

Case Report

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Answer of Regenerative Therapy Not Hair Treatment Patients with Androgenetic Alopecia Approved for Hairmetrix® Technology - Case Report

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ABSTRACT

Male alopecia is characterized by thinning hair and is mainly found in the crown and frontal regions of the hair. The objective of this study was to evaluate men from 33 to 44 years of age, with Androgenetic Alopecia Norwood-Hamilton III V, without topical and/or systemic treatment in the last 3 months and during the entire period of support, being periodically evaluated by HairMetrix® technology as alterations that occur in the amount of Miniaturized hairs, hair density per region and hair length per cm² after application of an autologous suspension obtained with the Rigenere® system in patients for 7 months. For this descriptive study, 08 (one) volunteer patients were consecutively and randomly recruited. The inclusion criteria defined by: men between 33 and 44 years of age diagnosed with AAG. The treatment consisted of the use of autologous cells that were prepared using a double centrifugation method. After activation, the autologous cells are grafted into the areas involved in the scalp once. According to research, all patients were satisfied as a result of the procedure with autologous cells and the images obtained from HairMetrix noted significant improvement after 7 months. The patients who participate in this research hope to be able to help other patients who are in the same situation and with the advancement of studies related to male pattern baldness and its treatments. Given two results obtained from this research, I conclude that Rigenere is a powerful technology that provides a fast and effective method for the recovery of the bald area. The procedure is minimally invasive and must be performed in offices by qualified and properly trained doctors. HairMetrix® technology is capable of quickly and accurately recording the condition of two hairs before and after the execution of procedures, significantly increasing the efficiency of treatments.

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Introduction

Alopecia is defined as a condition characterized by the reduction or absence of hairs and/or hairs, considered a chronic inflammatory condition that affects the follicles hairy [1]. Androgenetic alopecia (AAG) is characterized by loss progressively two sides end in the frontal and vertex regions of our haired heads and a diffuse thinning of women's hair, resulting in reduced vision. capillary density.

AAG, a type of non-scarring alopecia, is probably the most common cause of hair loss in male patients and of more advanced age [2]. The male father is characterized by fine hair and looks mainly in the crown and frontal regions of the scalp [3].

This is the most common type of hair loss and affects less than 80% of hair, this is a disorder that arises after puberty, a period in which androgens undergo interaction with genetically determined androgen-sensitive hair follicles, resulting in a sequence of events that includes follicular miniaturization and alteration of the hair growth cycle, culminating in progressive thinning of both hairs

and hair. It presents increasing prevalence with identity [4,5].

AAG is a disorder of multifactorial origin, in which genetics plays an important role. At home, it is an androgen-dependent characteristic, once the terminal follicle becomes susceptible to Dihydrotestosterone (DHT), leading to the anagen phase; As for women, the associated hormonal mechanisms are less evident [6].

AAG is frequently associated with negative psychological consequences, considering that it interferes with the patient's quality of life, leading to low self-esteem and relationship difficulties, including high levels of anxiety or even depression [1].

The classification of Norwood has seven stages, which are only used here. day to understand the evolution of male father baldness, they are [7]:

Type I: There is minimal retraction or none of the hair line.

Type II: There are triangular areas, generally symmetrical, of recess on the line frontotemporal hair.

Type III: Represents the minimum extent of hair loss sufficient to be considered baldness according to Norwood. Has a deep symmetrical recess 7 times that are empty or barely covered by

hair. Non-vertex Type III, Hair loss is mainly at the vertex with limited recess of the hair line frontotemporal that does not exceed the degree of recess seen in Type III.

Type IV: Frontotemporal recess is more serious than Type III and has thinning hair or none hair no vertex. The two areas of hair loss are separated by a Faixa of moderately dense hair that extends taupe hair. Essa faixa connects with a fully haired fringe on the sides of the haired head.

Type V: The vertex hair loss region is still separated from the region frontotemporal, more and less different. The hair in the crown is brighter and more sparse. The regions of vertex and frontotemporal hair loss are the largest.

Type VI: A hair put on that crosses the crown disappears, barely subtracting hair sparse The frontotemporal and vertex regions are united by the extent of hair loss. is older.

Type VII: The most serious form of hair loss is just a slight streak of hair. Ferradura-shaped hair remains on the sides and in the back of the hair group. This hair is generally not dense and can be very fine.

The most common father is the male gender of Norwood-Hamilton. Nesse registered, the rarefaction begins in the bitemporal region in the frontal line of the hair, symmetrically, with subsequent diffuse recess in the capillary crown. Eventually, there is a confluence of the frontal rarefaction with the vertex [8].

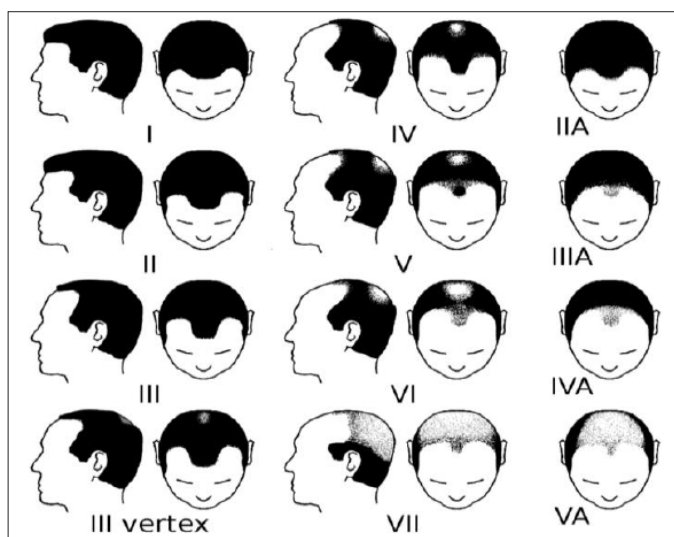


Figure 1: Norwood-Hamilton Scale Source: Bryan

The Hamilton-Norwood Scale (HNS) has been widely used to clinically assess the severity of androgenetic alopecia (AGA), especially for clinical trials. therapeutics and the same to establish their association with important diseases, such as ischemic heart disease and prostate cancer [9,10]. Loss of capillary density requires support and treatment continuous. Nesse sense, as therapeutic options - prescribed or natural - that we promote. The capillary growth has recently experienced a large increase; e.g. Capillary regeneration has become one of the two main objectives of the development of therapies [11]. The intuitive diagnosis and early treatment are the stabilization of anomaly. In addition to avoiding negative psychosocial effects in the degeneration of disease [12].

AAG is a common cause of hair loss in men with limited options of treatment. Despite being a very common condition, drug therapies Approved by the Food and Drug Administration in the

USA are limited to topical minoxidil and à oral finasteride [13]. The effectiveness of these therapies is limited and no significant improvement has always been achieved in all patients; therefore, there is a continuous need to find new treatment options for this condition [14].

Rigenera® technology is recommended for the treatment of alopecia Androgenetics, apart from other pathologies, promotes an acceleration in the healing process. The first studies carried out on the development of Rigenera® technology date back to 2006 and were conducted by two Italian researchers, Dr. Antonio Graziano and Dr. Riccardo D'Aquino during their doctorate program in Biotechnology applied to stem cells. O Rigenera® (Figure 2) is a Class I medical device manufactured in Italy by HBW, patented worldwide and marketed throughout the world [15].

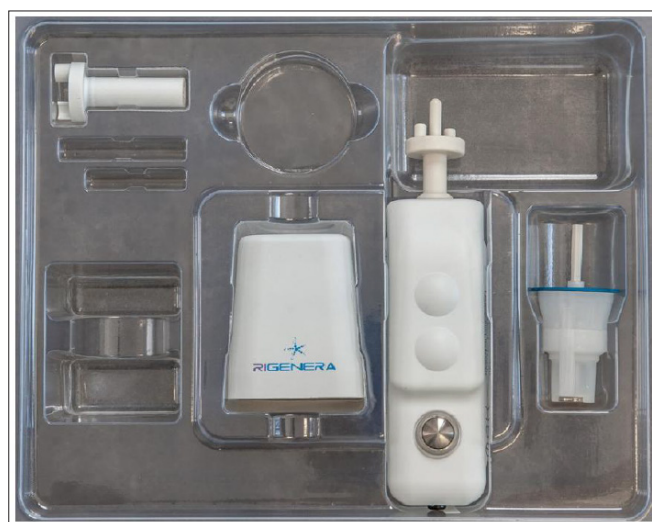


Figure 2: Rigenera® Device Source:[16]

The procedure is minimally invasive and must be performed in clinics and by specialized and trained doctors. By the method Rigenera® is obtained colhid microenxertos with a dermal punch. The dye is then processed into the hair. Rigeneracons, which can later be used as microenxertos.

Microenxertos are a key technique in fabric regeneration because it is Faster and more effective way for the clinical use of stem cells. or microenxerto could be obtained easily and safely using the Rigenera® fabric breaker, which is based on in an exclusively mechanical operation, in a single surgical time, without the addition of any chemical or pharmaceutical element, and which does not apply significant manipulation that legally limits its use. O Rigenera® is the only class 1 medical device with CE and FDA certification that allows the preparation of microinstructions for half a minute mechanical process for tissue regeneration treatments [17]. EITHER Rigenera® is protected by a world patent: it is a unique medical device in the world. These are some great developments in regenerative medicine that have demonstrated their effectiveness. no wound healing treatment in reconstructive plastic surgery and no treatment gives androgenetic alopecia in aesthetic medicine. Furthermore, start to demonstrate extraordinary results in parallel fields, such as cartilage regeneration in orthopedics [15].

During hair restoration surgery, a strip of hair from the region occipital is cut and sliced to isolate the follicular units. Below the

dermis, the hypodermis and adipose tissue that were discarded without passing. These fabrics are processed using the Rigenere system. The Rigenere device is a secure and standardized sample preparation system, for the automated mechanical disaggregation of the cell population. This mechanical fragmentation allows the extraction of only the smallest cells that represent the progenitor cells responsible for the formation of the tissue. Furthermore, this system is capable of cutting, without collisions, the constituents of the unique extracellular matrix, which plays an important role in reducing the process inflammation and, therefore, help in the scarring of the tissue.

The Rigenere® method does not involve any risk for the patient, but is mini-invasive and involves the removal of small pieces of skin, even in the case of lesions large [18].

No study carried out by Xavier or the Rigenere® System aims to increase the average thickness of hair, together with the reduction of its hair. lose; On the other hand, the immunohistological results are encouraging [19]. Generally, a Reduced quantity of Ki-67 immune cells is observed during involution two hair follicles. This denotes a suppression of capillary growth and reflects atrophy. two hair follicle. The cases treated with the Rigenere® system, meanwhile, will be presented increase in mitotic activity, suggesting greater metabolic activity consistent with hair growth phase. In the same way, CD34 and Vimentin stains It is also quantitatively greater during or after treatment, reflecting an increase in perifollicular vascularization, such as an increase in fibroblastic activity in the area adjacent to the hair bulb.

According to, the initial pre-clinical and clinical studies indicate that CD34 cells can play a crucial role in the regeneration of two follicles damaged hair, promoting hair growth [20]. These studies suggest that CD34 cells can improve hair microcirculation, increase production of growth factors and create a favourable environment for the regeneration of follicles capillaries.

By means of Rigenere® technology, mature autologous stem cells are obtained from biopsies of a patient using a preparation system for mechanical disintegration and filtration of solid tissues. In a study carried out by, the cell suspension was grafted onto the scalp of 11 patients affected by AGA [18]. 23 weeks after treatment, there was an increase of $29\% \pm 5\%$ in capillary density in the area.

The scalp that receives the treatment in comparison with the area that receives placebo. The authors suggest that pons-derived HFSCs can be isolated with this newly discovered method to avoid challenges related to cell culture and, most importantly, that they have the ability to increase capillary density in patients with AGA.

Zanzottera will use the Rigenere® device to prepare autologous ADMSCs obtained during the hair transplant procedure. The suspension was then applied to the scalp areas subject to hair transplantation in 3 patients. that sofrem of AGA. Mensal accompaniment reveals faster healing hair transplant induced wounds. Furthermore, there was a continued improvement in hair regrowth and a telogen phase shorter than two months after the treatment.

Nesse study was used for Mesotherapy in hair with cells Regenerative hair extracts are applied 0.1ML per point (30 applications), in the frontal, middle and occipital scalp regions, which aim to improve the health of the hair and hair. two hair follicles, promoting the growth of new hair and regeneration of two existing, thereby correcting deficiencies that contribute to hair loss.

One of the two main benefits of mesotherapy is its proven ability to Stimulate the growth of new hair and increase general density. I nourish you follicles and improve blood circulation in the hair, this treatment creates a ideal environment for the dormant follicles to react and produce new hair miss you.

HairMetrix® analyzes the hair and hair follicles in real time. Detailed information so that doctors and specialized professionals can choose Which treatment is most appropriate for the patient.

The objective of this study was to evaluate men between 33 and 44 years of age, with Alopecia Androgenetics Norwood-Hamilton III-V, without topical and/or systemic treatment in the last 3 months and during the entire period of support, being periodically validated Using HairMetrix® technology as alterations that occur in the quantity of miniaturized hair, hair density per region and hair length per cm2 after application of an autologous suspension obtained with the Rigenere® system in patients for 7 months.

Subjects and Methods

The treatment consists of the mechanical disintegration of a tissue sample obtained by a skin punch and subsequent filtration (50 microns) to be administered intradermally in the affected area in accordance with the technical specifications (Regenera® Protocol, Rigenere® System, Human Brain Wave SRL, Turim).

For this descriptive study, 08 (one) volunteer patients were consecutively and randomly recruited. The inclusion criteria defined by: men from 33 to 44 years of age diagnosed with AAG.

According to the Norwood-Hamilton scale (Figure 3), all of them present the following male pattern: 02 (two) type III Vertex, 04 (four) type IV, 01 (um) type V and 01 (um) type Va.

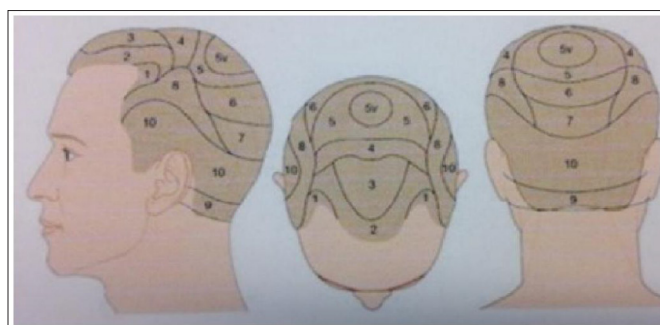


Figure 3: Hair Treatment Areas

Source: [19]

Exclusion criteria include: allergy to lidocaine, scarring problems, Scarring alopecia, chronic drug treatment, oncological processes and to have performed any topical, oral or injectable hair treatment within 3 months before and 7 months after the date of application of the treatment. The application was empty hair using mesotherapy. The treatment was applied to areas 1, 2, 3, 4, 5 and 5v.

Results

The patients participating in the study were selected based on criteria specific ones that guarantee homogeneity and demonstrate the validity of two results. All participants were diagnosed with androgenetic alopecia and were treated for years. defined inclusion and exclusion criteria.

To achieve the objective of this article that was objectively validate the alterations that occurred on hair, hair follicles and

hair after application of an autologous suspension obtained with the Rigenera® system in patients for 8 months.

The treatment involves the administration of intradermal injections in the affected area of A single application of an autologous cell suspension obtained using the Rigenera® system (Human Brain Wave SRL, Turim, distributed in Spain by the company Rigenera Activa) from an autologous cell test.

The steps of the Rigenera Capilar procedure:

- Antiseptic (Clorexidine aquosa 2%), in the extraction area in the occipital region;
- Lidocaine 2% SEM VASOCONSTRICTOR, applied just at the edge of the biopsy region;
- 5 Biopsies (follicle) with 2.5mm punch (removal of the center of the region scraped in the occipital region);
- Suture with 4-0 Nylon fibre;
- Autologous tissue inserted on top of the grade on the sheets + Physiological Soro 0.9% sterile 1.5ML;
- 2 cycles of 1 minute (SEM REMOVE FROM MACHINE);
- Insertion of more 1.5ML of Physiological Sodium 0.9% and subsequently the material was aspirated with a 3ml Luerlock syringe;
- Mesotherapy on the scalp with regenerative cells extracted from the hair device 0.1ML per point (30 applications), in the front region, middle scalpel and occipital.

According to the tests carried out, or method used, Rigenera has a high performance in the treatment of patients diagnosed with androgenetic alopecia, bringing benefits such as:

- Increase in average plant thickness;
- Hair loss reduction;
- Better hair density.

Other advantages of treatment such as Regeneration in the average time of each session of approximately 30 minutes, as this is a minimally invasive, not necessary or use of anesthesia. In summary, or hair treatment like Rigenera recovers health for two years, increases the average thickness of the follicle and improves capillary density, offering the patient quick and effective results.

Capillary Mesotherapy provides the hair with the necessary nutrients to Capillary health, through the application of microinjections directly on the hair. These injections contain a combination of vitamins, amino acids, minerals, and others essential nutrients, apart from medications that stimulate hair growth.

And to make an evaluation of the treatment, HairMetrix was used, which is a software developed by Canfield Scientific for analysis of visual data obtained through the VisioMed D200evo. The union of these technologies delivers the most professional and most advanced diagnostic imaging system dedicated to hair follicle assessment.

Quickly and accurately HairMetrix® (Figure 4) is capable of conditionally recording two hairs before and after the execution of procedures, significantly expanding the communication capacity and efficiency of consultations. The Hairmetrix is a modern trichoscopy equipment, which allows us to evaluate, in detail, the condition of two hairs. and the hairy leather.



Figure 4: HairMetrix

Source: [21]

Performed with the help of a video dermatoscope, a device that provides enlarged images of the skin, this exam is fundamental for the diagnosis of problems that hurts our nerves.

The Results Obtained in the HairMetrix® Evaluation of Two Patients

A fully automated real-time HairMetrix® analysis does not require none type of surgical intervention and allows adequate treatment plans and Objective monitoring of results are easily communicated to your patients.

Table 1: Patients Approved for HairMetrix® Technology

Name of Patient A –	Age	AAG Grade
L. OB –	44	III Vertex
TG	40	III Vertex
C – W.	33	IV
TD – RM	35	IV
E – RF	40	IV
F – RS	42	IV
G – FT	43	V
H – FC	44	Goes

Source: (Prepared by the author)

After capture, the images are processed by software, which analyzes various parameters, such as diameter and thickness of the hairs, density of the follicles and their disposition (Figure 4). Additionally, the software identifies symptoms of peeling, inflammation or scarring, providing a complete and accurate diagnosis [21].



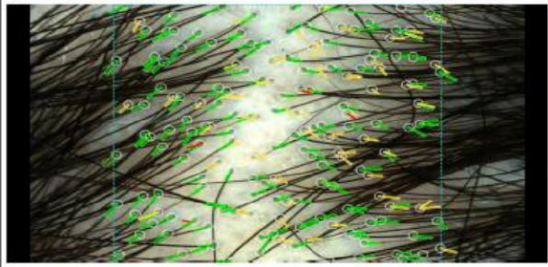
Figure 4: Parameters Attributed to the Evaluation of Two Types of HairMetrix Hair

Source: [21]

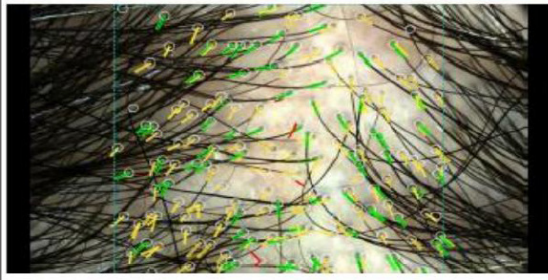
After analysis, HairMetrix produces detailed reports that synthesize the results, facilitating communication with the patient and elaboration of the treatment plan. Also, Trichoscopy also helps non-comparative images and does not accompany the results of the hair treatments performed on the patient.

Patient A - III Vertex – LO

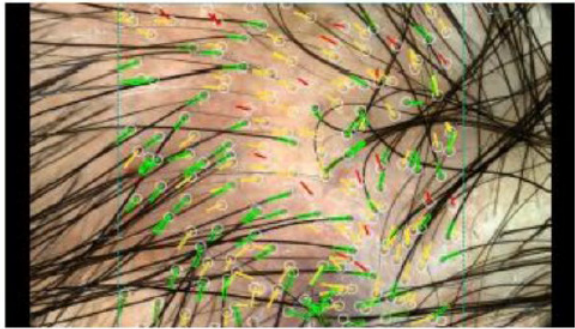
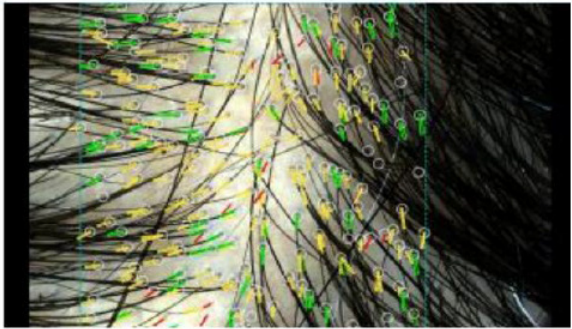
There was an increase of 5 follicular units per cm², it also gives a discrete reduction of the average interfollicular distance (mm). It was not an area that the patient had complained and nor was the focus of the treatment. Either focus was or vertex.

Location of comparison: Front 1		11/04/2024	07/11/2024
Proporção de terminal: vellus		47.3 : 1	11.6 : 1
Média de cabelo por unidade folicular		1.1	1.0
Largura média do cabelo(µm)		62.5	58.6
Unidades foliculares por cm²		146.0	151.0
Distância média interfolicular(mm)		0.96	0.95
11/04/2024		07/11/2024	
			

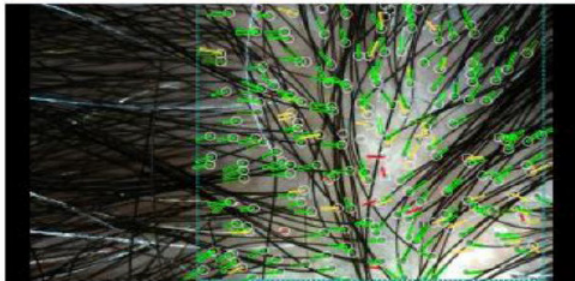
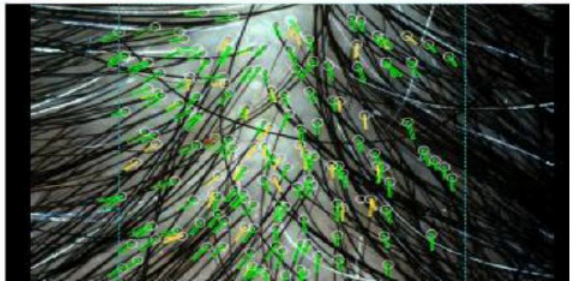
Increase in average hair length, in addition to an increase of 7 follicular units per cm².

Location of comparison: Mid		11/04/2024	07/11/2024
Proporção de terminal: vellus		32.7 : 1	12.9 : 1
Média de cabelo por unidade folicular		1.1	1.1
Largura média do cabelo(µm)		54.5	57.0
Unidades foliculares por cm²		148.0	165.0
Distância média interfolicular(mm)		0.94	0.90
11/04/2024		07/11/2024	
			

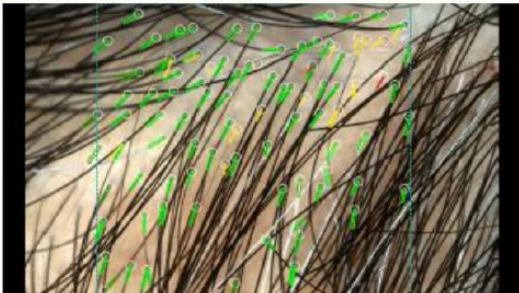
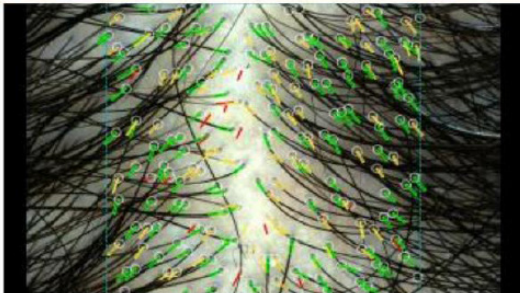
The number of hairs is visible in the image provided by HairMetrix. Apparently in comparison of the Length that the HairMetrix gave, visibly there are threads More coarse and numerous in the image obtained on 11/07/2024. HairMetrix gave an increase of 23 follicular units per cm2 in comparison of the two images.

Location of comparison: Vertex		11/04/2024	07/11/2024
Proporção de terminal: vellus		9.6 : 1	11.6 : 1
Média de cabelo por unidade folicular		1.1	1.1
Largura média do cabelo(µm)		54.6	51.2
Unidades foliculares por cm²		151.0	174.0
Distância média interfolicular(mm)		0.92	0.87
11/04/2024		07/11/2024	
			

In the terminal proportion comparison: you have a significant difference. Ha When comparing the images of Hairmetrix there is no apparent difference in the amount of follicular units, but the numerical data provided by them, have a decrease per cm².

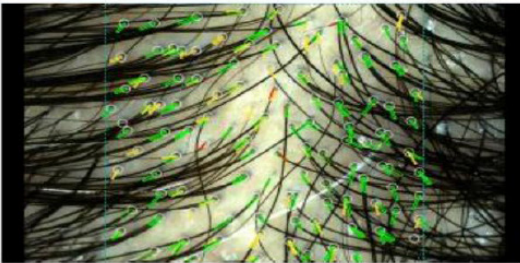
Location of comparison: Temporary 1 right		11/04/2024	07/11/2024
Proporção de terminal: vellus		22.9 : 1	169.0 : 1
Média de cabelo por unidade folicular		1.1	1.1
Largura média do cabelo(µm)		68.9	68.3
Unidades foliculares por cm²		169.0	125.0
Distância média interfolicular(mm)		0.87	0.95
11/04/2024		07/11/2024	
			

Note-se the number of follicular units per cm² obtained in this comparison.

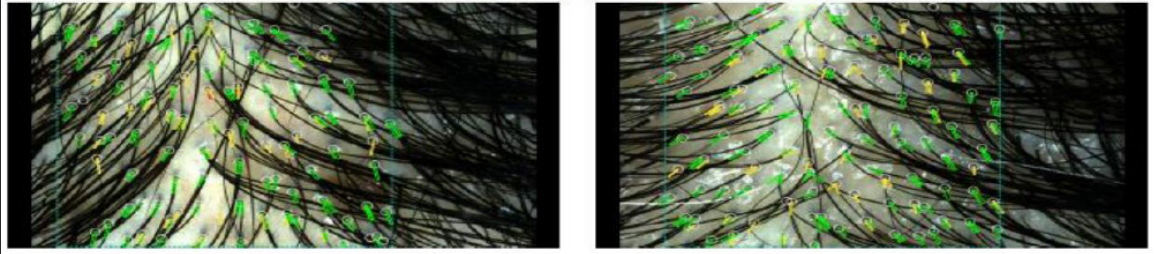
Location of comparison: Temporal 1 left		11/04/2024	07/11/2024
Proporção de terminal: vellus		51.0 : 1	11.3 : 1
Média de cabelo por unidade folicular		1.1	1.1
Largura média do cabelo(µm)		71.0	57.9
Unidades foliculares por cm²		76.0	165.0
Distância média interfolicular(mm)		1.24	0.91
11/04/2024		07/11/2024	
			

Patient B - III Vertex – TG

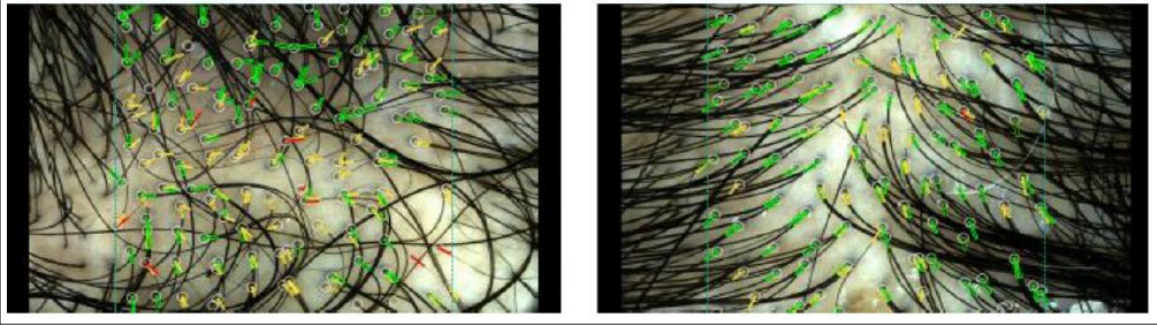
In the terminal proportion comparison: hair has a significant improvement, as HairMetrix images appear to differ in the quantity of follicular units and increase in hair length, but in the numerical data provided by it, there is a reduction per cm², but it shows this difference in the average length of the hair.

Location of comparison: Front 1		11/04/2024	07/11/2024
Proporção de terminal: vellus		2.4 : 1	36.4 : 1
Média de cabelo por unidade folicular		1.3	1.6
Largura média do cabelo(µm)		45.5	64.1
Unidades foliculares por cm²		120.0	96.0
Distância média interfolicular(mm)		1.01	1.16
11/04/2024		07/11/2024	
			

There is an increase in the proportion of terminal: vellus, follicular units per 18 cm² is the average hair per follicular unit (mm).

Location of comparison: Mid		
	11/04/2024	07/11/2024
Proporção de terminal: vellus	139.0 : 1	173.0 : 1
Média de cabelo por unidade folicular	1.3	1.5
Largura média do cabelo(µm)	66.6	64.7
Unidades foliculares por cm²	86.0	97.0
Distância média interfolicular(mm)	1.19	1.18
	11/04/2024	07/11/2024
		

There is a significant improvement in the comparison of the proportion in the average length two hair The image shows the impression of three more follicular units in the data on 07/11/24, but there is nothing that the numerical record shows.

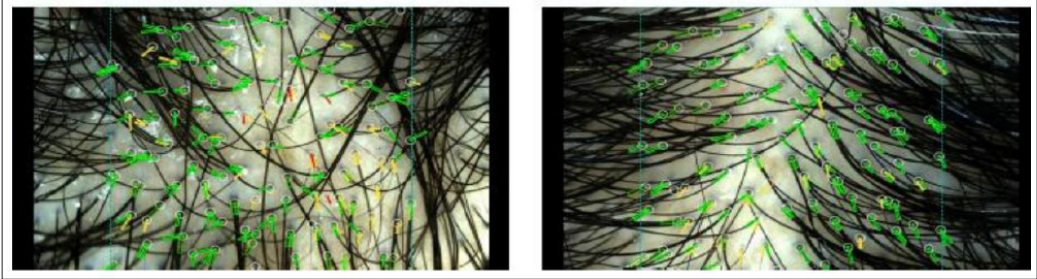
Location of comparison: Vertex		
	11/04/2024	07/11/2014
Proporção de terminal: vellus	18.1 : 1	168.0 : 1
Média de cabelo por unidade folicular	1.4	1.5
Largura média do cabelo(µm)	58.5	65.5
Unidades foliculares por cm²	111.0	96.0
Distância média interfolicular(mm)	1.11	1.21
	11/04/2024	07/11/2024
		

There are no records of Vellus files on 07/11/24. Increase in average length of hair.

Location of comparison:		
Temporary 1 right		
	11/04/2024	07/11/2024
Proporção de terminal: vellus	35.4 : 1	NA
Média de cabelo por unidade folicular	1.5	1.4
Largura média do cabelo(µm)	68.3	72.3
Unidades foliculares por cm²	102.0	96.0
Distância média interfolicular(mm)	1.17	1.20

11/04/2024

07/11/2024

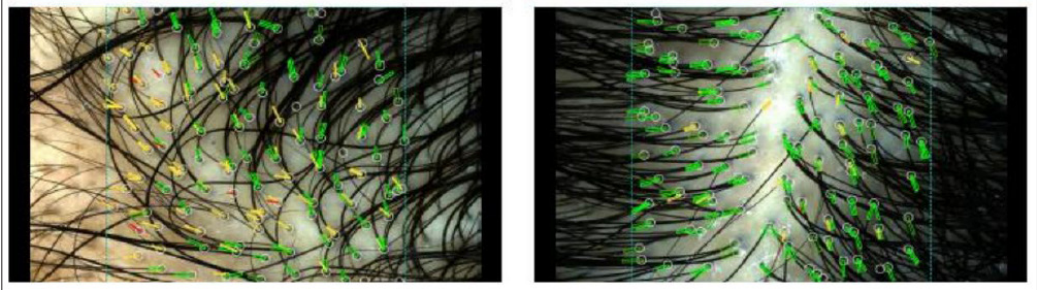


In the terminal proportion comparison: hair growth has a significant improvement; there is an increase in the average hair length in the follicular units per cm². In the image, you can see a very visible improvement.

Location of comparison:		
Temporal 1 left		
	11/04/2024	07/11/2024
Proporção de terminal: vellus	17.8 : 1	87.5 : 1
Média de cabelo por unidade folicular	1.4	1.5
Largura média do cabelo(µm)	59.3	74.6
Unidades foliculares por cm²	97.0	101.0
Distância média interfolicular(mm)	1.16	1.13

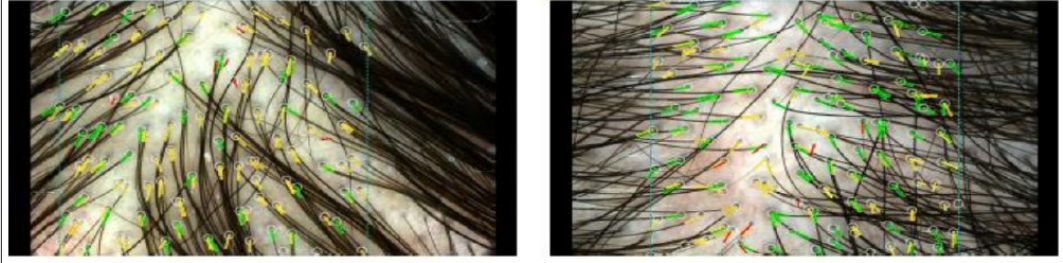
11/04/2024

07/11/2024

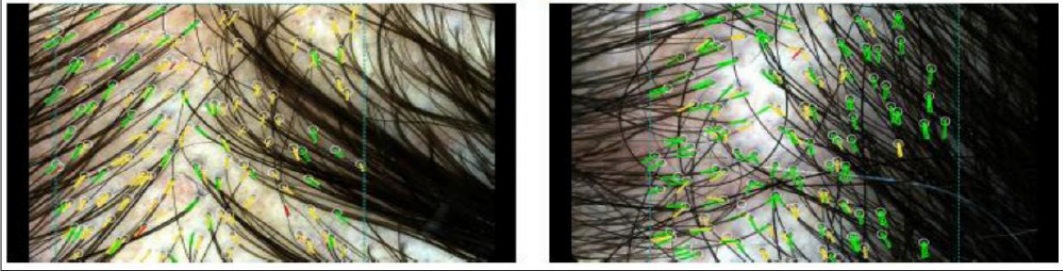


Patient C - IV – WT

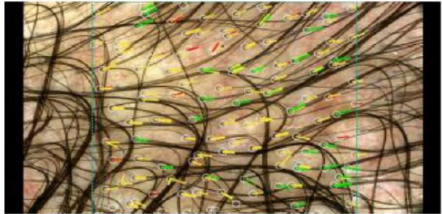
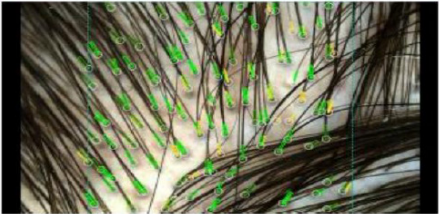
Find better average hair length and follicular units per cm² reduces the average interfollicular distance (mm).

Location of comparison: Front 1		
	11/04/2024	07/11/2024
Proporção de terminal: vellus	23.6 : 1	18.4 : 1
Média de cabelo por unidade folicular	1.4	1.4
Largura média do cabelo(µm)	52.5	58.3
Unidades foliculares por cm²	101.0	114.0
Distância média interfolicular(mm)	1.18	1.08
11/04/2024		07/11/2024
		

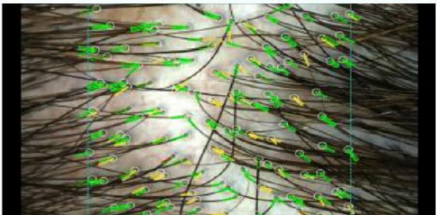
Best time in comparison of terminal proportion: vellus, average length hair and reduction of the average interfollicular distance (mm). In the image,note-it's better in all aspects.

Location of comparison: Mid		
	11/04/2024	07/11/2024
Proporção de terminal: vellus	24.3 : 1	173.0 : 1
Média de cabelo por unidade folicular	1.3	1.4
Largura média do cabelo(µm)	52.7	66.0
Unidades foliculares por cm²	111.0	105.0
Distância média interfolicular(mm)	1.11	1.06
11/04/2024		07/11/2024
		

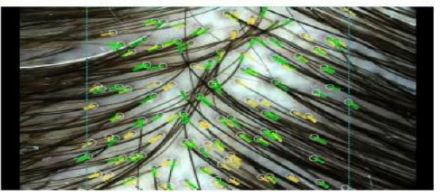
Note the absence of vellus threads. This image shows a better visual appearance and is very big. There is a discreet increase in average hair per follicular unit, much better increased average hair length and reduced average interfollicular distance (mm). Although the image does not appear, there is no Hairmetrix numerical registration, reduction of follicular units per cm².

Comparison location: Vertex center 04/11/2024		07/11/2024
Proporção de terminal: vellus	10.4 : 1	NA
Média de cabelo por unidade folicular	1.3	1.4
Largura média do cabelo(µm)	48.9	76.6
Unidades foliculares por cm²	102.0	83.0
Distância média interfolicular(mm)	1.16	1.27
11/04/2024		07/11/2024
		

In this image the visual improvement is great. There was a discrete increase in average hair per follicular unit, better than the average hair length, Terminal ratio: vellus and reduction in average interfollicular distance (mm). Despite The image does not appear, there was, hair numerical record of Hairmetrix, reduction of follicular units per cm².

Location of comparison: Temporal1 right 04/11/2024		07/11/2024
Proporção de terminal: vellus	20.8 : 1	97.0 : 1
Média de cabelo por unidade folicular	1.4	1.5
Largura média do cabelo(µm)	48.2	66.8
Unidades foliculares por cm²	117.0	109.0
Distância média interfolicular(mm)	1.08	1.12
11/04/2024		07/11/2024
		

Note the absence of vellus threads. This image should be visible best. There is a discrete increase in average hair per follicular unit, greatly increasing the average hair length and reducing the average interfollicular distance (mm). Although it gives image does not present, here, hair numerical record of HairMetrix, reduction of follicular units per cm².

Location of comparison: Temporal 1 left 04/11/2024		07/11/2024
Proporção de terminal: vellus	3.8 : 1	NA
Média de cabelo por unidade folicular	1.4	1.5
Largura média do cabelo(µm)	38.3	60.9
Unidades foliculares por cm²	113.0	95.0
Distância média interfolicular(mm)	1.10	1.18
11/04/2024		07/11/2024
		

Patient D - IV – MRI

The average hair length increased too much in comparison with the increase in follicular units per cm². The image presents a considerable improvement in comparison between periods. The terminal proportion: quadrupled vellus.

Location of comparison: Front 1		11/04/2024	07/11/2024
Proporção de terminal: vellus		9.9 : 1	39.0 : 1
Média de cabelo por unidade folicular		1.2	1.1
Largura média do cabelo(µm)		50.4	60.2
Unidades foliculares por cm²		147.0	150.0
Distância média interfolicular(mm)		0.94	0.96
11/04/2024		07/11/2024	

The average hair length increased too much in comparison with the increase in follicular units per cm². An average of hair per follicular unit increased. The proportion: vellus terminal has doubled.

Location of comparison: Mid		11/04/2024	07/11/2024
Proporção de terminal: vellus		8.1 : 1	15.1 : 1
Média de cabelo por unidade folicular		1.1	1.2
Largura média do cabelo(µm)		46.5	54.4
Unidades foliculares por cm²		144.0	159.0
Distância média interfolicular(mm)		0.96	0.94
11/04/2024		07/11/2024	

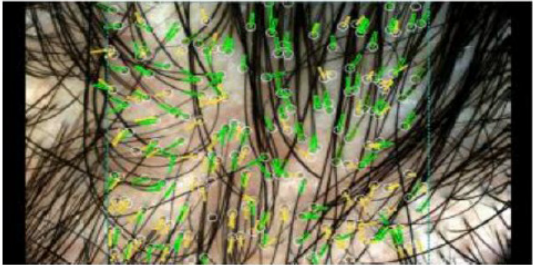
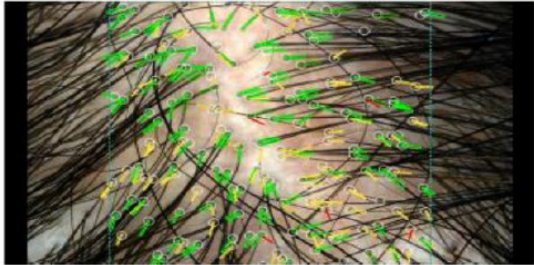
Terminal proportion: hair with a huge difference, approximately 12x better. You have much better time in the average length of your hair by increasing too much comparison. When comparing the images, there are more photos in the data of the day 11/07/24 but this is not the numbers represented. Half a hair per unit follicular increase.

Comparison location: Vertex center 04/11/2024		07/11/2024
Proporção de terminal: vellus	1.6 : 1	13.8 : 1
Média de cabelo por unidade folicular	1.3	1.3
Largura média do cabelo(µm)	35.0	59.5
Unidades foliculares por cm²	161.0	141.0
Distância média interfolicular(mm)	0.92	0.96
11/04/2024		07/11/2024
		

The images show the changes that have occurred. You have a significant improvement. Either HairMetrix is active in translating the images for the numbers in the terminal proportion: vellus, average hair length, but were unhappy with the follicular units per cm².

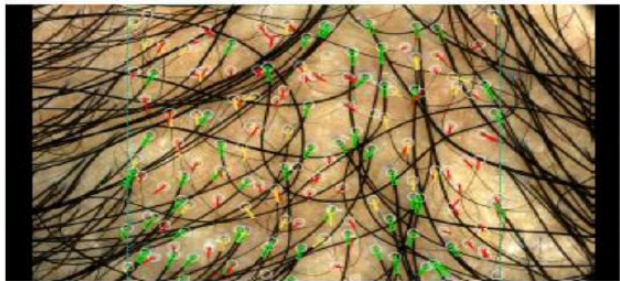
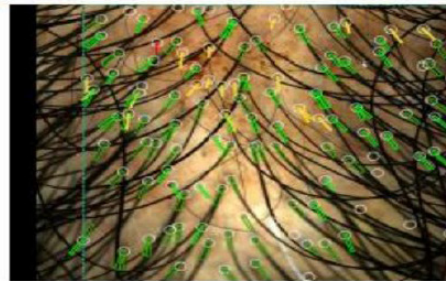
Location of comparison: Temporal1 right 04/11/2024		07/11/2024
Proporção de terminal: vellus	9.5 : 1	55.0 : 1
Média de cabelo por unidade folicular	1.2	1.2
Largura média do cabelo(µm)	46.3	63.8
Unidades foliculares por cm²	150.0	121.0
Distância média interfolicular(mm)	0.95	0.99
11/04/2024		07/11/2024
		

The region has increased to half a hair per unit. The images are very similar, but the numbers drawn by HairMetrix report to a worsening.

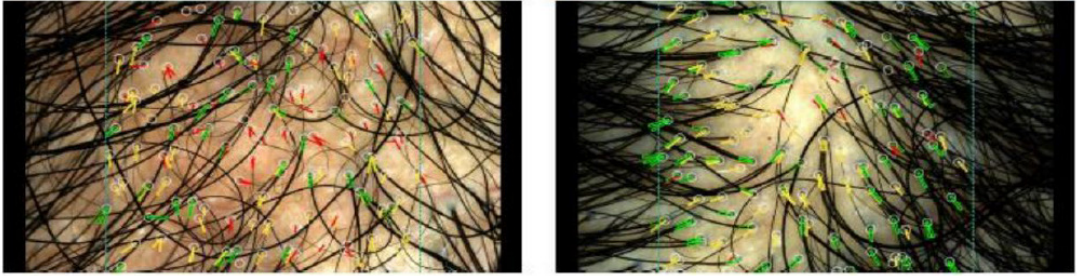
Location of comparison: Temporal 1 left		04/11/2024	07/11/2024
Proporção de terminal: vellus		234.0 : 1	36.5 : 1
Média de cabelo por unidade folicular		1.2	1.3
Largura média do cabelo(µm)		65.4	63.3
Unidades foliculares por cm²		159.0	143.0
Distância média interfolicular(mm)		0.93	0.96
11/04/2024		07/11/2024	
			

Patient E - IV – RF

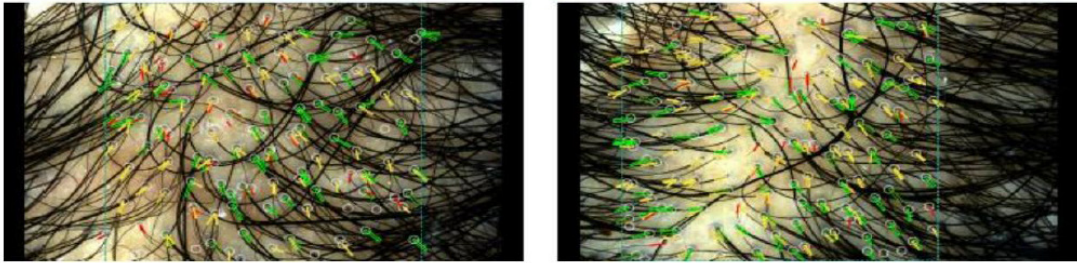
The comparison of the images shows intense improvement in all aspects. Incorrect numerical analysis provided HairMetrix hair, showing a reduction in follicular units per cm², or that it doesn’t match. Now, in accordance with an image, or HairMetrix shows the average length of hair that bends and compares the proportion of terminal: vellus you have a significant melhora.

Location of comparison: Front 1		11/04/2024	07/11/2024
Proporção de terminal: vellus		1.2 : 1	114.0 : 1
Média de cabelo por unidade folicular		1.2	1.0
Largura média do cabelo(µm)		44.2	84.1
Unidades foliculares por cm²		129.0	95.0
Distância média interfolicular(mm)		1.04	1.14
11/04/2024		07/11/2024	
			

You have better time in the average hair length, in the average hair per unit follicular and terminal proportion: vellus.

Location of comparison: Mid		
	11/04/2024	07/11/2024
Proporção de terminal: vellus	2.0 : 1	8.7 : 1
Média de cabelo por unidade folicular	1.2	1.4
Largura média do cabelo(µm)	45.9	59.9
Unidades foliculares por cm²	107.0	101.0
Distância média interfolicular(mm)	1.12	1.14
	11/04/2024	07/11/2024
		

There was a better intensity observed in the images, an increase in the average hair per follicular unit, an increase in the average hair length, a better time in the proportion of terminal: vellus in the follicular units per cm², also reduces the average interfollicular distance.

Comparison location: Vertex center 04/11/2024		
	11/04/2024	07/11/2024
Proporção de terminal: vellus	4.1 : 1	10.8 : 1
Média de cabelo por unidade folicular	1.3	1.5
Largura média do cabelo(µm)	52.7	56.5
Unidades foliculares por cm²	115.0	130.0
Distância média interfolicular(mm)	1.09	1.00
	11/04/2024	07/11/2024
		

In comparison of terminal proportions: you have a significant improvement, here increase in average hair per follicular unit, in average hair length in follicular units per cm².

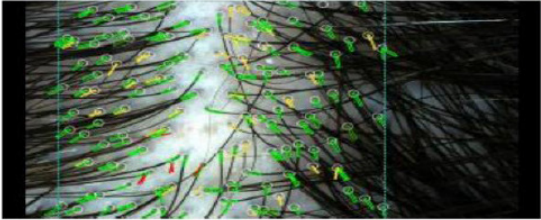
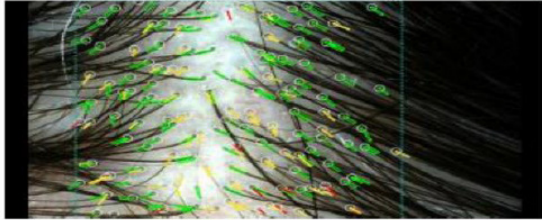
Location of comparison: Temporal1 right 04/11/2024		07/11/2024
Proporção de terminal: vellus	6.4 : 1	41.7 : 1
Média de cabelo por unidade folicular	1.1	1.1
Largura média do cabelo(µm)	55.1	75.6
Unidades foliculares por cm²	95.0	101.0
Distância média interfolicular(mm)	1.19	1.10
11/04/2024		07/11/2024
		

Better in all aspects visibly in the images. Average increase hair per unit, the average hair length and follicular units per cm² reduces the average interfollicular distance. 07/11/2024, in addition

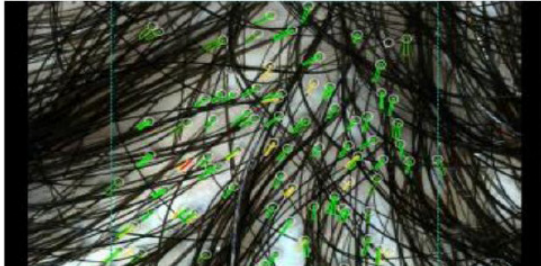
Location of comparison: Temporal 1 left 04/11/2024		07/11/2024
Proporção de terminal: vellus	2.1 : 1	4.3 : 1
Média de cabelo por unidade folicular	1.2	1.3
Largura média do cabelo(µm)	49.8	55.8
Unidades foliculares por cm²	111.0	116.0
Distância média interfolicular(mm)	1.09	1.06
11/04/2024		07/11/2024
		

Patient F – IV – RS

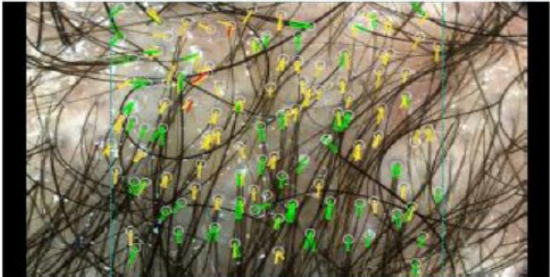
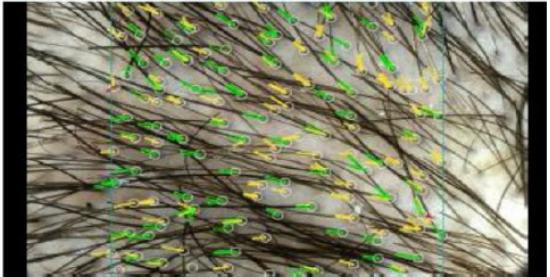
There was a significant increase in follicular units per cm² average interfollicular distance (mm).

Location of comparison: Front 1 04/11/2024		07/11/2024
Proporção de terminal: vellus	26.6 : 1	15.2 : 1
Média de cabelo por unidade folicular	1.3	1.3
Largura média do cabelo(µm)	68.3	62.3
Unidades foliculares por cm²	122.0	129.0
Distância média interfolicular(mm)	1.04	0.97
11/04/2024		07/11/2024
		

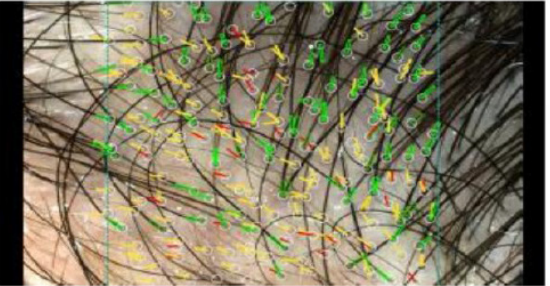
Significant increase in follicular units per cm², apart from reduced ter 07/11/2024, apart from reduced to have significantly at average interfollicular distance (mm). discreet increase in average hair per follicular unit.

Location of comparison: Mid		11/04/2024	07/11/2024
Proporção de terminal: vellus		95.0 : 1	73.0 : 1
Média de cabelo por unidade folicular		1.2	1.3
Largura média do cabelo(µm)		72.0	71.4
Unidades foliculares por cm²		67.0	96.0
Distância média interfolicular(mm)		1.29	1.07
11/04/2024		07/11/2024	
			

Significant increase in follicular units per cm² in average length hair, besides being reduced to average interfollicular distance (mm).

Comparison location: Vertex center 04/11/2024		07/11/2024
Proporção de terminal: vellus	57.3 : 1	49.0 : 1
Média de cabelo por unidade folicular	1.5	1.5
Largura média do cabelo(µm)	57.2	58.6
Unidades foliculares por cm²	96.0	111.0
Distância média interfolicular(mm)	1.15	1.14
11/04/2024		07/11/2024
		

This image shows better visual, average hair length and reduction in average interfollicular distance (mm). Although the image does not show, there is a numerical record of Hairmetrix, reduction of follicular units per cm².

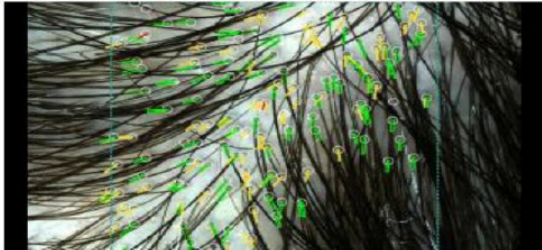
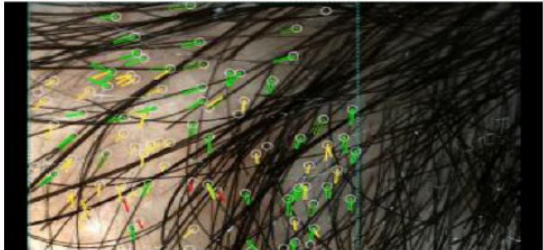
Location of comparison: Temporal 1 right 04/11/2024		07/11/2024
Proporção de terminal: vellus	6.9 : 1	14.5 : 1
Média de cabelo por unidade folicular	1.3	1.2
Largura média do cabelo(µm)	53.6	57.2
Unidades foliculares por cm²	156.0	115.0
Distância média interfolicular(mm)	0.92	1.01
11/04/2024		07/11/2024
		

There was a significant increase in follicular units per cm² and better results terminal: vellus ratio, discrete increase in the average hair per follicular unit, average hair length, and significant reduction in average interfollicular distance (mm).

Location of comparison: Temporal 1 left 04/11/2024		07/11/2024
Proporção de terminal: vellus	22.3 : 1	81.5 : 1
Média de cabelo por unidade folicular	1.1	1.2
Largura média do cabelo(µm)	61.5	62.1
Unidades foliculares por cm²	72.0	117.0
Distância média interfolicular(mm)	1.30	0.97

11/04/2024

07/11/2024



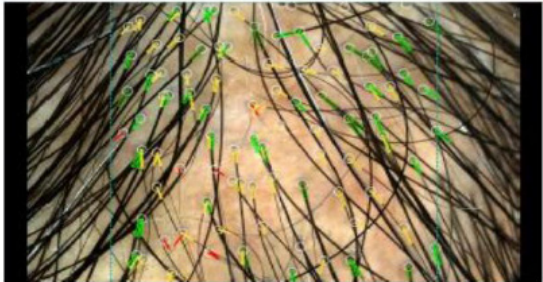
Patient G – V – FT

Increase in follicular units per cm² interfollicular(mm), that is, less apparent hair leather. 07/11/2024, and reduction in average distance

Location of comparison: Front 1		11/04/2024	07/11/2024
Proporção de terminal: vellus		13.4 : 1	14.6 : 1
Média de cabelo por unidade folicular		1.3	1.3
Largura média do cabelo(µm)		60.3	55.3
Unidades foliculares por cm²		76.0	101.0
Distância média interfolicular(mm)		1.30	1.14

11/04/2024

07/11/2024



Considerable increase in follicular units per cm² and average length hair, better terminal proportion: vellus, also reduction in medium distance interfollicular (mm), that is, less apparent hairy leather.

Location of comparison: Mid		11/04/2024	07/11/2024
Proporção de terminal: vellus		7.7 : 1	9.3 : 1
Média de cabelo por unidade folicular		1.4	1.3
Largura média do cabelo(µm)		47.9	53.6
Unidades foliculares por cm²		90.0	101.0
Distância média interfolicular(mm)		1.17	1.15
		11/04/2024	07/11/2024
			

Significant improvement in the image obtained from HairMetrix, but not demonstrated in numbering that it also presents.

Comparison location: Vertex center 04/11/2024		07/11/2024
Proporção de terminal: vellus	7.6 : 1	4.8 : 1
Média de cabelo por unidade folicular	1.4	1.3
Largura média do cabelo(µm)	45.1	46.5
Unidades foliculares por cm²	110.0	104.0
Distância média interfolicular(mm)	1.08	1.14
11/04/2024		07/11/2024
		

Better in the photos taken from HairMetrix in comparison, contrasting with incorrect count of follicular units per cm², the images give you something to look at great increase. Therefore, the numbers show a significant increase in the average hair length and improvement in the comparison of terminal: hair ratio.

Comparison location: right		
	11/04/2024	07/11/2024 Temporary 1
Proporção de terminal: vellus	7.6 : 1	119.0 : 1
Média de cabelo por unidade folicular	1.4	1.2
Largura média do cabelo(µm)	45.1	63.6
Unidades foliculares por cm²	110.0	81.0
Distância média interfolicular(mm)	1.08	1.20

11/04/2024

07/11/2024

Better in the photos taken by HairMetrix in comparison, with increased follicular units per cm² translated into a correct HairMetrix hair number. Note: The average length of the hair seen in the image is better, but it is not being translated. in numbers from HairMetrix analysis. Significant reduction in average distance interfollicular (mm).

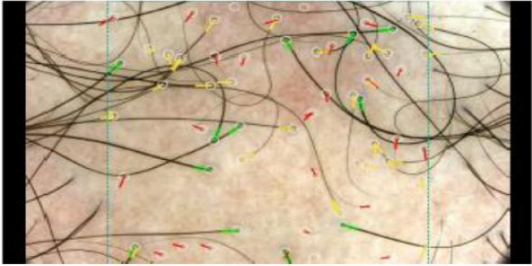
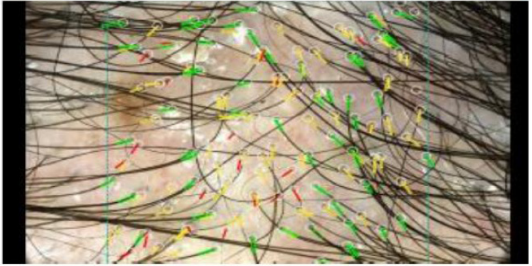
Location of comparison: Temporal 1 left 04/11/2024		
	11/04/2024	07/11/2024
Proporção de terminal: vellus	99.0 : 1	14.8 : 1
Média de cabelo por unidade folicular	1.2	1.2
Largura média do cabelo(µm)	65.8	64.5
Unidades foliculares por cm²	69.0	85.0
Distância média interfolicular(mm)	1.42	1.26

11/04/2024

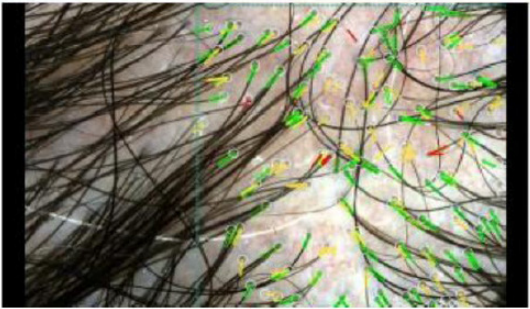
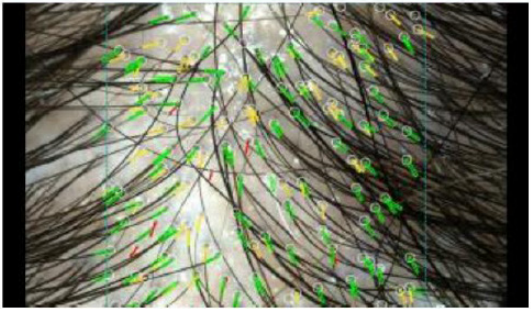
07/11/2024

Patient H - Va – FC

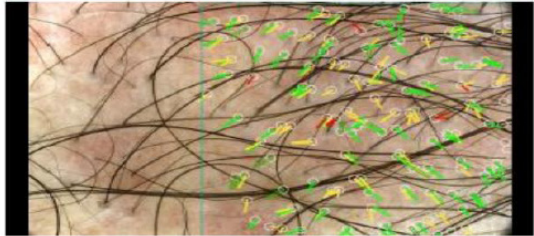
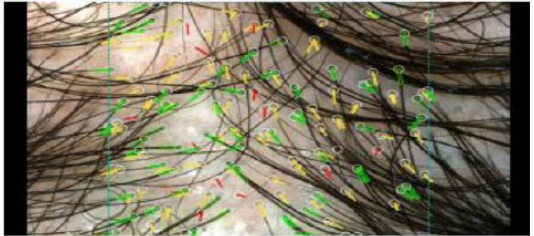
Visual improvement obtained from HairMetrix images. Dobrou or number of units follicular cells per cm², significant increase in average hair length and proportion of terminal: vellus, also giving a significant reduction in the average interfollicular distance (mm).

Location of comparison: Front 1		11/04/2024	07/11/2024
Proporção de terminal: vellus		1.8 : 1	5.6 : 1
Média de cabelo por unidade folicular		1.1	1.2
Largura média do cabelo(µm)		39.7	52.3
Unidades foliculares por cm²		50.0	108.0
Distância média interfolicular(mm)		1.74	1.09
11/04/2024		07/11/2024	
			

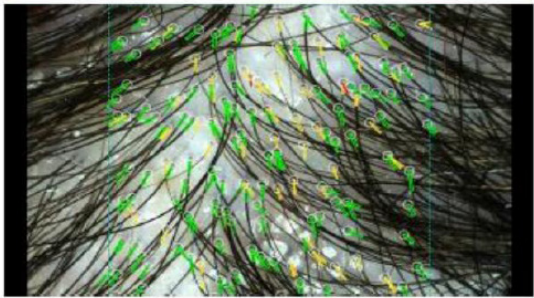
Increase in average hair length in follicular units per cm² 07/11/2024 , besides Reduction of the average interfollicular distance (mm). In the image, you can see a much greater improvement .This is significant compared to the numbers obtained with HairMetrix.

Location of comparison: Mid		11/04/2024	07/11/2024
Proporção de terminal: vellus		20.8 : 1	22.3 : 1
Média de cabelo por unidade folicular		1.3	1.2
Largura média do cabelo(µm)		60.6	62.2
Unidades foliculares por cm²		109.0	117.0
Distância média interfolicular(mm)		1.04	1.06
11/04/2024		07/11/2024	
			

Significant improvement in the images obtained from HairMetrix, not translated to us registered numbers themselves. Likewise, HairMetrix shows an increase in follicular units per cm² (visually, it increased much more than registration technology).

Comparison location: Mid/Vertex center 04/11/2024		07/11/2024
Proporção de terminal: vellus	20.8 : 1	10.1 : 1
Média de cabelo por unidade folicular	1.3	1.1
Largura média do cabelo(µm)	60.6	56.8
Unidades foliculares por cm²	109.0	113.0
Distância média interfolicular(mm)	1.04	1.09
11/04/2024		07/11/2024
		

Better in the images obtained from HairMetrix. Our numbers are better in the proportion of terminal: vellus, significant increase in the average hair length in the follicular units per cm², discrete increase in average hair per follicular unit (I prove that it has much more than that registered), in addition to a drastic reduction in the average interfollicular distance (mm).

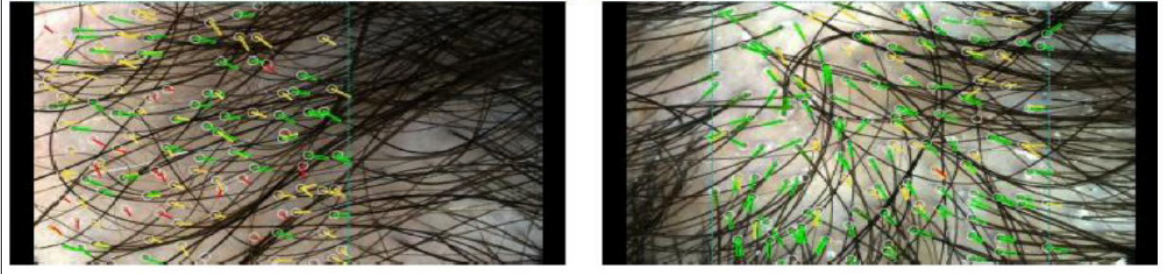
Location of comparison: Temporal 1 right 04/11/2024		07/11/2024
Proporção de terminal: vellus	1.9 : 1	93.5 : 1
Média de cabelo por unidade folicular	1.1	1.2
Largura média do cabelo(µm)	45.6	65.7
Unidades foliculares por cm²	80.0	134.0
Distância média interfolicular(mm)	1.23	0.99
11/04/2024		07/11/2024
		

Significant improvement in the images obtained with Hairmetrix hair and, likewise, brought given that they showed a significant improvement in the proportion of terminal: vellus, increase in the average length of the hair in the follicular units per cm², discrete increase on average of hair per follicular unit, in addition to drastic reduction in the average distance interfollicular (mm).

Location of comparison: Temporal 1 left 04/11/2024		07/11/2024
Proporção de terminal: vellus	5.3 : 1	167.0 : 1
Média de cabelo por unidade folicular	1.1	1.2
Largura média do cabelo(µm)	52.6	69.9
Unidades foliculares por cm²	99.0	114.0
Distância média interfolicular(mm)	1.14	1.10

11/04/2024

07/11/2024



In subjective evaluation it is confirmed that patients are satisfied with the result of the procedure with autologous cells. They stayed positively understood 07/11/2024 with the best visibility of everything in the scalp, and relates that, not only increase or number, but It is also very good for the quality of the wire, apart from the fact that it has ceased or effluvium.

Discussion

Androgenetic Alopécia (baldness) is a cause of hairy hair, of origin genetic and hormonal, which affects many men and women. Generally, in this condition clinically, for a hereditary reason (genetics), testosterone is converted to dihydrotestosterone (DHT), a hormone that ages the hair follicle, reducing the amount of wires and thickness two hairs to lose [6]. For hair we usually start in the frontal region (at the entrances) or in the vertex region of the scalp [3].

Capillary regeneration is a field of increasing interest in dermatology and regenerative medicine. O Rigenera is a new technology in the field of medicine regenerative, developed by the company Human Brain Wave (HBW) Srl. The technology is applied in various areas of medicine, including dermatology, orthopedics, medicine Aesthetics and bucomaxillofacial surgery is based on the application of autologous microenxertos directly not local to the deiscência, and the effectiveness of this approach has been demonstrated in other clinical fields, such as dentistry dermatology Zanzottera and non-management of other post-operative wounds [22-24].

Hair growth is a complex process that involves the activation of two hair follicles and the formation of new hair follicles [20]. O Rigenera is a medical device that uses an advanced technology called “autologous microenxerto” to collect and process stem cells and regenerative cells present in small samples of the patient’s own tissue. These cells are re-grafted into specific areas of the hair or scalp that require rejuvenation or stimulation of capillary growth [13].

The study carried out by Zanzottera showed that the Rigenera system gives the possibility of extracting the tissue only from the smallest cells that represent the progenitors responsible for the formation of the tissue. It allows cutting, without colliding, the constituents of the unique extracellular matrix, which are important in reducing the process inflammation and, therefore,

help the scarring of the tissue. In addition, it breaks down mature adipocytes, releasing many growth factors. This way, it’s possible maintain a kind of “cellular niche” in which each cell is a growth factor we can Play your role in tissue regeneration. The authors will explain that the application These cells in the hair transplant area increase the natural growth of hair transplantation. adipocytes, which are no longer present in the region of the protuberance and dermal papilla. Ella increases the amount of growth factors, facilitating the healing process and helping hair growth and loss of transplanted hair.

The Rigenera technology does not present any type of risk for the patient, because it is minimally invasive and involves the tail of a small fragment of skin, but not case of large lesions. In the same way, do not make risks for people, pois or use é simple and possible even in private practice (for non-hospitalized patients) Zanzottera.

Autologous tissue cells are a potentially useful therapeutic tool for alopecia, without major adverse effects. This study showed an increase in average hair length in follicular units per cm2 , also reduces the average distance interfolicular(mm). In the Image, (Patient H) Note much more significant improvement if compared to the numbers achieved with HairMetrix. To graft the regenerative cells deep litters give skin or no haired leather, the procedure aimed stimulate collagen production, improve skin texture, increase blood circulation and promote the growth of new hair follicles. However, due to the small number of trials conducted, more studies are necessary to investigate its effectiveness.

Nessa research, all patients will be satisfied as a result of the procedure with autologous cells in the images obtained from HairMetrix is significantly improved. The patients who will participate in this research hope to achieve help other patients who are in the same situation and advance the study related to male pattern baldness and its treatments.

In addition to the improvements observed in capillary density and a total reduction in hair loss, patients report an increase in self-esteem and a reduction in their complaints of identity loss due to baldness. This psychological aspect is fundamental, once androgenetic alopecia is known for its negative impact on the self-esteem and quality of life of affected individuals [20].

In general, the patient's subjective evaluation of the results was positive, indicating a improvement mainly in thickness and hair loss, being a treatment that was not tolerated in relation to sleep and without side effects. Nope, essays controlled, randomized, longer clinical trials, with a larger sample, placebo-controlled groups and quantified methods that are only necessary. It would be wonderful to continue that research to develop a molecular cause for these satisfactory clinical results and perform a larger and more complete clinical trial [25-27].

Conclusion

Many protocols are currently developed through continuous studies, testing new techniques and methods that map various innovations and technologies over the years procedures, with more advanced, personalized and effective treatments for or treatment of male AAG.

Given two results obtained from this investigation, it was concluded that Rigenera is a Ponta technology that provides a fast and effective method for area recovery bald. The procedure is minimally invasive and must be carried out in clinics and therefore qualified and devoutly trained dermatologist doctors. The HairMetrix technology is capable of recording quickly and accurately under the condition of two hairs before and after giving execution of procedures, significantly increasing the efficiency of treatments.

In this way, the doctor/patient relationship is configured as a fundamental part of this process, both to obtain the correct diagnosis and to plan the hair treatment. These are essential factors for the success of any procedure, conferring or expected result patient hair.

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