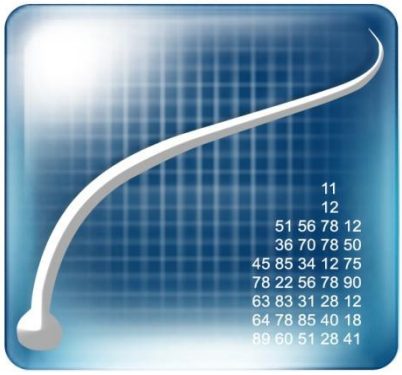
*The Art of Hair Diagnosis!*


Professional hair and scalp diagnostic software

# TrichoSciencePro©

www.TrichoSciencePro.com

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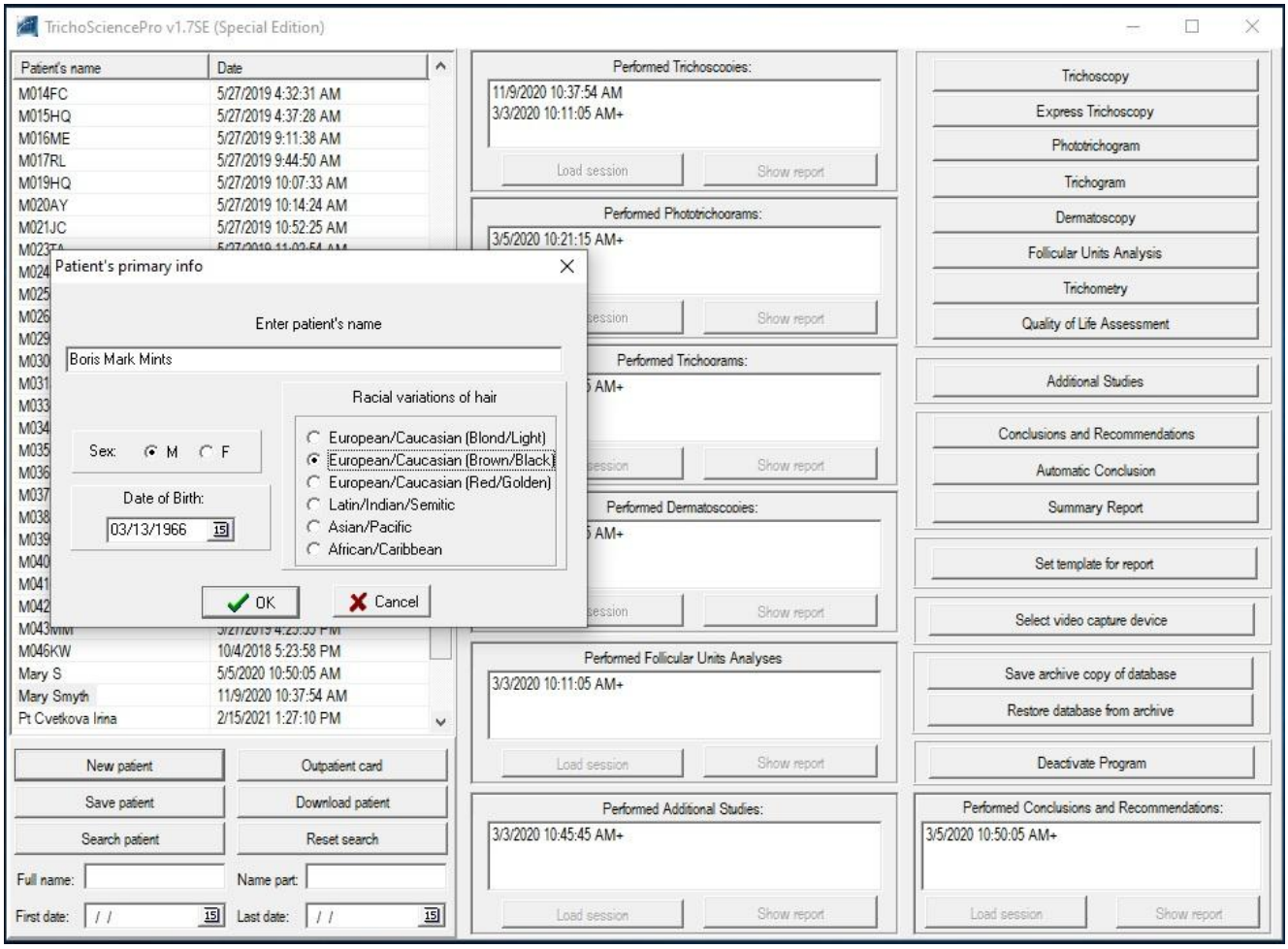
## Professional hair and scalp diagnostic software

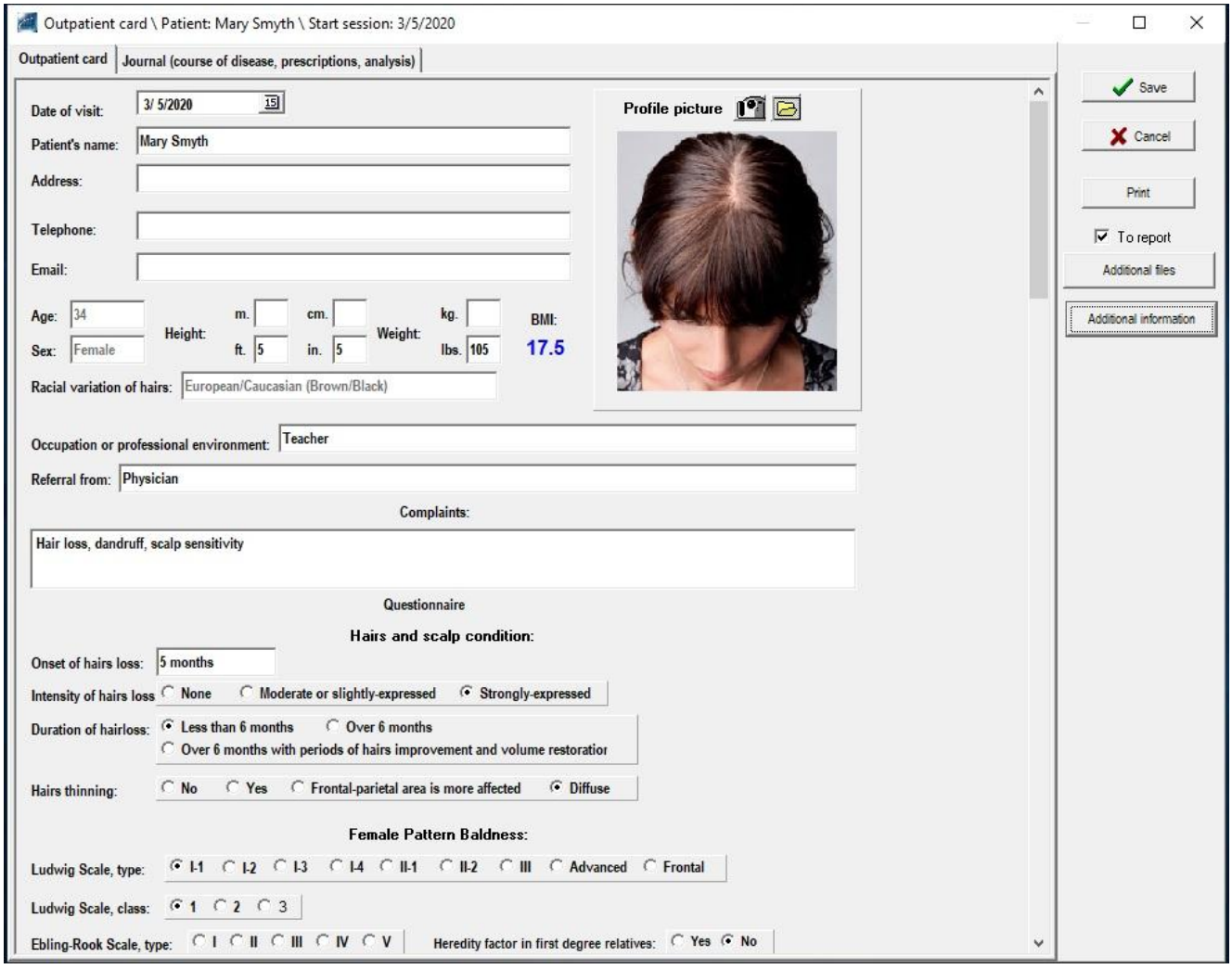
# PRESENTATION

The latest program version of TrichoSciencePro© in version 1.7 was released in August of 2020 and has numerous important updates and additions in comparison to earlier Program versions. The program incorporates some of the most relevant diagnostic and analytic studies in Trichology accumulated thus far. It also meets rapidly increasing demands for a single software source to perform and manage all typical clinical and non-clinical practice-associated activities for hair specialists of various professionals fields. This Program allows to run complete Trichoscopy, Phototrichogram, Trichogram, Dermatoscopy, Follicular Units Analysis and Global Photographs diagnostic studies. In addition, it allows to evaluate scalp pigmented lesions, run fully automatic measurements and calculations, use specialty hair calculators, view previously held sessions, build analytic diagnostic session reports, get automatic conclusions and summaries, manage patient sessions, outpatient cards, scheduling , databases and much more.

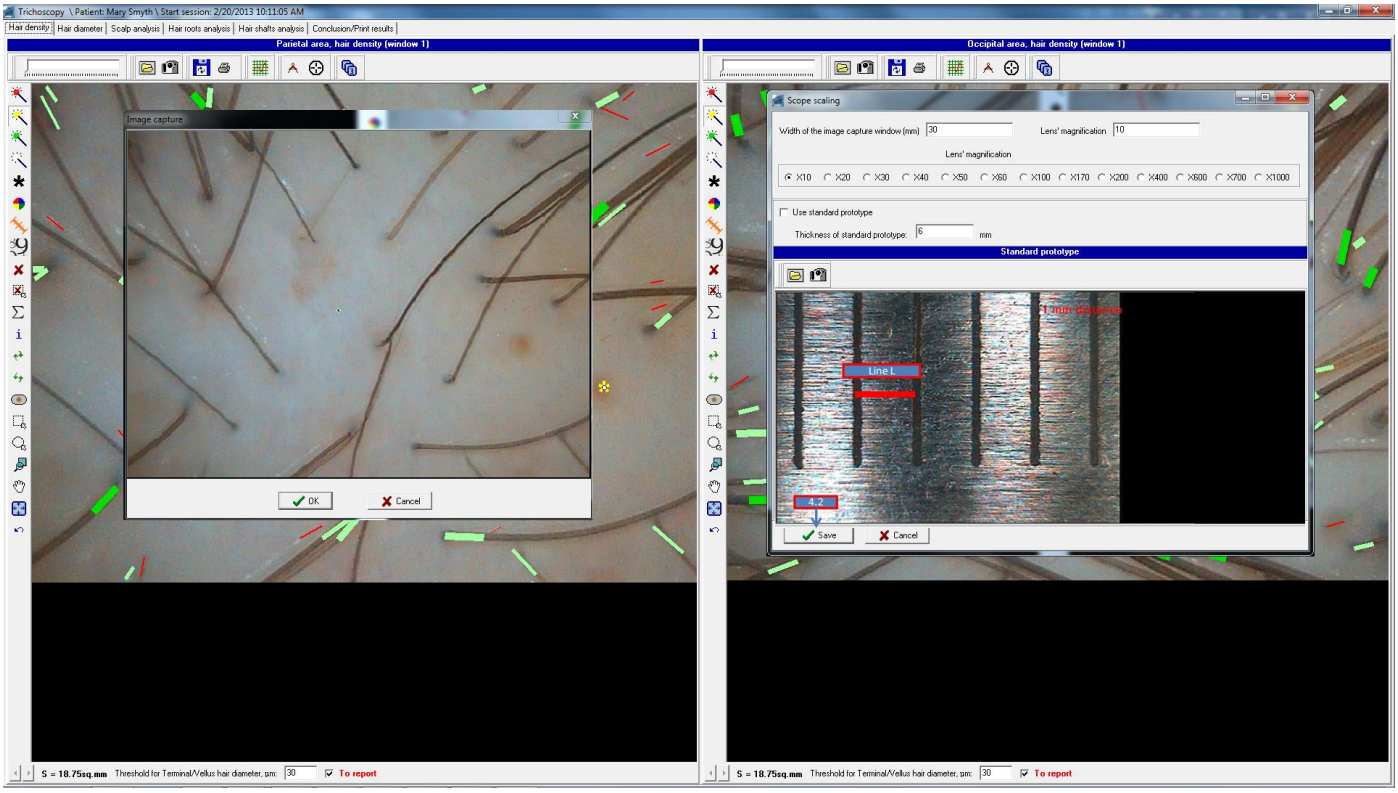
TRILOGIC



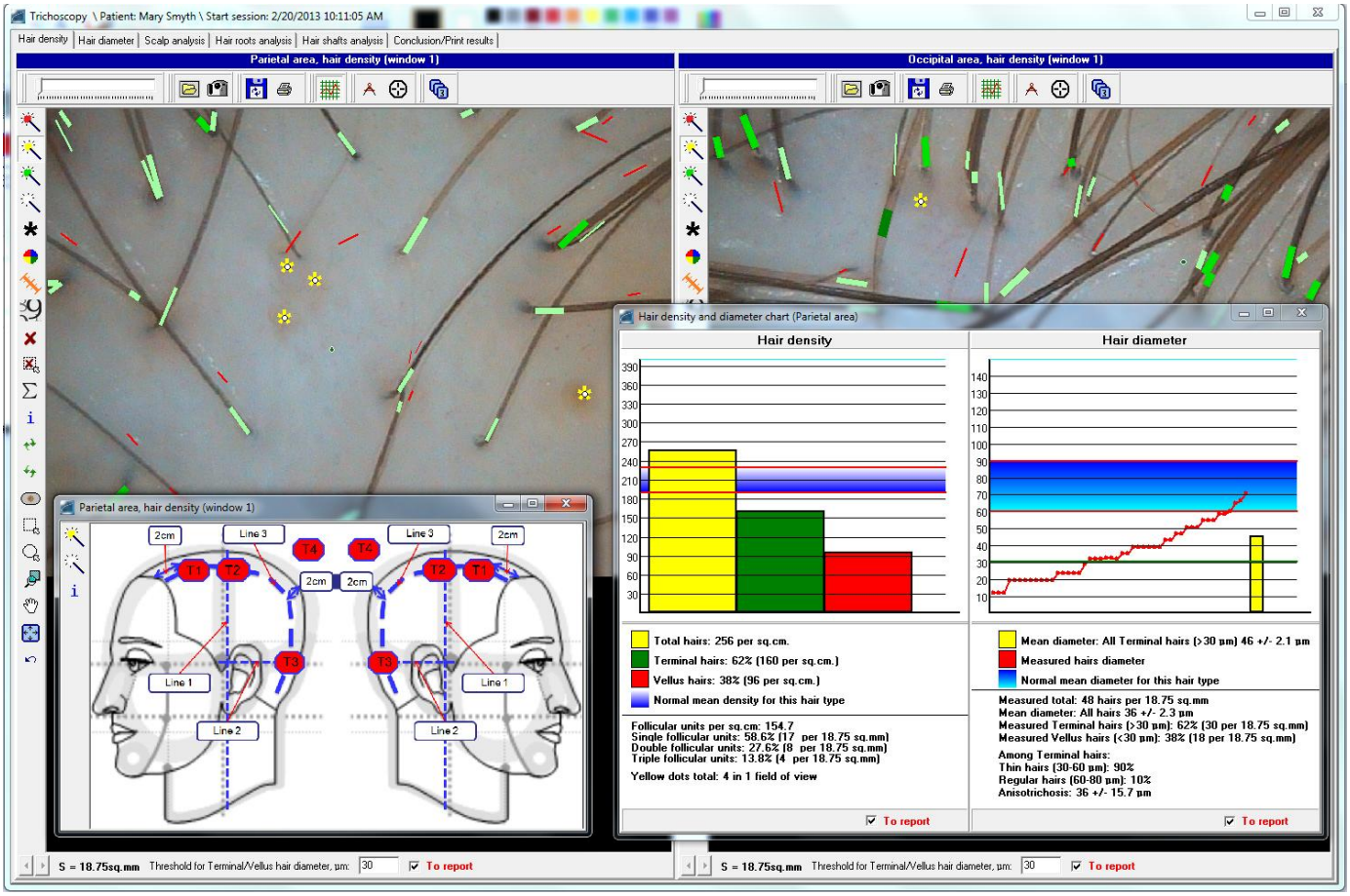

The program has convenient and user friendly interface. Program Manager module allows easy access to all program features. It enables to perform and control all new and previously held diagnostic sessions, manage patient's databases and much more.




The "Oupatient card" for new patients entry is built to include a comprehensive list of features that should be considered in management of patients with hair and scalp diseases or disorders. The accuracy and extent of information supplied in the "Outpatient card", especially its "Questionnaire" section, affects objectivity of the "Automatic Conclusion" module.




The "Trichoscopy" module allows to estimate density and diameters of hairs in different zones of the scalp, as well as to access their distribution in the follicular units. Any values obtained can be compared to mean values All measured and calculated data to mean values based on patients racial hair variations. Measurements can be carried out in a semi-automatic or manual modes. There are also scalp, hair roots and shafts studies and analyses included.

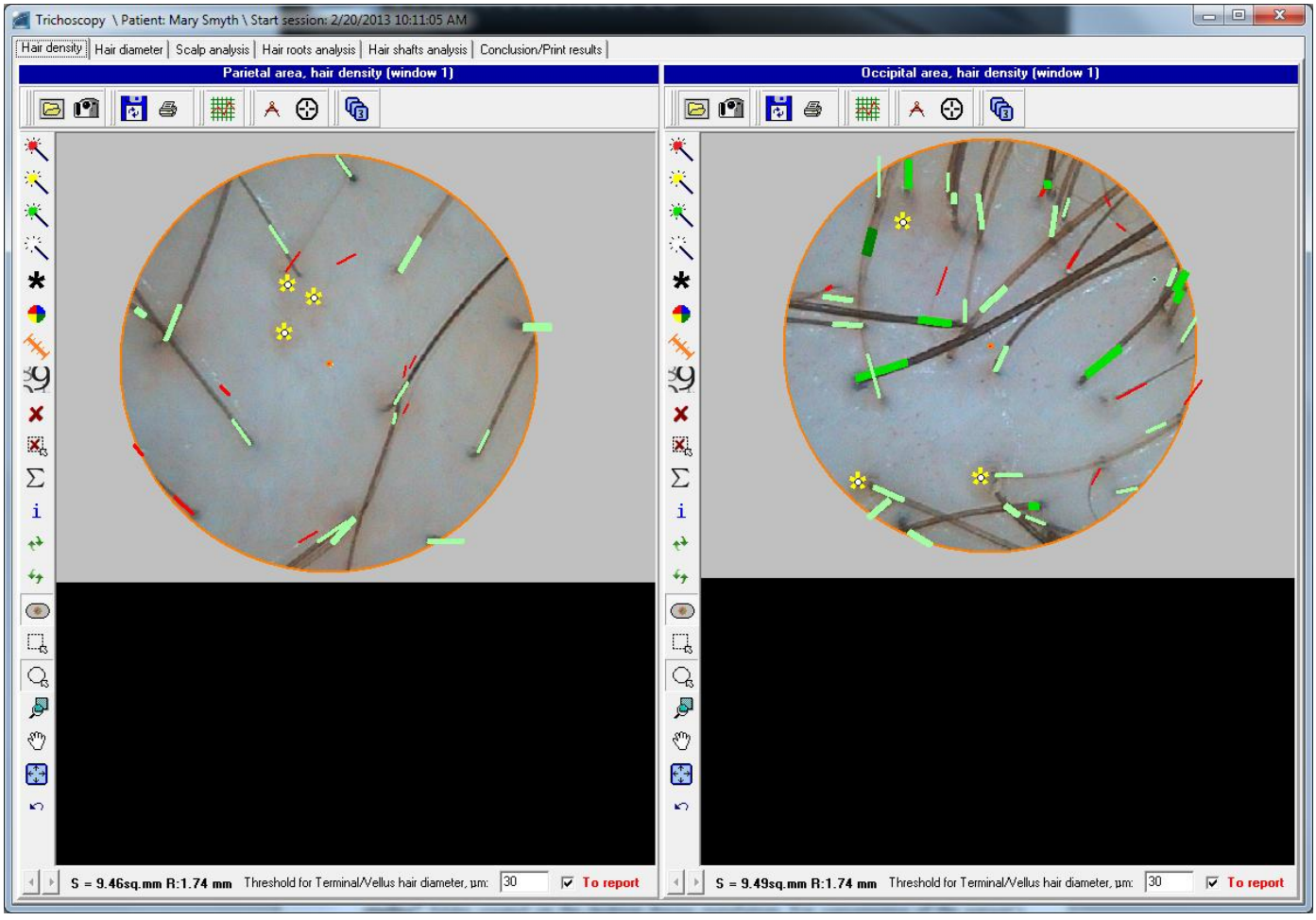



The “Hair Density” section of “Trichoscopy” module allows for semiautomatic and manual hair density measurements simultaneously with hairs diameters estimates, as well as to access their distribution in the follicular units. Other functions include “Perifollicular sign” mark ups and counts (“Pointed hair”, “Exclamation mark hair”, “Broken hair”, “Cadaverized hair”, "Yellow dots", "Red dots" and "White dots“). “Hair length” function allows to perform linear length measurements of any growing hair within the site of view. "Point localization" function allows to mark up specific measurement points on the scalp diagram, where the hair counts have been performed. All collected information is being represented on charts in form of graphs and data, both obtained from measurements and calculations. This information is also being compared to mean values based on patients racial hair variations.

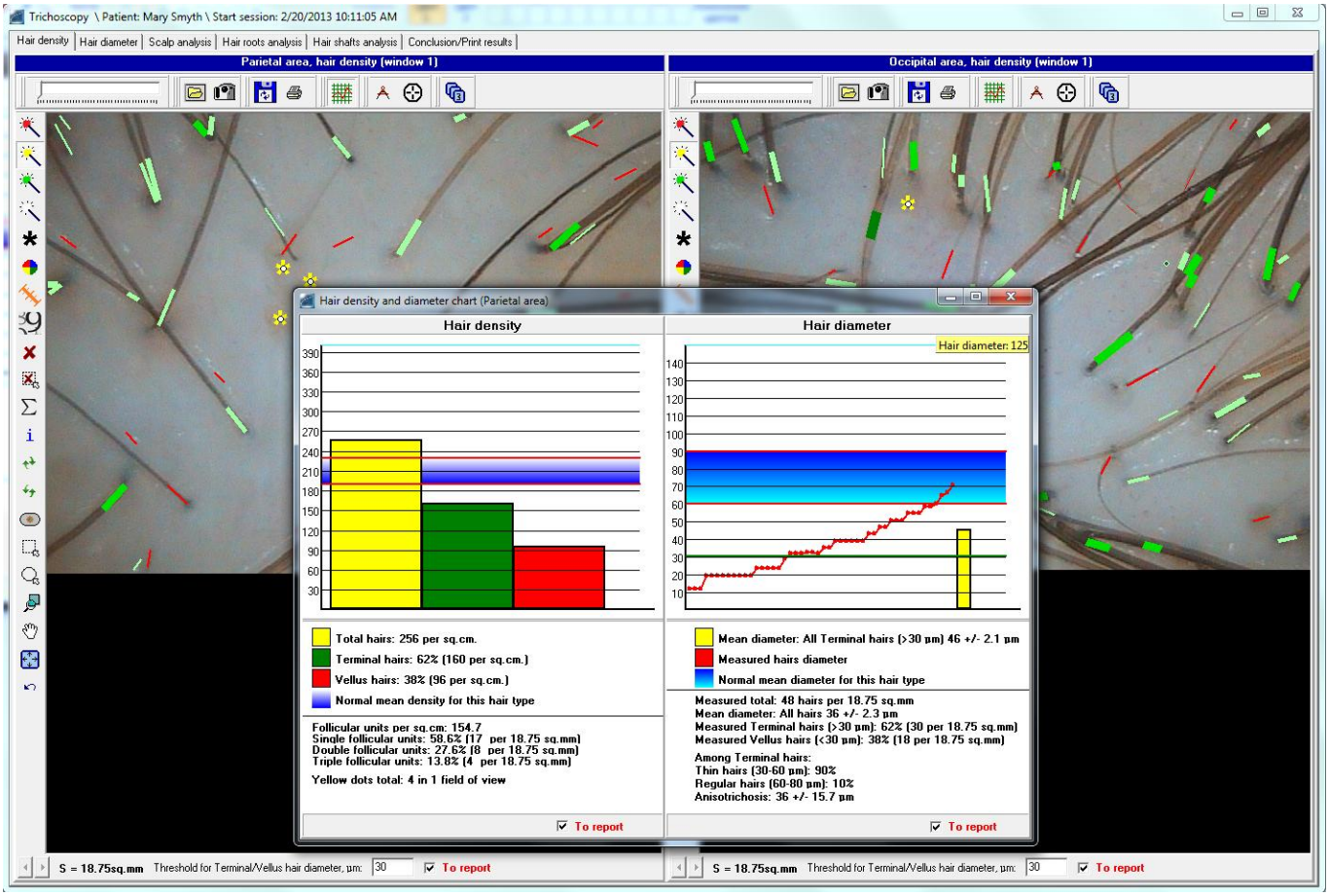
In addition to hair density and diameters evaluation, the severity of Anisotrichosis (or Polymorphism, that reflects the degree of deviation of hair diameters from norm), which is an important parameter that assesses progressive hair thinning, is taken into consideration along with percentages of Vellus hair less than 30 microns in diameter. This allows for a more comprehensive evaluation of the severity of ongoing pattern alopecia processes. In these cases it is also important that hair assessments are not limited to diameter estimates only, but include classification by type (i.e. thin, medium, and thick hair) along with calculations of the percentages for each of those types of hair. The resulting data is useful for assessing the current hair condition, as well as for the dynamic observation of patients during treatment or scientific studies. In each field of view , it is recommended to account for presence of various Perifollicular signs, such as ”yellow dots” (reflect delays of new hair growth phases), “white dots” (reflect the presence of follicle fibrosis, typical for scarring forms of alopecia), “spiky hair” (reflect the intensity of hair loss), “red dots” (reflect vascular changes, typical for Psoriasis, Discoid Lupus), hair in the form of an “exclamation mark” and “black dots” (characteristic of Alopecia Areata). Below are sample images contrasting Female Pattern Hair Loss (FPHL) and stable condition:

Signs of FPHL progression. Single units. Yellow dots. Anisotrichosis.

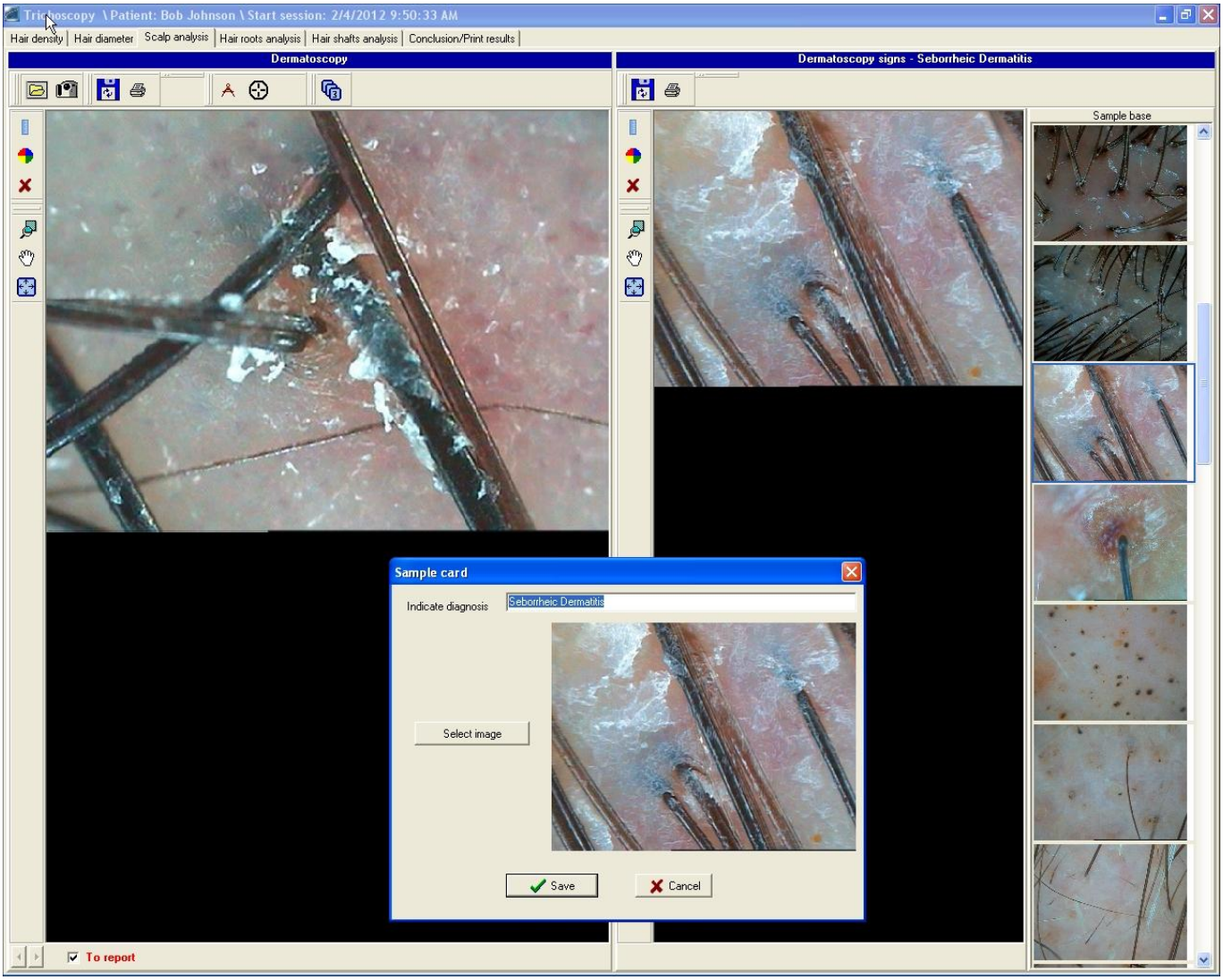
No signs of FPHL. Stable condition.




Trichoscopic assessment can be conducted in the circular fields of view, established per preset size. This is an important tool to be used in clinical trials or scientific researches, since this function allows to synchronize symmetric sites for evaluation, regardless of the angle used to obtain the images of study sites.



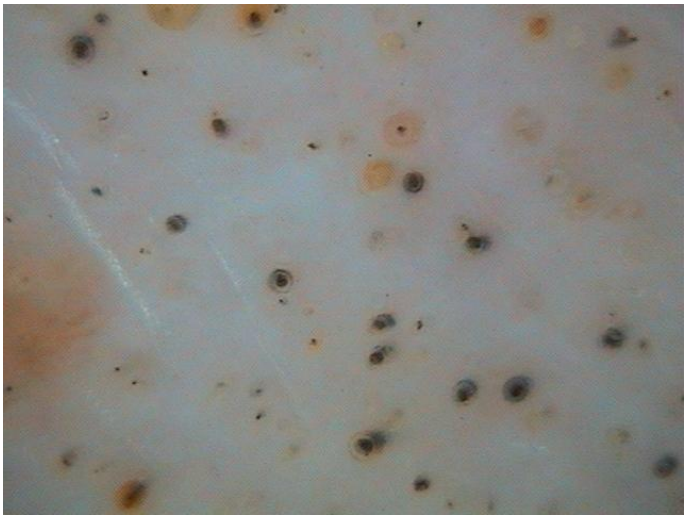

Hair diameter measurements and subsequent evaluation can be carried out under higher magnification, thus allowing for greater accuracy while obtaining data.



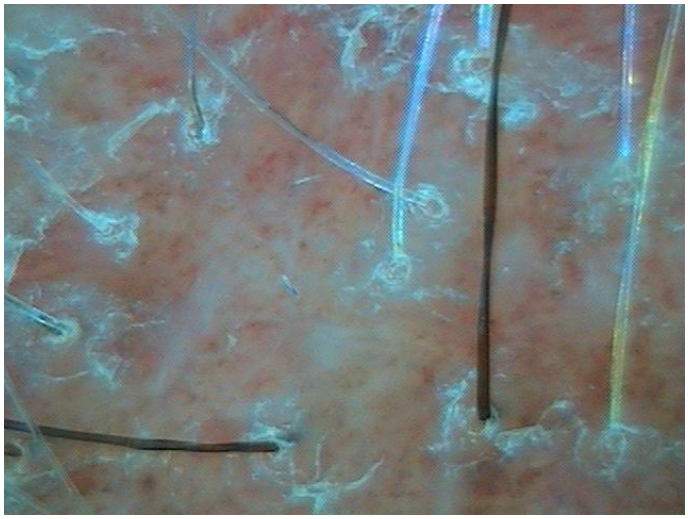

No less important is the proper assessment of the scalp condition. Detectable changes in the Perifollicular zone should be considered when selecting treatment for patients with alopecia or dermatosis signs.

Below are the sample images showing in detail some alopecia and dermatoses sings :

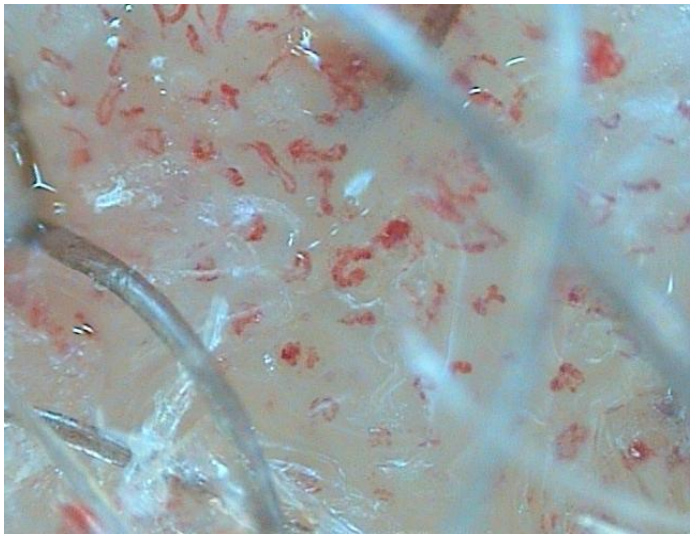
"Black dots" and "yellow dots" typical for Alopecia Areata

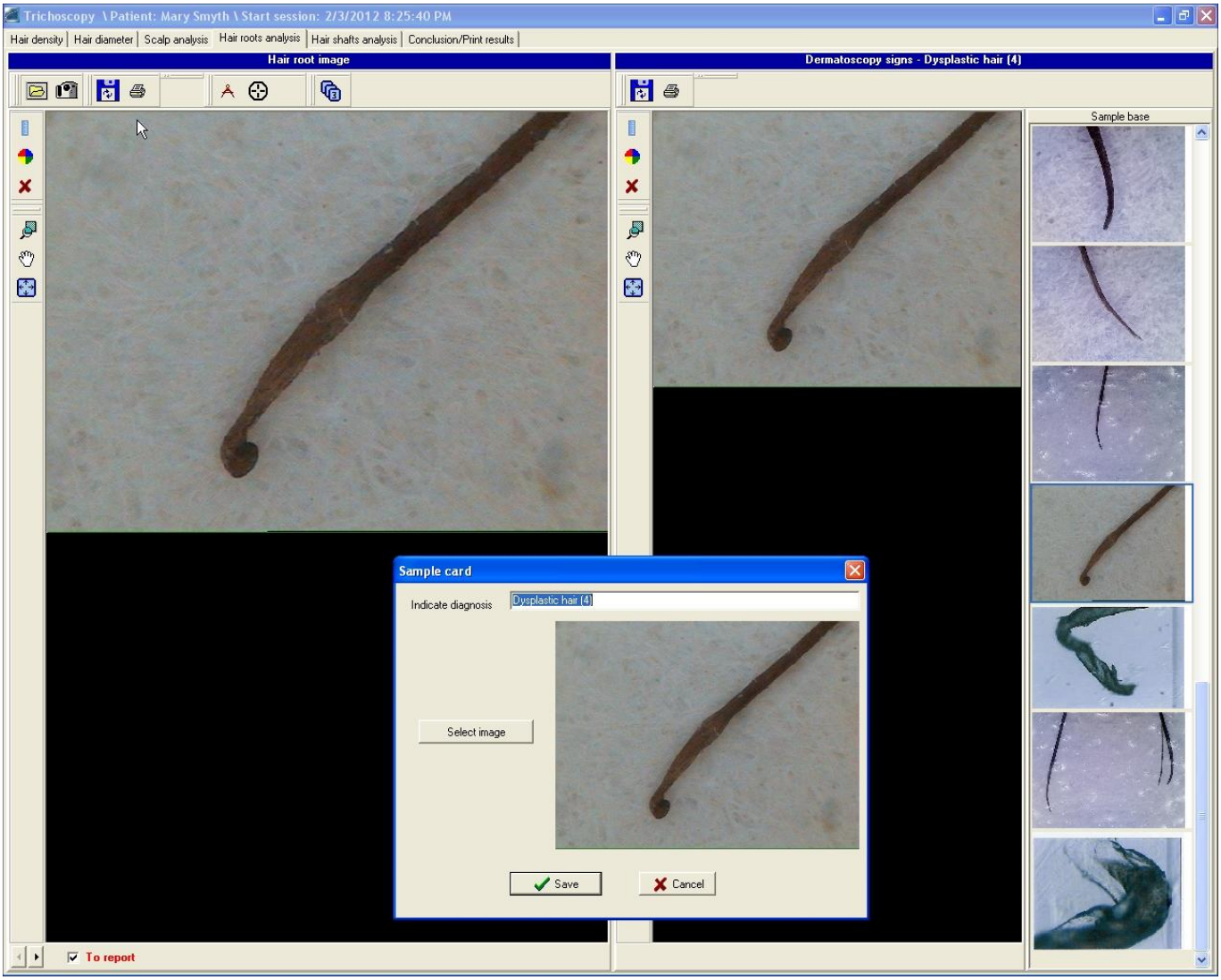


"White" dots typical for Lichen Planopilaris

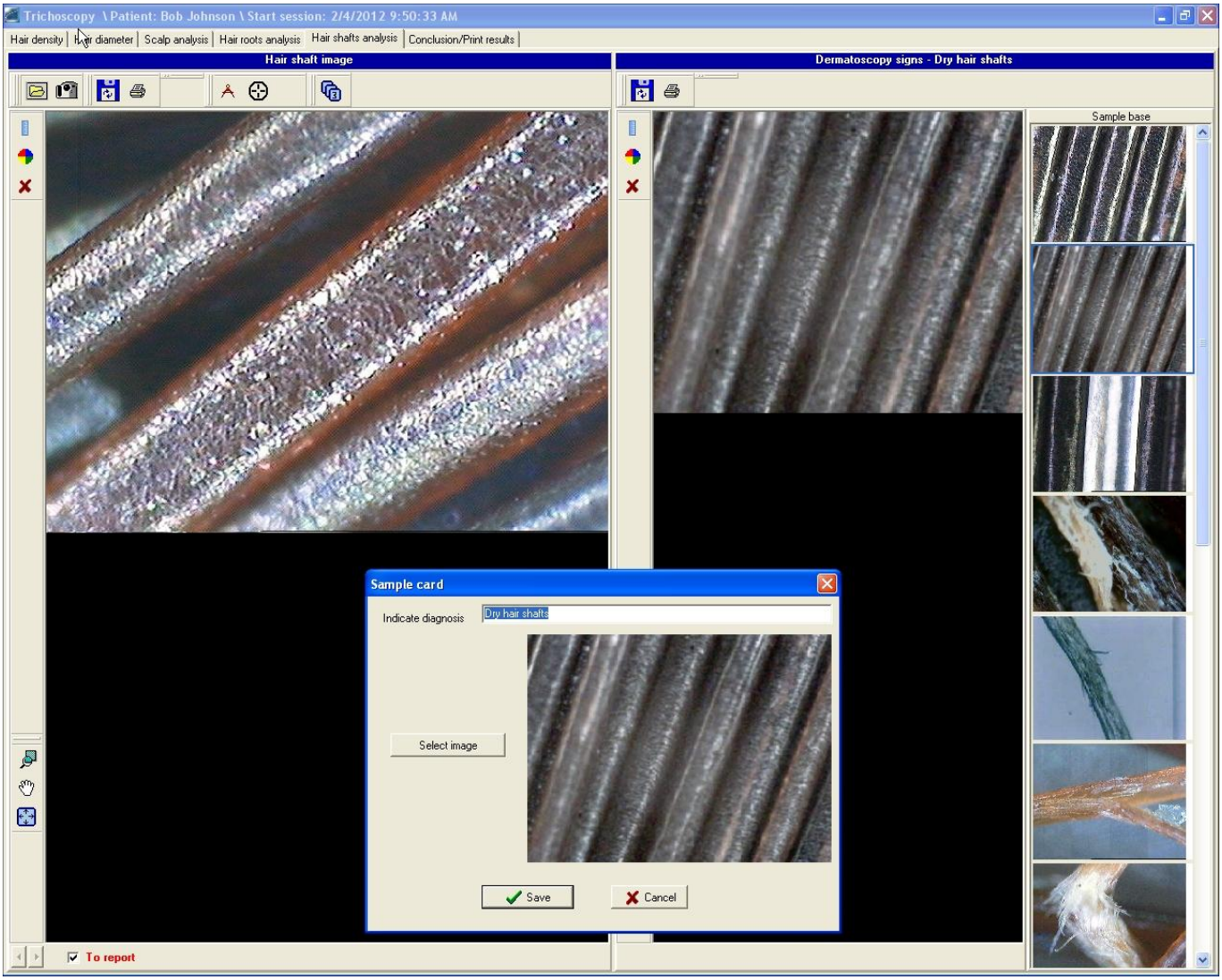


"Red globular rings" typical for Psoriasis

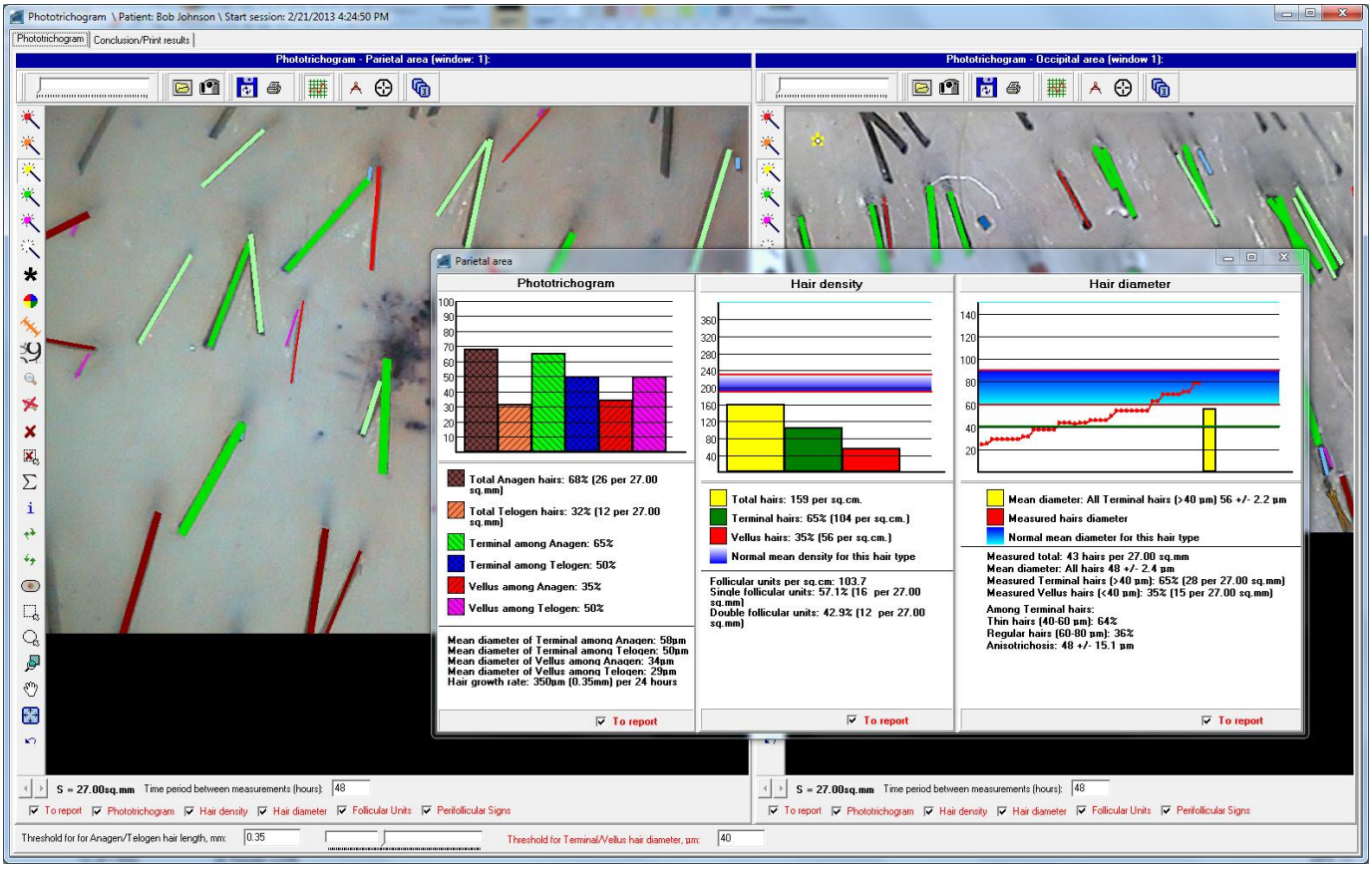





The proper microscopic evaluation of the extracted hair roots allows to quickly and accurately differentiate Anagen Alopecia from Telogen Alopecia. For example, presence of more than 80% of dystrophic hair roots in Anagen phase is the characteristic of Anagen Alopecia, which is associated with influence of toxic factors or autoimmune reactions. Dystrophic hairs have shattered bulb, conically narrowing shaft and no root sheath. In dysplastic hairs root bulb is deformed, reduced in diameter, root sheath is completely or partially absent. Dysplastic and dystrophic hairs are typically the signs of Alopecia Areata, however may also be present in hair loss induced by factors that affect hair follicle state at dermal papilla, such as effects of chemo- or radiation therapy, poisoning by salts of heavy metals, due to anticoagulant or interferon medication therapy, etc.




Microscopy of hair shafts allows to reveal various defects of hair keratinization that are hereditary in nature, as well as hair structural damages associated with improper care due to cumulative effects of physical, chemical and mechanical actions.




Currently, the Phototirchogram study is widely recognized and prevalent in clinical Trichology practice due to its high precision and affordability . For example, this methodology allows to distinguish subclinical forms of Female Pattern Hair Loss alopecia (FPHL) at early stages of disease, conduct differential diagnosis between androgenetic alopecia (AGA) and diffuse Chronic Telogen Effluvium alopecia (CTE), evaluate efficiency of alopecia dynamic treatment regimes, etc. The program calculates total number of hairs per square centimeter of skin, quantities and percentage of thick, regular and thin hairs, Terminal or Vellus hairs and Anagen or Telogen hairs among them. One of the most important diagnostic features is the predominance of Vellus hair in Telogen phase. The Phototrihogram study also allows to determine the average rate of hair growth.

The following significant features distinguish AGA from CTE in women in the early stages of hair loss development:

- In the early stages of AGA, despite the reduction in hair density in the Parietal area, the total quantity of hairs within the Parietal area remains higher than in the Occipital area. The average diameter of hairs in the Parietal area is also reduced, but there are no significant changes in diameters of the hairs in the Occipital area;

- With the AGA development, percentage of Vellus-like hairs averages to 20 +/-3.9%, while it averages 12+/- 1.5% in the control group. With appearance of the "yellow dots", indicating presence of empty follicles, the calculation of percentage of Vellus-like hair is considered impractical, as their quantity begins to decline;

- A pronounced condition of the Anisotrichosis is clearly applicable. When calculating the coefficient of the Anisotrichosis in the early stages of AGA, this value is greater than 12;

- There is an increase in the quantity of fine hairs (30-40 microns in diameter) in the Parietal area, as compared to the Occipital area;

- There is a reduction in the quantity of thick hairs (over 70 microns in diameter) in the Parietal area, as compared to the Occipital area;

- An increased percentage of single follicular units (up to 30%) in the Parietal area, as compared to the Occipital area;

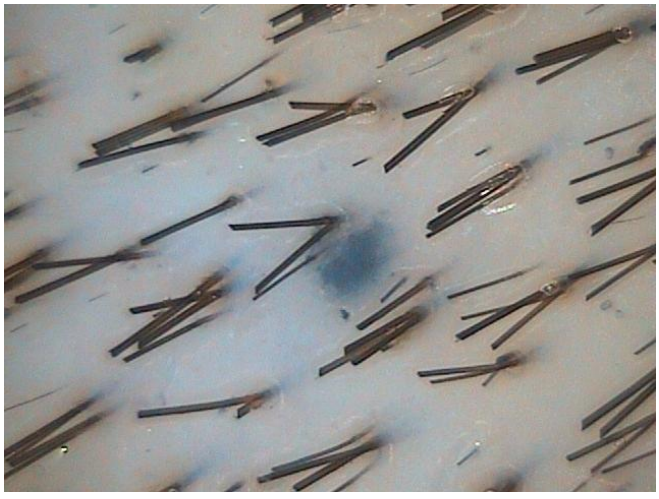
- A significant increase in the percentage of Telogen hairs in the Parietal area, as compared to the Occipital area;

- Out of the total quantity of Telogen hairs more than 50% are Vellus-like hairs. It shall be noted that in the later stages of AGA the proportion of Vellus-like hairs in Telogen phase may decrease as empty follicles in form of "yellow dots" start to replace thinning hairs;

- Appearance of the "spiky hairs" indicates the intensity of hair loss, but does not reflect progressive hair thinning. The progressive thinning of hair is best reflected by the Anisotrichosis value and the proportion of Vellus-like hairs in Telogen phase.

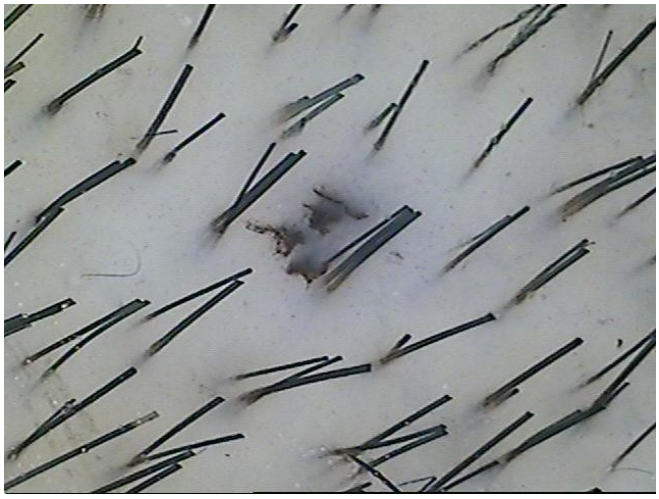
Below are sample images of the Phototrichogram studies with tattoo application, showing the detectable contrast between “FPHL” and “CTE”, as well as evaluation of the effectiveness of “AGA” treatment in dynamics.

Progressing “FHPL”. Hairs in the Telogen phase are significantly thinner compared to hairs in the Anagen phase.

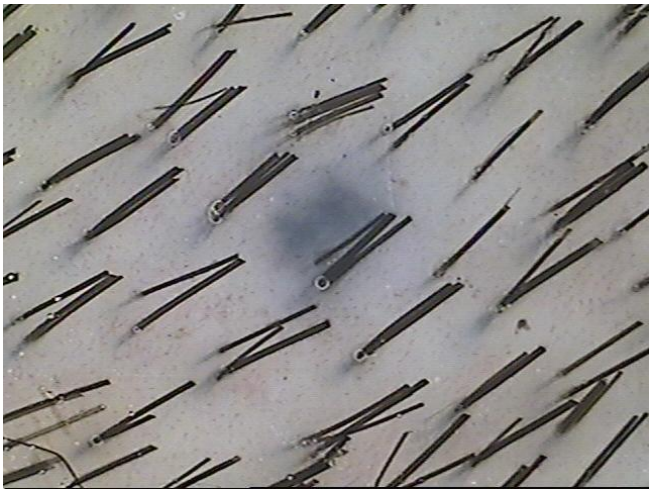


Progressing “CTE”. Telogen hair diameters do not differ from Anagen hair diameters.

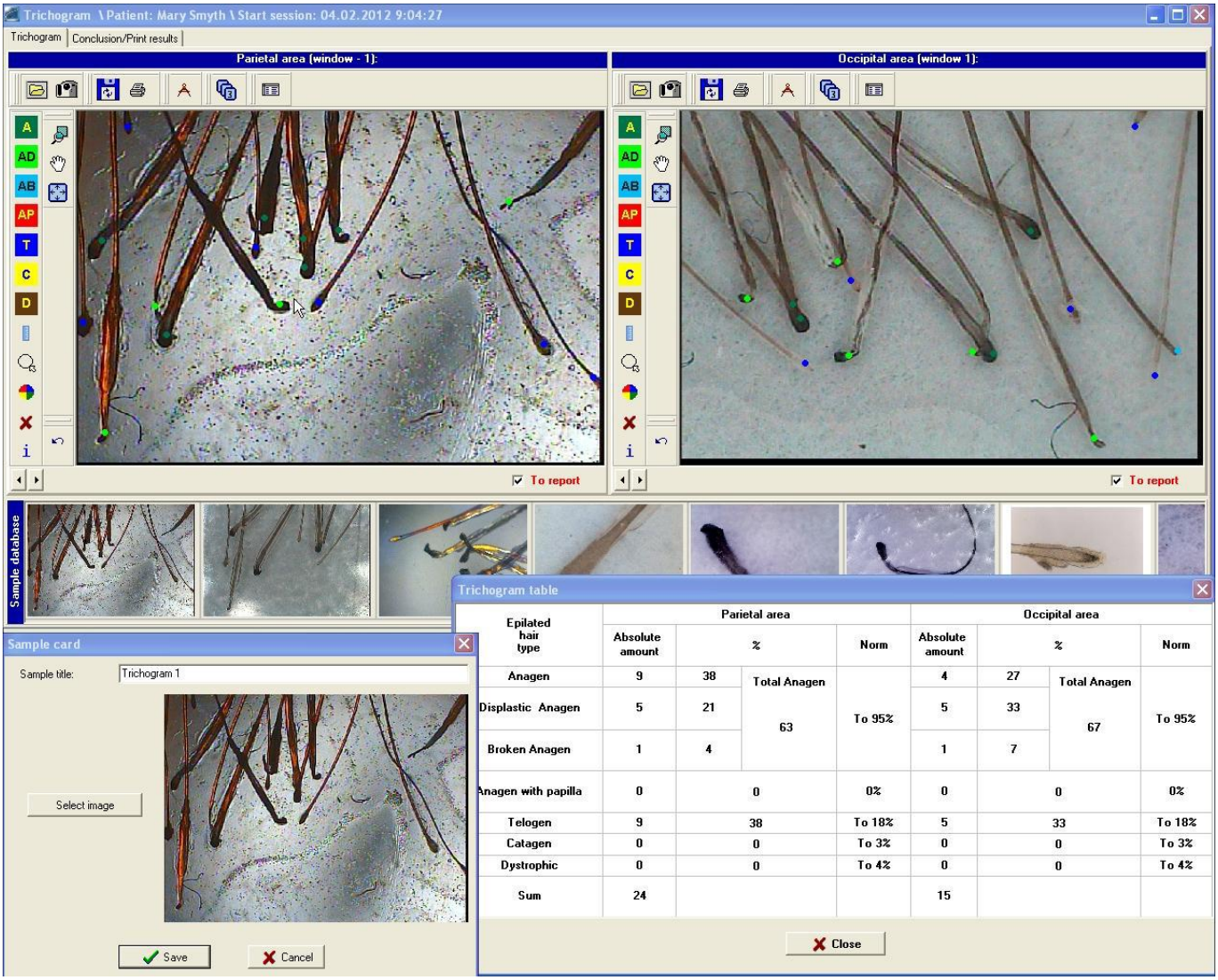
Evaluation of efficiency of a non-specific dynamic treatment regime of “AGA” .



Before treatment

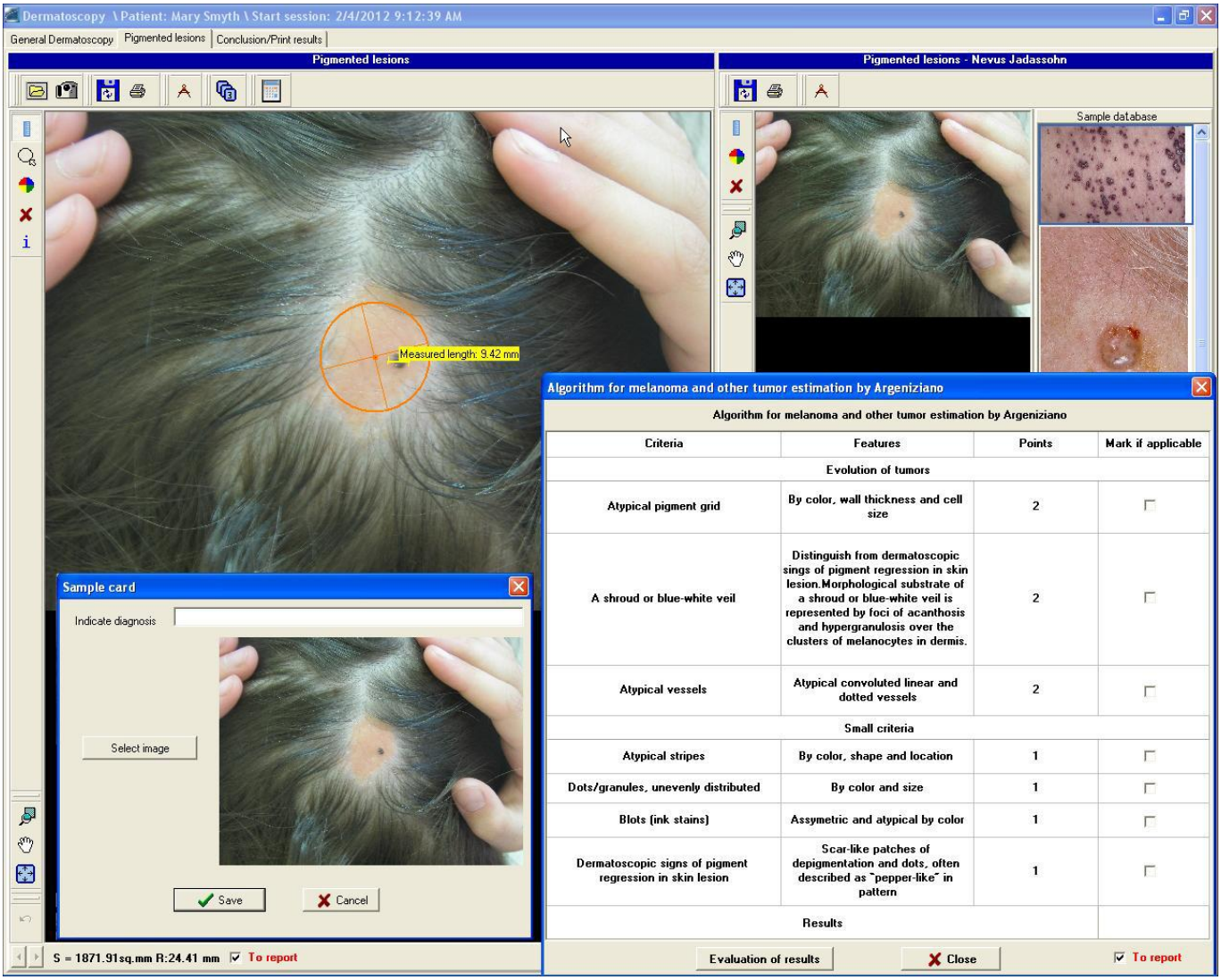


After four months of treatment

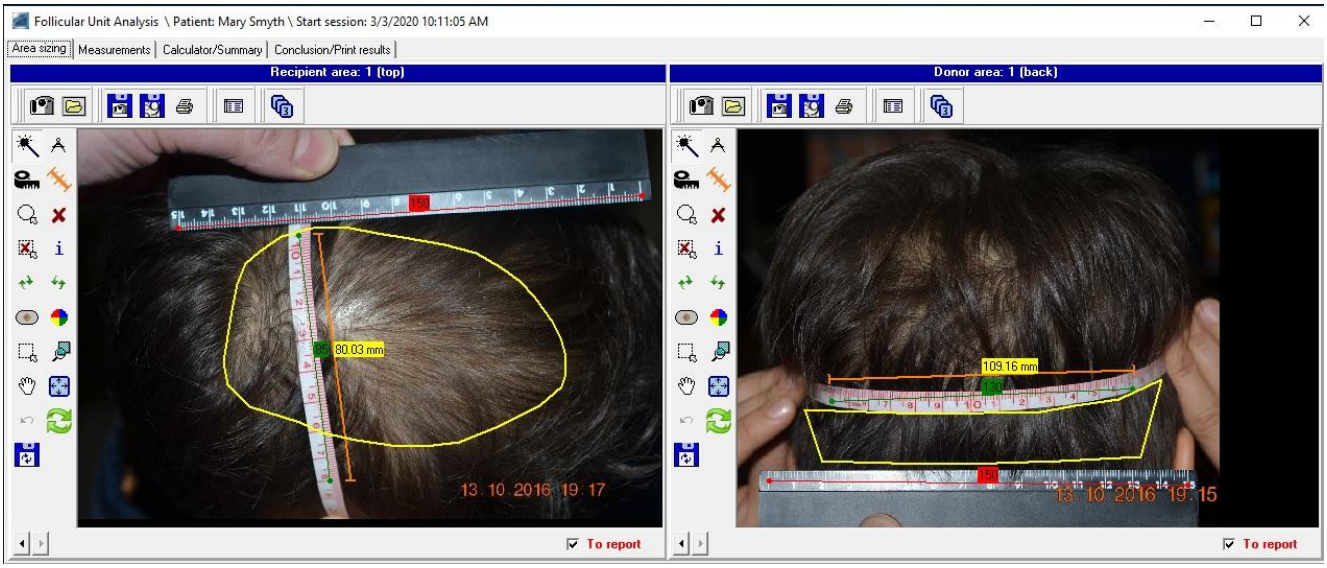



| Epilated hair type | Parietal area | | | | Occipital area | | | |
|---|---|---|---|---|---|---|---|---|
| | Absolute amount | % | | Norm | Absolute amount | % | | Norm |
| Anagen | 9 | 38 | Total Anagen | | 4 | 27 | Total Anagen | |
| Displastic Anagen | 5 | 21 | 63 | To 95% | 5 | 33 | 67 | To 95% |
| Broken Anagen | 1 | 4 | | | 1 | 7 | | |
| Anagen with papilla | 0 | 0 | | 0% | 0 | 0 | | 0% |
| Telogen | 9 | 38 | | To 18% | 5 | 33 | | To 18% |
| Catagen | 0 | 0 | | To 3% | 0 | 0 | | To 3% |
| Dystrophic | 0 | 0 | | To 4% | 0 | 0 | | To 4% |
| Sum | 24 | | | | 15 | | | |

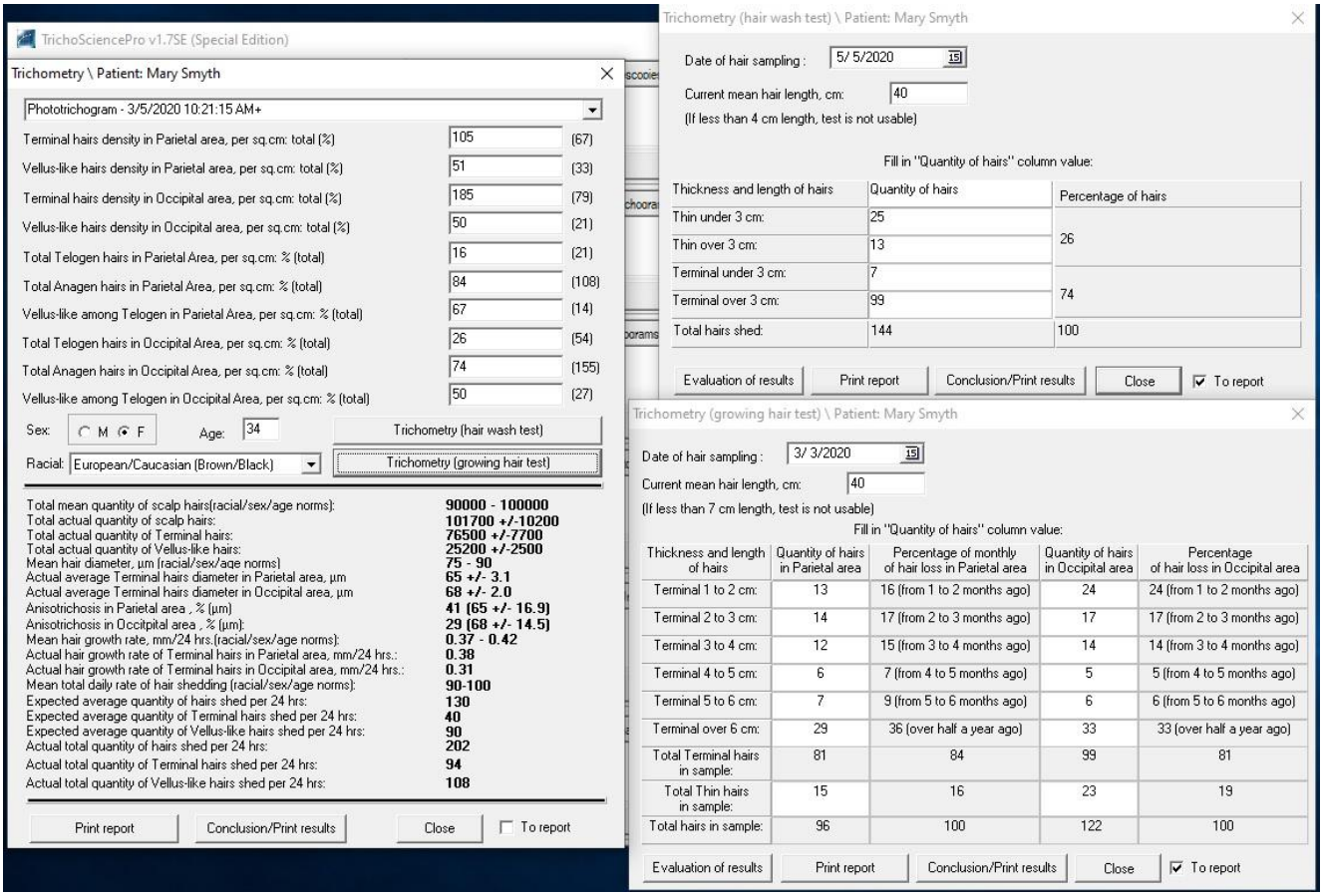
The Trichogram study is a semi-invasive method used to evaluate the roots of extracted hairs . The hair roots are examined in order to determine and calculate percentages of hairs in each of three phases of the hair growth cycle (Anagen, Catagen, or Telogen). Anagen hairs usually have living cells on the root end and often a sheath of living cells around the lower hair fiber. Telogen hairs have a club end, they do not have any living cells attached to the root. Catagen hairs are more difficult to differentiate, but usually these hairs have a tapered end to the root. Extracted Anagen and Telogen hairs may sometimes be difficult to distinguish based on their microscopic appearance. Extracted hairs thickness can be measured to find out whether they are Terminal or Vellus hairs in order to determine association with pattern or chronic diffuse hair loss forms. After counting process completion all results are being recorded and evaluated in the “Trichogram table”. There is a sample image database of hair roots included.



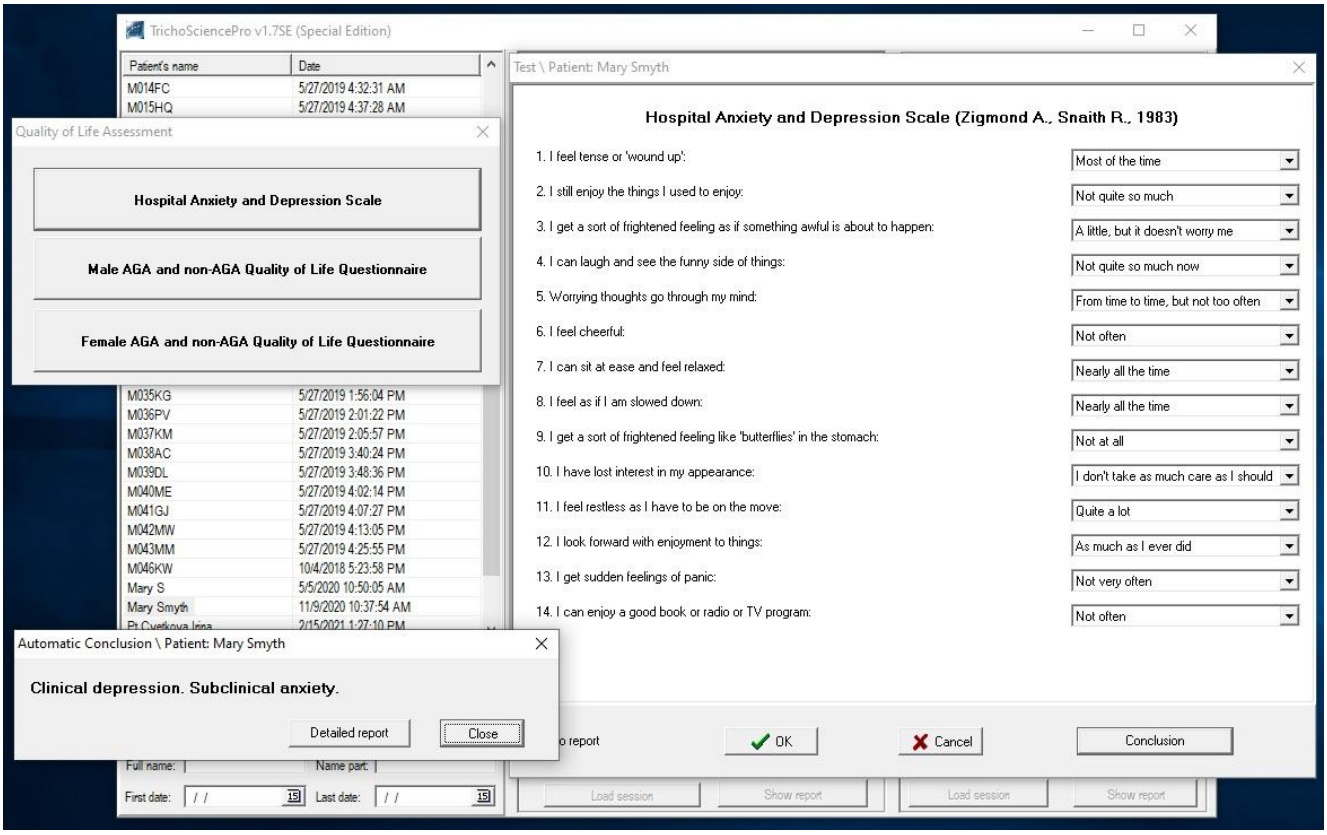

The "Dermatoscopy" module allows to conduct general study and carry out pigmented lesion identification, measurement and determination of their boundaries symmetry. The data obtained can be evaluated based on well-known "ABC", "ABCD", "Argeniziano" algorithms. There is a dermatoscopic sample image database included.



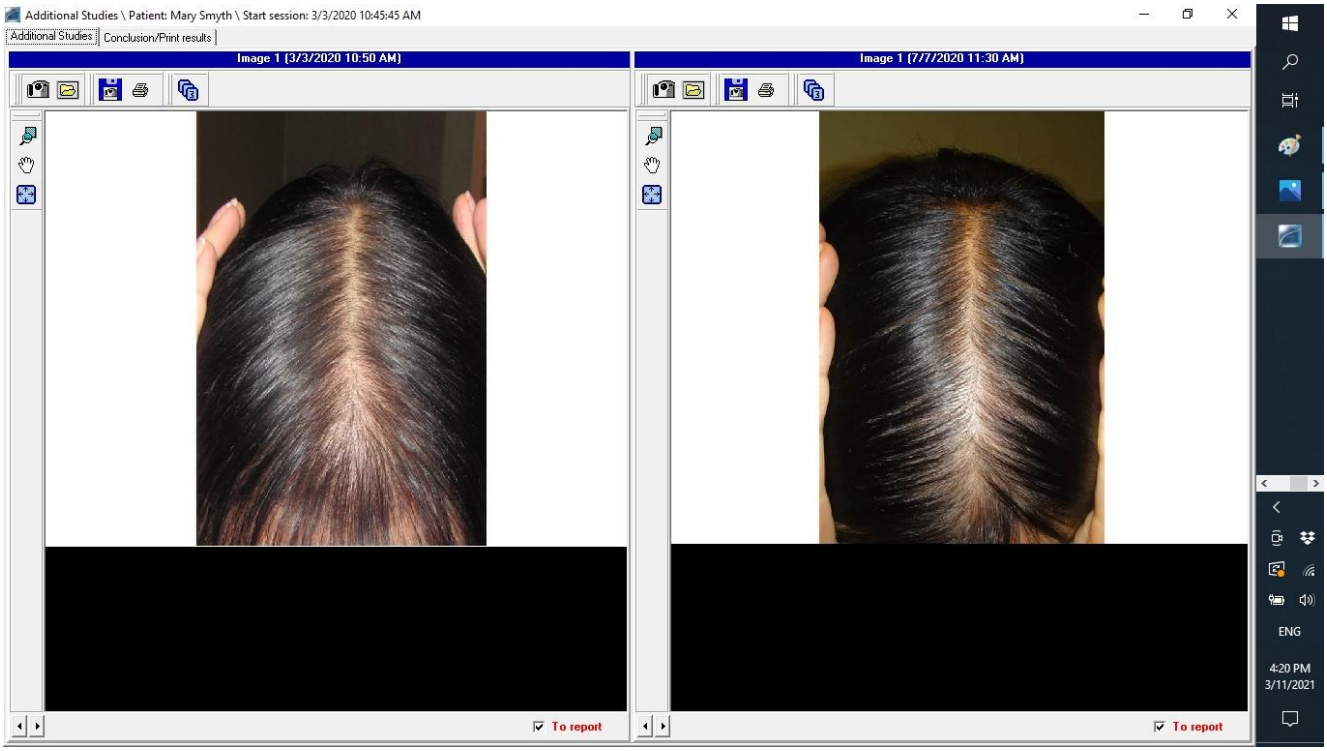

The “Follicular Units Analysis” module is specifically developed to aid hair transplant surgeons in counting available follicular units and hairs, calculating densities and diameters, recipient and donor scalp surface areas with a correction to an applicable scalp curvature, numbers of grafts, available and in need to achieve desired treatment results, etc. This module can be used both for initial consultation and prior to an actual procedure stages. Each standard “Follicular unit analysis" diagnostic session is composed of “Area sizing", "Measurements", “Summary/Calculator” sections, followed by final “Conclusion/Print results” step. First section "Area sizing" is devoted for sizing patient's areas of interest global pictures, both for Recipient and Donor areas. Second module section "Measurements" is devoted for taking magnified images within each established zone of Recepient and Donor areas of a patient in order to count available hairs and follicular units, thus, determining their densities, as well as measure hair diameters, estabslish their distribution per follicular units and distances between them, thus, determining their mean values. Third module section Calculator/Summary" is devoted to gather all measurements results and calculate for numbers of grafts, available and in need to achieve desired treatment results. Data for hair and follicular unit densities, including separating into single, double, triple and quadruple units, is being presented in counts per one sq.cm and recalculated for a total count per established each Recipient and Donor area size.



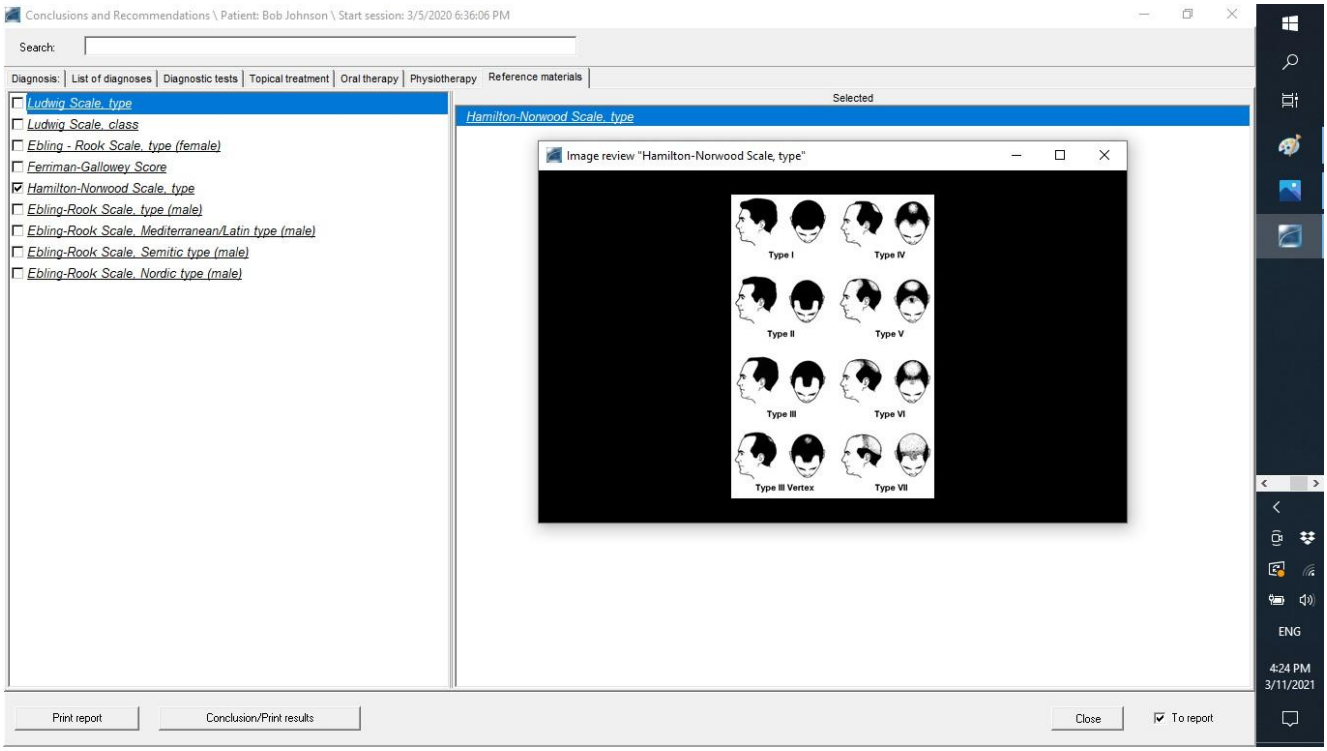

The "Trichometry" module allows to calculate total quantity of scalp hairs, hair growth and hair loss rates, as well as to compare this data to average values based on patient's sex, age and racial hair variations, and much more. The module functions are set in automatic mode by default. The data is obtained from corresponding "Trichoscopy" and "Phototrichogram" sessions, as well as from the "Outpatient card". All the data that was obtained for calculations automatically may be modified or corrected at anytime by typing in new information. Furthermore, included are two additional hair calculators, representing "Trichometry "functions, based on modified hair wash test and growing hair test results.



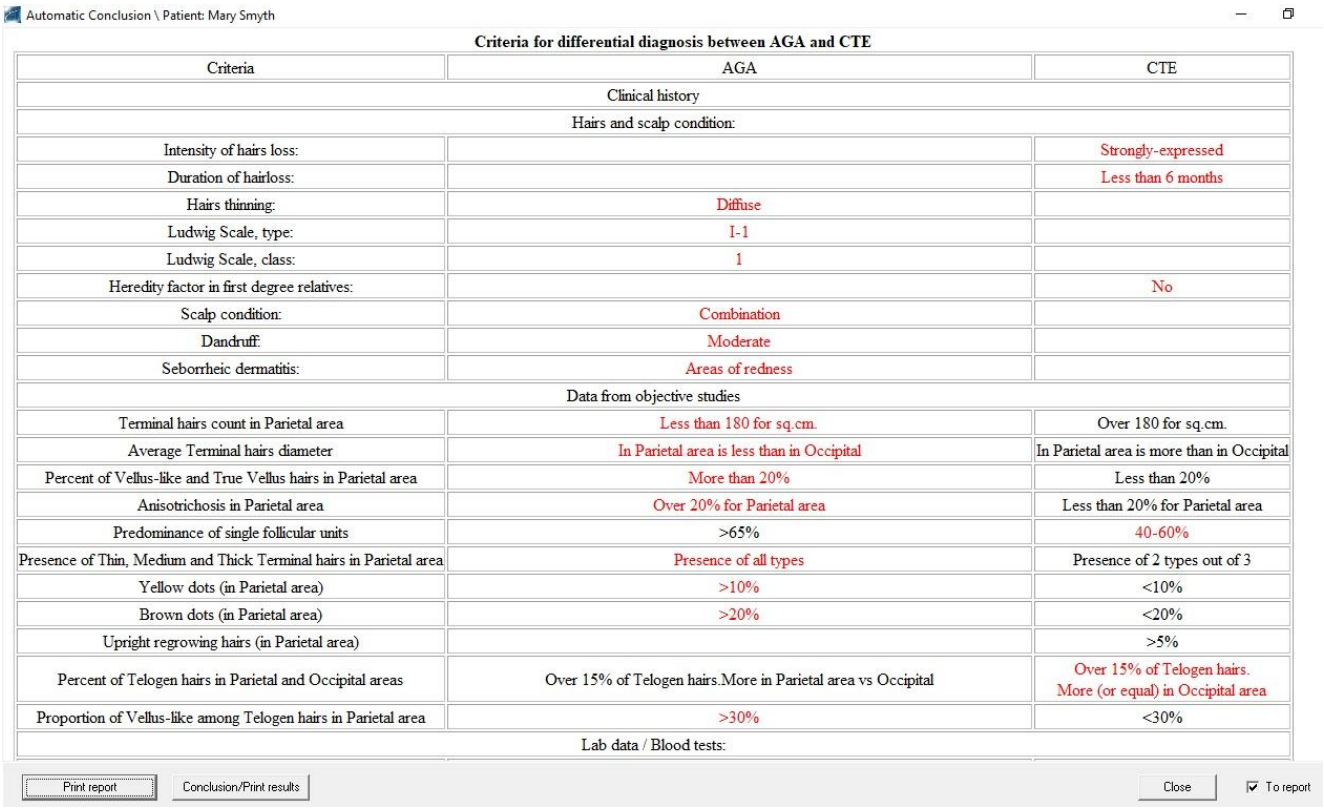

The “Quality of Life Assessment” module is a useful tool for rapid assessment of patients emotional background . It includes “Hospital Anxiety and Depression Scale”, “Male AGA and non-AGA Quality of Life Questionnaire” and “Female AGA and non-AGA Quality of Life Questionnaire”. Assessment conclusions are generated automatically when all multiple-choice questions are being answered by a patient.




While the "Additional Studies" module is intended to be used primarily for "Global photographs" study assessment for evaluation of treatment results and progress, any other diagnostic images, for example, any specific scalp area changes, etc., may be uploaded, compared and stored in a patient's file.




The "Conclusions and Recommendations" module is intended to record patient's diagnostic conclusions, results and applicable notes. It also offers extended listings of common diagnoses and additional diagnostic tests, frequently used topical, oral and physical therapy products and practices, as well as reference materials.



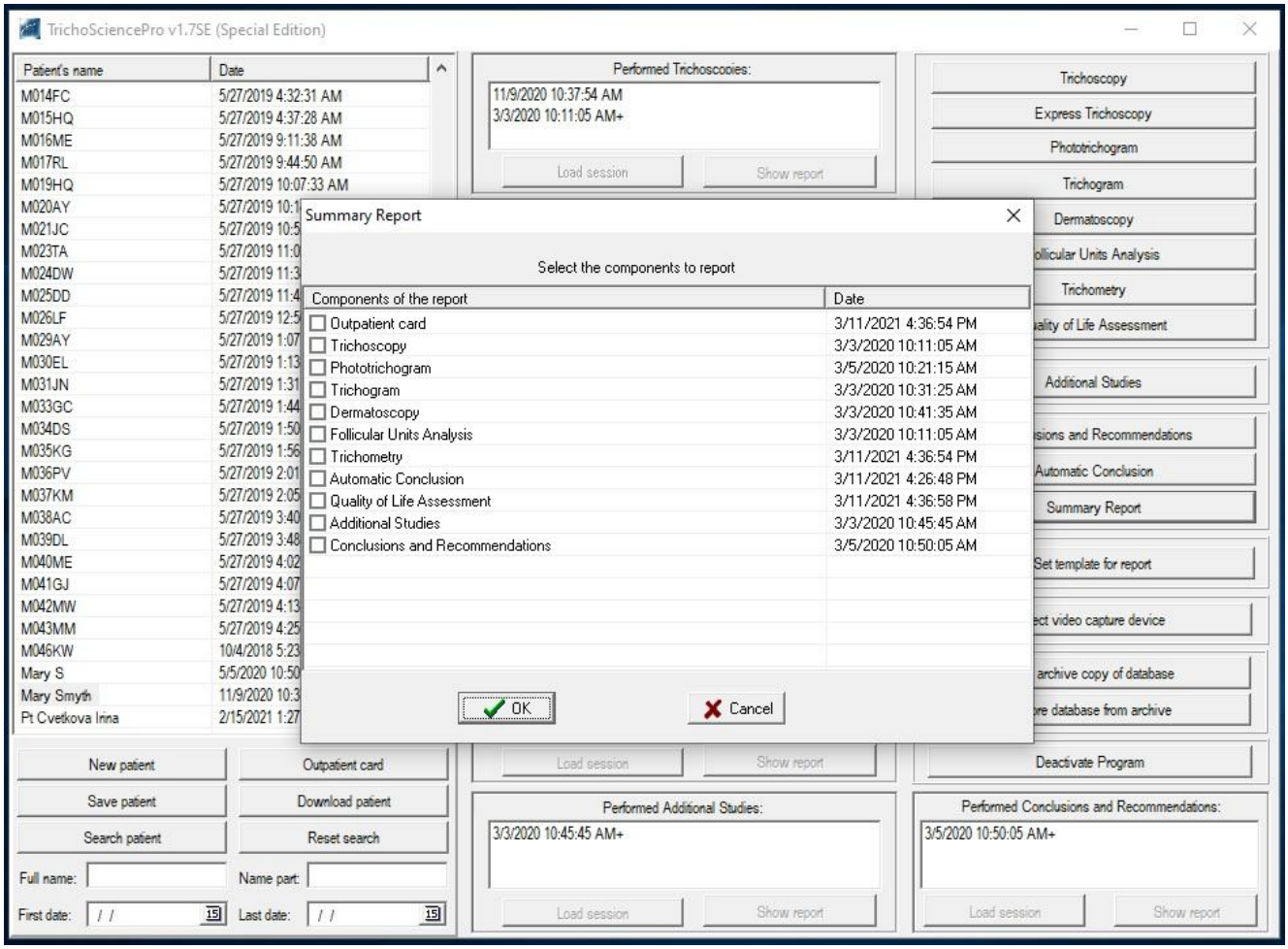
Automatic Conclusion \ Patient: Mary Smyth

**Criteria for differential diagnosis between AGA and CTE**

| Criteria | AGA | CTE |
|---|---|---|
| Clinical history | | |
| Hairs and scalp condition: | | |
| Intensity of hairs loss: | | Strongly-expressed |
| Duration of hairloss: | | Less than 6 months |
| Hairs thinning: | Diffuse | |
| Ludwig Scale, type: | I-1 | |
| Ludwig Scale, class: | 1 | |
| Heredity factor in first degree relatives: | | No |
| Scalp condition: | Combination | |
| Dandruff: | Moderate | |
| Seborrheic dermatitis: | Areas of redness | |
| Data from objective studies | | |
| Terminal hairs count in Parietal area | Less than 180 for sq.cm. | Over 180 for sq.cm. |
| Average Terminal hairs diameter | In Parietal area is less than in Occipital | In Parietal area is more than in Occipital |
| Percent of Vellus-like and True Vellus hairs in Parietal area | More than 20% | Less than 20% |
| Anisotrichosis in Parietal area | Over 20% for Parietal area | Less than 20% for Parietal area |
| Predominance of single follicular units | >65% | 40-60% |
| Presence of Thin, Medium and Thick Terminal hairs in Parietal area | Presence of all types | Presence of 2 types out of 3 |
| Yellow dots (in Parietal area) | >10% | <10% |
| Brown dots (in Parietal area) | >20% | <20% |
| Upright regrowing hairs (in Parietal area) | | >5% |
| Percent of Telogen hairs in Parietal and Occipital areas | Over 15% of Telogen hairs.More in Parietal area vs Occipital | Over 15% of Telogen hairs. More (or equal) in Occipital area |
| Proportion of Vellus-like among Telogen hairs in Parietal area | >30% | <30% |
| Lab data / Blood tests: | | |

Print report | Conclusion/Print results | Close | To report

The “Automatic Conclusion” function is implemented to differentiate between most common “AGA” and “CTE” diagnoses. Calculations are based on “Trichoscopy”, “Phototrichogram”, “Trichogram” session summaries and “Outpatient card” data. This information gets processed in a specialized table, which assigns and counts specific points. Total results obtained in this table indicate activity of each of these processes. Since signs of “AGA” and “CTE” often overlap, leading frequently to diagnostic difficulties, this function helps with more proper preventive diagnosis establishment.




After completing all diagnostic sessions and studies, as well as generating conclusions and reports for the patient, the "Summary report" function allows to select components to be included into the final report, such as "Trichoscopy", "Phototrichogram", "Trichogram", "Dermatoscopy", "Follicular Units Analysis", "Trichometry"", "Quality of Life Assessment", "Additional Studies", "Conclusions and Recommendations" and "Automatic Conclusion" data. The "Summary report" is generated as an MS Word document, which is convenient for making any additional adjustments to the final data to be printed, as well as for automatic translation into other languages.

Professional hair and scalp diagnostic software

# TrichoSciencePro©

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