growth was substantially compromised.

The hypothesis put forward by the authors was that systemic energy deprivation would lead to apoptosis of FSC. This idea was tested using the thymidine analog EdU, which is incorporated by dividing cells, allowing for the tracking of FSC activation. It was observed that, during feeding periods, FSC were activated normally, while during fasting periods there was a reduction in proliferation and an increase in apoptosis in these cells.

Interestingly, food reintroduction partially restored regenerative function, which suggests a reversible effect in the short term. However, mice chronically exposed to fasting for 8 months showed persistent alopecia and progressive depletion of FSC.

In the study in question, an increase in dermal lipolysis with the release of free fatty acids was also observed, which proved to be decisive for the death of FSC. Lipolysis in dermal adipocytes was identified after 16 hours of fasting, coinciding with the appearance of apoptotic FSC in the hair follicle. After the animals were fed, lipolysis ceased immediately and apoptosis of FSC decreased. These data therefore suggest a strong link between dermal adipocyte lipolysis and FSC apoptosis.

It is known that, during fasting, levels of the hormone leptin decrease, triggering activation of the hypothalamic-pituitary-adrenal axis, which results in the release of cortisol and epinephrine, both of which have lipolytic action. To confirm the hypothesis that lipolysis of dermal adipocytes would be triggered by this mechanism, adrenalectomy was performed on mice, with the removal of the adrenal glands. Subjected to fasting, these animals did not show induced dermal lipolysis or apoptosis of FSC, and follicular regeneration, as well as capillary growth, became insensitive to intermittent fasting. Under *ad libitum* feeding conditions, neither dermal lipolysis nor apoptosis of the FSC were observed.

These findings raise important questions about the unanticipated side effects of popular metabolic interventions. Although there is no direct evidence in humans, the murine model provides a plausible biological warning regarding the potential risks of prolonged fasting over cellular niches sensitive to energy availability.

The lesson here is clear: weight loss strategies, whether pharmacological or behavioral, should be conducted under the guidance of qualified professionals. In a scenario where thinness has often been mistakenly associated with health, it becomes urgent to recover a broader, more critical and well-founded understanding of what it truly means to promote health in a holistic, ethical and sustainable way.

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Bald Area Reduction

The long history of surgery is filled with techniques that were considered pioneering and that – after a few years, with dubious results – proved to be completely outdated. The same happened in hair restoration: innovations that were published with great enthusiasm ended up abandoned and forgotten. These events should be remembered and discussed only for the record for those who intend to bring advancements to our field, and to prevent similar mistakes from happening again.

In the 1970s, faced with the possibilities of skin expanders – recently introduced in restorative surgery and, especially, in the scalp flaps – the idea came up to change the donor area vs. recipient area equation. The proposal was simple: if there is no way to increase the number of follicles, why not reduce the extent of the area to be covered? Some authors have therefore proposed different procedures to reduce the bald area, which have come to be known as “scalp reduction techniques”.

The first article proposing this technique was published in Canada's *Journal of the National Medical Association* by brothers Guy and Bernard Blanchard (vol. 69, no. 9, 1977): “Obliteration of Alopecia by Hair-Lifting: A New Concept and Technique”. In it, the authors describe the different ways to eliminate areas with alopecia, performing these reductions in one or sev-

eral stages. With good planning, the scars would be well camouflaged, and could later be covered with follicular grafts, which at the time were made without the use of magnification (the so-called mini- and micro-grafts). With the reduction of the receptor area, the density of the hair strands increased.

Later, other authors expanded the procedure with more creative designs. To further increase the amount of scalp to be resected, Patrick Frechet*, from France, designed a bioelastic prosthesis that he called an extender: supported by hooks at the ends, the extender was stretched in the subgaleal plane and fixed. After a few weeks, the expander would return to its original size, bringing a large hairless area to the center of the scalp, which was then excised in a second surgery.

These different techniques for reducing glabrous areas were widely accepted for a time, but their disadvantages soon became well known and described: postoperative pain (especially with the use of the extender), displacement of the auricle with multiple stages, and mainly very wide scars (due to the stretch-back phenomenon). Currently, this scalp dryness is restricted to pathologies where there is excess skin, such as *cútis laxa* and *cútis verticis girata*.

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Obliteration of Alopecia by Hair-Lifting: A New Concept and Technique

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A new concept and technique of treatment of male-pattern alopecia are described. The concept is to remove, in serial stages, segments of skin that measure about 3 cm by 7 to 10 cm from the bald area of an alopecic scalp, and to raise the remaining hairy portion into the previously bald area.

The technique consists of undermining the skin in the normal plane of cleavage between the galea and the sub-aponeurotic loose connective tissue after each removal of bald skin and "lifting" of hairy skin into the operative defects as they are obliterated by primary closure. By this method, which we call hair-lifting, the patient benefits also from an associated partial face-lift. Whatever remains of baldness after as much hair-lifting as feasible has been performed, is filled with "punch" grafts or free or pedicled strips. Each stage of the procedure is done under local anesthesia. The entire procedure is particularly suitable for tonsure baldness in men and even in the skull-cap type of androgenic alopecia in women.

Rook, in 1973, stated, "The results of hair transplantation are far from perfect."¹ Such knowledgeable criticism would most likely seem to be directed at the difficulty in providing optimal hair density at the receptor site, especially in the Ebling and Rook (E&R)² grades III, IV, and V of male pattern baldness (MPB) which correspond to the Hamilton³ type VI, VII, and VIII scalps.

If we consider E&R grades I and II, Rook's criticism¹ rarely holds if the initial grafting sessions are later followed by "filling-in" periods. However, the objection does hold for grade V cases. It diminishes, however, if prior to the grafting operations, the enormity of the task confronting the prospective "hair transplanter" has been reduced. The "lifting" of the hairy scalp, more conveniently referred to as the hair-lifting operation, accomplishes just that, by the reduction of the bald area (Figures 1 and 2).

Principles

The following principles are involved in the hair-lifting operation: (1) The reduction of the size of the bald scalp through elliptical or crescentic resections of bald skin with its underlying galea aponeurotica; (2) the subsequent use of time-honored techniques, such as free "punch" grafts,^{4,5} (aptly named by Friederich,⁶ the Okuda-Orentreich technique) and free strip grafts of Vallis.⁷ Other more difficult techniques can be done as well, if not better, eg, the Lamont⁸ pedicled graft, after the bald scalp has been reduced to the maximum; and (3) the "gradual reduction of tegumentary deformities"⁹ where the bald scalp is considered a tegumentary deformity.

Technique

1. The operation is done under local anesthesia. A pericephalic block using 10-12 cc of one percent lidocaine (Xylocaine) with epinephrine 1/200,000 is performed. The solution is injected first, 4 cm above the glabella, then gradually towards the sides, where the needle "works" on a line joining the top of the auricles and the external occipital protuberance.¹⁰

2. Bald skin and its underlying galea are excised. For closure of the gaping wound, when no undermining has to be done, such as in the reduction of the "tonsure" only, as in a E&R grade II case, we make use of the "sliding" that the subgaleotic loose connective tissue provides to the overlying scalp.¹¹ When large resections must be accomplished, undermining is done under the galea in the anatomical plane of cleavage known as the "scalp-er's helper."¹² No perforating vessels are encountered.^{13,14} The scissors are active in all directions, but the dissection is blunt most of the time. It matters little whether the subgaleotic connective tissue is composed of three layers¹¹ or two layers¹⁵ because the blood vessels that are encountered are of a small caliber.¹⁵

Longitudinal Hairy Scalp-Lifting

Maximal length of the incision is up to 12 cm and the maximum width is up to 3.5 cm. An average resection is an alternative to about 100 4.5 mm "punch" grafts. Subsequent resections can be done, at intervals of four to six weeks, each successive reduction being less "enthusiastic" than its predecessor. . . . Sutures of the galea are 00-Dexon, and the skin is closed with nylon 4-0. Operative time is less than one hour and a half.

Transverse Hair-Lift

Maximum length, latero-lateral, is 8 cm and the maximum width, antero-posterior, is 3 cm. The transverse resection is done when all possible improvement has been gained from the longitudinal resection(s).

The technique is much less elaborate, and much easier than the bilateral Fleming advancement flap reported in 1965 which was done for a grade I-II bilateral fronto-parietal recession.¹⁶

Discussion

It is important to use resistant suture material (Dexon 00) on the

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Figure 1. Longitudinal hair-lifting procedure in grade IV alopecia. (Patient I) Pre-operative photograph of bald area, 12 X 14 cm. (a). After fourth hair-lifting operative procedure. Hair punches done concomitantly in previous months. Bald segment withheld at the occiput. Galeotic sutures in place with Dexon 00. (b). Bald area reduced to 6 cm X 8 cm, considering the density of new hair resulting from punches and strips in the frontal region. Onset of growth of hair from punches done at the vertex. (c). Six months later. Continued growth of new hair at vertex, about 200 punches remaining to be done. (d).

aponeurosis in order for the hair-lifting operation to hold firm. We use nylon 4-0 for the skin.

Out of 100 or more hair-lifting procedures done to date, we have had two cases of tissue intolerance to Dexon, both occurring after the second session. There was formation of granulation tissue with drainage. After preliminary disinfection, a total removal of the scar was done, followed by primary closure with nylon 2-0. Healing of the oozing wound followed in less than 10 days in these two patients.

It is possible to perform up to five or six hair-lifting procedures on the same patient at intervals of four to ten weeks. The patient is instructed to apply facial and scalp massages to favor lifting of the skin of the face and of the hairy areas towards the vertex of the skull.* This will eventually favor the hair-lifting operative procedures and will help in removing the

maximum of bald skin from the top of the head. In multiple resections, one incises every time on each side of the existing scar; the final number of scars will therefore be limited and these will eventually be obliterated by free punch grafts.

Two hair-lifting sessions can easily reduce by 80 percent a "tonsure" seen in grade II cases, or the "Käppchen" ("calotte") seen in Ludwig's¹⁸ No. 2 type of feminine androgenic alopecia.

In more important cases of alopecia that are amenable to surgical correction, grades III and IV, the frontal hairline can be concurrently rebuilt (although at a higher level than formerly) with free grafts taken deeply at the occipital area between the external ears, creating in effect, multiple perforations into the galea. The multiple occipital galeatomies, so performed, will facilitate the eventual lifting of the remaining hairy parts during the hair-lifting operative procedure.

The hair-lifting operation, at this stage, is a recent practice. It dates back to slightly over three years. It seems,

however, to offer great possibilities. The skin holds well in general and has not given rise, on a short term basis, to loosening. It will suffice, thereafter (or concurrently) to cover the residual bald areas, including the scars from the hair lifting procedures, with free punch-type grafts.

The technique can not only reduce the size of the bald pate but it has also been found to bring rejuvenation of the patient's face by creating a partial face lift.

Since all of the teguments over the head, as a whole, constitute a unit, the reduction of the upper facial wrinkles, although not the primary goal is logically to be expected.

Results

1. Once the hair-lifting procedures have been completed, one can hope to cover best and with fewer transplants, the residual areas.

2. Fewer transplant sessions will be needed.

3. Surgical fees are diminished.

* This type of massage was recommended by Wadel¹⁷ in 1935 as a to-be-hoped-for cure of common baldness in men.

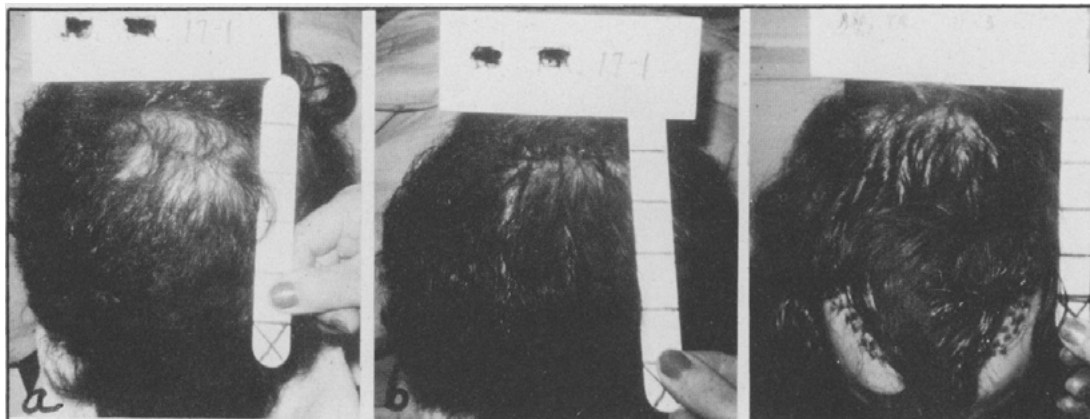


Figure 2. Transverse hair-lifting procedure in grade II alopecia (reduction of tonsure). Patient 2. Pre-operative photograph of bald area 5 X 7 cm. (a). Post-operative photograph. A 3 X 7 cm skin segment is removed and the bald area is reduced to 2 X 7 cm. (b). Photograph from the top. Free punches concomitantly done at the frontal receding hair line. (c).

Comments

We have not found among bald people, any lack of feasibility for the scalp to be displaced or "lifted." This is contrary to the teachings of Wadel,^{17,19} who in 1933, claimed that the bald scalp had a 50 percent lessening in displacement capacity (Verschieblichkeit) as compared to normal. This author was a disciple of Schein,²⁰ whose "tension" theory (Spannung) on the cause of baldness was completely discarded in the mid-1960s.

We utilize the sliding feature allowed by the loose subaponeurotic connective tissue as a guideline for our hair-lifting operation. The displacement or "lifting" of the skin edges following an elliptical skin resection approximates easily and without tension.

Where the galea and the subaponeurotic connective tissue might not be that loose, undermining in that same plane of cleavage with dissecting scissors will allow for the "lifting" feature of the operation. There is no

need for delay since there are no perforating vessels.

In certain cases, we have had to close with moderate tension. We have never observed a loss of hair around the scarred area, nor at a distance, even in cases where moderate tension was used.

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Hair health in the era of GLP-1 inhibitors



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Type 1 glucagon-like peptide (GLP-1) analogs — or GLP-1 receptor agonists (GLP-1RAs) — represent one of the most promising pharmacological classes in the management of obesity and type 2 diabetes. Among the most commonly used drugs are liraglutide, semaglutide and tirzepatide (the latter also acting on the GIP receptor - glucose-dependent insulinotropic polypeptide). GLP-1 is an endogenous incretin hormone secreted by the L cells of the intestine in response to food intake. Its main action occurs through stimulation of glucose-dependent insulin secretion, inhibition of glucagon secretion, delay of gastric emptying, and increased satiety via hypothalamic centers. These properties explain the central role of GLP-1 agonists in weight loss and metabolic control.

Synthetic GLP-1 agonists mimic the action of the natural hormone, promoting increased insulin sensitivity and improved glucose metabolism, decreased caloric intake through reduced hunger and increased satiety, and delayed gastric emptying, which contributes to glycemic stability and appetite control. These effects are mediated by GLP-1 receptors distributed throughout the pancreas, gastrointestinal tract, and central nervous system, resulting in an integrated metabolic response.

The most common adverse events include nausea, gastric fullness, constipation, heartburn and occasionally diarrhea. However, from a dermatological



point of view — and especially in medical trichology — the point of greatest interest lies in the hair loss observed after significant weight loss.

It is important to note that there is no evidence of direct toxicity of GLP-1 agonists on hair follicles. However, rapid and significant weight loss, associated with severe calorie restriction and macro- and micronutrient deficiencies, can trigger telogen effluvium 2 to 3 months after the start of weight loss.

Furthermore, protein deficiency and reduced intake of iron, zinc, biotin, and B vitamins—frequently observed in restrictive diets—compromise the anagen phase and mitotic activity of the follicular matrix, worsening the condition of telogen effluvium.

In practice, detailed nutritional assessment should be considered in patients using GLP-1 agonists, along with laboratory monitoring of vitamins and minerals, guidance on maintaining adequate protein intake, and early intervention — before or during the weight loss process — for trichoscopic evaluation of the scalp and initiation of treatment for pre-existing alopecia. Early recognition of this relationship helps avoid misinterpretations — for example, attributing alopecia exclusively to the drug — and contributes to the proper management of the patient, especially in contexts of rapid weight loss. Furthermore, for significant hair loss, it is worth considering strategies to minimize the rate of weight

loss, if clinically appropriate. There is no formal indication to discontinue treatment with GLP-1 inhibitors due to telogen effluvium, but dermatological follow-up is recommended during the weight loss process.

Therefore, GLP-1 analogs represent a significant therapeutic advance in the treatment of obesity and type 2 diabetes, with a positive impact on metabolism and cardiovascular health. From a dermatological point of view, it is essential to understand that the hair loss eventually reported by patients using these agents is, in most cases, due to the metabolic and nutritional context associated with weight loss, via telogen effluvium, and not the direct action of the medication. Patient education and multi-professional monitoring - including endocrinologists, nutritionists and dermatologists - are essential to ensure not only therapeutic success, but also the preservation of hair health.

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Scalp Necrosis Following Hair Transplant and the Use of Hyperbaric Oxygen Therapy



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INTRODUCTION

Scalp necrosis is a rare but potentially serious complication that can occur after hair transplant. The most frequently affected region is the recipient area, especially the central portion of the scalp (also called the midscalp) and the frontal region. The anatomical reason is attributed to inadequate blood perfusion in these regions.

In a retrospective analysis of 2,896 patients who underwent hair transplantation over 10 years (1), only three cases of small-scale skin necrosis were observed, all in smoking patients, which reinforces smoking as an important predisposing factor.

Similarly, a review of 18 documented cases of post-transplant scalp necrosis identified smoking in 66.7% of patients as the most prevalent risk factor, followed by diabetes mellitus in 13.3%². Other associated factors include the excessive use of adrenaline in the tumescent solution, the implantation of high-density grafts, and the presence of comorbidities such as high blood pressure.

The first case of scalp necrosis after FUE (*Follicular Unit Excision*) surgery was described in 2012³. The report involves a 22-year-old man who developed extensive necrosis in the donor area (left occipital region) after the extraction of 950 follicles, requiring the use of tissue expanders and subsequent rotation of hair flaps to reconstruct the affected area.

In 2015, the first case of necrosis in the recipient area after a FUE procedure was described⁴. It was a 33-year-old man who received 1,800 follicles in the frontal region and, three hours after surgery, presented with pain and cyanosis in the right frontal region, which progressed to cutaneous necrosis. Treatment included hyperbaric oxygen therapy, topical antibiotics, debridement of necrotic tissue, and second-intention closure.

COMPLICATIONS

PREVENTION, DIAGNOSIS, AND TREATMENT

Prevention of ischemic complications should begin in the preoperative period, with emphasis on identifying and controlling comorbidities that may compromise cutaneous microcirculation, such as diabetes mellitus, systemic arterial hypertension, and smoking. It is recommended to stop smoking at least seven days before surgery and maintain this abstinence for seven days after the procedure, a period considered critical for the integration of follicular units into the recipient bed. Furthermore, it is essential to ensure adequate glycemic and blood pressure control preoperatively to optimize tissue perfusion and reduce the risk of local vascular compromise during the healing process. During surgery, attention should be paid to the use of adrenaline solutions, especially in patients with risk factors for scalp necrosis ³⁻⁷.

It is important to identify early clinical signs of ischemia, such as pallor, cyanosis, or local pain. Proper management in the early stages is essential to prevent the progression of necrosis and improve scarring prognosis.

Several therapeutic approaches have been proposed for the management of scalp necrosis, varying according to the severity of the case and ranging from conservative measures to more extensive surgical interventions.

Among the conservative approaches are the application of appropriate dressings, manual massage in cases of early ischemia, and the use of vasodilating medications ^{6,7}.

Among these approaches, the use of topical nitroglycerin spray stands out, which, when applied early after the onset of cyanosis in the affected skin, can restore the normal color of the region in approximately 30 minutes, promoting a significant reduction in the progression of necrosis in the reported cases ⁸.

THE ROLE OF HYPERBARIC OXYGEN THERAPY IN ISCHEMIC/NECROTIC LESIONS OF THE SCALP

Hyperbaric oxygen therapy (HBOT) emerges as a promising adjunctive therapeutic modality in the management of ischemic and necrotic areas of the recipient region after hair transplantation of these complications (9-11). HBOT consists of administering oxygen at 100% concentration in a pressurized internal environment, between 2.0 and 3.0 ATA (ATA: atmosphere, unit of pressure used in hyperbaric treatment prescriptions),

promoting tissue hyperoxygenation that exceeds normal physiological levels ¹³. The mechanisms involved include increased dissolved oxygen tension in plasma, induction of neoangiogenesis via the VEGF (Vascular Endothelial Growth Factor) pathway, reduction of tissue edema by hyperoxic vasoconstriction, modulation of the inflammatory response and stimulation of fibroblast proliferation ^{10,13-15}.

The literature in plastic and reconstructive surgery has demonstrated consistent evidence of the effectiveness of HBOT in ischemic lesions and compromised flaps. Studies in procedures such as abdominoplasty and breast reconstruction show significant tissue rescue rates when HTBO is instituted early, with the reduction of necrotic area and acceleration of the healing process ^{9,12,15}. Subsequent studies established that the therapeutic benefit is time-dependent, and intervention within the first 24-48 hours after the identification of the ischemia is essential ¹⁵.

In the specific context of FUE hair transplantation, the scalp has peculiar vascular characteristics, with a rich anastomotic network that makes it resistant to ischemic events. However, factors such as extensive surgical trauma, excessive and unnecessarily high implant densities, application of tumescent solution with excessive vasoconstrictor, smoking, diabetes, and previous vascular impairment may predispose to complications ^{10,11,13}. The application of OHB in these cases is based on the same biological principles validated in other topographies, with the additional potential to preserve not only the recipient tissue, but also the transplanted follicles ^{14,16}.

The therapeutic plan varies according to the type and diameter of the lesion and involves 90-minute daily sessions, initially with greater frequency (1 to 2 times a day) in the acute phase, totaling an average of 20 to 40 sessions depending on the clinical response. Careful assessment of tissue viability through analysis of local color and temperature guides the therapeutic decision and the timing of the initiation of HBOT. The chance of reperfusion and success increases exponentially when treatment is initiated early.

In this context, scalp thermography is presented as an objective and non-invasive diagnostic tool for the evolutionary monitoring of ischemic lesions. The technique allows the early detection of changes in the tissue thermal pattern, identifying areas of hypoperfusion even before the evident clinical manifestation of necrosis. Serial thermographic mapping makes it possible to document the therapeutic response to HBOT, observing

COMPLICATIONS

the gradual normalization of thermal gradients as tissue perfusion is restored, thus constituting a valuable auxiliary method for both early diagnosis and monitoring the effectiveness of the treatment instituted ¹⁷.

CLINICAL EXPERIENCE - CASE REPORT

We report the case of a patient referred to us by a colleague at a specialized hyperbaric medicine clinic. He was a 42-year-old male smoker who developed an ischemic complication in the immediate post-operative period of a hair transplant using the FUE technique with pre-incisions using a 1.0 to 1.2 mm straight blade and implantation using tweezers. The patient presented with an ischemic lesion with a necrotic center in the right frontal recipient area, identified within the first 72 hours after the surgical procedure. The lesion was

characterized by clear clinical signs of vascular compromise, including perilesional pallor, peripheral cyanosis, and subsequent development of a well-defined necrotic center, indicating significant tissue damage.

Given the severity of the condition and the imminent risk of extensive tissue loss, a therapeutic protocol combining hyperbaric oxygen therapy and perilesional application of minoxidil was instituted. The patient underwent 23 consecutive sessions of hyperbaric oxygen therapy in a monoplace chamber at a pressure of 2.5 ATA, with 90 minutes of exposure to 100% oxygen per session, 15 minutes of which were compression and 15 minutes decompression. An initial intensive protocol of two daily sessions for the first 7 days was adopted, followed by a daily session until the treatment was completed, totaling 16 consecutive days. In parallel



Figure 01: Clinical evolution of an ischemic scalp lesion after hair transplant treated with hyperbaric oxygen therapy (HBOT). (A) Postoperative day 3: area of tissue suffering with hematic crusts and initial signs of ischemia in the right frontal region, characterized by perilesional erythema and the beginning of superficial necrosis in the central halo. (B) Day 11: progressive improvement in tissue perfusion after 8 HBOT sessions, with a reduction in the ischemic component. (C) Post-treatment: complete resolution of the condition after 20 HBOT sessions (2.4 ATA, 90 minutes), demonstrating adequate re-epithelialization, partial loss of implanted grafts and absence of residual necrosis. A further 03 sessions of HBOT were maintained to maintain tissue perfusion.

COMPLICATIONS

with hyperbaric oxygen therapy, a perilesional application of minoxidil 5% was performed through infiltrations with a 30G needle, forming a halo around the compromised area, with applications every 48 to 72 hours during the first two weeks.

A therapeutic response was observed early, with progressive improvement in signs of tissue perfusion within the first 72 hours. Reactive hyperemia appeared at the periphery of the lesion between the third and fifth day, a significant reduction in the central necrotic area with a clear demarcation between viable and non-viable tissue occurred from the seventh to the tenth day, and granulation began at the edges of the lesion with spontaneous elimination of devitalized tissue between the tenth and fourteenth day. At the end of the 23 sessions, there was almost complete remission of the lesion, with adequate tissue reperfusion and preservation of the integrity of the scalp. The treatment resulted in complete saving of the skin tissue in the receiving area, avoiding the need for extensive surgical debridement, but with partial loss of the hair grafts implanted in the affected region ^{Figure 1}.

This case demonstrates the effectiveness of early and aggressive intervention with hyperbaric oxygen therapy combined with topical vasodilators in the management of severe ischemic complications after hair transplantation, allowing for tissue salvage and potentially enabling another transplant session after complete recovery.

In more severe cases, surgical debridement of necrotic tissue, skin grafts, and scalp flap rotation may be necessary.

CONCLUSION

Necrosis in the recipient area after hair restoration is a very infrequent but serious complication: it involves the loss of the transplanted follicular units and months of topical treatment for proper healing. Prevention is the main factor in avoiding this complication and involves both correcting risk factors - such as smoking cessation - and adopting surgical techniques that preserve the vascular integrity of the scalp.

We warn colleagues that the risk of this complication increases as the FUE procedure is trivialized, performed in franchise clinics or in the so-called illegal market, where assistant technicians perform the procedure without any medical training and without supervision. Excessive removal of follicular units can lead to areas of necrosis in the donor region. In the recipient area, excessive use of anesthetic solution with vasoconstrictor, the use of blades larger than necessary for pre-incisions, and excessively dense placement of follicular units can result in an area of low perfusion, predisposing to scalp necrosis.

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Artificial Intelligence Applied to **Hair** **Transplant Planning**



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On September 30, 2025, the third edition of the Ricardo Lemos Forum was held, with the theme “Artificial Intelligence applied to hair transplant planning”, a subject of great relevance in the current surgical trichology scenario. The event brought together leading professionals in the field, who shared their experiences with different artificial intelligence (AI)-based platforms focused on the practice of hair transplantation.

Dr. João Pedro Pereira presented the ScalpScan AI, highlighting its usefulness in accurately measuring the bald area and in the automated calculation of the number of follicular units needed for surgery. Next, Dr. Rafael Reinert demonstrated his HairMetrix (Canfield) protocol, showing how the integration between digital dermatoscopy hardware and image recognition software enables accurate measurement of follicular density and hair count in both the donor and recipient areas, before and after the procedure, as well as its use in other clinical applications.

Afterwards, Dr. Gabriel Fachini presented the application of TrichoScan in the surgical planning of his gigasessions, highlighting the tool’s ability to perform a detailed analysis of the density and thickness of the hair rods, in addition to allowing the three-dimensional evaluation of the donor and recipient areas. The system also provides estimates of the total donor capacity of the scalp, allowing for realistic simulations of surgical outcomes.

As a summary of the presentations, it is understood that ScalpScan AI stands out as a precise and efficient software technology, aimed at measuring the



recipient area and defining the number of follicular thickness, on the Precise scale; HairMetrix represents an integrated hardware and software platform, indicated for the analysis of the donor and recipient area by means of digital trichoscopy; while TrichoScan is configured as a comprehensive hair assessment solution, combining digital trichoscopy, analysis of density, thickness and three-dimensional hair volumetry.

In a survey conducted in the ABCRC (Brazilian Association of Hair Restoration Surgery) WhatsApp group, it was observed that, of the respondents, 28% use HairMetrix, 8% use ScalpScan AI, 8% use TrichoScan, 20% reported employing

other methods or technologies, and 36% stated that they do not currently use any digital tool for surgical planning. These data reflect the diversity of approaches and the growing interest of hair surgeons in the use of artificial intelligence in the clinical routine.

The Ricardo Lemos Forum 2025 therefore demonstrated that the use of artificial intelligence in hair transplant planning is a promising trend, with the potential to improve diagnostic accuracy, surgical predictability, and the personalization of results, thus establishing itself as an important advancement in the practice of modern hair restoration.

Hair Transplant Tip: FUE Technique



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2025/2026
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Scan the QR code
to watch the
video "Tinting the
Donor Area with a
Marking Pen"



The FUE technique - *Follicular Unit Excision* - is currently increasingly gaining ground in the field of surgical hair restoration.

The technique can be performed with shaved hair, with long hair after prior preparation by shaving areas from which follicular units will be extracted, or even with unshaved hair, extracting follicular units with *long hair*, in the *Preview Long Hair* technique, developed by the Brazilian surgeon Marcelo Pitchon.

OUR CONTRIBUTION WILL BE ON THE FUE TECHNIQUE WITH SHAVED HAIRS.

For patients with light, blond, or white hair, the use of hair dye is recommended, an extremely popular and readily available product. The goal is that, by dyeing the hair strands, we have an easier time visualizing the follicular units for extraction. We can guide the patient to use this product a few days before the procedure or spend a few minutes before starting the surgery. While performing this procedure in our practice, we noticed that many patients complained of local burning, itching, redness, something that bothers and that may persist sometime after the procedure. Furthermore, when we used the dye, we noticed that it was more difficult to clean, delaying the start of the procedure, as well as making hygiene more difficult.

In this way, we looked for other alternatives, and arrived at the technique of using highlighter pens, which proved to be very effective, easy and simple to execute and which eliminated the complaints of burning, irritation, redness and itching that we observed in the previous technique.

We demonstrate the technique in the following video and hope to contribute to cases of patients with light-colored hair, which presents little contrast with their skin color, making visualization difficult and consequently making extraction more laborious and time-consuming. Currently, we use this technique on all patients who will undergo the scraped FUE technique, as we have observed that, even in the case of dark wires, painting with the pen makes it more visible and easier to remove the follicular units.



Advertising and Publicity



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In the first published article on marketing, we discussed its concepts in medicine, making it possible to understand and clarify that the topic is much more comprehensive than the simple dissemination or advertisement of a service or product. In the second article, we covered the correct concept of what marketing is, search and advertising, to avoid them being confused as if they were the same thing.

In this article we will discuss relevant points regarding the future of marketing and advertising in medicine, and how important it is for doctors to have visibility in the most widely used media today.

One of the great challenges we face in our daily lives is how to get our messages, our advertising strategies noticed. In such a competitive environment, where companies are large and small fighting to advertise their services on the market, both digitally and conventionally, one of the biggest difficulties we have is: how do we make our company stand out from the crowd?

We start with an important idea, which is the need for doctors to adapt to the new era of elec-

tronic marketing. After all, it is pointless to ask a river to stop flowing, the best thing is to learn to swim in the direction of the current.

Jack Welch, chair of General Electric, has a phrase that shows this: *"When the rate of change inside a company is lower than the rate of change outside the company, the end of the company is near"*.

The digital revolution has fundamentally changed our concepts of space, time, and volume. Products and services are sold in the form of bytes, rather than in their physical form. There are billions of people around the world connected via the internet and digital commerce is already worth trillions of dollars, with an expectation of even greater growth.

This digital age has opened doors for new companies to target specific market niches even with little capital, allowing them to reach the global market. The owners of these companies, who previously spoke to smaller groups of customers regionally, opened doors for communication and outreach to a much larger area, encompassing a larger number of potential consumers, speaking to individuals from all over the world.

Consumer behavior has also changed considerably. With the replacement of old information and thinking systems by artificial intelligence and the use of cell phones that integrate telephone, television, and computer functions, it has become much more practical and easier for consumers to access information and make purchasing decisions. All this from the screen of a cell phone connected to the world.

Families around the world have discovered how much easier it is to choose products and order goods and services using internet tools, discussing, and reading reviews in chat rooms, and participating in blogs with professionals and sellers of different products and services. Using search tools that are based on artificial intelligence to help them make the best decision is already a reality. Knowledge and information are becoming increasingly accessible to everyone, democratizing access to knowledge in an unimaginable way.

While companies expanded their market reach, they discovered that their former domain, their safe territory, was being invaded and contested by companies from other locations, which were not even seen as competitors. The globalization of information, and the presence of services and products on the internet, has allowed people all over the world to consume products that were previously only available locally. Similarly, products

from around the world have also begun to reach places that were previously protected by regional companies.

Easy access to information across different companies has also led to a trend of shorter waiting times among customers, requiring companies to act quickly and efficiently in response, negotiation, delivery, and service provision.

In the health sector, medical advertising, the promotion of medical services, is increasingly present on social networks in a competitive and innovative way, showing potential clients a complete menu of surgeries and treatments that can help those interested in solving their problems.

With electronic shopping comes the growth of direct marketing, which is an interactive system that uses different types of media to obtain a measurable response or transaction at any location. In a way, it is communication that ends up being more direct with the final consumer. This communication and sales process has become increasingly specific and personalized, showing that the new sales process must be done one-on-one, contradicting the old approach of mass communication marketing.

Today, speaking to a large audience and standardizing the consumer is no longer important. It has become essential to tell a few people what you are looking for, creating a relationship, and customizing the service to keep the customer's attention.

Traditional advertising activities in the medical sector, such as creating and participating in scientific events, lectures, technical and scientific publications, participating in press programs, sending articles to the press, creating hospital visitation programs, celebrating Doctor's Day, and sponsoring events in the health field, have ceased to be interesting to the consumer. These were activities that previously showed the public the training and involvement of doctors within their area of expertise. Today, consumers are looking for a professional who speaks directly with them and who meets the customer's demands in a personalized way. He is more objective, he wants solutions, he wants quick answers, and he does not want to be treated like a mass customer.

This process necessitates personal and career marketing, creating a medical image that will be recognized by the client, leading to their interest in the professional and social behavior of the doctor in question, which will result in the perception of technical reputation and performance in the market. When this identification happens between the client and the healthcare profes-



sional, a bond emerges that matures into a process of trust. Thus, take the decision to consume the service provided by the chosen professional.

It is understood, therefore, that it is not enough to be present on social media, to be present on digital channels offering the product, but rather it is necessary to create a personality, a concept that will be followed, that will be understood by potential consumers, by specific patients who, after a process of identification, will decide on a future acquisition of the service provided. So, more important than simply paying for clicks, it is necessary to generate engagement, identification with the target audience, showing it to them. The key points, the important concepts within your medical practice and work. Developing this identity, this culture, will lead to a solid basis for communication and the identification process, facilitating future sales.

It is therefore understood that the digital presence, through promotional channels, transcends the mere

exposure of the product. It is essential to build a coherent identity and concept that resonates with the target audience, the potential patients. Once they identify with the proposal, they will decide to purchase the service. Thus, more relevant than investing in clicks, is fostering engagement and identification with the audience, communicating the fundamental values and principles of medical practice. Developing this identity and corporate culture will strengthen communication and the identification process, optimizing future conversions.

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“I’ll think about it and I’ll tell you” - and other pearls from the Brazilian doctor’s office



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There is a very particular ecosystem that inhabits medical offices throughout Brazil — especially those of plastic surgery.

An environment where indecisive professionals, budget tourists, last-minute philosophers, and negotiators worthy of an open market mix.

They all have a repertoire of phrases so frequently repeated that they could become catchphrases in prime-time soap operas, although this is not exclusive to the medical field.

And let us be frank, for those who deal with these “gems” is an Olympic sport: it requires Zen-like patience, theatrical improvisation, and Swiss diplomacy in equal measure.

Next, a brief inventory of these folkloric expressions — accompanied by accurate answers and their respective “internal translations,” those that remain there, trapped between thought and professional smile.

1. “I’LL THINK ABOUT IT AND LET YOU KNOW.”

Oh, the classic sentence. The consultation goes smoothly, everything is clarified, the budget is prepared, the surgery is practically scheduled... and, in the end, the

person switches to “existentialist philosopher” mode.

Sharp answer:

“Perfect! Making decisions calmly is essential. I only ask that, if you wish to continue, you let us know as soon as possible — the schedule tends to be busy.”

Internal translation:

“Think calmly... just don’t take as long as the voting process in Congress.” “The agenda doesn’t revolve around telepathy.”

2. “I NEED TO TALK TO MY HUSBAND/WIFE”

This one is beautiful. The person conducts the entire consultation alone, decides everything on their own, but at the last second the great oracle of the home appears - the domestic CFO. The invisible entity that decides everything.

Strategic response:

“Excellent idea to involve the partner! We can schedule a brief conversation with the two of you and avoid the “telephone game.”

Internal translation:

Perfect, call in the Ministry of Marital Finance. After all, every surgery needs the blessing of the Central Sofa Committee.



3. “SEND ME THE PROPOSAL BY WHATSAPP AND I’LL CHECK IT OUT LATER”

Welcome to the territory of budget tourists. They treat the medical proposal like a pizza flyer: they look at it, comment with their aunt, post it in the family group chat, and... disappear.

Charming answer:

“Of course! I just stress that the proposal has a due date - costs and schedule may vary. If you have any questions, let me know first.”

Internal translation:

Great! It goes straight into the virtual drawer where dreams, expired coupons and abandoned gym plans rest.

4. “I FOUND IT MUCH CHEAPER ELSEWHERE”

Surgical version of “boy, do it for less?” It is not an offense — the patient is just testing your professional elasticity.

Firm answer:

“Great that you are researching. Each professional has their own unique background and experience, and this is reflected in the price. The important thing is that you feel safe.”

Internal translation:

Excellent! Cheap surgery is like a clearance sale parachute: it might open... or it might not. Good luck with

your landing. And remember, there is no Black Friday here. It is medicine.”

5. “MAKE A GOOD PRICE BECAUSE THERE’S A LINE WAITING FOR MY RESULT”

The national champion. A mystical line of cousins, friends, and followers swears they will storm the doctor’s office as soon as she has surgery.

A humorous response:

“I’m glad they trust you! But here the price is the same for everyone. The best marketing is an impeccable result - that does attract real lines.”

Internal translation:

Depending on the line, I already think of a yacht, 10 years of paid crew and, in addition, I will name it “Laura”, in honor of my beautiful granddaughter.

CLINICAL EPILOGUE

Working in Brazilian healthcare requires technique, empathy, and a good dose of elegant irony. These phrases are not enemies - they are part of consulting folklore. Knowing how to answer them with lightness and intelligence transforms potential pitfalls into delightfully human interactions.

And when the determined patient finally appears - as rare as a blue macaw parading down the Avenida Paulista - celebrate in silence. For everyone else, keep your smile, your posture, and your sense of humor.

Because, after all, laughing is still the best medicine.



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