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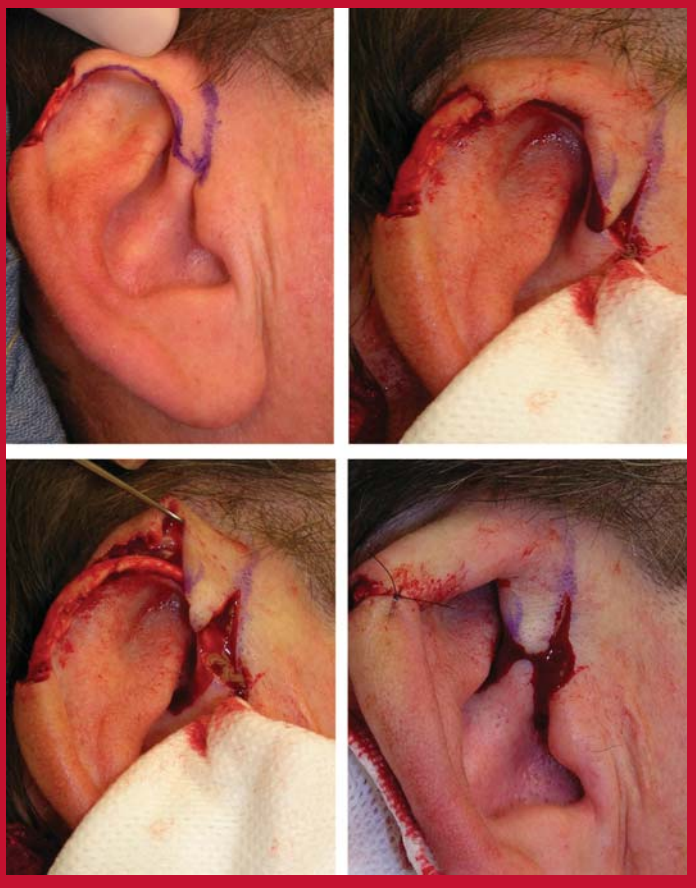

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Issues will be printed in Portuguese, with titles and abstracts in Portuguese and English. The full English-language version will be available on the Brazilian Society of Dermatology's website.

All manuscripts will be submitted to the anonymous and confidential review of at least two members of the Editorial Board or the National or International Board of Reviewers. If accepted for publication, articles will be subjected to minor corrections or adjustments that will not alter the authors' style.

Research involving human beings must have the prior approval of a Research Ethics Committee and abide by the ethical standards of the 1975 Declaration of Helsinki, revised in 2000.

GUIDELINES FOR THE PREPARATION OF ARTICLES

The correct preparation of a manuscript allows more efficient reviewing and publishing processes. The recommendations below are aimed at allowing a more straightforward preparation of manuscripts.

1- The articles must be original and written in the authors' native language (Portuguese, Spanish, or English). The Editorial Team will provide the necessary translations.

2- The article's title must be short and concise, provided in Portuguese and English, with up to 150 characters (not including spaces), and accompanied by a short title.

3- The abstracts in Portuguese or English must comply with the appropriate format for the type of article.

4- Authors must accompany their names with abbreviations, highest qualification, institutions with which they are affiliated, and the study location. One of the authors must be designated as the corresponding author, providing a full address, work telephone and fax numbers, and e-mail.

5- Authors must disclose any conflict of interest and financial support.

6- A minimum of three and a maximum of 10 key words must be cited in Portuguese and English, and must be included for all types of articles. The key words must be part of the DeCS (Descritores em Ciencias da Saude) and/or the MeSH (Medical Subject Headings), which can be accessed on the Internet.

7- The maximum word counts for each type of article do not include references or abstracts.

8- Abbreviations and acronyms must be limited to those of general use, and must not be used in titles or abstracts.

9- Long and repetitive introductory information must be avoided, with preference given to the most recent and unpublished data. Repetition of the same information in the Abstract, Introduction, and Discussion must be avoided.

10- Weights and measurements must be expressed in the decimal metric system. Temperatures must be expressed in degrees centigrade.

11- Drugs must be referred to by their generic names, followed by the employed dosage and posology, avoiding the citation of commercial terms or brands. Descriptions of any equipment, instrument, test, or reagent must contain the manufacturer's name and location.

12- Acknowledgements can be added before the references.

References must be listed at the end of the article, numbered sequentially according to their citation in the text, following the Vancouver Convention style, as advised by the ICMJE. References cited in captions of tables and figures must adhere to the sequence of references cited in the text. All authors must be cited in references with up to six authors; if there are more than six authors, the first six must be cited, followed by "et al." Examples:

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13b. Book chapter

Reppert SM. Circadian rhythms: basic aspects and pediatric implications. In: Styne DM, Brook CGD, editors. Current concepts in pediatric endocrinology. New York: Elsevier; 1987. p. 91-125.

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International Union of Biochemistry and Molecular Biology. Recommendations on Biochemical & Organic Nomenclature, Symbols & Terminology etc. [Internet]. London: University of London, Queen Mary, Department of Chemistry; [updated 2006 Jul 24; cited 2007 Feb 22]. Available from: www.chem.qmul.ac.uk

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14- Illustrations (figures, graphs, and tables) must be referred to in sequential order in the text in Arabic numbers (e.g., Figure 3, Graph 7), with repetitions excluded at the Editor's discretion. The figures' and graphs' captions, and the titles' and tables' footnotes must precisely describe their contents with short phrases and be sufficient for understanding even if the article is not completely read.

15- Figures must have a minimum resolution of 300 DPI, a minimum width of 1,200 pixels (with proportional height), and be provided in JPEG or TIFF formats. Arrows or lines can be used to locate areas of interest. Captions of histologic images must specify the coloration and degree of magnification. In case a figure has been previously published, the original source must be cited in the caption/legend and be quoted in the *References* section. The copyright holder must give permission to reproduce it, and permission must be sent to the S&CD journal Editors. When using/employing figures where the patient's face is identifiable, the patient's written authorization will be needed for publishing (see document *Authorization for the use of photographs* on S&CD's website).

16- When making use of videos, please insert captions and/or legends containing information such as the manuscript's title, authors, institution and other relevant comments. When specifically using a patient's image/s, their identity should be safeguarded, otherwise written permission for disclosure will need to be provided.

17- Graphs must be prepared in Microsoft Excel. Tables must not require explanations in the text, their purpose is to complement the text rather than make it longer. The weight, measure, and temperature units used to describe results (m, g,

g/100 ml, mL, etc.) must be specified at the top of each column. Patients must be identified by letters or numbers, and never by names, initials, or hospital register numbers.

18- Statements and opinions expressed in the Journal are the exclusive and entire responsibility of the authors, and do not necessarily coincide with those of the Editorial Board, the National and International Board of Reviewers, or the Brazilian Society of Dermatology.

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1- ORIGINAL ARTICLE

An original article is a report of an original experimental clinical-cosmetic or dermatologic related procedure or investigation. Examples include experimental studies, clinical studies, descriptions, comparisons of evaluation techniques or methods, and studies from related areas (pharmaceutical studies in Cosmetic Dermatology). Maximum limits: 4,000 words, 10 illustrations, and 35 references.

Abstract: Include sections labelled: Introduction, Objective, Methods, Results, and Conclusions (maximum 200 words). Do not state that results or other data will be presented and discussed.

Introduction: Describe the motivation for conducting the study and the current level of knowledge on the subject. The last paragraph should specify the main question or objective of the study, as well as the main hypothesis tested, if applicable.

Methods: Explain how the study was conducted, and include the following information: a -*Type of study:* Describe the design, specifying retrospective or prospective, type of randomization (simple random, matched random, or stratified sampling, etc.), blind, comparative, controlled by placebo, etc. b -*Place:* Indicate where the study was conducted (private or public institution), state that the study was approved by the Ethics on Research Committee of the institution, and describe the selection procedures, inclusion and exclusion criteria, and the number of patients at the beginning of the study. c -*Procedures:* Describe the main characteristics of the interventions performed, including a detailed description of the technique, so that the investigative study can be replicated. d -*Description of evaluation methods.* e -*Statistical analysis:* Explain the type of analysis (descriptive and/or comparative), describing the planning of the sampling (representative of the universe to be studied), analysis and statistical tests, with the level of significance adopted. The use of unusual statistical analysis is supported; however, in such cases, the author should give a detailed description of the method.

Results: Detail the main results. This must include specific estimations and dispersion measurements (for example, mean and standard error), or interval estimations (for example, confidence intervals), as well as the descriptive levels of the statistical tests used (for example, p-value). Those findings must also be interpreted from a clinical point of view.

Discussion: Emphasize the new and important results of the study, which will be part of the conclusion. Data mentioned in the introduction or results should not be repeated in detail. Mention the limitations of the findings and the implications for future studies. Report the observations of other relevant studies.

Conclusions: Concisely address only the proposed objectives. The same emphasis should be given to studies with positive or negative results.

2- COMMUNICATION

Original, short articles on preliminary results of new findings of interest for Dermatologic Surgery, Cosmetic Dermatology, or Cutaneous Oncology, among others, may be submitted. The format is similar to that of Original Articles, with a structured abstract of up to 200 words. Limits: the full article must not have more than 2,000 words, 8 illustrations, and 15 references.

3- REVIEW ARTICLE

Surgical or Cosmetic Dermatology related procedures, algorithms, and statistical compilations, among others, are subjects that may be addressed. These are free-format papers; however, they must contain a non-structured Abstract of up to 100 words, and conclusions or considerations. Limits: 6,000 words, 10 illustrations, and 60 references. Systematic review articles or meta-analyses must follow the appropriate guidelines (http://cochrane.bireme.br)

4- CONTINUING MEDICAL EDUCATION (CME)

CME articles have an educational character, focusing deeply and completely on important subjects in Surgical Dermatology, Cosmetic Dermatology, and laser therapy. Maximum limits: 4,000 words, 10 illustrations, and 40 references. To avoid duplication, authors must obtain prior approval from the Editors before writing the article. Authors are requested to define the educational objectives for the article, which specify what the participant should have learned after completing the CME (for example: identify a condition, know its treatment, select the best technique, etc.). The understanding of those objectives must be measured by 10 questions with five multiple-choice answers. The answer key must also be sent with the article.

5- NEW TECHNIQUES

These articles describe new techniques or details of techniques. They must contain a non-structured Abstract of up to 100 words, an Introduction with a literature review, and Methods, Results, Discussion, and Conclusion. Maximum limits: 1,200 words, 8 illustrations, and 10 references.

6- IMAGING DIAGNOSIS

Authors may submit one to six images (accompanied by a short description) that apply to dermatologic surgery and cosmetic dermatology (e.g. dermoscopy, confocal microscopy, ultrasound, and other methods). Maximum limits: An unstructured abstract of up to 100 words, full article/text of up to 800 words, 6 illustrations, and 5 references.

7 - CASE REPORT

Case reports are descriptions of cases or series of cases of particular interest in the areas of Dermatological Surgery, Cutaneous Oncology, Cosmetic Dermatology, treatment of unaesthetic dermatoses, complications, etc. They must contain a non-structured Abstract of up to 100 words, an Introduction with a literature review, and Methods, Results, Discussion, and Conclusion, where appropriate. Maximum limits: 1,200 words, 8 illustrations, and 10 references.

8- COMMUNICATIONS

Briefs are short original articles discussing the preliminary results of new findings of interest in Dermatologic Surgery, Cosmetic Dermatology or Cutaneous Oncology, among others. They must contain a non-structured Abstract of up to 100 words. There are no specific requirements for the structure or format of the text. Maximum limits: 1,200 words, 8 illustrations, and 10 references.

9 – LETTERS:

Objective and constructive comments on published articles. Maximum limits: 600 words and 10 references.

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Photography in dermatologic surgery and cosmiatry—Part I

A fotografia na cirurgia dermatológica e na cosmiatria – Parte I

Continuing Medical Education

ABSTRACT

Photography is an essential tool in the dermatologist's daily practice and can be used in various ways. From simple records of lesions verified in dermatological examinations to illustrations of a treatment's result, photographs document more clearly and concisely what is seen due to the utterly descriptive nature of this medium. Nevertheless, it is important to note that the present article refers specifically to what is known as Medical Photography, a type of photography that reproduces subject matter with maximum detail and relevant information. To achieve this, it is necessary to master the basics of photographic technique, including knowledge of available equipment and the fundamentals of digital technology, and also to establish a photographic routine that includes the standardization of the images.

Keywords: photography; dermatology; face; surgical procedures.

RESUMO

A fotografia é ferramenta fundamental na prática diária do dermatologista, podendo ser utilizada de várias formas. Desde o registro simples das lesões no exame dermatológico até a ilustração do resultado de um tratamento, a fotografia expressa de forma mais clara e concisa o que vemos, pois é absolutamente descritiva. No entanto, devemos observar que aqui nos referimos ao que chamamos de Fotografia Médica, que é um tipo específico de fotografia: reproduz a realidade com o máximo de detalhes e informações relevantes. Para isso, é necessário ter conhecimento dos princípios básicos da técnica fotográfica, incluindo os equipamentos disponíveis e noções da tecnologia digital, e estabelecer uma rotina fotográfica que inclui a padronização das fotografias.

Palavras-chave: *fotografia; dermatologia; face; procedimentos cirúrgicos.*

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INTRODUCTION

Dermatology is a purely visual specialty.[1] For the dermatologist, the possibility of seeing a cutaneous lesion is as valuable as reading about it. In this fact lies the importance of photography for this medical specialty.[2] The first medical imaging was performed in France in 1845, using a daguerreotype (a camera prototype in the early history of photography, invented by Louis Daguerre). Medical photography itself emerged almost 150 years later and has been constantly improving since then, following technological advances in the wider field of photography.

For decades, photography was accepted as an efficient way of documenting dermatological conditions,[3] having become a fundamental tool in the daily practice. Nowadays, it can be said that the act of photographing has become routine for the dermatologist, who can be called a *functional photographer*

The present study was carried out at the Unidade de Cosmiatria, Cirurgia e Oncologia (UNICCO) of the Dermatology Department of the Universidade Federal do Estado de São Paulo (UNIFESP)—São Paulo (SP), Brazil.

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4, since taking pictures is necessary for exercising this profession. Photography is necessary for the follow-up records of lesions, and as an auxiliary tool for choosing the best treatment, for it clearly shows outcomes (before and after pictures of cosmetic procedures and surgeries); for the education of physicians (lectures and training of resident physicians); for supporting and illustrating clinical research and publications; as a modality of legal documentation; and finally as the basis of teledermatology, a field that has been developed in recent years.

Since the introduction of digital technology in 1981, photography has had a steady development. The cost of digital cameras is decreasing as the technology advances, and the great diversity of models found in the market allows easy access to good quality equipment at low cost.

Nonetheless, there is still room for improvement, since most of the medical pictures are disappointing:[5] they are excessively bright or dark, have color distortions, blurry images, and it is difficult to serially compare a set of images. *Medical photography* is characterized by the accurate and reliable description of all alterations observed. Medical images are different from *snapshots*, [6] those pictures that are taken at random, without any care or attention to detail and which include elements that pollute the image and distract the viewer.

In order to get better quality photographs, some aspects such as the choice of proper equipment, the proper execution of photographic technique, and the standardization of photographs must be taken into account.

CHOICE OF EQUIPMENT

Faced with the diverse range of camera models, brands, and prices currently available, the choice of equipment should be based on the intended photographic subjects and the available budget. Whatever the choice, it is important to bear in mind that the camera is only a means, and that with basic knowledge of the photographic technique, anyone can obtain great photographs. Before buying a camera, it is worth considering that there are hundreds of models on the market—from the simplest to most sophisticated professional models.

Most compact models are of the *point-and-shoot* variety, meaning that once it is turned on, the camera is ready to take pictures. The more elaborate models have semiautomatic menus, enabling their use in different conditions (portrait, landscape, night, close-up, manual mode, etc), though it is not possible to change lenses, therefore limiting their use. Despite this, they are lighter, cheaper, and simpler to handle. There are brands with good quality lenses, such as Zeiss or Leica, and others with acrylic lenses, which compromise the quality of images.

The D-SLR or Digital Single-Lens Reflex (Figure 1) are deemed to be professional and semi-professional cameras, which allow the changing of lenses, and broadening the spectrum of use.[7] They are bigger and noisier, and more expensive and difficult to use.

More recently, compact cameras have arisen that allow the user to change the lenses, making up an intermediate category, as they are not as expensive as the professional models and have technology similar to that of the compact models.

Whichever model is chosen, reading the manual is highly recommended for getting the full potential out of the camera.

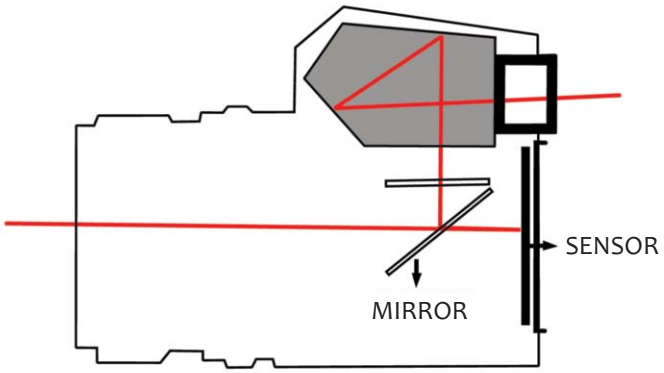

Figura 1: Esquema de uma câmera D-SLR (Digital-single Lens Reflex): a luz entra pela lente, é refletida por um sistema de espelhos no interior do corpo da câmera, e a imagem é vista pelo visor. Quando o botão de disparo é apertado, o obturador se abre, e a luz atinge o sensor, formando a imagem

THE PHOTOGRAPHIC TECHNIQUE

The photographic technique involves several complementary factors to produce a good photograph. The most significant are the *aperture*, the *shutter speed* and the *ISO*, which comprise the "photographic triangle". In addition to these factors, the *focal length*, the *angle of coverage*, the *white balance* (which is related to the color temperature) and other concepts such as *macro photography* and *zoom* must be observed. [8,9]

Aperture

The camera's diaphragm is formed by a set of blades arranged circumferentially in the body of the lens. Its movement increases or decreases the size of the opening through which the light passes. The diaphragm corresponds to the iris of the eye, meaning that the smaller the opening, the less light passes through the orifice, enabling the control of the amount of light that reaches the sensor. It is represented by a variable called an *f-stop* (or just *f*) in a scale in which the smaller numbers corresponds to larger apertures [10] (Table 1).

Table 1: Scale of diaphragm aperture, shutter speed, and ISO.

Aperture (f)	1,2 – 1,4 – 1,8 – 2,0 – 2,8 – 4,0– 5,6 –8,0 – 11,0 – 16 – 22 – 32 – 45 – 90
Shutter speed	bulb – 30" – 15" – 8" – 4" – 2" – 1" –1"/2 – 1"/4 – 1"/8 – (...) – 1"/30 –1"/60 – 1"/125 – 1"/250 – (...) – 1"/4000
ISO	100 – 200 – 400 – 640 – 800 – 1000– 1250 – 1600 – 3200 – 6400 – (...) – 20000

Another crucial effect of the diaphragm is related to the focus (or sharpness) of the image. The portion of the image that appears focused and sharp in the photograph is called the depth of field (DOF). Since the light is always projected in a straight path, every ray of light should only reach a single point in the sensor in order for the object to be in focus. When the diaphragm is set at a large aperture, the light rays are allowed to enter the lens from several different directions, striking the sensor at different points and in a disorganized way; only the rays that reach the sensor perpendicularly stay focused. In practice, an observer will see a photograph whose center is sharp but with a blurred background. If set at a small aperture, the rays are better "organized" and most of the image is in focus. In the diaphragm's scale, the lower the number *f*, the larger the DOF. When photographing a patient's face before a particular procedure, it is important that the entire face appears clearly in the image, including its outline. To attain this, a lower DOF is insufficient, meaning that the value of *f* cannot be low—as a lower value indicates a greater amount of light passing through the lens (Figure 2).

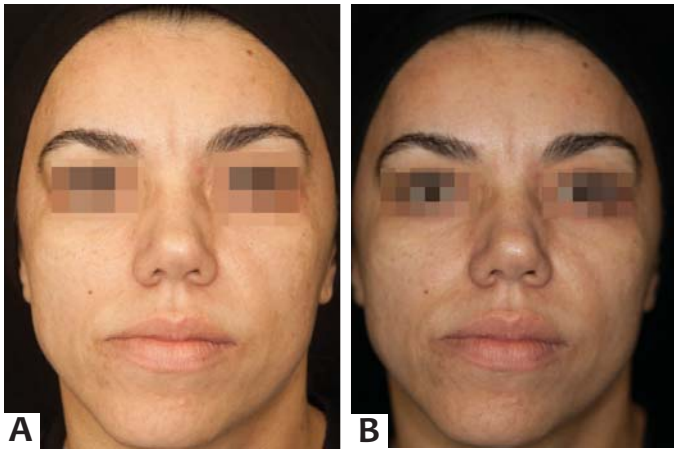

Figure 2: Depth of field (DOF) **a)** Sharp contour of the face = excessive DOF **b)** Blurred contour = little DOF

Shutter speed

The shutter corresponds to the "eyelid", and its movement is similar to that of the blink of an eye. The shutter speed is related to the perception of movement in a photograph, but also has the function of adjusting the amount of light that will reach the sensor. It consists of one or two blades—whose location depends on the camera type—that can be opened and closed at different speeds, given in seconds or fractions of seconds [11] (Table 1). During the time it remains open, light passes through, determining the amount of movement in the picture. The longer the time it remains open, the more light passes through the shutter, recording a greater amount of movement, which may cause a "blurred" image. Shorter opening times record a smaller amount of, or no movements at all (frozen). A classic example is that of photographs of waterfalls: in an image where the water appears as a veil, the shutter remained open for a long time (less speed, closing slowly) and the water appeared "blurred". If the shutter remained open for a short time (higher speed, closing quickly), the image of water would have appeared "frozen".

The time interval during which the sensor is exposed to light is called *exposure* (Figure 3). A long exposure time allows the sensor to be reached by a greater amount of light, resulting in a brighter or overexposed image. On the other hand, a short exposure time produces a darker or underexposed image.

ISO

The ISO determines the sensor's sensitivity to the light, and can be adjusted according to the ambient light. Its values are also presented according to a scale (Table 1). The ISO (International Standard Organization) is equivalent to the ASA (American Standards Association, nowadays ANSI), which measures a film's speed. The ISO should ideally be set at 100. Excessive increases in the ISO also entails a loss in image quality, causing them to become grainy.

The *aperture*, the *shutter speed* and the *ISO* work together, mutually offsetting each other, thus determining the *photometry*, which is a measure of the amount of light that reaches the sensor. With the ISO set at the basic value (100), the *aperture* and *shutter speed* automatically adjust in an inversely proportional ratio, aimed at maintaining the correct exposure.

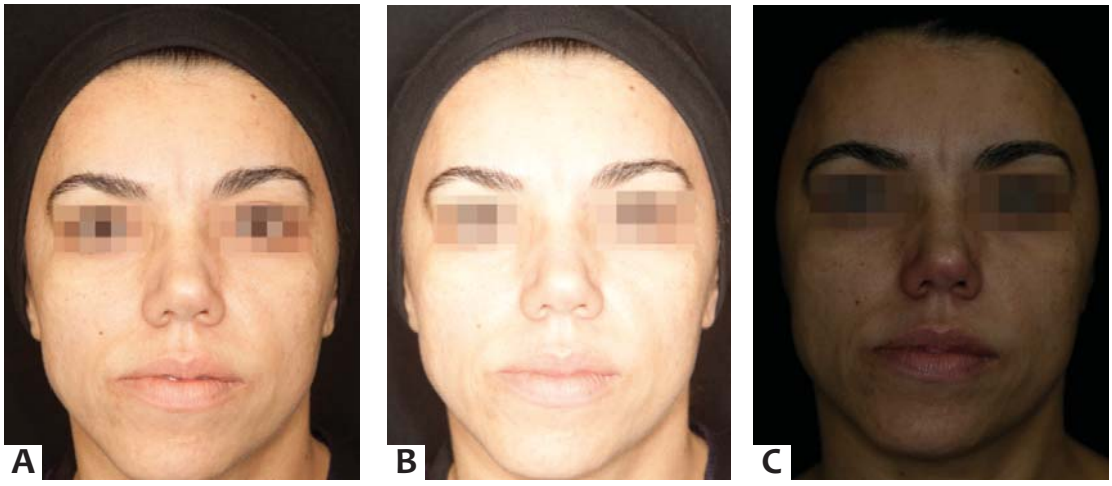

Figure 3: Photometry
a) Normal exposure
b) Overexposed (too bright);
c) Underexposed (too dark)

Focal length (FL)

The measure of focal length (FL) is marked on the body of the lens, serving to identify its power. For instance, a 300mm lens is six times more potent than a 50mm lens, meaning it has six times more magnification power (Figure 4). Each lens has an angle of coverage, which is the angle range through which the lens captures the image (Table 2). According to the angle of coverage, lenses are classified into wide-angle, normal, and telephoto. It is important to note that the higher the FL, the smaller the angle range and thus the image formed. A 50-55mm lens is quite interesting for dermatologists for its angle of coverage is similar to that of the human eye. With such a lens, it is possible to photograph a range that includes a patient's entire body to various individual parts of his/her body, barringdetail photos. For that a macro lens is necessary.

Macrophotography

Macrophotography reproduces the full size image on the camera's sensor (1:1). Macro lenses are specific and designed to take pictures at close range without distorting the image, i.e. with normal perspective (Figure 5). Macrophotography must be distinguished from the "macro function" (universally represented by the symbol of a flower on compact cameras), which takes pictures at close range (between two and 5cm), but with distortion of the image, causing rounded and blurred edges and angulated faces. The specification "macro" is written on the body of the lens, which can have a variable FL.

Table 2: Angle of coverage according to the focal length. Note that the greater the focal length, the smaller the angle. This means that a 300mm lens, for instance, will capture a smaller part of the scene than a 50mm lens.

FOCAL LENGTH	ANGLE OF COVERAGE
16mm	108°
28mm	74°
50mm	46°
135mm	18°
300mm	8°
500mm	5°

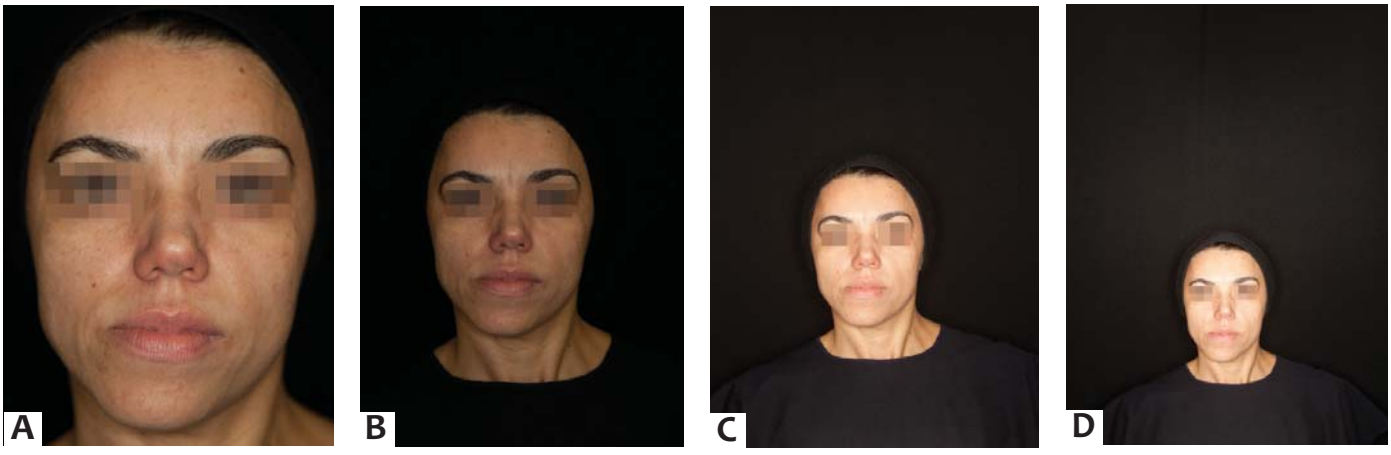

Figure 4: a) FL = 70mm; **b)** FL = 50mm; **c)** FL = 35mm; **d)** FL = 24mm. FL = focal length. Note that the greater the FL, the less background will appear in the photograph; the ideal framing is that where less background appears.

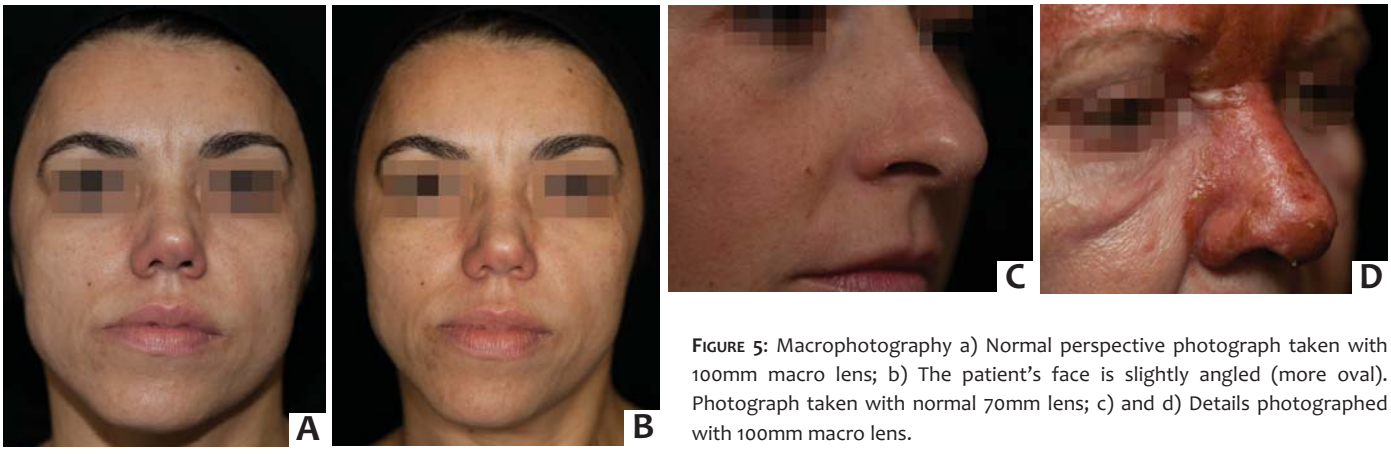

Figure 5: Macrophotography a) Normal perspective photograph taken with 100mm macro lens; b) The patient's face is slightly angled (more oval). Photograph taken with normal 70mm lens; c) and d) Details photographed with 100mm macro lens.

Zoom

Zooming in is a way of getting closer to the photographed subject without the necessity for the observer to move their position. The zoom function can be of two types: optical or digital. In *optical zoom*, the lens extends physically (altering the FL) in order to magnify the subject without changing the image quality. The *digital zoom* "cuts off" the area surrounding the subject, therefore keeping a smaller size image, which is then increased to fit in the frame—this phenomenon is called interpolation and entails loss of image quality.

When choosing a camera for purchase, it is important to make sure it has *optical zoom*.

White balance (WB)

Different light sources also render different colors. Images usually become greenish under fluorescent light, while incandescent sources render orange tones. The naked eye is able to differentiate colors and recognize white. Cameras, however, have to be "taught" to differentiate and recognize colors, setting a basic parameter from which it will carry out the actual reading and recording of the colors present in the image. Cameras have menus with WB settings for specific situations (flash, sunlight, shade, fluorescent light, incandescent light, etc), including the automatic mode (Figure 6).

LIGHTING

Light has a fundamental role in the image, which should accurately describe the color and contours of the skin. It is of paramount importance to take into consideration the source of light in the environment in which the photographs are taken.

In medical photography, the image must not appear too dark or too bright, for that would hamper the observation of point in time alterations. In daily practice there are usually two types of light sources: natural (from windows) or artificial (ceiling lighting, desk and/or floor lamps). The light from windows determines a very heterogeneous lighting, given that around noon light is more bluish and at the beginning and end of the day, it is more orange. On the other hand, artificial light produces unusual shadows below the eyes, nose, and chin, and less light causes alterations in the exposure and reduces the appearance of wrinkles. Tungsten-based and fluorescent sources of light cause color discrepancies (Figure 7). It is considerably difficult to reproduce photographs in a consistent manner; the use of a flash must be considered in order to correct the ambient light. The flash can be built into the camera or externally attached to the equipment. It generally works well in automatic mode, however can also be manually adjusted. In order to avoid shine on the skin (in addition to previous degreasing), a white bond paper or tracing paper should be put in front of the flash, or specific diffusers should be used to cause the light of flash to become softer.

In addition, there are numerous accessories, including reflectors, which help redirect light, thus improving the quality of lighting. A single flash positioned frontally or very close to the patient can excessively illuminate an area and "hide" wrinkles or important details of the image. Ideally, two flashes positioned diagonally to the patient should be used. Another option is the ring flash (rounded flash positioned around the lens), which, however, can cause a "flattened" aspect to the image for it does not allow the correct visualization of textures and reliefs. In environments with white walls and ceilings, the light is reflected, lending a brighter aspect to the image. This can be avoided by decreasing the aperture and preventing excessive penetration of light. Conversely, in darker environments the patients' pupils will be dilated, reflecting the light of the flash and making the eyes appear red. Some cameras come with "red-eye reducer" options for mitigating this effect. However, a simple way to overcome this issue is to ask the patient to keep his or her eyes closed until the photograph is about to be taken, only opening them at that time of the shooting. Currently, there are sources of continuous light that provide softer lighting than that of flash systems.

Figure 6: White Balance (WB); **a)** WB set to be used with flash, which is how the photograph was taken. **b)** Example of how the photograph would look if the WB were set to fluorescent light in a picture taken with flash. It becomes evident that the WB must be adjusted to the light that will in fact be used at the instant the photograph is taken.

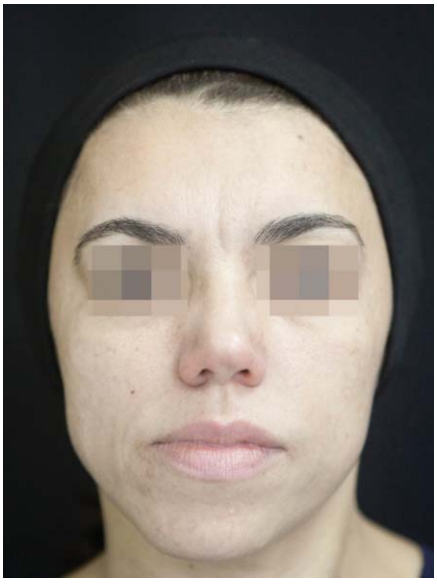

Figure 7: Photograph without flash—the patient is lit by light bulbs in the ceiling only. Note the shadows below the eyes and nose.

DIGITAL IMAGE

The light entering the lens is captured by an electronic sensor to form a digital image. These sensors can be of two types: 12 CCD (coupled-charged device) or CMOS (complementary metal-oxide semiconductor), and consist of millions of photosensitive elements, pixels (from "picture elements") and a silicone chip. The pixel is the smallest element of a digital image, and the amount of pixels is directly related to the resolution: the greater the amount of pixels, the higher the resolution of an image, meaning it has more detail and better quality. A camera of three to six megapixels (MP) is sufficient for use in dermatology (Figure 8).

File Formats

Each image formed by the sensor generates a file, whose size is directly proportional to the number of pixels, meaning that the greater the amount of the latter, the more memory space it will occupy.[13] Most cameras use three types of files: JPEG (Joint Photographic File Format), an international standard which compresses the image and makesit much smaller, so that it takes up less memory space without significant loss of resolution; TIFF (Tagged Image File Format), the industry standard, is larger than the JPEG format; RAW, which is used in D-SLR cameras and is a minimally processed image that does not suffer compression and therefore there is no loss of quality. By default, images are saved at 72dpi (*dots per inch*), however an image editor is able to convert it to 300dpi, which is a more appropriate format for printing.

Storage

Ideally, downloading of medical images from the camera to storage devices should be carried out at least twice a week in order to avoid the risk of losing them. [14] Memory cards can be erased and re-used. Images downloaded to computers should be classified by patient—with names and dates specified—and stored in folders. For safety, the back up of these images should be carried out regularly. Pen drives, CDs, DVDs, and HDDs are examples of solutions for backing up image files.

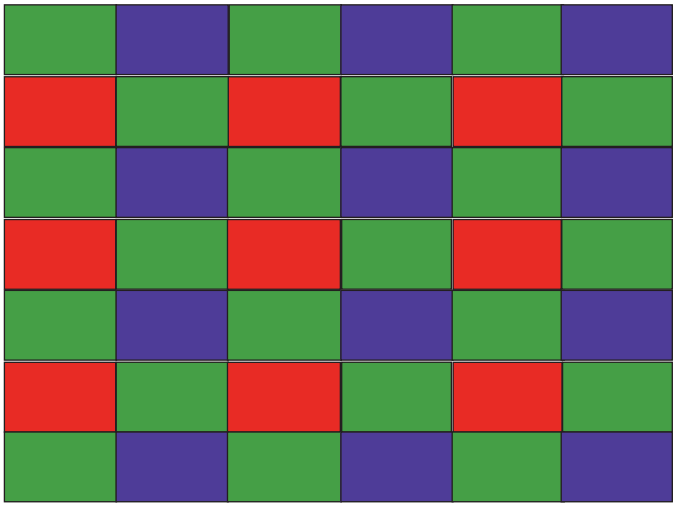

Figure 8: Schematic drawing of a CCD sensor with RGB filter (red, green, blue). The register of the combinations of these colors results in the other colors seen in an image.

STANDARDIZATION OF PHOTOGRAPHS

Once in possession of the most adequate equipment, and after careful observation of the photographic technique and correct aspects of ambient lighting have been carried out, a good quality photograph can be achieved with a few more steps.[15] The last—but not least—item to be added to the photographic routine, is the standardization of the images, which lends credibility to the cosmetic or surgical treatment.

In order to obtain photographs that are comparable with each other, the only variable in the pictures should be the patient. Everything else should remain constant: viewpoint, lighting, position, color, contrast, perspective, background, distance between the camera and the patient. These principles should be applied to any series of two or more images of the same patient, and require planning and attention to detail.

It is important to establish a photographic routine, which begins with the patient's signing of the Term of Consent. The patient must be clearly identified in the picture, however in a careful way so that the identification does not overwhelm the subject of the photograph. A good identification method is to

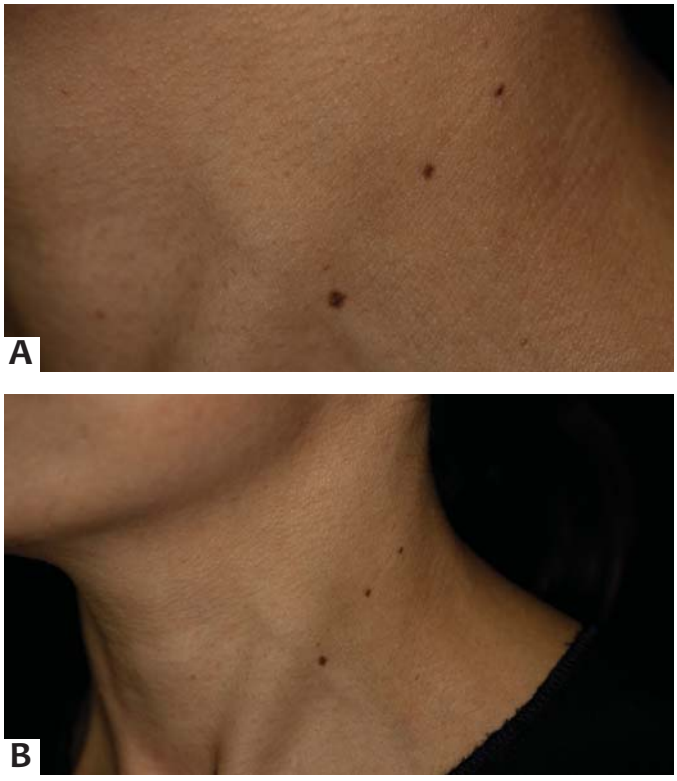

Figure 9: a) The photograph does not indicate where the lesions are located. **b)** Here it is possible to note that the lesions are located in the neck.

affix a small dated label with the patient's initials in an area that does not contain a lesion or a clinical change intended to be highlighted in the photograph. Also, the patient's data can be photographed in the first picture of the sequence. In photographs of details, parts of the body can become unrecognizable, making it important to record some reference to it in the photographs (Figure 9).

Lighting should be exactly the same in before-and-after photographs. The background must have a solid and neutral color, such as black, white, or gray. Always bear in mind that some colors may be reflected in a patient's skin. Any factor drawing the observer's attention away from the main subject must be eliminated. This includes articles of clothing, makeup and accessories, and hair, which must be secured with a band of neutral color or with a cap. The camera must be positioned at the same angle with respect to the patient, and the same lens must be used in all photographs. The patient should be comfortable and maintain a neutral facial expression, for any small muscle movement can accentuate or soften wrinkles and/or stains.

ETHICAL AND LEGAL ASPECTS

On legal terms, the original digital image is the one that has been recorded on the memory card. Therefore it is important to take photographs using RAW format, which corresponds to the film'snegative.[16] In the digital age, the ease of manipulation of images has led to a growing concern about the reliability of the photographs and the preservation of the patient's confidentiality. Therefore it is crucial that the patient signs a Term of Consent authorizing the use of the photographs, in order to prevent their misuse. In addition, the use of software that alters the appearance of real images must be avoided.[17,18]

It is also worth noting that patients may feel intimidated by having to undress to be photographed. Therefore everything possible must be done to make the situation less awkward, including the explanation of objectives and goals of each photograph. ●

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Questions for continuing medical education—CME

1) Medical photography stands out for:
a) Showing situations where a physician is needed.
b) Accurately reproducing alterations observed in the patient's dermatological examination.
c) Showing groups of physicians in their usual workplace.
d) Reproducing situations experienced in daily life of dermatologists.
e) Having a physician as a photographer.

2) Photography is present in the daily life of dermatologists because:
a) It illustrates the clinical examination.
b) It assists in choosing the best treatment.
c) It assists in the physician's education.
d) It serves as a legal document.
e) All of the above.

3) The camera is an important piece of photographic equipment. Which parameter below is an unimportant detail in the purchasing decision of a camera, regarding its use in dermatology?
a) Size
b) Lens material (glass or acrylic)
c) Resolution
d) Menu for manual adjustments
e) Optical zoom

4) Photographic technique includes basic knowledge of the parameters that must be adjusted to get a good picture. Three of these parameters always work together, and are adjusted in a compensatory manner:
a) ISO, aperture and shutter speed.
b) White balance, ISO and aperture.
c) Aperture, shutter speed, and zoom.
d) Shutter speed, aperture, and diaphragm.
e) ISO, focal length, and angle of coverage.

5) About the diaphragm
a) Its function is to open and close the shutter's curtain.
b) Controls the sharpness of the image, allowing the passage of greater or lesser amounts of light.
c) Its function is similar to that of the eyelids.
d) The figure represented by the letter f is related to the speed of passage of the light.
e) It closes in low light situations.

6) About the shutter:
a) It has the function of opening when the camera is turned on.
b) It allows the passage of light, even when the diaphragm is closed.
c) Together with the ISO and macrophotography, it composes the photographic triangle.
d) It is correlated to the speed of passage of light; the greater the speed the slower it closes.
e) When its closing speed is slow, it means that the light has longer to pass through, and the image may register movements, resulting in a blurred image.

7) The incorrect statement below is:
a) ISO refers to the sensitivity of the sensor to light, as the ASA refers to that of photographic films.
b) Setting the ISO at 100 (base), when the diaphragm is opened too wide (i.e. f is too low), the shutter must close quickly, allowing just enough light to register the image and reach the sensor.
c) The focal length is the distance between the camera and the patient.
d) Angle of coverage means the "portion" of a scene that will be captured in a photograph; the greater the angle, the smaller the "portion".
e) The angle of the lenses determine whether they are normal, wide-angle, or telephoto lenses.

8) Choose the correct statement:
a) Macrophotography is the photography of large lesions.
b) In optical zoom, the image is cropped and suffers loss of quality.
c) The zoom is a way to get close to the photographed subject without altering the observer's location.
d) In macrophotography, recorded images are triple in size.
e) In digital cameras there is no optical zoom.

9) About the white balance, it is possible to state:
a) All light sources render white color.
b) The white balance automatically adjusts to the scene being photographed whenever the ceiling and the walls are white.
c) Fluorescent and tungsten lights render the same color.
d) The camera must be set for the type of ambient light to be photographed, for unlike naked eyes, the camera cannot recognize white color.
e) The white balance is not used in indoor photographs.

10) About digital images, it is possible to state:
a) The memory card is made up by pixels and forms the photographed image.
b) Sensors can be of three types: JPEG, TIFF, and RAW.
c) The greater the number of megapixels, the lower the resolution.
d) The pixel is the main element of digital photography and can be of various sizes, determining the image quality.
e) Resolution is determined by the number of megapixels in an image. The greater the number of megapixels, the greater the detail and the better the quality of the image.

Key:
Onychomatricoma. Surg Cosmet Dermatol 2012; 5 (1) :10-5.

1c 2d 3e 4a 5e 6b 7d 8d 9b 10a

Answers must be submitted online using the website www.surgicalcosmetic.org.br.
The deadline for submitting answers will be provided by e-mail with a direct link for accessing the journal.

Article
Original

Microneedling: experimental study and classification of the resulting injury

Microagulhamento: estudo experimental e classificação da injúria provocada

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ABSTRACT

Introduction: *A trend is currently observed towards the indication of less invasive procedures, isolated or combined, in the treatment of stretch marks, scars, and the effects of aging. Microneedling is an option that stimulates collagen production without causing the total de-epithelization observed in ablative techniques.*

Objective: *To carry out an experimental study aimed at establishing the correlation between the lengths of the cylinder's needles used for microneedling with the depth of the damage inflicted to the skin.*

Methods: *Biopsies were performed in skin areas of alive pigs that underwent microneedling with cylinders containing 192 needles of 0.5 – 1, 1.5 –2 and 2.5 mm.*

Results: *Microscopic examination carried out immediately after the procedure revealed vascular ectasia with extravasation of red blood cells, affecting the papillary dermis with 0.5 mm needles and reaching the reticular dermis with longer needles. The authors propose classifying the inflicted injury as mild (0.5 mm needles), moderate (1.0 and 1.5 mm needles), and deep (2.0 to 2.5mm needles).*

Conclusion: *The microneedling procedure can be indicated for a broad spectrum of skin alterations when the goal is to stimulate the production of collagen. Establishing the relationship between the length of the needle used and the resulting damage to the skin assists in choosing the microneedling tool used in different directions.*

Keywords: *desearch design; collagen; wound healing; ambulatory surgical procedures; rejuvenation*

RESUMO

Introdução: Observa-se atualmente tendência à indicação de procedimentos pouco invasivos isolados ou combinados no tratamento de estrias, cicatrizes e envelhecimento. O microagulhamento é opção que estímula a produção de colágeno, sem provocar a desepitelização total observada nas técnicas ablativas.

Objetivo: Estudo experimental, para estabelecer a relação do comprimento das agulhas dos cilindros utilizados para o microagulhamento, com a profundidade do dano.

Método: Foram realizadas e biopsiadas áreas de microagulhamento, em pele de porco vivo, com cilindros contendo 192 agulhas de 0,5 a 2,5mm.

Resultados: O exame microscópico imediatamente após o procedimento revelou ectasia vascular com extravasamento de hemácias, acometendo a derme papilar com agulhas 0,5mm e estendendo-se à derme reticular com as agulhas de maior comprimento. Os autores propõem classificação da injúria em leve (agulhas de 0,5mm), moderada (agulhas de um e 1,5mm) e profunda (agulhas de dois a 2,5mm).

Conclusão: O microagulhamento pode ser indicado para amplo espectro de alterações quando o objetivo é o estímulo da produção de colágeno. O estabelecimento de uma relação entre o comprimento da agulha utilizada e o dano provocado na pele facilita a escolha do instrumento nas diferentes indicações.

Palavras-chave: desenho experimental; colágeno; cicatrização; procedimentos cirúrgicos ambulatoriais; rejuvenescimento.

INTRODUCTION

The proposal to use ablative treatments aimed at stimulating and remodeling collagen has long been advocated in the field of dermatology. It is widely known that the mechanical or chemical removal of the epidermis triggers the release of cytokines and the migration of inflammatory cells, resulting in the replacement of damaged tissue by cicatricial tissue.[1] Medium and deep chemical peels are examples of ablative treatments that are popular among dermatologists due to their indisputable stimulation of collagen production, which results in the attenuation of wrinkles, improvement of texture, brightness and color of the cutaneous surface, in addition to their capacity for correcting depressed scars, and relieving photodamage.[2] However, the recovery for these procedures is protracted and results in sensitive tissue that is subject to post-inflammatory hyperpigmentation and photosensitivity, in addition to the risk of complications such as hypertrophic scarring, persistent erythema, and dyschromias. Currently, a trend is being observed towards the indication of less invasive procedures, isolated or in conjunction, aimed at reducing the risk of complications and allowing a patient's earlier return to normal life. The microneedling principle proposes a stimulus for the production of collagen, without causing the total de-epithelization observed in ablative techniques.

Microneedling fundamentals

Orentreich and Orentreith[3] were the first to describe the use of needles aimed at stimulating collagen production in the treatment of depressed scars and wrinkles, a technique that became known by the term *subcision*. Based on the same principle of rupturing and removing damaged subepidermic collagen and subsequently replacing it with new collagen and elastin fibers, other authors confirmed this initial study.[4] More recently there has been a proposal for a system of microneedles that is applied to the skin with the objective of generating multiple micropunctures, which are long enough to reach the dermis and cause bleeding, triggering inflammatory stimuli that results in the production of collagen.[5] The percutaneous collagen induction (PCI), as the technique has been called, begins with the cutaneous barrier loosing its integrity (aimed at dissociating keratinocytes), resulting in the release of cytokines such as interleukin-1α (predominantly), interleukin-8, interleukin-6, TNF-α and GM-CSF, and leading to dermal vasodilation and migration of keratinocytes, a process that restores the epidermal damage.[6] For didactic purposes, three stages of healing following trauma with needles can be clearly delineated: in the first stage (injury stage) is a release of platelets and neutrophils (which are responsible for releasing growth factors that act on keratinocytes and fibroblasts as growth and transformation factors α and β (TGF-α and TGF-β), of platelet-derived growth factor (PDGF), of Protein III (activator of connective tissue), and connective tissue growth factor (Figure 1A).

In the second stage (healing stage), neutrophils are replaced by monocytes and angiogenesis, epithelialization and fibroblast proliferation take place, followed by the production of type III collagen, elastin, glycosaminoglycans and proteoglycans. Concomitantly, fibroblasts growth factor, TGFα and TGF-β are secreted by monocytes. Roughly five days after the injury inflicted, the fibronectin matrix is completely formed, allowing the deposition of collagen directly beneath the basal layer of the epidermis (Figure 1B).

In the third stage (maturation stage), type III collagen, which is prevalent in the early phase of the healing process is slowly replaced by type I collagen (which lasts longer and persists for a period ranging from five to seven years).[7-9] In order for this inflammatory sequence of events to take place, the trauma caused by the needle must reach a depth of 1-3mm, and the epidermis must be preserved (only perforated and not removed).[5] Hundreds of microlesions are created, resulting in columns of blood collected in the dermis, accompanied by edema of the treated area and virtually immediate hemostasis. The intensity of these reactions is proportional to the length of the needle used in the procedure.

For instance, a1mm depth entails an almost microscopic hematoma, while that resulting from a 3mm depth can be seen

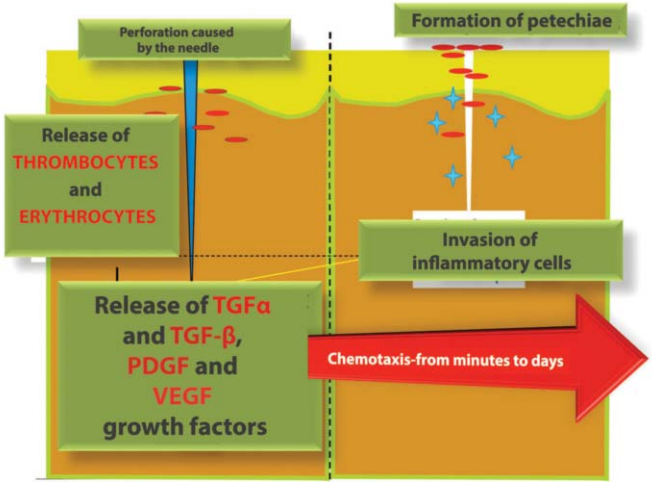

Figure 1A: : Injury stage

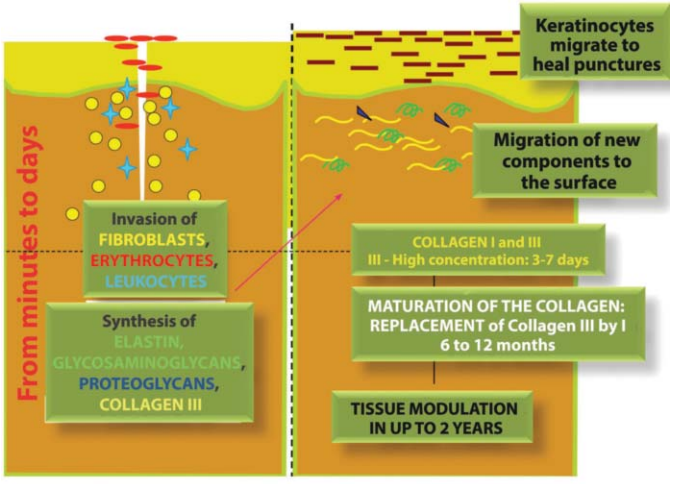

Figure 1B: Healing and maturation stages

with the naked eye and can persist for hours. Nonetheless, it is necessary to understand that the needle does not penetrate completely during the rolling process (Figure 2).

It is estimated that a 3mm long needle penetrates only 1.5-2mm (or roughly 50-70% of its total length). Therefore, with a 1mm long needle the injury caused to the skin would be limited to the superficial dermis, resulting in a more limited inflammatory response than that caused by a longer needle (Figure 3).

Characteristics of the microneedling technique

The device used to perform microneedling comprises a polyethylene roll studded with sterile stainless steel needles symmetrically aligned in rows, with a total of 190 units on average (a number that may vary depending on the manufacturer). The length of the needles is fixed throughout the structure of the roll and varies from 0.25-2.5 mm, according to the model. The procedure is usually well tolerated under local anesthesia, with needles not exceeding 1mm in length. For greater lengths, anesthetic blockade supplemented by infiltrative anesthesia is recommended. With the aim of providing more comfort for the patient in situations of a prolonged surgical time and deeper injury, local anesthesia with sedation is recommended. Microneedling is a technique-dependent procedure and familiarization with the device used and mastery of the technique are factors that directly influence the final outcome.[10] The vertical pressure exerted on the roller must not exceed 6N, because greater force can damage deeper anatomical structures and cause excessive pain. It is recommended to position the device between the thumb and index finger—as if holding a *Hashi*—controlling the force with the thumb. The back and forth movements must imprint a uniform pattern of perforations (resembling petechiae) throughout the treated area. In order to achieve this, 10-15 passes in the same direction must be made, and at least four crossing passes in the rolling areas seem to be sufficient. In theory, 15 passes allow a damage corresponding to 250-300 punctures/cm2 (Figure 4).

The time that the petechiae pattern takes to arise varies according to the thickness of the treated skin and the selected needle's length. Therefore, a thinner and looser skin, which is usually photodamaged, will present a uniform petechiae pattern earlier than a thicker and fibrotic skin, which is commonly observed in patients with acne scars, for example. In this manner, the choice of the needle's length depends on the type of the skin to be treated and the ultimate goal of the procedure. There is not yet a classification correlating the length of the device's needles to the depth of the expected damage in the treatment.

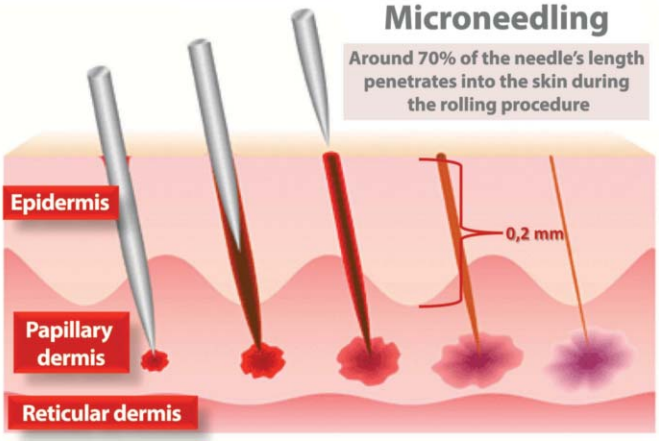

Figure 2: Schematic view of the penetration of the needle during the procedure.

OBJECTIVE

The present study's proposal is to establish the correlation between the length of the needle used, to the depth of the resulting damage, using in this first stage of research the skin of living pigs, considering it as the model that is most similar to human skin.

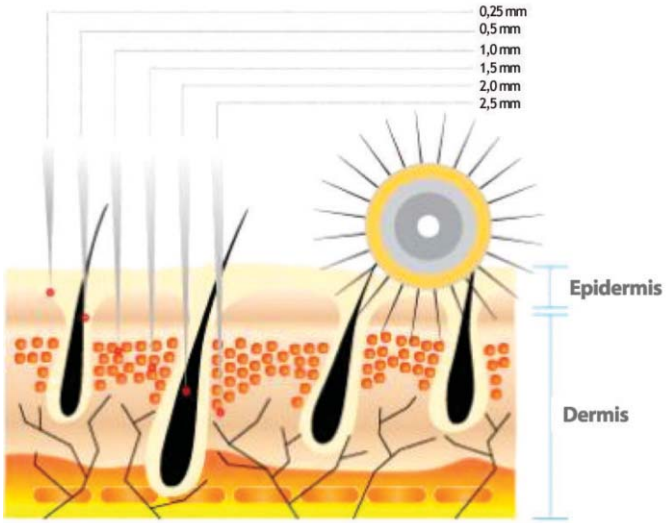

Figure 3: Correlation between the length of needles and penetration into the skin

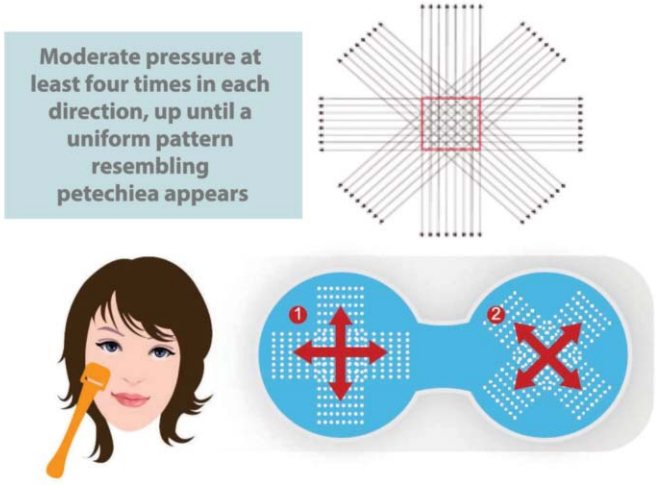

Figure 4: Schematic drawing of the treatment with needles

METHOD

Dr.Roller® devices (Moohan Enterprise Co., Gyeonggi-Do, South Korea), duly registered with ANVISA, the Brazilian Health Surveillance Agency (under the number 80669600001), composed of 192 stainless steel needles, arranged in eight rows across the extension of a polyethylene roller, sterilized with gamma rays, were used in the experiment. The investigation was performed *in vivo*, on the skin of live pigs. The pigs underwent general anesthesia and were kept under assisted respiration in the Experimental Surgery Laboratory of the Universidade de São Paulo. The experiment was approved by the Research Ethics Committee.

The animal's dorsum's right side region was divided into tracks on which the roller with needles was passed back and forth, for two or three minutes. Rollers with needles measuring 0.5mm, 1mm, 1.5mm, 2mm and 2.5mm in length were used (Figure 5). Immediately after the procedure, a sample of each area was collected using a scalpel blade n. 11, formolized and sent for histologic analysis. After undergoing the hystologic processes, specimens were micro-cut into 5μ sized specimens, which were stained with hematoxylin and eosin, and subsequently evaluated through optical microscopy.

RESULTS

The macroscopic appearance of the pigs' skin after treatment (Figure 5) evidently suggests that the damage caused by the microneedling holds a proportional relation to the length of the needle used. The microscopic examination in the first stage (immediately after the injury) revealed predominantly vascular ectasia with the extravasation of erythrocytes. This finding was observed superficially, having affected the papillary dermis with 0.5mm needles (Figure 6), reaching the reticular dermis with needles of greater length (Figure 7). The amount of bleeding was also increased proportionally to the length of the needles. The epidermis remained apparently intact under optical microscopy, except for the presence of the needle path site (Figure 8). None of the samples presented lesions in the subcutaneous tissue.

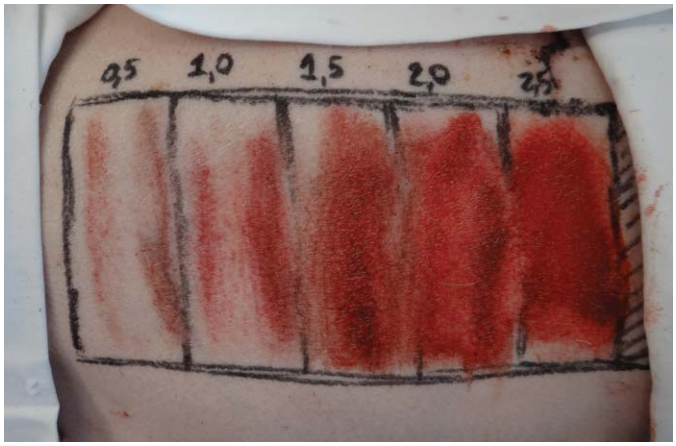

Figure 5: From left to right, demarcated areas treated with different needle lengths

Classification of the severity of the injury caused by microneedling

Based on the results, the authors propose the classification of the injury as mild, moderate and deep, correlating to the needles' length and their ability to induce the planned trauma (Table 1).

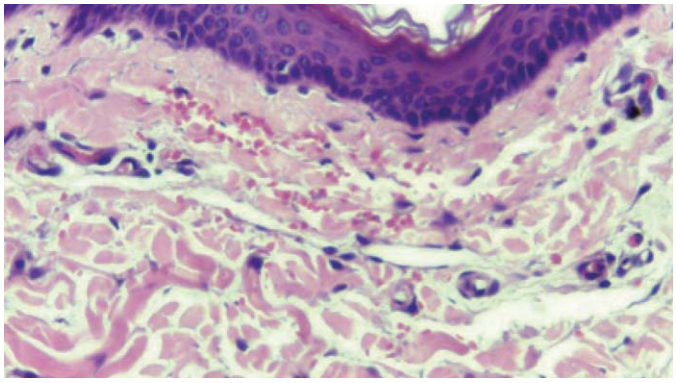

Figure 6: Superficial hemorrhage restricted to the papillary dermis, with needles 0.5mm long (HE, 100x)

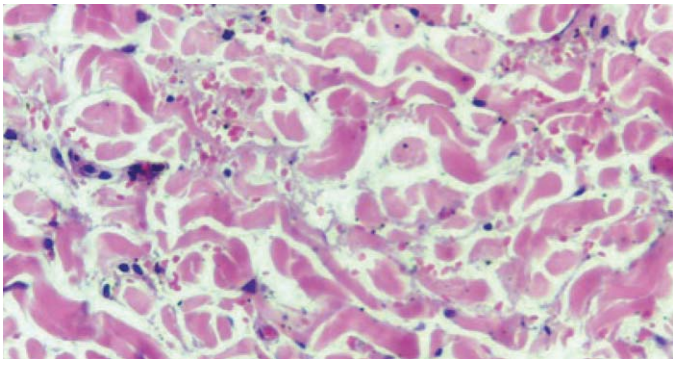

Figure 7: Deep hemorrhage involving the reticular dermis, with needles 2.5mm long (HE, 100x)

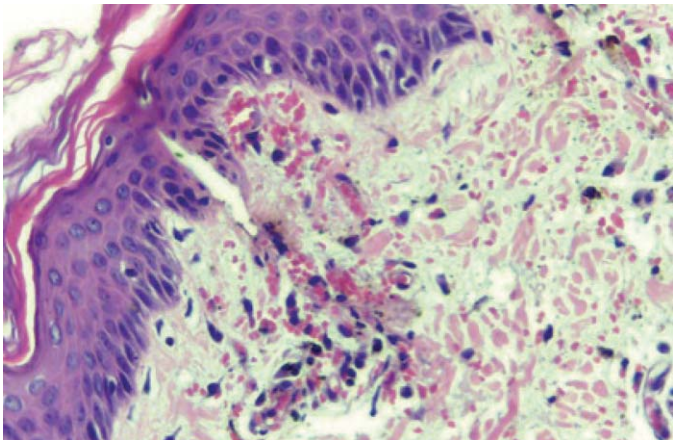

Figure 8: Needle path associated with hemorrhage. Adjacent epidermis without significant alterations (HE, 100x)

Further, the authors also propose a correspondence between the type of injury and the most appropriate indications, described in Table 2.

DISCUSSION

In this manner, based on the authors' experience and evaluation of the available literature, considerations were made that microneedling can be used:

A) As a delivery system for active principles in rejuvenation, such as retinol and vitamin C.
B) As an isolated stimulus in the rejuvenation of the face, improving color, texture, and brightness of the skin.
C) In the treatment of sagging skin and the attenuation of wrinkles, given that it promotes the production of collagen, and provides increased volume in the treated area, based on the stimulus described in item B.
D) In the correction of distensible, depressed, corrugated, and retractile scars, as well as in the improvement of old and recent stretch marks.

Advantages of microneedling

- The procedure allows the stimulation of collagen production without removing the epidermis.
- The healing time is shorter and the risk of side effects is reduced as compared to ablative techniques.
- The skin becomes thicker and more resistant, unlike in ablation techniques, where the cicatricial tissue is more susceptible to photodamage.
- It is indicated for all skin types and colors, and can also be used in areas of a lower concentration of sebaceous glands.
- Low cost when compared to procedures that require technologies demanding high investment values.

Chart 1: Classification of the severity of the injury caused by microneedling

Stimulus characteristics	Length of needle
Mild injury	0,25 e 0,5mm
Moderate injury	1,0 e 1,5mm
Deep injury	2,0 e 2,5mm

Chart 2: Classification of the severity of the injury caused by microneedling

Stimulus characteristics	Length of needle
Mild injury	Drug delivery; Fine wrinkles; improvement in brightness and texture
Moderate injury	Cutaneous sagging; Medium wrinkles; Global rejuvenation
Deep injury	Depressed distensible scars; Estriae; Ondulated and retractile scars

Disadvantages of microneedling

- It is a technique-dependent procedure and requires training.
- Requires prolonged recovery time if moderate to deep injury are indicated.
- Demands careful assessment of the patient on the part of the physician, and a therapeutic proposal compatible with possible outcomes that can be achieved, avoiding unrealistic expectations.

CONCLUSION

Microneedling is an innovative treatment that can be used for a broad spectrum of indications when the objective is to stimulate the production of collagen, constituting an additional weapon in the dermatologist's therapeutic armamentarium. The goal of the present study was to establish the correlation between the length of the needle used in the roller and the extent of damage caused to the skin, thereby facilitating the choice of instrument in different indications. The behavior of human skin under the effects of microneedling will be the subject of the authors' next research, nevertheless they believe that the model used in the present study (the skin of live pigs), provides us with answers to questions that had not been addressed by scientific articles to date. The authors believe that the present paper's results will contribute to the proper use of this technique, which has offered a good therapeutic response when properly indicated. It is up to the individual dermatologist to perform an accurate assessment of the lesion to be treated, and to be technically prepared to conduct the procedure within the recommended precepts. ●

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Article
Original

Reconstruction of nasal defects after tumor excision through Mohs micrographic surgery

Reconstrução dos defeitos nasais após exérese de tumores pela cirurgia micrográfica de Mohs

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ABSTRACT

Introduction: The reconstruction of surgical defects resulting from the excision of tumors in the nose is a challenge for dermatologic surgeons due to its rigid structure and low mobility. The Mohs Micrographic Surgery technique allows the preservation of healthy tissue and leads to a smaller surgical wound.

Objective: To demonstrate techniques for surgical correction of defects after removal of tumors of the nose through Mohs Micrographic Surgery, according to the anatomical location of the tumor.

Methods: Descriptive study of patients operated on using Mohs Micrographic Surgery during the period 1996-2010. Patient images taken pre-, intra-, and post-operatively were analyzed with the aim of classifying the defect's anatomic location and the type of surgical reconstruction adopted.

Results: 170 patients (totaling 203 lesions) were included in the study. The most common locations for tumors were (in descending order): nasal ala, dorsum, tip, and lateral wall. The advancement flap was the most common reconstruction type for lesions located in the lateral wall and in the nasal ala. Grafts were most often used in lesions located in the tip of the nose. Grafts and advancement flaps were more frequently used in the dorsum of the nose.

Conclusions: The parameters that provide guidance on choosing the best reconstruction method must take into consideration the size and location of the surgical defect.

Keywords: Mohs surgery; carcinoma, basal cell; carcinoma, squamous cell.

RESUMO

Introdução: *A reconstrução dos defeitos cirúrgicos gerados pela excisão de tumores no nariz, por sua estrutura rígida e de pouca mobilidade, é um desafio para os cirurgiões dermatológicos. A técnica de cirurgia micrográfica de Mohs (CMM) permite poupar tecido saudável, produzindo ferida cirúrgica menor.*

Objetivo: *Demonstrar as técnicas de correção dos defeitos cirúrgicos após remoção de tumores do nariz pela CMM, de acordo com a localização anatômica do tumor.*

Métodos: *Estudo descritivo com pacientes operados pela CMM no período 1996 a 2010. Foram analisadas imagens pré, intra e pós-operatórias dos pacientes com o intuito de classificar a localização anatômica do defeito cirúrgico e o tipo de reconstrução adotada.* ***Resultados:*** *Foram incluídos no estudo 170 pacientes, totalizando 203 lesões. A localização mais comum dos tumores foi (em ordem decrescente): asa nasal, dorso, ponta e parede lateral. Nas lesões localizadas na parede lateral e asa nasal o tipo de reconstrução mais utilizado foi o retalho de avanço. Nas lesões localizadas na ponta nasal, o enxerto; no dorso, o enxerto e o retalho de avanço.*

Conclusões: *Os parâmetros que nos orientam na escolha do melhor método de reconstrução devem levar em consideração o tamanho e a localização do defeito cirúrgico.*

Palavras-chave: *cirurgia de Mohs; carcinoma basocelular; carcinoma de células escamosas.*

INTRODUCTION

Skin tumors are the most common neoplasm in humans. The estimated incidence of non-melanoma skin cancer in Brazil for 2013 is 134,000 new cases—62,680 in men and 71,490 in women. These values correspond to the estimated risk of 65 to 71 new cases per 100,000 men and women, respectively.[1]

Basal cell carcinoma (BCC) is the most common type and accounts for approximately 75% of these lesions, followed by the squamous cell carcinoma (SCC) with an incidence of 15% and, more rarely, by melanoma, which in Brazil corresponds to 4% of cutaneous malignancies.[2,3] The most common site of occurrence is on the face, with 70% located on the nose and forehead.

The Mohs micrographic surgery technique (MMS) is used to perform the mapping of 100% of the margins, allowing the complete removal of the lesion, which translates into high cure rates. The five-year recurrence rate of primary and recurrent BCC treated with conventional surgery is 10% and 17%, respectively. In tumors treated with MMS that rate decreases to 1% and 6%.[4] The MMS technique also spares normal tissue, which results in smaller surgical wounds.[5]

The complex contours of the nose reflect the different structures by which it is formed, as well as the different features of the skin that covers it. While the skin is thick and sebaceous in the nasal tip and wings, it is thin in the dorsum and lateral regions. In addition, the skin has greater mobility in the upper two-thirds of the nose. The combination of these factors leads to the creation of aesthetic subunits of the nose (dorsum, tip, lateral wall, nasal ala, and columella) (Figure 1).[6] The reconstruction of surgical defects generated by the excision of tumors on the nose is a challenge for dermatologic surgeons, due to its rigid structure and limited mobility.

In the reconstruction of nasal defects, the fulfillment of some basic principles is essential for a good aesthetic result. Initially, it is necessary to determine the surgical wound's characteristics (topography, length, and depth). When possible, the limited availability of tissue at the site should be offset by the best available equivalent, which in the nose region is the skin adjacent to the wound. Another principle that must be followed is to respect the aesthetic units, aiming at locating scars in the natural folds and furrows of the nose.[7] In cases where the tumor affects more than 50% of an aesthetic unit, some authors recommend the complete excision of the subunit, closing the wound with an advancement flap or graft to minimize tissue contrasts.[8,9]

Many techniques can be used in the closure of surgical defects that result from the excision of tumors on the nose, among them are the side-to-side closure, the advancement flap, the transposition flap, the bilobed flap, grafts or a combination of techniques.

The objective of the present study is to demonstrate the available techniques for correcting surgical defects on the nose, according to the anatomical location of the tumor, in patients who underwent CMM at the Dermatology Service of the Hospital do Servidor Público Municipal de São Paulo (HSPM), (SP) Brazil, between 1996-2010.

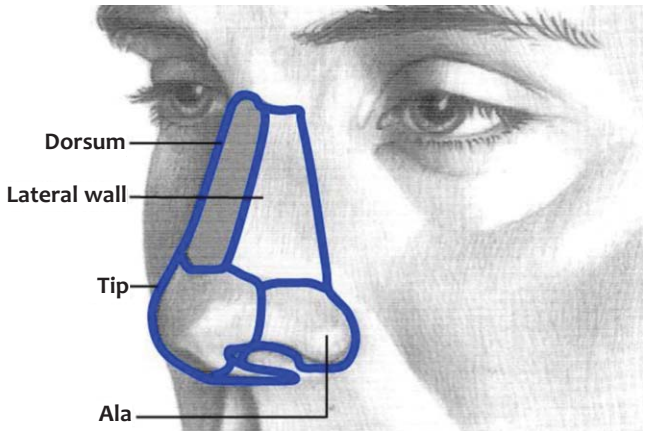


Figure 1: Aesthetic subunits of the nose

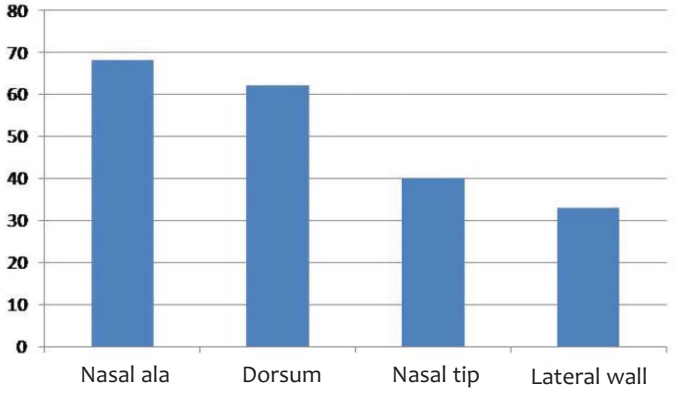
METHODOLOGY

A descriptive study of patients who underwent CMM at the Dermatology Service of the HSPM during the years 1996-2010 was carried out. Medical records and pre-, intra-, and post-operative photographs of patients who underwent exeresis of tumors in the nasal region were analyzed in order to correlate the surgical defect's anatomical location and the type of reconstruction to be adopted. The study excluded patients whose lesions extended into more than one nasal sub-unit or the limits of the nose, as well as those who did not have a complete photographic record.

RESULTS

Two hundred and thirty-six (236) patients were operated on, with 279 tumors removed from the nasal region through CMM during the 1996-2010period. Of these patients, 170 were included in the study (109 women and 61 men, with a total of 203 lesions). The patients' ages ranged from 19-93 years (mean = 65 years).

Treated neoplasms corresponded to 190 BCCs and 13 SCCs. The following distributions were verified, according to the anatomical location: 68 lesions in the nasal alae, 62 in the nasal dorsum, 40 on the nasal tip, and 33 in the lateral wall of the nose (Graph 1).



Graph 1: Distribution of tumors by nasal sub-units

The following techniques were used for reconstruction of defects in the nasal dorsum: 18 grafts, 17 advancement flaps, 13 direct sutures, 7 bilobed flaps, and 5 transposition flaps. Combined techniques (direct suture and graft or advancement flap and graft) were performed in 2 patients.

In lesions on the nasal tip, 16 cases were closed with grafts, 9 with bilobed flaps, 8 with advancement flaps, 6 with direct sutures, and 1 with transposition flap.

For lesions located in the lateral wall, the advancement flap was used more often (16 cases), followed by the bilobed flap (7 cases), direct suture (six cases), graft (2 cases), transposition flap (1 case) and a combination of advancement and transposition flap (1 case).

Finally, of the 68 surgical defects located in the nasal ala, 33 were reconstructed with advancement flaps, 17 with transposition flaps, 8 with bilobed flaps, 5with grafts, 4 with direct sutures, and 1 with the combination of transposition flap and graft.

The distribution of the surgical techniques used for closure of the lesions according to the anatomical location of the surgical defect is depicted in the pie charts of Graph 2.

DISCUSSION

The closure of nasal defects is often difficult when it comes to achieving good functional and aesthetic outcomes. The patient's age, and size and location of the surgical defect are the parameters that guide the choice of the best reconstruction method.

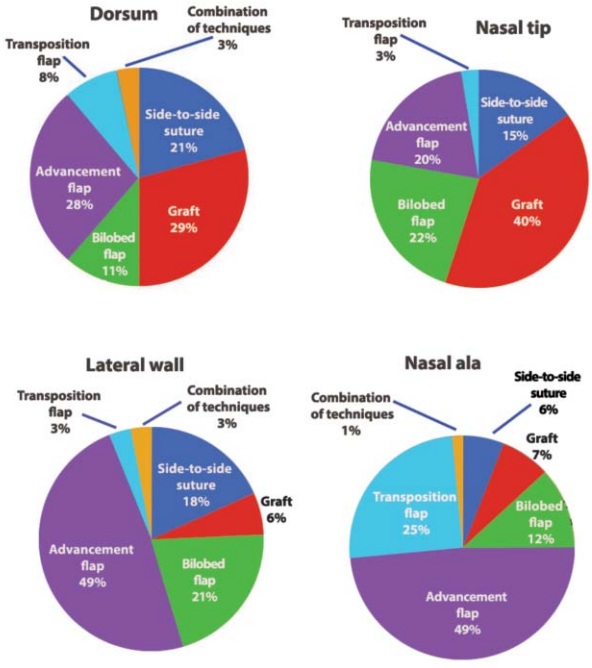


Gráfico 2: Distribuição dos tipos de reconstrução de acordo com a subunidade estética

MMS is considered the most reliable method to approach skin cancer for it allows the histologic control of the margins of excised tumors, resulting in cure rates that exceed those of other therapeutic modalities, in addition to providing the maximum conservation of healthy tissue.[4] Nevertheless, there are several challenges regarding the reconstruction of the nose in day-to-day practice.

In the present study, it was possible to observe that the topographical location of the most common tumors of the nose was the nasal ala (33% of cases), followed by the dorsum (30%). This data is consistent with the literature, which states that most tumors of the nose are located in the distal two thirds.[8,9] Brata *et al.* studied 1,131 patients who underwent MMS and verified that the most common sites of neoplastic involvement were the nasal alae and dorsum. [10]

In the nasal dorsum, grafts (29% of cases) and advancement flaps (28%) were the most frequently used techniques for correcting surgical defects (Figures 2 and 3). Since the skin of the dorsum of the nose is thin and very mobile, flaps in this region should always be considered, unless there is fibrosis linked to prior surgeries that may preclude its mobility. [11] In such cases—or in large surgical wounds—grafts become the best option due

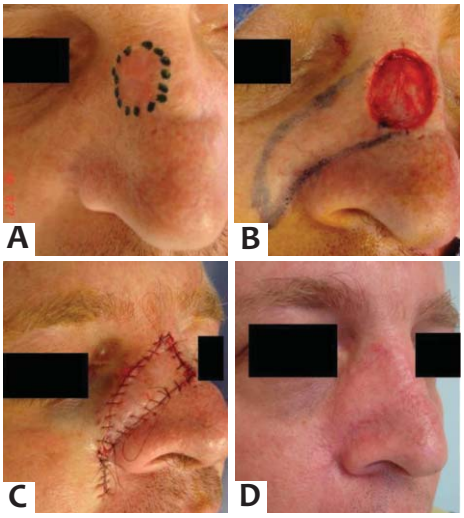


Figure 2: Advancement flap used in the closure of the surgical wound in the nasal dorsum (A, B, C, and D).

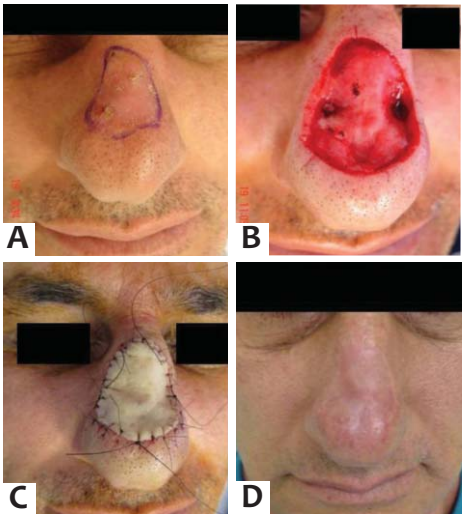


Figure 3: Large dimension surgical defect in the nasal dorsum and use of graft with excellent final result (A, B, C, and D).

to being thinner, and the number of sebaceous glands in that region.[8,12]

In addition to these two types of reconstruction, the side-to-side closure (21% of cases) was widely used in defects in the nasal dorsum of the present study's patients. A fundamental principle governing reconstructive surgery is that the simplest route must be always chosen, meaning primary closure is the best option whenever it can be attained (Figure 4).[13] Nonetheless, the relative number of such procedures was lower than that for flaps and grafts, evidencing the number of moderate to large surgical defects present in the study's sample.

For lesions located in the nasal alae, the greatest challenge is to maintain the natural curvature of the nose without flattening it, keeping the respiratory function and intact balance with the opposite side.[14] Of such defects, 49% were reconstructed with alar advancement flaps, 25% with nasogenian transposition flaps, and 12% with bilobed flaps. This data is consistent with the literature. Half of the study's patients bearing lesions in that subunit (nasal alae) had relatively small lesions located below the nasal sulcus, allowing for the performing of alar flaps. Bilobed flaps are often used for the reconstruction of the dorsum and of the inferolateral third of the nose.[15] Nasogenian flaps are widely used for repairs in the nasal tip and alae due to their good blood supply and the availability of redundant skin, offering good conditions for reconstruction.[16] The transposition flap is a good option for lesions located close to the nasal alae's free margins because it does not raise the nostril and provides for the rebuilding of the nasal ala (Figure 5).[17]

Twenty-four of the 33 lesions (72%) which affected the side wall of the nose were closed with flaps—of which the most used was the advancement flap, corresponding to 49% of cases (Figure 6). The literature quotes advancement flaps from the jugal region to repair defects in the nasal lateral wall and dorsum due to their high mobility capacity.[18]

Regarding the tip of the nose, the techniques used more often in these cases were: grafts (40% of cases), bilobed flaps (22%), advancement flaps (20%), and direct suture (15%). It is important to note that for smaller lesions bilobed and advancement flaps were the most successful, resulting in excellent final results (Figure 7). In fact, some authors consider bilobed flaps, as well as the primary closure, very efficient for small defects of the

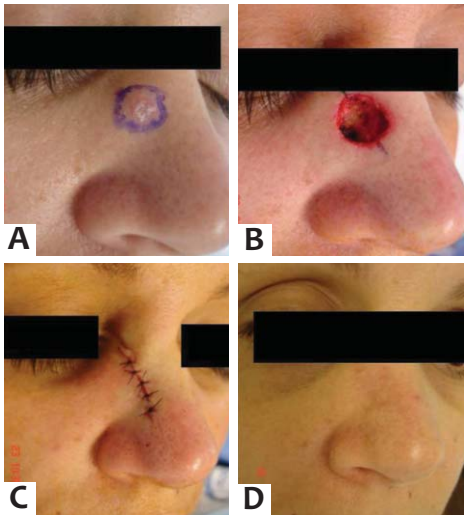


Figure 4: Closing with side-to-side suture (A, B, C, and D).

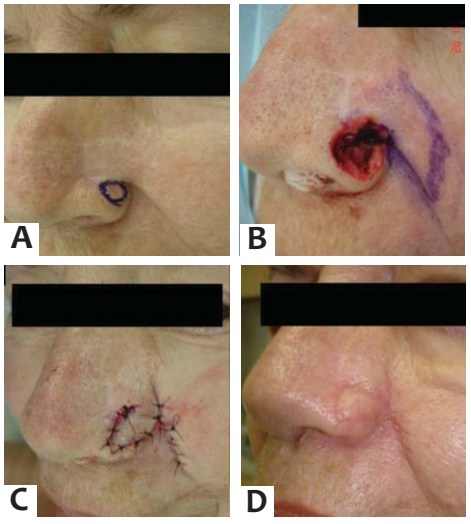


Figure 5: Transposition flap used for reconstructing the defect in the nasal wing with maintenance of the anatomical contours (A, B, C, and D).

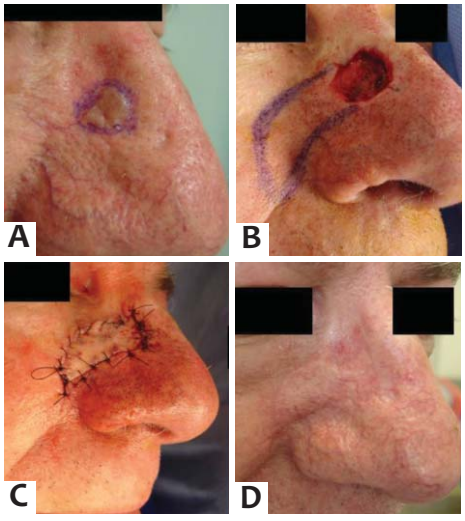


Figure 6: Use of advancement flap in the closure of a defect in the lateral wall (A, B, C, and D).

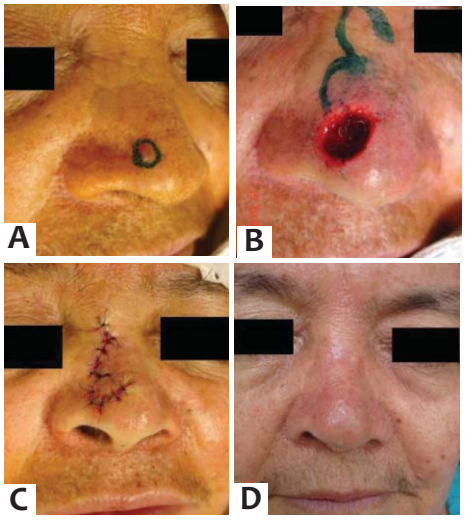


Figure 7: Defect surgery on the nasal tip and reconstruction with bilobed flap (A, B, C, and D).

nasal tip.[19] For larger lesions, grafts have proven a good option as there was no deviation of the nose. Another possibility reported in the literature for the reconstruction of large defects in the nasal tip includes the frontal flap, however this technique was not included in the present study due to the exclusion of cases in which the wound exceeds more than one nasal sub-unit, or the limits of the nose. Furthermore, this reconstruction type requires a second surgical visit for the resection of the pedicle.

In the present study, it was observed that most of the grafts was performed in the early years of the analyzed period and that, as more experience and surgical skill were accumulated by surgeons of the dermatologic service, flaps were included in the preferred techniques for reconstructing large defects in the nose. According to the literature, this concept of restorative surgery—which prioritizes flaps over grafts whenever possible—developed in other dermatologic services worldwide due to the fact that the use of skin from the same aesthetic unit provides perfect texture and color.[8,20]

The dermatologic surgeon must bear in mind the principle that when choosing the most appropriate method, the reconstruction must be as simple as possible and based on their technical capacity, and should also take into consideration the characteristics of each patient. ●

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Article
Original

Treatment of Nevus of Ota in patients from Western populations with high phototypes

Tratamento do nevo de Ota em ocidentais de fototipos altost

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ABSTRACT

Introduction: *Nevus of Ota is a dermal melanocytic nevus located in the skin area that is innervated by the second and third branches of the facial nerve. It occurs mainly in patients of Asian ethnic background. The present study was aimed at evaluating the therapeutic response in the Western population, where higher skin types and characteristics diverse from those that have already been studied are common.*

Methods: *A retrospective study based on the analysis of medical records, an active search of patients and the application of a questionnaire. All study patients were treated with 1,064 nm Q-Switched Nd:YAG laser, with or without a 532 nm tip, with 1 to 4-month intervals between sessions, 10ns pulse duration, 3mm spot size, 1 to 3 Hz frequencies and 2 to 12 J/cm2fluences.*

Results: *According to the research physicians' evaluation, from the seven assessed patients, three had excellent improvement (greater than 75%), two had good response (51-75%) and one had moderate response (25-50%). The analysis of the degree of patient satisfaction showed that four patients reported being very satisfied and three, satisfied. The best results were observed in patients with phototypes up to grade IV and after having undergone seven sessions.*

Conclusions: *QS lasers have proven a useful tool for treating patients with Nevus of Ota and high skin phototypes.*

Keywords: *nevus of Ota; treatment outcome; lasers.*

RESUMO

Introdução: O nevo de Ota é nevo melanocítico dérmico localizado na pele inervada pelos segundo e terceiro ramos do nervo facial. Ocorre principalmente em asiáticos. Nosso objetivo foi avaliar a resposta terapêutica em nossa população, em que são comuns os fototipos altos e características distintas das já estudadas.

Métodos: estudo retrospectivo a partir da análise dos prontuários, busca ativa dos pacientes e aplicação de questionário. Todos foram tratados com o Q-Switched Nd:YAG laser 1064 associado ou não a ponteira de 532nm, com intervalo entre cada sessão variando de um a quatro meses, duração de pulso de 10ns, spot size de 3mm, frequência de um a 3Hz e fluência de 2-12J/cm2.

Resultados: de acordo com a avaliação dos médicos pesquisadores, dos sete pacientes analisados, três tiveram melhora excelente (superior a 75%), dois tiveram resposta boa (entre 51 e 75%) e um resposta moderada (entre 25 e 50%). O grau de satisfação do paciente mostrou que quatro pacientes relataram estar muito satisfeitos e três satisfeitos. Os melhores resultados foram observados em pacientes com fototipos até IV e após sete sessões.

Conclusões: os QS lasers se mostraram ferramenta útil na abordagem de pacientes com nevo de Ota e fototipos elevados.

Palavras-chave: nevo de Ota; resultado de tratamento; lasers.

INTRODUCTION

The Nevus of Ota was initially described as *Nevus fusco-caeruleus ophthalmomaxillaris*, by Ota and Tanino in Japan in 1939.[1] It is a dermal melanocytic nevus with low malignization potential, clinically characterized by a blue-grayish macula interspersed with smaller brownish macules located in the skin. It is innervated by the second and third branches of the facial nerve, and is often associated with ocular pigmentation and can occur in the nasal, palate, pharyngeal, or tympanic mucosa. It is usually unilateral, nevertheless 5-15% of cases can be bilateral.[2]

It occurs mainly in women of Asian origin, with a prevalence of 0.4-0.8% in the Japanese population, being rare in Caucasians. It has two peaks of onset: the first in the first two months of life (50-60% of cases), with most present at birth; and the second in adolescence (40-50% of cases). The onset between the ages of 1 to 11 years and after 20 years of age is unusual. The literature describes rare cases of familial Nevus of Ota, however no hereditary factor has been characterized.[1-3]

The Nevus of Ota may grow over time and persists throughout life, causing damage to the interpersonal relations of affected individuals.[3]

Its histology evidences normal epidermis and dermal dendritic fusiform melanocytes associated with abundant fine granules of melanin. In general, there is an absence of melanophages.[4]

Several treatments, such as surgery, electrosurgery, dermabrasion, cryotherapy, and chemical peels were described with minor responses or complications such as scarring and dyschromias.[5-7] The best results were achieved with Q-switched lasers (QS lasers), which is the best laser to treat benign melanocytic pigmented lesions.[3,7-10] QS laser types that stand out are the QS neodymium doped yttrium aluminum garnet (QS Nd:YAG) that operates at 1,064nm and 532nm (infrared and green light); the QS Ruby laser that operates at 694nm; and the QS Alexandrite that operates at 755nm.[11-13]

The introduction of laser therapy has emerged as a new tool for the therapeutic approach to various unaesthetic lesions. The principle of selective photothermolysis—which allows for acting on specific chromophores—lent objectivity to laser-based treatment, which uses prevailing parameters in each lesion (such as color variation, applicability, and relief) for the purpose of evaluation.[3,7-19]

The target-chromophore to be reached is melanin, and QS lasers' mechanism of action occurs through a photomechanical effect based on the generation of photoacoustic waves produced by the emitted photons, which heat the small particles of pigment and melanosomes, resulting in the formation of cavities within the cells, with subsequent rupture.[3]

The Alexandrite and Ruby lasers have shorter wavelengths, resulting in greater absorption by melanin, which increases the risk of dyschromias and epidermal damage. 17 The most severe side effects were rarely observed in studies—the majority of which were carried out in patients of Asian background—focused on QS lasers.

The present study was aimed at presenting the experience of the Cosmiatry Department of the Instituto de Dermatologia Professor Rubem David Azulay of the Santa Casa de Misericórdia do Rio de Janeiro (RJ), Brazil, in the treatment of the Nevus of Ota with 1,064/532nm QS Nd:YAG laser, in patients of western background with high skin phototypes.

METHODS

A retrospective analysis was carried out based on medical records and on the active search for patients with Nevus of Ota who had been treated with the 1,064/532nm QS Nd:YAG laser, at the Cosmiatry Department of the Instituto de Dermatologia Professor Rubem David Azulay of the Santa Casa de Misericórdia do Rio de Janeiro. The equipment used in those treatments was the Victory Tattoo Removal Laser® (Beijing, China), with 1,064nm wavelength and converter to 532nm, with 10ns pulse duration, 3mm spot size, 5Hz frequency and 2 to 12J/cm2 fluence. All participant patients read and signed a Free and Informed Term of Consent before undergoing the treatment. An active search was carried out aimed at selecting patients for photographic reassessment and application of a questionnaire to analyze individual profiles, satisfaction, and effectiveness of the treatment. The assessment of the response to the treatment was carried out by both the patients and the physician researchers.

Inclusion criteria were: all patients with Nevus of Ota who had been treated with 1,064/532nm QS Nd:YAG laser at the Cosmiatry Department of the Instituto de Dermatologia Professor Rubem David Azulay of the Santa Casa de Misericórdia do Rio de Janeiro, from May 2007 to July 2011, independently of age, gender, or skin phototype, and who had no history of previous treatment. Exclusion criteria were: not being able to contact the patient, and patient attendance at fewer than five sessions. Fourteen patients were initially selected, with seven being withdrawn from the study for failing to meet the inclusion criteria specified above. The age range of patients was 16-44 years. Altogether, five female patients and two male patients—with phototypes III to V—were included. Only one patient had bilateral lesions (Table 1). The number of sessions varied from 7 to 16 (average = 10.2), with an interval between sessions of 1 to 4 months, depending on the post-inflammatory hyperpigmentation degree and availability of the patient.

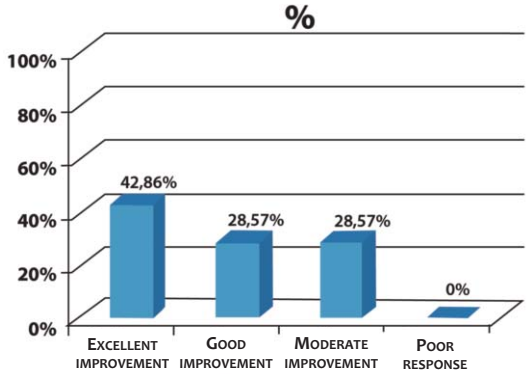
All patients underwent pre-procedure preparation and care for at least 15 days with the Kligman's modified formula and topical anesthetics under occlusion for 30 minutes before each session. Antibiotics and topical corticosteroids were prescribed during the post-procedure period for seven days, with patients being instructed about the necessary use of sunscreen. In adherence to the Cosmiatry Department's protocol, only the 1,064nm tip was used in the first session, with an absence of adverse effects, such as dyschromia and scars. The remaining sessions were carried out with the combination of 1,064nm and 532nm tips, in that order. Patients were photographed before each session. The period of re-evaluation of the response after the completion of the treatment ranged from 2 to 50 months.

Table 1: Relationship between clinical characteristics and therapeutic responses

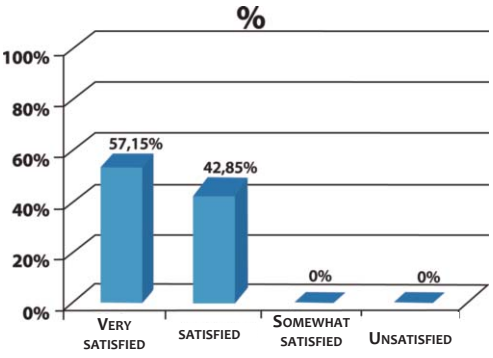
Patient	Gender	Age	Phototype	Asian relative	Total sessions	Degree of improvement	Degree of satisfaction	Improvement of self-esteem	Complications
1	M	23	IV	No	16	Excellent	Satisfied	Positive	None
2	F	34	IV	No	7	Excellent	Very satisfied	Positive	Transient hyperchromia and erythema
3	F	22	V	No	10	Moderate	Satisfied	Positive	Transient hyperchromia and erythema
4	F	44	III	No	11	Good	Very satisfied	Positive	None
5	F	16	V	No	7	Moderate	Very satisfied	Positive	Transient hyperchromia and erythema
6	M	25	III	No	10	Good	Satisfied	Positive	None
7	F	37	III	No	11	Excellent	Satisfied	Positive	None

RESULTS

The relationship between the clinical characteristics and therapeutic response is shown in Table 1. Of the 14 patients with Nevus of Ota, 7 met the inclusion criteria previously established. There was no correlation between the degree of clinical improvement and the interval between sessions. Of the 7 patients, 3 had excellent improvement (greater than 75%), 2 had good response (improvement between 51-75%), two had moderate response (improvement between 25-50%). There was no poor response (Figure 1). The degree of patient satisfaction assessed through the questionnaire showed that 4 patients reported being very satisfied and 3 satisfied (Figure 2). Better results were observed in patients with phototypes up to IV, after seven treatment sessions. Hyperpigmentation, erythema, edema, and a burning sensation were reported in the immediate post-procedure in all patients, in addition to crusts 5-7 days after the start of the treatment. Three patients developed transient hyperchromia and erythema, which receded with the use of topical whiteners and sunscreen. There were no reports of hypopigmentation, scarring, secondary infection, or persistent complications. (Figures 1 to 4)



Graph 1: Medical evaluation



Graph 2: Degree of patient satisfaction

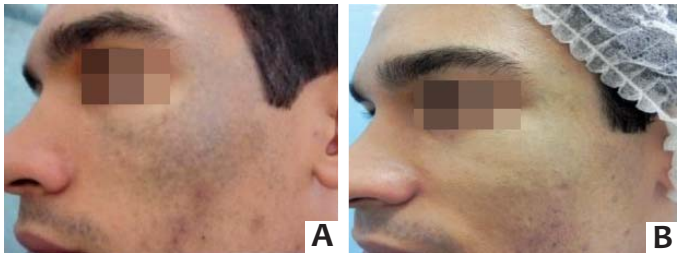


Figure 1: Pre-treatment, and after 16 sessions

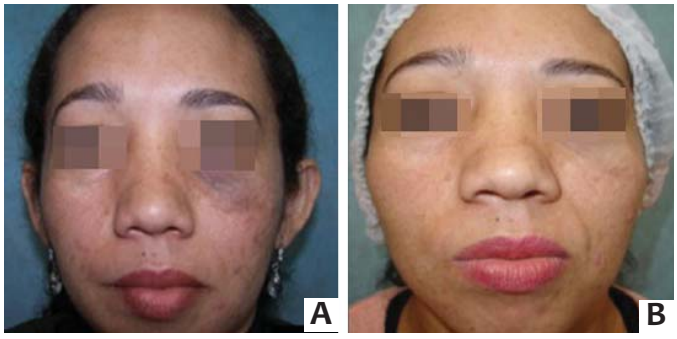


Figure 2: Pre-treatment, and after 7 sessions

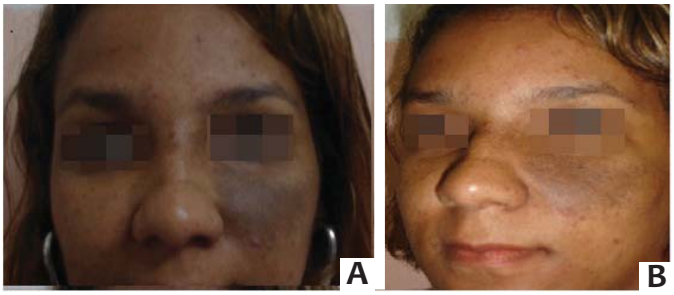


Figure 3: Pre-treatment, and after 10 sessions

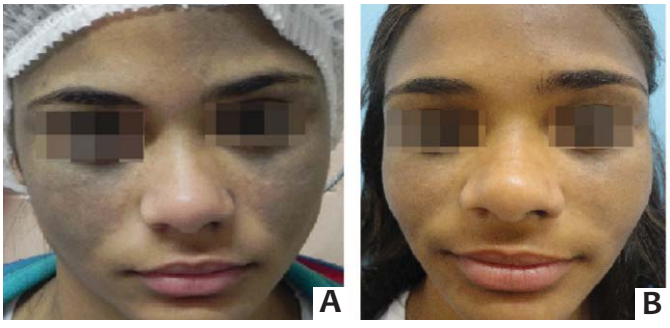


Figure 4: Pre-treatment, and after 7 sessions

DISCUSSION

The pathogenesis of Nevus of Ota is still the subject of discussion. In the literature, 80% of cases are seen in women, which coincides with our study. The lesions occur mainly in patients of Asian origin, however none of the patients in the present study were of Asian origin. Most lesions can be identified from birth and are usually unilateral, however in 15% of cases they may be bilateral. In the present study, all patients had a lesion since birth, and one of the seven patients had a bilateral lesion, which also coincides with the literature's data.

In the literature, studies are aimed at assessing the therapeutic response of Nevus of Ota in the Asian population, which typically has high skin phototypes according to the Fitzpatrick's classification (Chart 2). Nevertheless, Asian populations have distinct skin characteristics and colorations from that of this study (a Brazilian population), which due to miscegenation has numerous skin tones and different responses to light stimuli, creating a challenge in treating these patients.[3, 6-20]

Geronemus RG 6 reported success with QS Nd:YAG laser and preference for using it in high phototypes, due to the longer wavelength and less epidermal damage, therefore minimizing complications. The 1,064nm wavelength was safer, for it reaches deeper levels of the dermis, sparing the epidermis. Thus, for being shallower, the 532nm tip presents a higher risk of dyschromia. 19 However, some authors suggest the concomitant use of the two tips for greater whitening of the lesions, a fact that was also observed in the present study.[19]

Few side effects were observed in studies with QS lasers, the main being: discomfort, edema, and erythema up until 48 hours after the application. A study with two patients of African origin with Nevus of Ota, treated with the 1,064nm tip of the QS Nd:YAG laser, concluded that the probability of dischromia depends more on the laser parameters than on the patient's phototype or number of sessions.[8] The present study recommends the use of low fluences.

Regarding the side effects, the authors of the present study have the impression that the combined use of the two tips showed greater chance of post-inflammatory hyperchromia, which, however, was transient in all cases, with resolution after the use of whiteners and sunscreens. In the present study, the best results were obtained after the seventh session. It is worth noting that due to the fact that the group of patients in the present study presented higher phototypes (from III to V), a greater number of sessions were performed due to the higher risk of complications. However, no significant complications, such as permanent scarring or dyschromias, were observed.

Chart 1: Fitzpatrick's phototype scale

Phototype	Characteristics	Sensitivity to exposure to the sun
I - White	Easily burns, never tans	Very sensitive
II - White	Easily burns, tans very little	Sensitive
III- Light brown	Burns moderately, tans moderately	Normal
IV - Brown	Rarely burns, tans with ease	Normal
V - Dark brown	Burns with ease, tans with ease	Little sensitivity
VI - Black	Never burns, deeply pigmented	Insensitive

Hague JS *et al.*[17] evaluated the degree of satisfaction of 67 patients bearing pigmented lesions treated with Nd:YAG and erbium:YAG, with a 21-month follow-up (27% had phototypes varying from IV to VI, average = 5.4 completed sessions). Approximately 30% of patients reported excellent results. The most common injuries treated were congenital nevi and the Nevus of Ota. In the present study, the degree of patient satisfaction was measured through a questionnaire that showed that 57.15% were very satisfied and 42.85% were satisfied (Graph 2). The best results were observed in patients with Phototype IV, after seven treatment sessions.

CONCLUSIONS

Due to the fact that the present analysis was a retrospective study, the resulting analysis was of a clinical nature, based on the physician's evaluation (Graph 1) and on the degree of patient satisfaction (Graph 2). The QS Nd:YAG laser has proven useful and safe, even in a location subject to high ultraviolet radiation and with high patient skin phototypes. Although the present study was carried out in a western, miscigenated population, where no individual was of Asian descent, and clinical characteristics were distinct from those found in the literature, the epidemiological data and therapeutic responses were satisfactory and similar to those already described. ●

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Article
Original

Skin barrier in atopic dermatitis: the importance of an appropriate cleansing agent

Barreira cutânea na dermatite atópica: o valor de um limpador adequado

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ABSTRACT

Introduction: *Skin xerosis commonly occurs in atopic dermatitis, promoting pruritus and inflammation. Hygiene with syndets (synthetic detergents) is gentle and preserves the skin barrier.*
Objective: *To evaluate the skin's tolerance, and improvement of the xerosis, with the use of a shower gel specially developed for atopic skin.*
Methods: *Thirty-three patients (18 to 50-years-old) were evaluated during four weeks, when using exclusively this product. Hydration, transepidermal water loss, and skin surface pH measurements were taken from the forearm at baseline and after a single application, and were compared to the untreated control area (contralateral forearm).*
Results: *All patients completed the study and there were no adverse reactions. Higher levels of hydration and a reduction of transepidermal water loss were verified in the area washed with the shower gel when compared to the area washed with pure water. Significant improvement was observed in the pruritus and skin smoothness, and there was less irritation and dryness after continued use.*
Conclusions: *A cleansing process using a syndet gel was demonstrated as capable of preserving not only the skin's integrity, but also the skin barrier in atopic patients, in addition to improving clinical signs and symptoms related to xerosis, such as dryness and pruritus.*
Keywords: *dermatitis, atopic; skin care; pruritus; therapeutics.*

RESUMO

Introdução: A xerose cutânea, comum na dermatite atópica, favorece o prurido e a inflamação. A higiene com tensoativos syndet é suave e preserva a barreira cutânea.
Objetivo: Avaliar a tolerância e melhora da xerose da pele com gel de banho especialmente desenvolvido para a pele atópica.
Métodos: Avaliaram-se 33 pacientes entre 18 e 50 anos, durante quatro semanas de uso exclusivo; medidas de hidratação, perda de água transepidérmica e pH da superficie cutânea foram feitas no antebraço ao início do estudo, e, após aplicação única, a área foi comparada com a que não foi tratada (antebraço contralateral).
Resultados: Todos os pacientes terminaram o estudo; não houve reações adversas. Foram constatados maiores níveis de hidratação e redução da perda de água transepidérmica na área lavada com o gel de banho em comparação à área lavada com água pura, observando-se melhora significativa no tempo de duração de prurido, bem como na maciez da pele, além de menor irritação e ressecamento após o uso continuado.
Conclusões: A higienização com gel syndet demonstrou não somente preservar a integridade da barreira cutanea no paciente atópico, como também a melhora clínica de sintomas e sinais relacionados à xerose, tais como ressecamento e prurido.
Palavras-chave: dermatite atópica; higiene da pele; prurido; terapêutica.

INTRODUCTION

Atopic dermatitis is an inflammatory dermatosis in which the skin barrier's primary defect supports the continuity of the pathophysiology, making it more susceptible to pruritus, xerosis, and secondary infections.[1] If not treated, xerosis can also exacerbate atopic dermatitis, as well as other inflammatory dermatoses. The defect in the skin barrier favors the release of inflammatory cytokines, which in turn triggera dermal inflammatory process, causing or worsening dermatitis. With increased transepidermal water loss resulting from this process, and with the increased contact with irritants and allergens, there is deterioration of the skin barrier's function, perpetuating the damage.[2]

In this scenario, any measure that can preserve and restore the skin barrier must be taken. Appropriate cleansing combined with the use of moisturizers stabilizes the barrier's function, limiting the conditions that favor irritation and helping to reduce the use of topical steroids, which disrupt the skin barrier's function in the long run, and predisposing it to infections.[3] In regards to the cleansing process, it is important to establish a balance between removal residues and impurities, keeping the skin barrier and surface pH significantly unchanged, a fundamental condition for the equilibrium of the microflora (which helps in the prevention of infections).[4,5] The normal pH of untouched skin is slightly acidic, between 5.5 and 6.5.[6] Maintaining the pH level in this range involves the degradation of fillagrin into amino acids, which occurs during the keratinization process. It results in the formation of urocanic acid and induces the presence of fatty acids derived from NMF (natural moisturizing factor) and sebaceous glands, which are also produced by the lipases of normal microflora.[7,8]

In atopic patients, there is a trend towards increased pH levels. This phenomenon is caused by the reduction of proteolysis in the filaggrin, and is associated with altered synthesis of free fatty acids by sebaceous glands and epidermal phospholipids, which entails an increase in pH, particularly in the areas with lesions.[9]

This increase in the pH of the cutaneous surface is an important factor inalterations to the local microflora, causing a tendency towards infection by *Staphylococcus aureus*.[10] There is evidence that at least 30% of patients with atopic dermatitis have a genetic deficit in the synthesis of filaggrin, loricrin, and ceramide, as well as of antimicrobial peptides.[11] In this context, surfactants are of paramount importance, given that they are responsible for the emulsification of lipids in the skin's surface. Syndets (*synthetic detergents*) have a milder degreasing action, with a neutral or slightly acidic pH, and do not promote the alcalinization of the cutaneous surface.[12,13]

Syndets have the least amount of surfactants (*surface active agents*), which are compounds responsible for the adsorption of impurities on the surface, forming micelles.[14] Some studies suggest clinical improvement of eczematous lesions through continuous cleansing with the use of syndets, including in children.[15,16]

There is an absence of studies on the behavior of atopic skin with regard to its cleansing with the use of products specifically developed for this purpose. The present study was aimed at evaluating the tolerance and impact on the symptoms of atopic dermatitis when exposed to a skin cleanser specially developed for atopic skin, measuring its effects on hydration, pH, and the skin barrier through measurements of transepidermal water loss.

METHODS

A prospective, controlled study was conducted in June and July 2011, at a private clinical research laboratory (Medcin Instituto da Pele), in the city of Osasco (SP), Brazil.

The study population consisted of 33 male and female adult patients, between the ages of 18- and 50-years-old, with a clinical diagnosis of mild atopic dermatitis (according to Hanifin and Rajka criteria) without active lesions at the time of admission, and who hadn't used medication for up to four weeks prior to inclusion.

Patients with acute eczematous dermatitis who required immediate medicament-based therapy, or who were under the use of oral or topical corticosteroids, as well as any kind of topical or systemic medication that could influence the inflammatory response, were not included.

After signing the free and informed term of consent, all participants were clinically evaluated at baseline for the parameter *cutaneous xerosis*, according to a five-point scale where: 1 = very xerotic skin; and 5 = hydrated skin with no sign of xerosis. Following the clinical examination, biophysical measurements were collected in order to assess the product's behavior regarding its effects on the skin barrier through hydration, transepidermal water loss, and cutaneous surface pH. The following equipment was used:

- Measurement of the stratum corneum's hydration: Corneometer® MPA 580 (Courage & Khazaka, Germany). The device gauges the electrical capacitance of the epidermis. Higher measured values indicate greater volumes of epidermal water.
- Measurement of transepidermal water loss: Tewameter® (Courage & Khazaka, Germany). It gauges the state of the barrier integrity regarding its capacity to retain water. Higher measured values indicate worse states of barrier integrity.
- Measurement of the pH levels of the skin's surface: Phmeter® (Courage & Khazaka, Germany). The scale varies from 1 to 14, with lower values indicating higher acidity and higher values suggesting greater alkalinity.

After a single application of the product on the forearm—by washing the evaluated area according to the product's use instructions—new corneometric and transepidermal water loss (TEWL) measurements were taken immediately after the washing process and then every hour for four hours. The pH measures were taken just before and again 15 minutes after the cleansing process. The contralateral forearm was used as the control area for all measurements taken, being washed in the same manner, however in this case only water was used.

All measurements were taken at room temperature and controlled humidity (24+2C° and 50 + 5%, respectively), with the average of three measurements being recorded and used for

the purposes of the study. These measurements were performed in order to assess the immediate impact of a single cleansing procedure with the shower gel.

Evaluation under use conditions

At the end of the instrumental evaluation, the volunteers were given a standardized bottle containing 400ml of facial and body cleanser gel (Nutratopic® emollient shower gel, Isdin, São Paulo SP, Brazil) and instructed to apply once a day at home, during bathing, for 28 +2 days.

At the end of the study, subjective questionnaires were distributed to the participants for the evaluation of the following items: cleansing without drying, cleansing without irritation, improvement of pruritus, improvement of dryness and smoothness. The study protocol and the free and informed term of consent were previously approved by the Independent Ethics Committee.

RESULTS

All patients (N = 33) reached the end of the study. No adverse reaction was mentioned or detected in the clinical examination of the group treated with the emollient shower gel.

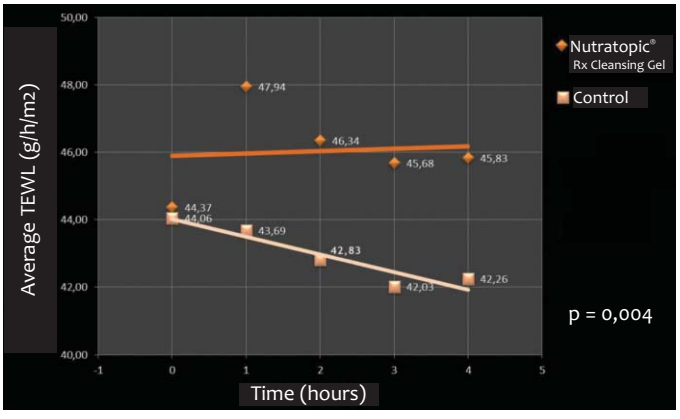
Instrumental assessment of the skin barrier

The following graphs illustrate the behavior of the mean of the instrumental measurements for the evaluated group after a single application of the emollient shower gel. (Graph 1)

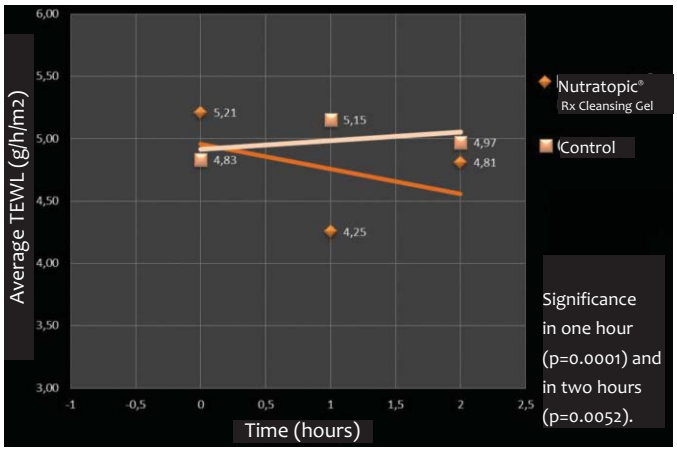
A significant improvement of corneometric levels was verified after a single cleansing procedure, within up to four hours after the application, when compared to the control (p = 0.004). (Graph 2)

There were significant time reductions (by one hour, p = 0.0001 and two hours, p = 0.0052) for Nutratopic® Shower Gel as compared to the control, evidencing the cutaneous barrier's restorative effect. (Graph 3)

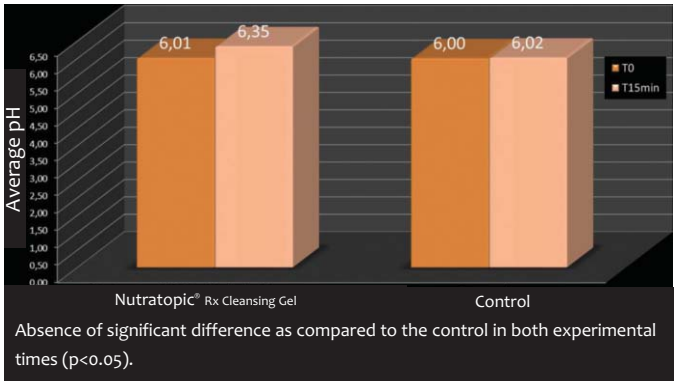
The variation of pH occurred within physiological parameters, with no significant difference when compared to the control (p <0.05).



Graph 1: Mean of the time-point corneometric measurements before and after one, two, three, and four hours of a single application, in both the treated and untreated areas (n = 33).



Graph 2: Average of time point evaporimetric measurements before and after one, two, three, and four hours of a single application,both in the treated and untreated areas (n = 33)



Graph 3: Average of pH measurements in the time points before and 15 minutes after,a single application, in the treated and untreated areas (n = 33)

Statistical evaluation

All data were statistically analyzed through a Student's t-test, with a 5% significance level.

Clinical evaluation

Of the 33 patients evaluated in the treated group, none developed eczematous pattern lesions during the evaluation period. None of the patients presented a picture of a clinical worsening of the atopic dermatitis. Cutaneous xerosis: there was an improvement in the score used to measure xerosis. At baseline, the average scores obtained for xerosis was 2.9. Twenty-eight days after, the average of the scores rose to 4, suggesting a significant improvement in the clinical assessment (roughly 66%, p <0,01).

Subjective evaluation

The subjective evaluation suggested significant improvement over time for all parameters assessed in the treated group, as shown in Chart 1.

Chart 1: : Final evaluation: subjective questionnaire

Subjective evaluation	Intense/moderate improvement
Softer skin	97%
Cleansed without drying	97%
Cleansed without irritating	97%
Improved the pruritus	94%
Improved the dryness	94%

DISCUSSION

Alterations in the cutaneous barrier are typical findings in atopic dermatitis, even in clinically uninjured skin.[17] There is increased transepidermal water loss and lower water levels in the epidermis, which contribute to the perpetuation of the inflammatory picture, because it favors pruritus and secondary infections due to the elevation of the pH.[18] The cleansing of atopic skin is a concern in the therapeutic approach. The dilapidation of the cutaneous surface during bathing increases the damage to the barrier, worsening the pruritus. Emollients often do not readily act on the recovery of the barrier and cannot completely prevent pruritus. Corticosteroids, in turn, increase the damage to the cutaneous barrier, inducing a vicious cycle.

For ethical reasons, the study was conducted on patients with mild atopic dermatitis without active lesions. Such patients many times do not use emollients routinely, which often undermines the prevention of recurrences.[19] Patients in the present study had xerotic skin, with levels of around 44 corneometric units, as compared to eudermic skin, which often has above 55 corneometric units.[20] The use of the studied syndet-based cleanser allowed the maintenance of previous hydration levels. With statistical significance, the data demonstrates that such a preservation level is not observed when the cleansing procedure is carried out with pure water. The same finding is observed in the main parameter that evaluates the cutaneous barrier (the transepidermal water loss), where there is no significant alteration—and even the presence of a slight improvement—a fact that is not observed when cleansing without any type of soap. This parameter is an important indicator of the integrity of the barrier.[21] This data was clinically translated into the relief of typical symptoms of atopic dermatitis, such as pruritus and dryness. Even without the concomitant use of emollients, no discomfort was reported in any of the patients after continued use, with the majority considering its use as a factor of relief of symptoms. During the clinical examinations, the significant improvement in xerosis confirmed the impact of an adequate cleansing process for reducing the damage to the barrier. The cleansing action of soaps is effected by the detergent agents. In daily practice, only substances such as soaps and similar products are considered detergents. This is because of the fact that their molecules have a hydrophilic part (that attracts water molecules) and a lipophilic part (which is hydrophobic), and therefore emulsify fats or organic materials.

Surfactants are molecules that have detergent action. The spatial chemical structure of the molecules has two areas: polar (water soluble, hydrophilic) and nonpolar (not water soluble, hydrophobic).[12] This chemical structure, which has dual polarity, interacts favorably with molecules—both water and non-water soluble molecules, such as oils and non-soluble silicones—and is responsible for the detergent action.

Soaps with synthetic surfactants (syndets) are composed of lipids that have undergone reactions such as ethoxylation, esterification, and others, but have not been saponified, and are milder than the classical surfactants. They lend a more acidic pH to the cleansing agent, with greater tolerability and lower reactivity with salts present in the water, in addition to imparting a softer feeling to the skin after its use.[22] Many body care products contain surfactants for cleaning without irritation, nevertheless tolerance is higher only in those in which syndet surfactants predominate. Adding emollients in the formulation also lend softness to the cleansing process, particularly when the cleanser is specifically directed to xerotic skin, such as in the case of the product evaluated in the present study.

In a recent study, Cheong demonstrated that patients with alterations in the skin barrier benefit from gentle cleansing, which acts synergistically to hydration.[23] Continued use of products with a slightly acid pH (physiological) helps to preserve the skin's natural pH and therefore reduces the risk of staphylococcal infections.[24, 25] In addition, they do not cause a risk of sensitization and are more effective at removing impurities and bacteria.[26] Currently, syndet based cleansers are the safest option for the treatment of the skin with alterations in the cutaneous barrier, such as atopic dermatitis.

CONCLUSIONS

The preservation of the cutaneous barrier is a fundamental requisite in the treatment of atopic skin, in which xerosis may worsen with the use of common soaps. Cleansing with a syndet product, such as the shower gel analyzed in the present study, demonstrates that not only is there preservation of the integrity of parameters inherent to the cutaneous barrier, but there is also improvement in clinical signs and symptoms linked to xerosis, such as dryness and pruritus. ●

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Article
Original

Nail surgery: follow-up on cases conducted during a practical course of a Dermatological Meeting

Cirurgia das unhas. Seguimento de casos operados em curso prático realizado em Congresso Dermatológico

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ABSTRACT

Introduction: *Workshops are offered during Dermatological Meetings in order to teach surgical procedures, both live and in detail. Nevertheless, access to post-operative developments, as well as to the results obtained, are restricted to the physicians from the medical services responsible for organizing these events.*

Objective: *To assess, and make known, the progress and results of previously operated cases.*

Methods: *Eight patients with different pre-operative diagnoses were operated on the nail surgery workshop that occurred during the Brazilian dermatological meeting RADESP 2011, with a nine-month follow up. The results were evaluated using photographs, taken every three months, by the surgeons responsible for the surgeries.*

Results: *Of the eight operated cases, two were considered as yielding satisfactory results (one with mild dystrophy of the nail plate and the other with time considered insufficient for better assessment), and five were deemed as cured. One case did not return for the follow-up visits.*

Conclusion: *Following up and presenting the post-operative development of these patients as well as publishing the responsible surgeons' evaluations, complements the knowledge acquired by the workshops' attendees, and that of other participants at the meetings.*

Keywords: *general surgery; nails; treatment outcome.*

RESUMO

Introdução: Durante os Congressos de Dermatologia são ministrados cursos práticos com o intuito de ensinar, ao vivo e de forma detalhada, os procedimentos cirúrgicos. Porém, a evolução pós-operatória, bem como os resultados obtidos, ficam restritos aos médicos dos serviços responsáveis pela organização desses eventos.

Objetivos: avaliar a evolução e resultados dos casos operados tornando-os conhecidos.

Métodos: Oito casos operados durante Congresso Dermatológico – RADESP 2011 - no curso de cirurgia da unha, com diferentes diagnósticos pré-operatórios seguidos por nove meses. Os resultados foram avaliados pelos cirurgiões responsáveis pelas cirurgias, por meio de fotos a cada três meses.

Resultados: Dos oito casos operados, dois foram considerados com resultados satisfatórios, sendo um com leve distrofia da placa e outro com tempo considerado insuficiente para melhor avaliação e cinco curados. Um caso não compareceu aos retornos.

Conclusão: A apresentação do seguimento destes pacientes bem como a avaliação dos cirurgiões responsáveis complementa o conhecimento adquirido pelos participantes destes cursos como também aos demais congressistas.

Palavras-chave: cirurgia geral; unhas; resultado de tratamento..

INTRODUCTION

In recent decades, annual meetings in the dermatologic field have attracted increased interest by offering pre-event practical surgical workshops—initially hands-on, currently only observational. These courses last at least one full day and cover the vast majority of subjects in surgical dermatology. Typically, a local university medical school accredited by the Brazilian Society of Dermatology takes responsibility for the organization of such courses, including the selection and monitoring of participant patients. Both Brazilian and foreign-renowned physician professors actively take part, performing surgical procedures. Diagnoses, indications, and surgical planning are discussed with attendees during the courses. The surgeries are presented step-by-step, with attendees being allowed to ask questions during the procedures. Participant patients are seen, assessed, and guided throughout the post-operative period by monitors appointed by the medical school in charge. The data gathered during the post-operative follow up, as well as the final outcome of those procedures, is brought to the knowledge of course attendees later on. In this manner, the authors have evaluated and monitored participant patients who underwent surgical procedures in a practical course held at a dermatological annual meeting, making the developments and outcomes available, and completing the learning cycle of attendants.

METHODS

A prospective observational study was conducted at the Hospital Universitário de Taubaté (SP), Brazil. Eight previously selected patients for the pre-event practical nail surgery course (2011 Annual Meeting of the Brazilian State of São Paulo's Dermatologists—RADESP) were followed up with for nine months. The course was coordinated by Prof. Eckart Haneke (Germany) and Prof. Nilton Di Chiacchio (Brazil). All patients were contacted, having consented to the publication of data and photographs. Those who did not attend the return visits were excluded from the final results. Previous diagnoses and techniques used are described in Table 1. The patients were evaluated post-operatively by the responsible medical school's care service at monthly intervals and photographed every three months. With nine months of follow-up, the photographs were sent to the instructors responsible for the surgical procedures carried out during the courses, who then issued their opinions and comments on the outcomes.

RESULTS

Of the eight case surgeries conducted, only one (melanonychia) did not attend the return visit and therefore was excluded.

The outcome of Case 1 (transverse hyper-curvature of the nail) was deemed satisfactory up until the present article was written.[1,2] According to the surgeons responsible for the procedure, the nail plate will still grow, however will remain narrower when compared to the contralateral hallux. This outcome is expected in hypercurvature surgeries, where the main goal is pain relief and, secondarily, aesthetic improvement.

Cases 2 to 6 (ingrown toenail Grades 1and 3,[1,3] subungual exostosis,[1,4] chronic paronychia[1,5] and fibrokeratoma,[1] respectively) were deemed cured with excellent aesthetic results.

In Case 7 (melanonychia),[6] the responsible surgeons verified the occurrence of a limited nail dystrophy, justified by the necessity of removing a great portion of the nail matrix, due to the size of the lesion. According to the surgeons, tangential excision of the matrix is aimed at decreasing or avoiding completely the undesirable dystrophy of the nail plate, which is common in the previously used techniques of elyptical excisions or when employing a punch. In Case 7, the resulting dystrophy had been considered acceptable thus far, for as the nail plate grows, the dystrophy may still be replaced by a normal plate (Figures 1 to 3).

DISCUSSION

Practical courses taught during dermatological events impart knowledge to the attendees, who have direct contact with the conditions that occur most frequently in practices, and have the opportunity to discuss the best course of treatment. Surgical techniques are presented and discussed, providing access to details and knowledge that are not usually described in textbooks. Thus, attendees who are inexperienced in the subject have the opportunity for a first contact with the procedure, and experienced practitioners have the opportunity to enhance their expertise.

The post-operative follow-up is of paramount importance for the success of the surgical procedure. Depending on

Table 1: Identification of patient, ungual condition, and surgery procedure performed

	Gender	Age	Ungual condition	Surgery performed
Case 1	Female	50	Transverse hypercurvature of the nail – pincer nail	Haneke's technique
Case 2	Female	64	Ingrown nail Grade 1	phenolization of nail matrix
Case 3	Female	28	Ingrown nail Grade 3	phenolization of nail matrix and Dubois
Case 4	Male	22	subungual exostosis	Osteotomy
Case 5	Female	48	chronic paronychia	excision of the proximal nail fold
Case 6	Female	58	Digital Fibrokeratoma	excision
Case 7	Female	68	melanonychia	Tangential excision
Case 8	Female	60	melanonychia	Tangential excision

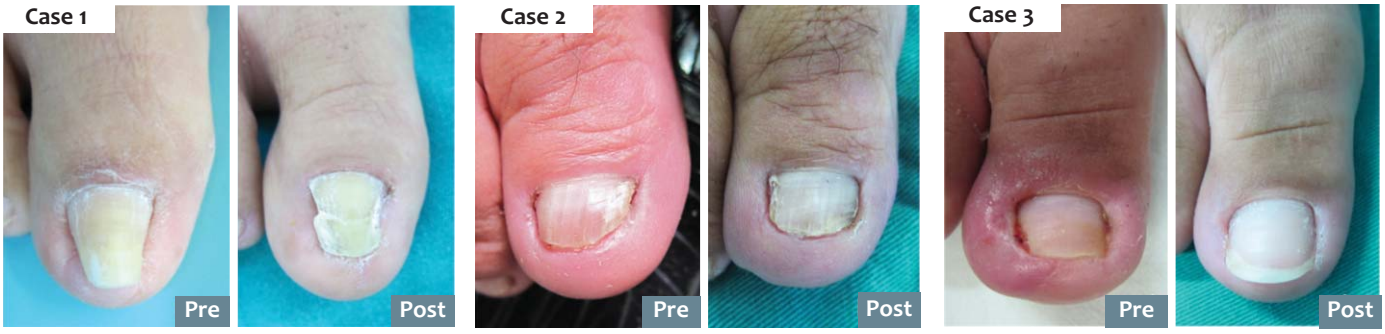

Figure 1: Cases 1, 2 and 3. Nine month follow up

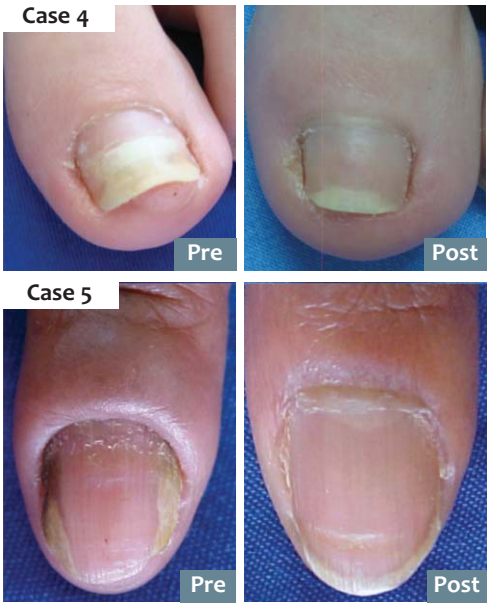

Figure 2: Cases 4 and 5. Nine month follow up

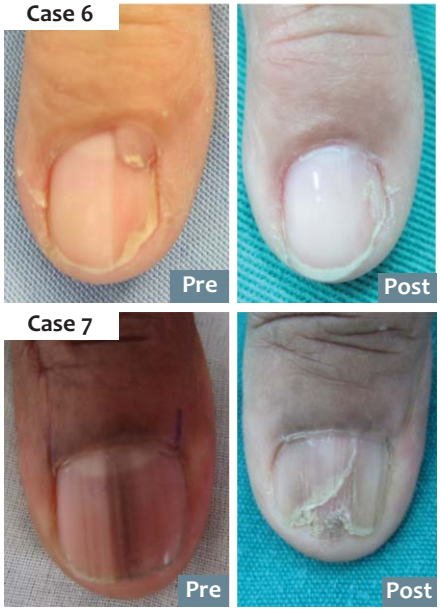

Figure- 3: Cases 6 and 7. Nine month follow up

the procedure used, the duration of the post-operative period can vary and complications might occur that the doctor must know how to handle. In the pre-event courses, the post-operative development of participant patients is usually not followed up, leading to the existence of an important gap in the learning of the attendees.

The present paper evaluated the 9-month post-operative period of patients operated for the correction of complex conditions that compromised the nail apparatus, submitting the outcomes to the responsible surgeons, who in turn evaluated and commented on the results. In this manner, not only course attendees but also the wider community of dermatologists can have access to the continuity of relevant surgical procedures, further enhancing their knowledge.

Based on the outcomes off the seven cases that reached the end of the pre-determined post-operative follow up, all were considered cured—with some reservations about the necessity of a longer follow up period. Photographic documentation can be considered crucial for monitoring the post-operative development and verifying outcomes.

CONCLUSION

The surgical outcomes of the pre-event course studied in the present paper showed good results. Monitoring the development of participant patients, and making both the follow-up data and the responsible surgeons' evaluations available complements the knowledge gained by course attendees and the wider dermatologic community.

Development data and outcomes of other pre-event courses should also be made available for the same purpose. ●

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Article
Original

Treatment of gynoid lipodystrophy with unipolar radiofrequency: clinical, laboratory, and ultrasonographic evaluation

Tratamento da lipodistrofia ginoide com radiofrequência unipolar: avaliação clínica, laboratorial e ultrassonográfica

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ABSTRACT

Introduction: Gynoid lipodystrophy may affect up to 95% of post-pubertal women. Treatments are aimed at improving the skin's appearance. Invasive procedures have long recovery times and may cause complications. Non-invasive methods, such as radiofrequency, are increasingly becoming popular.

Objective: To evaluate unipolar radiofrequency's safety and efficacy in the treatment of gynoid lipodystrophy.

Methods: Eight women with gynoid lipodystrophy grades II and III, in the gluteus region and thighs, underwent treatment with four sessions of unipolar radiofrequency at fortnightly intervals. Clinical-photographic, laboratory, and ultrasound evaluations of the patients were performed before, during, and 30 days after the end of the last session.

Results: Improvement in the sagging of the skin was clinically observed in all treated patients. Four patients also had improvement in morphology. The ultrasound evaluation showed a statistically significant increase ($p < 0.05\%$) in dermal thickness after the treatment in seven of eight patients. There were no laboratory abnormalities.

Conclusions: Unipolar radiofrequency is an effective and safe method in the treatment of gynoid lipodystrophy in the gluteus region and thighs.

Keywords: cellulitis, ultrasonography, Treatment Outcome.

RESUMO

Introdução: *A lipodistrofia ginoide pode acometer até 95% das mulheres pós-púberes. Os tratamentos visam melhorar o aspecto da pele. Procedimentos invasivos têm tempo de recuperação longo e podem causar complicações. Métodos não invasivos, como a radiofrequência, têm obtido popularidade.*

Objetivo: *Avaliar a segurança e eficácia da radiofrequência unipolar no tratamento da lipodistrofia ginoide.*

Métodos: *Oito mulheres com lipodistrofia ginoide grau II e III, na região glútea e coxas, foram submetidas ao tratamento com quatro sessões de radiofrequência unipolar com intervalos quinzenais. Foi realizada avaliação clinicofotográfica, laboratorial e ultrassonográfica das pacientes antes, durante e 30 dias após termo da última sessão.*

Resultados: *Clinicamente, a melhora na flacidez da pele foi observada em todas as oito pacientes tratadas, e a melhora na morfologia em quatro delas. A avaliação ultrassonográfica mostrou aumento estatisticamente significativo ($p<0,05\%$) na espessura da derme após tratamento em sete das oito pacientes. Não foram observadas alterações laboratoriais.* ***Conclusões:*** *A radiofrequência unipolar é método eficaz e seguro no tratamento da lipodistrofia ginoide da região glútea e coxas.*

Palavras-chave: *celulite; resultado de tratamento; ultrassonografia.*

INTRODUCTION

Gynoid lipodystrophy (GL), commonly known as cellulite, is considered by many to be an aesthetic disorder. This terminology was introduced by the French medical literature more than 150 years ago.[1,2] Other terms, such as dermopanniculosis deformans and adiposis edematosa, are also used.[3-5]

It is estimated that between 85-95% of women have some degree of GL after puberty,[6] which can be located in any body site containing adipose tissue.[4] However, the hip, gluteal region, and lower limbs are the most susceptible areas.

There are four main hypotheses for the origin of GL, the first being the sexually dysmorphic architecture of the skin, based on gender-related differences. According to this theory, the skin depressions common to the appearance of GL are caused by fat herniation. The fat penetrates from the subcutaneous tissue in the dermal-epidermal interface through the inferior surface of a weakened dermis. Its presence was, confirmed by ultrasound. This is a characteristic of female anatomy.[7-9] Some authors have studied autopsy specimens of the thighs of healthy women between 29-39 years old who had GL, comparing them with the thighs of men and women who did not have GL. The comparison revealed important characteristic differences in the microarchitecture of the fibers of the subcutaneous connective tissue of these groups. It also showed that this alteration was immediately below the dermal-epidermal interface. The conclusion was that the permanent depressions of GL are the result of the continuous and progressive stretching of the hypodermis' collagen fibers (in the vertical direction), entailing the weakening of the connective tissue, which allows for the herniation of the fat, also giving rise to the conjunctive tissue's septa alteration theory.[10]

Later on, it was postulated that the origin of GL could be related to vascular alterations. It is believed that the process originates from damage that occurs in the dermal vasculature, in response to alterations in the sphincters of the precapillary arterioles of the affected areas. This occurs in association with the deposition of glycosaminoglycans (GAGs) in the walls of the dermal capillaries and within the fundamental substance between the collagen and elastin networks.[4] These changes would lead to increased capillary venous permeability and to the excessive retention of fluids within the dermis, among adipocytes, and between the lobular septa. This would occur due to the hydrophilic property of GAGs, increasing the interstitial pressure. The resulting edema generates cellular alterations and entails vascular compression and vessels ectasia, in addition to decreased venous return with tissue hypoxia. This leads to the thickening of the fibrous septa in the superficial adipose tissue and deep dermis, causing the mattress aspect of GL.[11-13] Finally, some authors quote inflammatory factors as key pathophysiological agents of GL. Based on the complaint of sensitivity to compression of some GL patients, 2,14 Kligman 14 reported the diffuse appearance of chronic inflammatory cells in the fibrous septum of patients with GL. This inflammation leads to dermal adipolysis and atrophy. Other authors did not find inflammation in patients with GL.[2,6,10]

GL occurs in all races, but is more common in Caucasian women.[15] Several predisposing factors, such as female gender, advanced age, heredity, ethnicity, and obesity, have been described.[16] It is important to note that in all body sites where there is deposition of fat (in the female pattern), GL is observed. Nonetheless, a patient does not need to be obese in order for GL occur.[6] On the other hand, overweight—or even obese—men have little or no expression of GL, which leads to the suggestion that the hormonal factor is determinant in the pathogenesis of this condition. Another factor that reinforces the hormonal influence hypothesis is the observation of the worsening or onset of GL associated with estrogen action, such as puberty, pregnancy, menstruation, and estrogen therapy.[17] Other hormones are also associated. Insulin—which in patients with unbalanced diets and excessive consumption of fat and carbohydrates causes hyperinsulinemia—increases lipogenesis and inhibits lipolysis, thus generating fat accumulation. Another associated hormone is prolactin, which increases water retention, generating edema.[18] Many etiopathogenic mechanisms are involved, and in most cases it is not possible to determine a single cause.

Among the available treatments is liposuction, a surgical method of removing fat aimed at reducing GL, which leaves unsatisfactory results in most cases—even possibly worsening the skin's appearance.[11] Multiple topical treatments are used, aimed at improving the skin's appearance, such as the xanthines and retinoids. These substances are deemed effective, producing a slight change in the skin's irregularity after months of use, with continuous use being necessary to maintain its efficacy.[19-21]

Among the devices used, ultrasound has been developed with an aim at producing volumetric heating of the treated tissue and, secondarily, lipolysis, however more clinical studies are necessary.[22] More recently, shockwave therapy, similar to that used in the treatment of nephrolithiasis,[22] was described with significant improvement of GL. Two mechanisms have been described that have demonstrated the ability to perform the thermal modification of the skin's connective tissue: laser and radiofrequency (RF). RF produces heat through the action of an electric current between two dipoles, which is different from lasers, whose heat output is due to the absorption of photons (emitted by a source of light) by the tissue's chromophores.[1] An advantage of RF is the possibility of using this technology in any skin phototype. RF works through two main mechanisms of action: producing dermal heating, and vasodilation. The thermal injury activates the inflammatory cascade and stimulates the synthesis of collagen by the fibroblasts (neocollagenesis), promoting the thickening of the dermis.[1,23] Vasodilation leads to hyperemia and lymphatic draining in the adipose tissue.[1] The association of mechanisms acting on the dermis and subcutaneous tissue provides the improvement of the skin's appearance.

RF devices produce electromagnetic currents using radiation in the 3kHz to 300 MHz frequency range. When the current is applied to the tissue, it encounters resistance due to the tissue's impedance—which is a property inherent to the type of tissue. This resistance to the passage of electric current converts the latter into thermal energy, producing heat.[24,25]

The energy used is computed through the formula , where:

I = current,
z = impedance,
t = time (seconds).

Therefore, the amount of energy produced depends on the current and the impedance of the target tissue. High impedance tissues, such as subcutaneous fat, generate large amounts of energy and have deeper thermal effects. [25,26]

Various RF delivery methods have been developed: monopolar, unipolar, bipolar, and fractional. RF devices operate in different ways according to the technique or technology. The monopolar RF system releases energy using one dipole located in the device's tip and another in contact with the patient's skin, which acts as a grounding or return electrode. The skin retraction effect is based on the principle of volumetric heating. The electrode is designed to uniformly disperse the energy through the skin surface, through a process called capacitive coupling, which creates a zone of higher temperature at a controlled depth of 3-6mm. The depth of the heat depends on the size and geometry of the tip used. [25,26]

The unipolar RF differs from other RF devices in that it does not produce electric current in the tissue. Rather, it produces high frequency electromagnetic radiation, resulting in a rapid alternating polarity of the electromagnetic field, inducing high frequency rotational oscillation in the wate rmolecules, which acts as the "chromophore". Such ultra-fast oscillations generate heat, which is then dissipated in the tissue. The electromagnetic wave phase produced by this device is controlled in such a way that it allows the penetration of heat in a tissue depth of up to 20mm. The heat produced by the movement of the water molecules allows the skin's surface temperature to stabilize in the range of 400ºC, while higher temperatures (50-75ºC) are obtained in the reticular dermis.[1,16,25] There is no return electrode in this RF modality, entailing that there is no need for the target to be static.[1]

The main difference between bipolar and monopolar RF is the configuration. The bipolar configuration consists of two active electrodes placed at a short distance from each other, with the current flowing between them and a penetration depth of approximately half the distance between the two electrodes. The main limitation of this configuration is the penetration,[25] however it provides better control of the distribution of energy and less pain.

The fractional non-ablative RF consists of a new therapeutic approach. While some devices use electrodes, others use microneedles arranged in pairs, with bipolar energy being released between them. This energy generated by that RF produces areas of treated skin, sided by areas of untreated skin. In the treated areas, there is thermal damage of the deep dermal collagen, stimulating healing, dermal remodeling and formation of new collagen, elastin, and hyaluronic acid.[26,27] The untreated areas—located between the treated areas—initially maintain the integrity of the skin, but in the long run serve as a reservoir of cells that promote and accelerate healing.[28] All these RF systems generally have a cooling system to prevent epidermal heating and provide additional comfort to the patient. The most commonly reported side effects in RF-based treatments are transitional erythema, small and large blisters, echymosis, crusts, scars, and dyschromias, all resolving without complications.[1,16]

Despite the availability of multiple therapeutic modalities, there is little scientific evidence demonstrating the treatments' effectiveness. In fact, most of the evidence is anecdotal, subjective, or based on patients' self-evaluation.

The present study is aimed at evaluating the efficacy and safety of a unipolar RF device in the treatment of GL in the gluteal region and thighs, not only through dermatologic examination, but also through ultrasound, in order for a less subjective assessment to be carried out. Laboratory tests for lipid profile evaluation were aimed at assessing the possible interference of deep unipolar RF action in lipid metabolism.

METHODS

A prospective, comparative (before-and-after), non-randomized and without control study was carried out in female patients with GL in the gluteal region and thighs. The treatment was performed at the authors' private practice. The proposed technology for the treatment was the Accent® high energy RF (Alma Laser Ltd., Israel), with unipolar tip. The laser-based thermometer (Center 350) was used to take temperature measurements during the treatment.

The ultrasound device with 13MHz multifrequency transducer (General Electric, GE, model Voluson 730) was used to assess the thickness of the dermis and hypodermis before and after the treatment. The ultrasound examinations were performed at the private practice of one of the authors of the study (a radiologist physician). Numeric indices were used for the objective evaluation.

A Sony DSC H9 – super steady shot 8.1 MP camera was used in the photographic study.

Additional laboratory tests were used to assess the safety of the proposed method.

The selection of patients was carried out by the two dermatologist physicians who performed the procedures. The clinical evaluation was carried out by two dermatologist physicians who were not involved in the project, with the assistance of the sagging and morphology photographic scale.[29]

Side effects, such as erythema, blisters, hematomas, echymosis, crusting, scarring and dyschromias, were evaluated according to the four-point scale: 1) absent, 2) mild, 3) moderate, 4) heavy.

The statistical analysis of dermal measures obtained from ultrasound was carried out using the Wilcoxon test (SPSS software, version 13).

PATIENTS

Inclusion Criteria

The authors selected eight female volunteer patients aged 28-45 years, Fitzpatrick phototypes II to IV, BMI between 20 and 25, and who had grades II and III GL (Nurnberger - Muller scale) in the gluteal region and thighs. After receiving an explanation about the procedure and all stages of the study, the patients signed a term of consent and authorized the publication of photographs.

Exclusion Criteria

Infections or scars in the treatment site, pregnancy, use of a pacemaker or cardioverter, autoimmune disease, epilepsy, diabetes, and prior history of surgery or liposuction on the gluteal region and/or thighs.

Unipolar RF-based procedure

Four RF sessions were carried out on predetermined sites with intervals of two weeks. Patients were instructed not to change their eating habits or use any medication aimed at improving the firmness of the skin or GL during that period. The patients received follow up from the same physicians throughout the study period. The marking of the area to be treated (a total of 20cm2 for each gluteal region and thigh) was carried out with the patient in orthostatic position. Before the application of the RF, mineral oil was applied in the area, with the aim of facilitating the sliding of the device's tip on the skin, allowing better energy transfer.

During the treatment, the unipolar tip was kept in an upright position and in full contact with the skin, and was moved constantly in circular, horizontal, and vertical strokes for 10 minutes in each of the 10cm2 areas, with 5 to10 seconds intervals, every 30 seconds (20 cycles of 30 seconds).

The initial energy used ranged from 180W x 30 seconds = 5,400 joules = 109 J/cm^2 to 220W x 30 seconds = 6,600 = 133 J/cm^2, with 20 consecutive passes in each gluteal region. The initial energy was chosen based on the BMI of the patients (for BMIs between 20 and 22, the initial energy was 180W), (for BMIs between 22 and 25, the initial energy was 220W), being increased or decreased depending on the tolerance of the patients. Upon reaching the a 40°C temperature, it was decreased by 10% in every 30-second cycle, with a view to providing comfort to the patient and alleviating side effects. Nevertheless, the temperature was always kept between 39-41°C during the 10-minute procedure (for each 10cm^2). The temperature was monitored with a digital thermometer after each of the 30-second cycles.

Neither cream, nor any type of massage or lymphatic drainage, was applied after the procedure.

The clinical analysis was carried out by comparing photographs of the morphology and the sagging of the patients' gluteal region and thighs both before, and 30 days after the treatment. The photonumeric scale of cellulite severity described by Dr. Doris Hexel et al.[29] was used as a basis for that analysis. That scale shows photographs of different degrees of sagging and morphology of the cellulite, rating the severity from zero to three, as follows:

Morphology: 0) unaltered, 1) orange peel appearance, 2) cottage cheese appearance, 3) mattress appearance.

Sagging: 0) unaltered, 1) slightly sagging appearance, 2) moderate sagging appearance, 3) severe sagging appearance.

Before, and 30-days after, treatment photographs were compared with the photographs from the scale, and then subsequently graded. When there were changes of at least one point both in the morphology and in the sagging scales, clinical improvement was acknowledged.

Photographic evaluation

The photographs taken were standardized (same room, same professional photographer, camera fixed at the same place, patients standing up at the same distance from the camera). Pretreatment and 30-days after photographs were taken, with the patients' gluteal muscles both in the relaxed and contracted positions, from the posterior, left side, and right side views.

Complementary examinations and laboratory tests

Laboratory tests were carried out before, during, and after the treatment to evaluate possible endocrine and metabolic alterations.

Tests carried out before the treatment: blood count, erythrocyte sedimentation rate, glucose level, urea, creatinine, thyroid hormones (free T4 and TSH), lipid profile, hepatography.

In the third session, the lipid profile was carried out before the procedure and two hours after for the evaluation of possible alteration of serum lipids.

Tests carried out after the last session: blood count, lipid profile.

Ultrasonography

The ultrasound examination was always performed by the same radiologist physician, before the treatment, and 30-days after the last session.

The areas for sonographic evaluation were chosen randomly in the right thigh (supine position, with an isolation area of 10 x 10cm located 15cm below the anterior superior iliac spine) and right gluteal region (prone position, just above the gluteal line, isolating the inferomedial region).

Measurements of the thickness of the dermis and hypodermis were taken. In the evaluation areas, the presence of vertical septa at the superficial hypodermis were verified and counted. The evaluation area's size was defined as having the same size of the transducer, which in almost all ultrasound devices measures from 38-40mm. The transducer was positioned in a way to allow the visualization of the maximum possible number of vertical and inclined septa. The septa represent the adipose tissue's interlobular trabeculae that connect the dermis to the fascia. Orifices were observed in the posterior dermis and measured in their diameter and thickness. Aiming at lending more objectivity to the sonographic evaluation, the radiologist physician created two indices to measure these orifices: the IFD and IFO, as described below:

IFD – Dermis' Base/Dermis' Total Thickness Index (Índice Fundo da Derme/Derme integral): obtained by dividing the distance from the bottom of the fat herniation entry orifice to the surface of the dermis, by the total thickness of the dermis.

IFO – Dermis' Base/Entry Orifice (Índice Fundo da Derme/Orifício de Abertura): obtained by dividing the distance from the bottom of the fat herniation entry orifice to the surface of the dermis, by the diameter of the entry orifice of the fat herniation.

This method allowed for the evaluation of alterations that occurred in the dermis and subcutaneous tissue in the GL area before and after the proposed treatment.

Statistical Analysis

The Wilcoxon test was applied in the analysis of the dermic measures obtained through ultrasound before, and 30days after the treatment, employing the software SPSS, version 13.

Any p values < 0.05 were considered statistically significant for two related samples.

RESULTS

Clinical results

The evaluations of the morphological and sagging characteristics of the patients' gluteal regions were carried out through the comparison of photographs before, and 30 days after the treatment. In these evaluations, the evaluator physicians were able to correctly identify the pre-treatment and post-treatment photographs in 100% of the cases, for the four treatment sessions with unipolar RF (which were rated using a photonumeric scale). Regarding the sagging, the evaluator physicians determined a point on the scale at which the condition was considered to have improved, using this reference point for all eight patients. Regarding the morphology, there was improvement of one point in the scale in four of the eight patients (Figures 1 and 2).

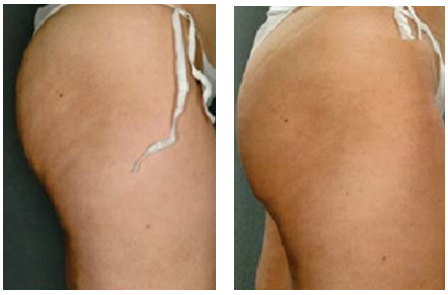


Figure 1: Right-hand side lateral photograph before, and 30 days after the treatment. Improvement of sagging is observed in the treated area 30 days after treatment

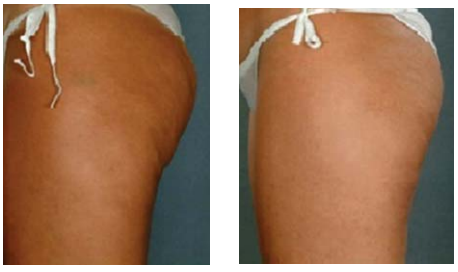


Figure 2: Left hand side lateral photograph before, and 30 days after the treatment. Improvement of sagging and morphology is observed 30 days after the last treatment.

Side-effects

The only side effect observed was moderate to intense transient erythema, with resolution within one to two hours after the treatment for all eight patients.

Laboratory tests

There werealterations in the pre-treatment exams. There was no pattern of alteration or increase comparatively significant in serum levels of cholesterol, HDL, LDL,VLDL or triglyceride in any of the evaluation phases (Table 1).

Ultrasonography

The measurement of the dermis showed increased thickness 30 days after the treatment—corresponding to three months after the first session—in seven of the eight patients treated. The greatest increase was 0.6 mm after four sessions, and the smallest increase was 0.1mm, with a total mean initial thickness of 2.22 mm and total mean final thickness of 2.45 mm (Table 2). The entry orifice for the herniated fat was found in three patients before the treatment. These orifices were not detected in the post-treatment examination, indicating the therapeutic efficacy of the therapy.

Table 1: Mean values of the study patients' laboratory tests

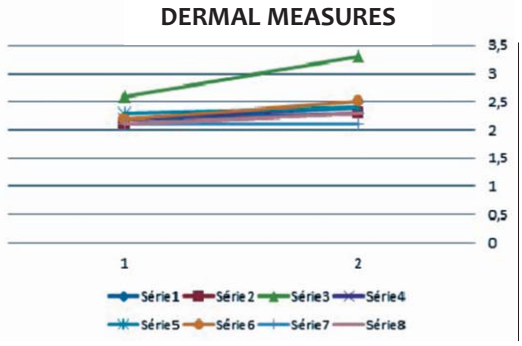
Examination	T1	T2	T3	T4
Total cholesterol <200mg/dl	155,25	178	176,62	163,87
HDL > 40mg/dl	51	60,62	54,37	62,5
LDL < 100mg/dl	107,62	100,5	105,5	101,62
VLDL < 30mg/dl	18,5	16,87	16,62	15,75
Triglycerides <150 mg/ dl	92,25	83,75	83	84,67

T1 - before the treatment
T2 - before the 3rd session
T3 - after the 3rd session
T4 - after the treatment

Table 2: Dermal thickness before and after the treatment

Patient	Pre-treatment dermal thickness (mm)	Post-treatment dermal thickness (mm)
1	2,2	2,3
2	2,1	2,3
3	2,6	3,3
4	2,2	2,4
5	2,3	2,4
6	2,2	2,5
7	2,1	2,1
8	2,1	2,3
Average	**2,22mm**	**2,45mm**

A difference in the thickness of the dermis can be observed through ultrasound before and after the treatment.



Graph 1: Dermal measures
1) Before the treatment
2) 30 days after the treatment

Statistics

The statistical analysis based on the Wilcoxon test suggested a positive effect in the dermal measures with statistical significance $p < 0.05$, showing an increase in the dermal thickness after four unipolar RF sessions (Figure 1).

DISCUSSION

Armenakas et al. 30 evaluated the efficacy and safety of unipolar RF in the improvement of the appearance of GL through a randomized, blind, and controlled study of 10 patients with cellulite grades II to IV on the thighs. The patients received up to six sessions of unipolar RF unilaterally (number of sessions at the discretion of the investigator), with fortnightly intervals. The thigh to be treated was chosen randomly, and the results were evaluated through questionnaires administered to the participants and to two blind evaluators, using photographs and a new quantitative classification system for GL. Patients were evaluated at one and three months after the treatment. All patients responded to the treatment, suggesting that favorable results that were clinically visible and measurable through a scale, were maintained three months after the treatment. That study—as well as the present study—has indicated unipolar RF's efficacy in the treatment of GL, despite the lack of an evaluation based on an imaging method.

Goldberg et al.[16] evaluated the efficacy of the unipolar device (Accent RF System, Alma Lasers, Buffalo Grove, IL) in 30 patients with cellulite grades III and IV in the upper thigh. All were treated with a total of six sessions, applied in intervals of 15 days, and were evaluated before, and six months after the treatment through clinical photographs, clinical measurements, biopsies, MRI, and blood lipid tests. Twenty-seven patients had clinical improvement. The average reduction in the circumference of the leg was 2.45cm. Histological alterations were reported, evidencing dermal fibrosis, however no alterations were observed in the treated patient's MRI or lipid levels. That study confirms the results obtained in the present study, showing efficacy in the treatment of GL with unipolar RF, with an absence of undesired effects on lipid metabolism. Nonetheless, the MRI's results recorded neither alteration in the adipose tissue nor in skin layers, a diverse result from that obtained in the present study. In the present study, the ultrasound evidenced a significant increase in the dermal thickness in most patients and the disappearance of the orifices generated by the herniation of dermal fat, which would translate into a dermal strengthening that would avoid the herniation of that layer, in turn suggesting the effectiveness of the treatment used in the present study.

Although MRI is the gold standard for the assessment of improvement in GL, 16 it is an expensive and difficult to access method. As evidenced by the present study, the ultrasound can be considered a good alternative method for the diagnosis and evaluation of the therapeutic response to unipolar RF treatment, for it allows the measurement of the dermis, the assessment of the septa, and fat herniation into the dermis.

Del Pino et al.[1] conducted a study with 26 healthy women bearing visible bilateral GL grades I to III in both the gluteal regions and/or thighs, who underwent two RF unipolar sessions, with15-day intervals. The initial parameter was 150W x 30sec = 4,500 joules = 91 J/cm^2, with three consecutive passes in each area during each session. This energy level was increased or decreased depending on the patient's tolerance or up until a temperature between 39º- 41ºC was reached in each treated zone. The evaluation of the subcutaneous tissue's thickness in the thigh and gluteal region took place prior to the first and second treatments, and 15 days after the second treatment through ultrasound examination, with photographs being taken to record the contour and superficial alterations. Measurements of the distance between the stratum corneum and the Camper's fascia, and from the stratum corneum to the muscle were taken. The authors evidenced that 68% of patients showed contraction of approximately 20% in the volume. The study shows that the use of ultrasound in the evaluation of results is a good, uncomplicated, and easy to access method, corroborating the present study's results.

Most studies use the measuring of the treated area's circumference and the photographic evaluation as a method to assess the response to proposed treatments.[16,31] In the present study, not only the morphology and sagging of the skin were evaluated through a standardized clinical-photographic scale, but also the alterations detected in the dermis and hypodermis induced by the treatment with unipolar RF, contributing to an advanced understanding of the mechanism of action of the technique. Moreover, it was possible to assess the method's safety through laboratory tests.

CONCLUSIONS

The authors of the present study believe that the treatment with unipolar RF was effective for clinically improving the appearance of the GL in the gluteal region and thighs, while providing increased firmness and decreasing the skin's wavy appearance.

The increase in the dermal thickness and the reduced number of herniations of the subcutaneous tissue into the dermis—observed in the ultrasound evaluation—contribute to the understanding of the possible mechanisms of action of the unipolar RF, and corroborate the clinical effects observed.

The present study's results lead to the conclusion that the high-energy unipolar RF is an effective and safe method for the treatment of GL in the gluteal region and thighs, with clinically visible results just one month after treatment, with few local side effects, and an absence of serum alterations. ●

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Artigo Original

Inframammary hyperhidrosis: clinical and gravimetric characterization

Hiperidrose inframamária: caracterização clínica e gravimétrica

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ABSTRACT

Introduction: *Hyperhidrosis is characterized by excessive, generalized, or focal sweating. The idiopathic or primary forms are usually focal. The inframammary location is atypical, being underreported. The severity of hyperhidrosis is evaluated through objective methods (gravimetry) or measures of impact on the quality of life (Hyperhidrosis Disease Severity Scale).*

Objectives: *To characterize inframammary hyperhidrosis regarding its prevalence associated factors, impact on quality of life, and gravimetry.*

Methods: *An observational, descriptive, and transversal study was carried out, in which all patients seen during a certain week were asked about the presence of excessive inframammary sweating. Those who answered positively were administered a questionnaire, were assessed according to the severity scale, and underwent gravimetry. The data were analyzed using descriptive statistics and chi-square test (x2).*

Results: *A total of 678 patients were seen, of whom 39 (5.7%) confirmed the complaint of inframammary hyperhydrosis. Statistical association between the gravimetry's result and body mass index was detected.*

Conclusions: *The prevalence of inframammary hyperhydrosis was demonstrated as an important location for primary focal inframammary hyperhydrosis. The characterization of inframammary hyperhydrosis—up until now a condition that has been little studied—can serve as a basis for future studies on therapeutic options that could improve patients' quality of life.*

Keywords: *hyperhidrosis; gravimetry; sweating.*

RESUMO

Introdução: A hiperidrose é caracterizada por sudorese excessiva, generalizada ou focal. As formas primárias ou idiopáticas são geralmente focais. A localização inframamária é atípica, sendo pouco citada. A severidade da hiperidrose é avaliada por métodos objetivos (gravimetria) ou de impacto na qualidade de vida (Hiperydrosis Disease Severity Scale).

Objetivos: Caracterizar a hiperidrose inframamária quanto à prevalência, fatores associados, impacto na qualidade de vida e gravimetria.

Métodos: Estudo observacional, descritivo e transversal, em que todos os pacientes atendidos durante uma semana foram questionados sobre a presença de sudorese excessiva inframamária. Aqueles que responderam positivamente preencheram questionário, escala de gravidade e submeteram-se à gravimetria. Os dados foram analisados por estatística descritiva e testes de qui-quadrado (x2).

Resultados: Foram atendidos 678 pacientes dos quais 39 (5,7%) confirmaram a queixa de HH inframamária. Associação estatística entre resultado da gravimetria e índice de massa corpórea foi encontrada.

Conclusões: A prevalência da HH inframamária foi demonstrada como importante localização de HH focal primária. A caracterização da HH inframamária, condição pouco estudada até agora, pode servir de base para estudos futuros, sobre opções terapêuticas que possam melhorar a qualidade de vida dos pacientes.

Palavras-chave: hiperidrose; sudorese; gravimetria.

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Hyperhidrosis is a condition characterized by excessive, generalized, or focal sweating. Generalized hyperhidrosis involves the entire body and is usually associated with systemic problems such as endocrine or neurological disorders, or infections. -The primary or idiopathic focal form affects healthy people, being more frequent in the palmoplantar region, axillae, and face.[1] The pathophysiology is not completely known, and is attributed to a dysfunction of the sympathetic nervous system.[2]

The diagnosis is carried out clinically, based on history and physical examination. The severity of hyperhidrosis is evaluated through objective (quantitative) or subjective measurements.[1] Among the objective measurements, gravimetry—which quantifies the sweating weight (milligrams) per time unit (minutes)—is the more frequently described in the literature.[3]

Subjective evaluations are used to estimate the impact of the condition on the quality of life of patients, as well as the degree of severity. Since this condition can result in substantial hardship to the patient, subjective assessments of severity are important, including limitations to work, social interaction, physical activities and leisure, as well as psychological and social relationship disorders. The Hyperhidrosis Disease Severity Scale (HDSS) is specific for hyperhidrosis and measures its interference in individual patient's daily activities.[4]

The prevalence of focal hyperhidrosis is variable. In Brazil, epidemiological studies found a prevalence of 9% in the city of Blumenau, in the Southern State of Santa Catarina[5] and 5.5% among medical students in the city of Manaus, in the Northern State of Amazonas.[6] Yet there are few reports of cases in the inframammary region, with references in two previous studies, serving only to exemplify this body site as a region of unusual focal sweating.[7,8]

The present study was aimed at characterizing inframammary hyperhidrosis in regards to its prevalence, associated factors, impact on quality of life, and gravimetry in patients treated at the Dermatology Clinic of the Hospital do Servidor Público Municipal de São Paulo.

METHODS

A cross-sectional, observational descriptive study was carried out. All patients were treated at the Dermatology Clinic of the Hospital do Servidor Público Municipal de São Paulo (SP), Brazil. During the course of a week they were questioned about the presence of excessive inframammary sweating. Those who answered positively were asked to complete a clinical questionnaire (Chart 1) and fill in an adapted severity scale based on the HDSS (Chart 2).

The criteria for inclusion of patients in the study were: 14 years of age or older, complaints of excessive inframammary sweating, and signing of the Free and Informed Term of Consent (FITC). Patients under 18 years of age who met the inclusion criteria could only take part in the study when accompanied by their legal representatives, who signed the FITC.

Exclusion criteria were the following: pregnancy, breastfeeding, children under the age of 14, and the refusal to take part in the study. All patients were properly informed about the voluntary nature of their participation, and the absence of any financial cost or incentive arising from their participation.

A questionnaire about personal data was applied (ID information, family history, improvement and/or worsening factors, comorbidities, use of medication, age when symptoms arose, and

Chart 1: Clinical evaluation questionnaire

Inframammary hyperhidrosis

1. Personal data

Name: **MR (medical record):** **Age:** **Gender:**
Ethnicity: **Weight:** **Height:** **Telephone:**
Bra size: **Occupation:** **Age of onset of symptoms:**
Family history:
[ ] No [ ] Does not know [ ] Yes. kinship:

2. Evaluation of Hyperhidrosis

2.1. Aggravating factors:

Anxiety **Physical exercise** **Heat** **Stress**
Sleeping pattern **Clothing (Which?)** **Food (Which?)**
Other: **[ ] There is no correlation** **[ ] Does not know**

2.2. Other body sites where focal hyperhidrosis occurs:

[ ] No **[ ] Yes (Which?)** **Current** **Previous**

2.3. Previous treatment of hyperhidrosis:

[ ] No **[ ] Yes (Which?)**

2.4. Comorbidities: **[ ] No** **[ ] Yes (Which?)**

2.5. Regular use of medicaments:

[ ] No **[ ] Yes (Which?)**

3. Severity scale of Hyperhidrosis

1 - I never notice my sweat and it never interferes with my daily activities;
2 - My sweat is tolerable, but sometimes interferes with my daily activities;
3 - My sweat is barely tolerable and frequently interferes with my daily activities;
4 - My sweat is intolerable and always interferes with my daily activities.

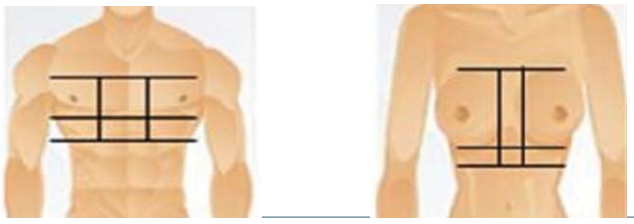


Chart 2: Severity scale

Grade 1	The sweat from my armpits is never noticed and never interferes with my daily activities
Grade 2	The sweat from my armpits is tolerable, but sometimes interferes with my daily activities
Grade 3	The sweat from my armpits is almost intolerable and frequently interferes with my daily activities
Grade 4	The sweat from my armpits is intolerable and always interferes with my daily activities

Adapted source: Solish N, 2007.[1]

other areas of focal hyperhidrosis, which is part of the clinical evaluation of hyperhidrosis already standardized in other studies).[9]

The subjective evaluation of the impact of inframammary hyperhidrosis on the quality of life was carried out by the patients themselves, based on the graduation used in the HDSS scale.[4]

During the gravimetry analysis (Figure 2) all tests were performed in the same room under the same temperature range (25 to 29°C), gauged with a model Cool23CTA40 thermometer (Incoterm®, PortoAlegre (RS), Brazil).

Moisture in the inframmamary region was removed with absorbent paper prior to performing the gravimetry test in order to avoid interference with the measurement of sweating. Paper filters (medium 102 paper filter, Melitta®, São Paulo (SP), Brazil) were previously weighed on a precision balance (Ohaus Precision Standard®, model TS 2KS, Metrohom, São Paulo (SP), Brazil) and then placed in the dried inframammary region. The filters were weighed again after five minutes with the difference between the two weight measurements being considered as the amount of sweat produced, in milligrams, during five minutes.

The data were analyzed through descriptive statistics and chi-square tests (X^2 tests). A greater than 95% confidence interval and a significance level less than or equal to 5% were used.

The study was approved by the Ethics Committee of the Hospital do Servidor Público Municipal de São Paulo (*Protocolo 227/2011, Parecer. 15/2011*).

RESULTS

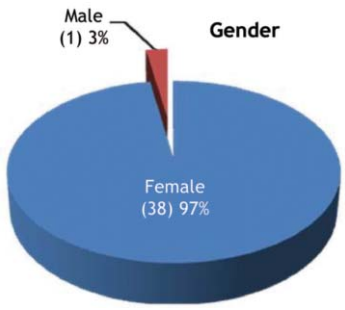
During the study period, 678 patients were treated. Thirty-nine (5.7%) answered positively about excessive sweating in the inframammary region (38 women and 1 man) (Graph 1).

The most affected age group was that of 50-59 years-old (Graph 2), with an age of onset ranging 15-63 years.

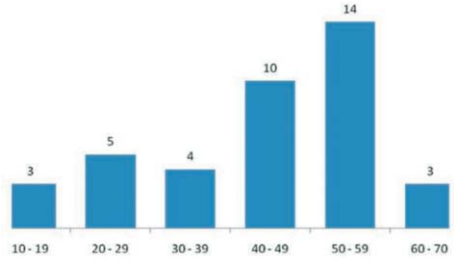
Positive family history for hyperhidrosis (Graph 3) was observed in 41% of patients (31% uncertain, 28% denied).

The following results were observed regarding the qualitative evaluation of severity, according to the HDSS adapted scale: Level 1: "I never notice my sweat and it never interferes with my daily activities." 6.6% of cases; Level 2: "My sweating is tolerable but sometimes interferes with my daily activities." 36.39%; Level 3: "My sweating is barely tolerable and frequently interferes with my daily activities." 27.29%; and Level 4: "My sweating is intolerable and always interferes with my daily activities." 24.26% (Graph 4).

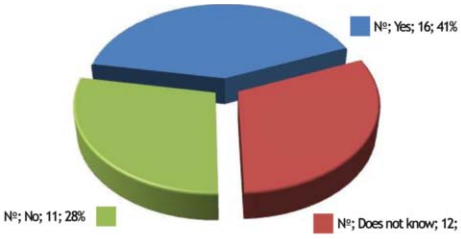
Figure 2: Thermometer and precision scale used in the gravimetry test



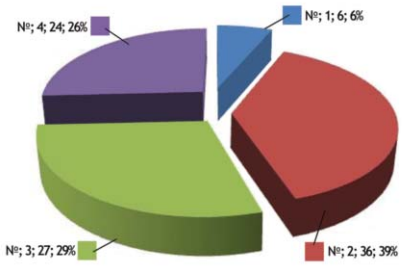
Graph 1: Gender distribution



Graph 2: Number of cases and prevalence of hyperhidrosis by age group



Graph 3: Prevalence of family history



Graph 4: Severity scale's frequency level

Aggravating associated factors were, in descending order: heat, physical exercise, mental stress, anxiety, clothing, and food. Association among hyperidrosis factors was observed in 84.62% of cases (Table 1).

Gravimetry values ranged from zero (nil) to 330mg/5minutes. Attempts to correlate these values with other independent variables suggested no significant association between gravimetry and family history (X^2 = 31.754, p = 0.2014), bra size (X^2 = 120,078, p = 0.7224), or severity scale (x^2 = 9.497, p = 0.3927). There was statistically significant association between body mass index and gravimetric results (Table 2), both for isolated results (X^2 = 56,456, p = 0.0349) and for weight range group (X^2 = 19,838, p = 0.0189).

Table 1: Aggravating factors and other factors associate withinframmamary focal hyperhidrosis

Associated factors	Yes		No		Not reported		Total patients
	Nº	%	Nº	%	Nº	%	
Anxiety	20	51,28	18	46,15	1	2,56	39
Physical exercise	30	76,92	8	20,51	1	2,56	39
Heat	38	97,44	1	2,56	-	-	39
Food	5	12,82	33	84,62	1	2,56	39
Stress	22	56,41	17	43,59	-	-	39
Other body	19	48,72	19	48,72	1	2,56	39
sites where hyperhidrosis occurs	33	84,62	6	15,38	-	-	39

Table 2: Association between the Gravimetric and the Body Mass Indices

Gravimetry mg/5min	Normal	Overweight	Grade I obesity	Grade II obesity	Grand total
0 - 50	9	16	4	1	30
60 - 100	-	1	-	1	2
110 - 150	1	-	2	-	3
>150	1	1	-	2	4
Grand total	11	18	6	4	39

DISCUSSION

Although previous studies carried out in Brazil have estimated the frequency of focal hyperhidrosis according to the body site where it occurs, the prevalence and characterization of inframammary hyperhidrosis was first described in the present study.

The age group[10] and positive family history[11] were in line with the literature's data for other focal hiperidroses—in the U.S. population there was a higher prevalence in the 45-55 year-old age group and 47.5% frequency in patients with a family history.

Statistical association found between gravimetry and body mass index corroborates the hypothesis that the degree of obesity is reflected in the body surface area and density of sweat glands, being also observed in other areas of focal hyperhidrosis.

Body mass index was recently evaluated in patients in Brazil with facial hyperhidrosis, with an absence of results that indicated correlation.[12] Though not based on statistical data, a positive relationship between obesity and primary hyperhidrosis was nonetheless observed in a Brazilian study carried out with medical students in the city of Manaus, in the northern State of Amazonas.

Other features of inframammary hyperhidrosis were similar to those observed in studies focusing on diverse body sites. The frequency observed in the severity scale was similar to that observed in the pioneering study that standardized such a scale,[13] with a higher prevalence in Level 2: "My sweating is tolerable, but sometimes interferes with my daily activities.", and Level 3: "My sweating is barely tolerable and frequently interferes with my daily activities.".

Aggravating and/or other factors associated with inframammary hyperhidrosis were similar to those found in previous studies that focused on other body sites where focal hyperhidrosis typically occurs, and where a greater association with heat, stress, anxiety, and physical exercise was observed in epidemiological surveys in the U.S. and Canadian populations.[11]

The coexistence of inframammary hyperhidrosis with other affected body sites was also reported by the patients (84.62%), and is consistent with the association between different areas of focal hyperhidrosis already described in the literature.[10]

CONCLUSION

The prevalence of inframammary hyperhidrosis—a condition that has been little studied to date—demonstrates its importance as a primary and focal variant of hyperhidrosis.

The use of gravimetry and a severity scale were instrumental in evaluating inframammary sudoresis. The degrees of severity showed that sudoresis exerts a frequent and important impact on the quality of life of patients and can be approached therapeutically. Therefore, there is consensus that it should be seen as an abnormality.

The methodology used in this study was similar to that employed in studies aimed at characterizing other forms of focal hyperhidrosis 5,6,13 and can serve as a base for future studies on therapeutic options that can be used to improve patients' quality of life.

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Talon noir: dermoscopy assisted differential diagnosis of pigmented lesions

Talon noir: auxílio da dermatoscopia no diagnóstico diferencial de lesão pigmentada

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ABSTRACT

Talon noir was first described in 1961 by Peachey as atraumatic petechial eruption characteristic of basketball players' heels, and were originally called calcaneal petechiae. It is a dermatosis linked to trauma, with asymptomatic lesions, marked by the presence of blood within the stratum corneum. It presents varied clinical manifestations, with the location depending on the involved provocative factor. The present study describes a case of talon noir in a patient with psoriasis vulgaris and demonstrates the importance of the correlation of clinical, dermoscopic, and histopathological characteristics.

Keywords: *blood stains, nevi and melanomas, foot.*

RESUMO

Talon noir foi descrita pela primeira vez em 1961 por Peachey, como erupção petequial traumática característica dos saltos dos jogadores de basquete e originalmente chamada de petéquias do calcâneo. É dermatose relacionada ao trauma, com lesões assintomáticas e marcada pela presença de sangue dentro do estrato córneo. Apresenta manifestações clínicas variadas e sua localização depende do fator provocativo envolvido. Os autores apresentam caso de talon noir em paciente com psoríase vulgar e demonstram a importância da correlação das características clínicas, dermatoscópicas e histopatológicas.

Palavras-chave: manchas de sangue; nevos e melanomas; pé.

INTRODUCTION

Talon noir is a dermatosis that presents with an asymptomatic petechial lesion, trauma-related and mostly found in acral body sites. It is histologically characterized by blood within the stratum corneum.[1] Since its initial description, it has been referred to by several names (Chart 1), with the lesion's description primarily relating to the affected body site and provocative factor[2].

The most typical appearance of this clinical entity is the presence of coalescing macules forming a blackened purpuric plaque. It was precisely this appearance that gave rise to the denomination of the dermatosis, termed by the French dermatologist Peachey as *talon noir*, which means black heel.[3] Its pathogenesis is of traumatic origin, and the lesion is caused by excessive tangential pressure applied to the skin. Although it is characteristically bilateral and located in the heels, it can be found on any acral surface.[4,5]

Scarification of the lesion with a scalpel blade allows the detachment of thin layers of pigmented skin that can be evaluated with the aid of dermoscopy or sent for histologic analysis.[1] Carrying out a dermoscopy of the lesion is another valuable tool in the diagnosis, for it offers findings that suggest the presence of blood in the stratum corneum.[6,7] Diagnostic confirma-

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Chart 1: Terms used in the medical literature to describe lesions with the presence of blood in the stratum corneum

- Calcaneal Petechiae
- Post-traumatic punctate hemorrhage of the skin
- Tennis player's heel
- Disseminated punctate intraepidermal hemorrhage
- Black palmar macule
- Plantar chromhydrosis
- Black heels
- Traumatic purpura of the feet
- Tennis player's toe
- Subcorneal hematoma
- Black palm
- Pseudochromhydrosis
- Talon noir
- Basketball player's heel
- Hyperkeratotic hemorrhage
- Pigmented palmar petechiae
- Playstation player's thumb

Source: Urbina F, et al. 2008[1]

tion is given by the histopathology, which may reveal hyperkeratosis, presence of blood in the stratum corneum and extravasated erythrocytes in the papillarydermis.[1]

The main differential diagnosis is the presence of melanocytic proliferation, with melanoma being the most important clinical differential diagnosis.[1,6] Close inspection is crucial for ruling out simultaneous melanocytic tumor. No treatment is necessary, for the lesions tend to disappear spontaneously.[1,2]

The present case report is aimed at demonstrating the clinical, dermoscopic, and histopathologic features of this condition, and issuing an alert regarding the importance of including it in the differential diagnosis of lesions that occur in the relevant topography.

CASE REPORT

A 65-year-old male patient sought the dermatology ambulatory due to the exacerbation of psoriasis lesions and for being off treatment for two years. For roughly two weeks he had had an asymptomatic blackened macular lesion in the fifth right toe, referring no recollection of local trauma.

Ectoscopic examination evidenced psoriasiform plaques on the trunk, dorsum, and limbs. The patient had a single red-blackish macula in the medial region of the distal phalanx of the fifth right toe (Figure 1). Dermoscopic analysis verified a homogeneous global pattern with red-blackish color pigment, with the presence of hemorrage minute punctate macules in the periphery (Figure 2). The following hypotheses have been suggested: *talon noir* and atypical nevus. Scarification of the macula was carried out, resulting in the detachment of blackish colored skin layers (Figure 3). A biopsy of the lesion was performed in order to confirm the diagnosis, and histology revealed fibrin, hemosiderin's ocher pigment, and degenerated erythrocytes

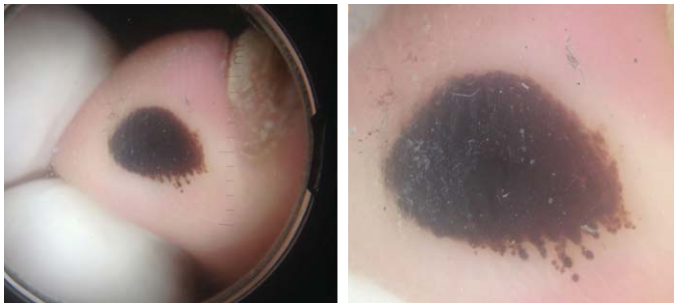

Figure 2: Dermoscopy: red-blackish pigment; homogeneous global pattern, with some punctate hemorrhage macules on the periphery

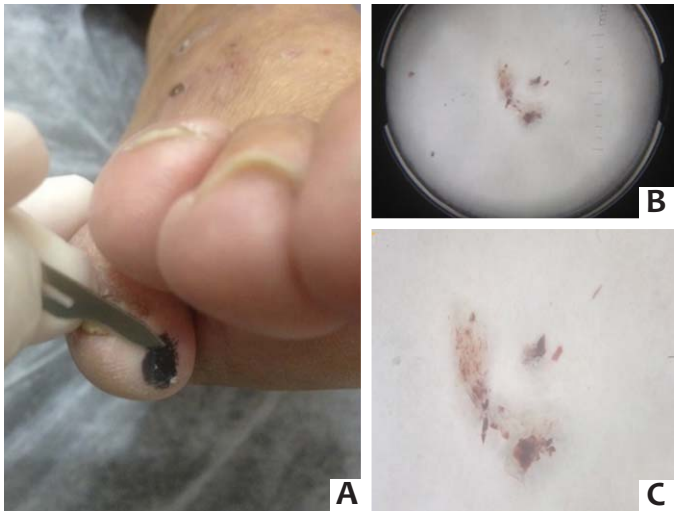

Figure 3: a) Scarification of the lesion's surface with a scalpel blade. **B)** Material resulting from the scarification. **C)** Thin layers of skin of red-blackish color.

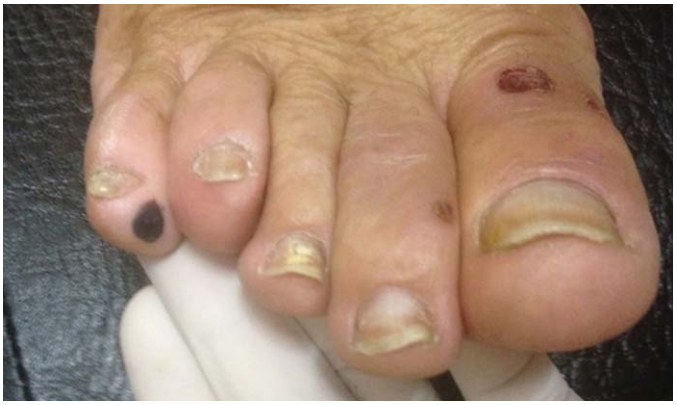

Figure 1: Blackened macula with well defined limits in the distal phalanx of the fifth right toe

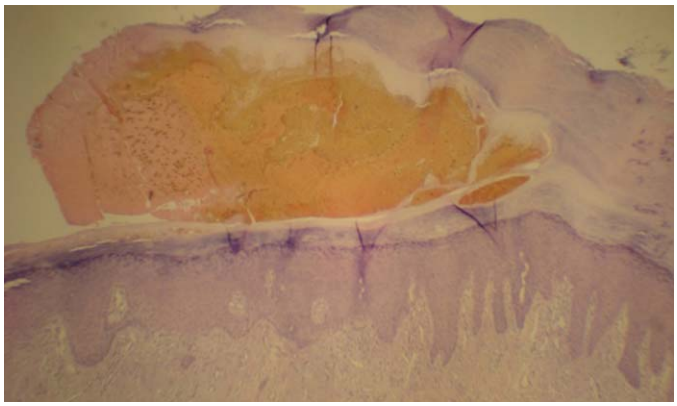

Figure 4: Fibrin, hemosiderin's ocher pigment and degenerated erythrocytes trapped in the lower third of the stratum corneum; the remainder of the epidermis is unaltered

trapped in the lower third of the stratum corneum. The remainder of the epidermis had no alteration (Figure 4).

Thus, associating the clinical aspect to the scarification related, dermoscopic, and histopathologic findings, a diagnosis of *talon noir* was established. The authors instructed the patient about the benign nature of the picture and in the six-week return visit, verified the spontaneous disappearance of the lesion.

DISCUSSION

Dermoscopy increasingly gains more importance in the clinical practice, with an increasing number of indications.[8] This diagnostic method allows the physician to recognize the morphological structures of pigmented skin lesions that can determine whether their nature is melanocytic or not, adding a new dimension to the clinical examination.[7,9]

In the dermoscopy, the pigmentation seen in lesions in which there is subcorneal hematoma usually has a slightly lighter appearance, revealing a reddish hue. Most often, the overall pattern observed is homogeneous or globular, nevertheless in some cases the pigment may be distributed along the crests, lending a parallel aspect, which makes it even more difficult to differentiate the lesion from acral melanoma.[7] In the present case, in addition to the already described dermoscopic features, the authors verified the presence of peripheral hemorrhagic punctate macules.

In some cases, the lesion's color may provide clues to their timing and development. The extravasated blood will be reabsorbed, causing chromatic variation from the outset of the condition to the full recovery of the lesion. This variation in hue is known as the Legrand du Saulle ecchymotic spectrum (see Chart 2) and has an important value in forensic traumatology.[10] Due to anatomical peculiarities, some body sites such as the ocular conjunctiva, fingers, and palmoplantar regions do not present ecchymotic spectrum.[10]

The authors propose that in the presence of dermoscopic findings suggestive of subcorneal hematoma in a patient who presented local trauma, an expectant approach can be taken for 30 days to evaluate the development. The occurrence of spontaneous regression is consistent with the diagnosis of *talon noir*. In the present case, by considering the hypothesis of melanocytic lesion, and due to the fact that the patient did not remember having had a trauma in the relevant site, the authors chose to perform an incisional biopsy for diagnostic confirmation.

The authors emphasize the importance of adding *talon noir* to the differential diagnosis of melanocytic lesions, including melanoma, and suggest the use of dermoscopy as an auxiliary method in the diagnosis.

Chart 2: Legrand du Saulle ecchymotic spectrum

Chromatic alterations	Development (in days)
Dark red	First day
Violet	Second and third days
Bluish	From the 4th to the 6th day
Dark green	From the 7th to the 10th day
Yellowish-green	From the 110th to the 120th days
Yellow	From the 120th to the 170th day
Natural color of the neighboring epidermis	After the 200th day

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Platelet-rich plasma in dermatology

Plasma rico em plaquetas em dermatologia

Review article

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ABSTRACT

The present article describes Platelet-Rich Plasma, with emphasis on its use in dermatology. The application of this procedure in medicine has become increasingly frequent during the last decade. Most publications on the topic arise from areas such as Orthopaedics, Sports Medicine, and Odontology. In the dermatologic field, Platelet-Rich Plasma has been used in order to promote accelerated wound healing, as an adjuvant treatment in rejuvenation and alopecia, and even after laser sessions. In the present review, the authors used articles published on the subject, attributing the Oxford Centre for Evidence Based Medicine's "Level of Scientific Evidence" classification.

Keywords: *blood platelets; dermatology; blood.*

RESUMO

Neste artigo, descrevemos o que é o Plasma Rico em Plaquetas com ênfase na sua utilização em Dermatologia. A aplicação do Plasma Rico em Plaquetas em Medicina vem se tornando mais frequente na ultima década. A maioria das publicações existentes sobre o tema, vem de áreas como Ortopedia, Medicina Esportiva, e Odontologia. Na nossa área, o PRP vem sendo utilizado com o intuito de promover a aceleração de cicatrização de feridas, como tratamento coadjuvante de rejuvenescimento, alopecias e mesmo após sessões de laser. Para elaboração desta revisão, utilizamos artigos publicados na área e atribuímos a estes, a classificação de "Nível de Evidência Científica" do Oxford Centre for Evidence Based Medicine.

Palavras-chave: plaquetas; dermatologia; sangue.

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INTRODUCTION

The use of Platelet-Rich Plasma (PRP) in medicine has become increasinglymore widespread during the last decade. Most studies on the subject are carried out in areas such as orthopedics, sports medicine, and odontology. Only recently have articles relating to the dermatologic field begun to be published, where PRP has been used in order to promote accelerated wound healing and as an adjuvant treatment in rejuvenation, alopecia, and even following laser sessions.

The main objective of the present article is to describe what PRP is and to introduce some existing publications related to dermatology.

The authors have classified the publications according to the Oxford Centre for Evidence-Based Medicine's guideline[1,2] for levels of scientific evidence (LOE), criteria also adopted by the Brazilian Ministry of Health as a standard for the development of technical-scientific opinions (Chart 1).[3]

The present study was carried out at the author's private practice—São Paulo (SP), Brazil.

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Chart 1: Growth factors in platelets

Growth factor	Biological activity
TGF (Transforming Growth Factor) Tipos α e β	Proliferation and differentiation control of many cell types
PDGF (Platelet derived growth factor) α,β,C,D	Potent mitogen for connective tissue cells, inhibitor of apoptosis, increases the motility of mesenchymal cells, fibroblasts, endothelial cells, and neurons. May be involved in physiological processes and in diseases such as cancer and atherosclerosis
IGF I (Insulin-like growth factor I)	Promotes the mediation of the various effects of growth hormone
FGF I (Fibroblast growth factor I)	Induction of fibroblast proliferation and angiogenesis
EGF (Epidermal growth factor)	Induces the differentiation of cells and mitosis of cells of ecto and mesodermal origin
VEGF A, B e C (Vascular Endothelial growth factor)	Induces angiogenesis through the induction of mitosis in endothelial cells, and promotes alterations in vascular physiology and permeability

The definition of LOE employed in the present article[1] takes into account the methods used in the studies and was elaborated with the aim of assisting physicians in making treatment decisions based on the available scientific literature.

Finally, it is important to emphasize that, in response to a request from ANVISA (the Brazilian National Health Surveillance Agency), the Brazilian Federal Council of Medicine (CFM) issued an opinion on the use of PRP, in July 2011. The opinion was requested following media reports highlighting the effects of this therapy in orthopedics and dermatology. The opinion, which is available in its full version on the CFM's website[4], states: "Platelet-rich plasma has been used by some physicians with varying results. Due to the variety of such results, it is not yet possible to define the degree of usefulness or approve definitively its use in therapeutic practice, thus it continues to be considered an experimental procedure."

Platelet-rich plasma: what is this?

The term Platelet-Rich Plasma is a generic term used to describe a plasma suspension obtained from whole blood, prepared so as to contain platelet concentrations higher than those normally found in circulating blood. There is no consensus regarding which above-referenced concentration levels define the PRP—reference values used to define normality in the platelet count in blood is 1.5 to 4 x 10^5 platelets per ml).

A consensus on the appropriate values for classifying a plasma sample as PRP has not yet been reached among researchers, resulting in one of the difficulties found in the evaluation and comparison of results described in scientific articles. There are researchers concerned with obtaining a standardization for these blood derivatives taking into account quantities of components in the PRP, in addition to the platelets themselves.[5]

It is known that PRP contains diverse concentrations of white and red cells, and that this may have an impact on the final outcome of the proposed treatment.

In 2008, the Brazilian Ministry of Health published a guide for the use of hemocomponents[6], where the platelet concentration used for transfusion should contain 1x 10^7/µl.

Some studies[7,8] diverge regarding cellular content and growth factors in PRPs obtained from the same individual when different methods are employed (e.g. one versus two centrifugation cycles). Such divergence was also found when different commercial kits were used in the preparation of blood samples.[7] Significant differences in the PRP's final result were also observed in the same individual who underwent successive blood collections.[8]

There are a number of protocols described for obtaining PRP,[9,10] however all in general include a centrifugation process through which the different components of whole blood are separated according to their different densities.

The protocols differ in time, speed, and number of centrifugations to which the whole blood is subjected. The volume of the initial blood sample and the types of collection tubes and anticoagulants used are also different for each method.

Cellular components

Platelets are anucleated fragments of megakaryocytes, and are produced in the bone marrow.[11] They contain granules consisting of various substances, which are released upon activation of the platelets.[12] Among the main substances that are released are growth factors (Chart 1), cytokines, adhesion molecules, integrins, and coagulation proteins.

As already mentioned, an important aspect to consider is the amount of erythrocytes and leukocytes in the obtained PRP.

There is disagreement as to the effect caused by leukocytes remaining in the PRP of the treated tissues. Some authors attribute an inflammatory effect—therefore a negative effect—to the presence of white cells in PRP,[13] while others attribute antibacterial and immune effects related to the presence of these cells.[14] The current perception is that there are significant differences in the biological effects of PRP, according to its cellular content. Dohan *et al.*[15] sought to group different PRP types according to their composition of leukocytes and fibrins. They suggest that the amount of white blood cells present in the PRP

has a great influence on the release of growth factors. of the latter. This fact would have an impact on the biological effect of PRP's, entailing difficulties in the comparison and evaluation of clinical results of patients treated with PRP's of different compositions, for instance.

Soluble components

The activation of platelets causes the release of soluble factors present within their granules.[12] Platelet activation depends on the adhesion of their surfaces to the molecules present on the damaged endothelium (von Willebrand factor, collagen, fibronectin, and laminin) or occurs through the epinephrine, for instance. It is of paramount importance to note that the molecules present in the endothelium are also expressed in other cell types, as demonstrated by Monteiro:[16] the glycoprotein GPIb alpha (present in platelet membranes and exerting the function of mediator of the adhesion to the von Willebrand factor in the vascular endothelium) was also detected in the membrane of dermal cells known as dermal dendrocytes.

The presence of receptors of platelets in the membrane of dermal cells may indicate the participation of these cells in wound healing and repair processes.

It is important to remember that the skin houses different types of stem cells (including cells present in the hair follicle bulge) and cells of mesenchymal origin, all dispersed in the dermis.[17] In theory, growth factors released by platelets could act in these cells, promoting differentiation and proliferation. This information should be taken into account when planning to achieve a specific goal with the use of PRP in the skin.

In Table 1 there are descriptions of some of the functions of growth factors released during platelet activation.

Applications in dermatology

The use of PRP in medicine is based on the fact that platelets contain many growth factors in their alpha granules. These factors have a well-known role in the process of tissue repair. Thus, the concentration of these substances in injured tissues could be beneficial to providing more agility to the regeneration processes.

Alopecia

The application of PRP in the treatment of alopecia has been investigated with renewed interest in recent years. Some studies seek to establish the molecular mechanisms through which such patients could benefit from PRP. In an *in vitro* and *in vivo* study in animals, Li *et al.*[18] showed that there is a greater proliferation of dermal papilla cells when incubated with PRP, as compared to controls. That effect was due to increased expression of FGF-7 (Fibroblast growth factor 7) and beta-catenin, as well as an increase in extracellular signaling of Akt and ERK.

The animals that received subcutaneous injections of PRP had a faster transition from the telogen to the anagen phase as compared to the controls, which received only saline injections. The study by Li *et al.* indicates the molecular mechanisms through which these results were found, reinforcing the importance of further investigations into the use of PRP for this indication. This study presents LOE 5, given that it is based on physiological mechanisms in animals and cell cultures (Chart 2).

In a study published in 2006, Uebel[19] described an apparent improvement in survival rates and take in hair grafts that were exposed to PRP before implantation, as compared to contralateral controls, in a group of 20 male patients. The limitation of this study is linked to the fact that the interpretation of the results was not carried out by independent researchers and also because the area that received the implants treated with PRP was not clearly defined. This study has a LOE 4.

Chart 2: Level of scientific evidence by study type

Level of evidence	Study type
1	Systematic reviews of randomized controlled trials
2	Systematic review of cohort studies
3	Systematic review of case-control studies
4	Case reports
5	Physiological or animal studies

Wound healing

The use of PRP to accelerate the healing of wounds inspires the greatest number of clinical studies. Publications address various issues, such as its use in the treatment of chronic wounds in diabetic patients, in the assessment of the speed of re-epithelialization of donor sites in skin grafting, and in the closing of chronic ulcers due to vascular insufficiency, among others.

Two systematic reviews of randomized controlled trials on the use of PRP in the treatment of chronic wounds led to differing conclusions.

After the evaluation of nine clinical trials, Sommeling *et al.*[20] considered that the use of PRP may be beneficial as an adjuvant measure in the treatment of chronic ulcers. Nevertheless, the authors highlight the poor quality of the trials used in the review and the lack of standardization in the methods employed to obtain the PRP and the manner in which it was used.

In a review conducted by Cochrane,[21] nine studies were included, totaling 325 treated patients. The authors conducted an analysis of randomized, controlled trials that compared the use of PRP versus a placebo or alternative therapies in the treatment of chronic ulcers (of any etiology) in adults. The studies were selected based on previously defined criteria, such as patient selection, data collection, and risk of bias. After the evaluation of these studies by two independent authors, it was concluded that there was no evidence in favor of the use of PRP in the treatment of ulcers, when compared to placebo or other alternatives. However, due to the small number of studies included in the review, some of them with a risk of bias, the authors suggest that more encompassing and more well-formatted studies were necessary.

According to the Oxford CEBM classification, systematic reviews of randomized controlled trials correspond to LOE 1.

Laser

There are few reports on the association of laser treatments and a concomitant application of PRP. In these studies, a small number of patients underwent treatment with a fractional laser (1,550nm[22] and 10,600nm[23,24] wavelengths).

In a study by Shin,[22] 22 patients were treated with a 1,550nm laser, with only half of them receiving topical applications of PRP following the laser sessions. At the end of the study, the group treated with the combination of laser and PRP showed less erythema and greater subjective satisfaction. The authors' conclusion does not suggest a clear superiority of the combined approach as compared to the isolated application of fractional laser.

In two studies[23,24] that combine the applications of fractional CO2 laser and PRP (injected intradermally or applied topically after the laser) there was faster recovery of post-laser edema and erythema as well better outcomes (assessed subjectively) when compared to patients who did not receive this treatment.

As with other applications, there was no standardization in the method for obtaining PRP in this case.

These studies are defined as LOE 4.

Rejuvenation

There are few published clinical studies[25,26] regarding the use of PRP for rejuvenation purposes, with most of them not clearly describing the method for obtaining PRP, nor clarifying the content of the material obtained. As noted earlier, these data have a fundamental impact on the evaluation of results. Furthermore, many of the studies[25] do not have control groups, and others have only photographic images and the subjective impressions of researchers and patients on the final results, as the only method of assessing results. Those studies have LOE 4.

Studies that have used animals[27] or cellular cultures[28,29] have LOE 5.

The introduction of PRP into the culture medium of human dermal fibroblasts led to an increased proliferation of these cells, as well as to an increased production of collagen,[28] in comparison to control cultures that were not incubated with PRP. Likewise, the culture of stem cells derived from adipose tissue in a medium containing PRP also led to the increased proliferation of these cells.[29] This finding reinforces the possibility of PRP interfering with the biology of stem cells present in the skin. A similar study carried out in animals showed similar results.[26]

Annex: Levels of Scientific Evidence

Evidence-based medicine is a concept that unites good scientific research and clinical practice. The practice of this kind of medicine assumes that the choice among therapeutic interventions should be based on the hierarchy of evidence available at the time, among other criteria. This does not mean that the physician's professional experience should not be taken into account, but that good scientific research can help enormously in making therapeutic decisions.

chart 2 presents a summarized scheme of the LOEs[1] proposed by the Oxford Centre for Evidence-Based Medicine, which must be understood in conjunction with the accompanying introductory document[2]. These LOEs relate solely to issues related to treatment.

The BrazilianMinistry of Health[3] adopts this classification in their technical opinions.

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Reconstruction of the superior helix

Reconstrução da região superior da hélice

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ABSTRACT

The ear is a complex anatomical structure in which each subunit has unique characteristics. No single reconstruction technique could work in all situations; therefore, knowing different ways to reconstruct surgical defects in each one of these subunits is essential to achieving the best cosmetic results. We report here a detailed explanation of a superior helical advancement flap designated to repairs of the upper helical rim.

Keywords: *Mohs surgery; reconstruction; ear neoplasms; ear; surgical flaps.*

RESUMO

A orelha é uma estrutura anatômica complexa que pode ser dividida em diferentes subunidades, cada qual com suas particularidades. Certamente, não há uma única técnica cirúrgica que seja efetiva nas mais variadas situações. Dessa forma, é necessário conhecer diferentes técnicas reconstrutivas aplicadas a cada uma das sub-unidades da orelha, com o objetivo de alcançar resultados estéticos satisfatórios. A seguir descrevemos detalhadamente o retalho de avanço na região superior da hélice, para a reconstrução de defeitos cirúrgicos.

Palavras-chave: cirurgia de Mohs; reconstrução; neoplasias da orelha; orelha; retalhos cirúrgicos.

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INTRODUCTION

The ear is a complex anatomical structure in which each subunit has unique characteristics. No single reconstruction technique could work in all situations; therefore, knowing different ways to reconstruct surgical defects in each one of these subunits is essential to achieving the best cosmetic results. We report here a detailed explanation of a superior helical advancement flap designated to repairs of the upper helical rim.

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The present study was carried out by DermSurgery Associates, Houston (TX), USA.

Financial support: None
Conflict of interest: None

CASE REPORT

A 55-year-old Caucasian male (Fitzpatrick skin type II) presented with a 1.0 cm x 0.7 cm papule in his left superior auricular helix. The lesion had been previously biopsied by his attendant physician and the histological evaluation confirmed the diagnosis of basal cell carcinoma (BCC). After local anesthesia with 0.5% lidocaine with 1:200,000 epinephrine, Mohs micrographic surgery was performed and the BCC was cleared in two stages. The final surgical defect size was 2.0 cm x 1.2 cm (Figure 1).

The superior advancement helix flap starts with an incision beginning from the anterior part of the defect and running until the superior border of the tragus. This incision parallels the inferior margin of the helix by approximately 1 mm and when it reaches its final length, a back cut is performed to allow the loose preauricular skin to advance freely (Figure 2A). Note that if the incision is made within the helical crease it will be much harder to suture later on. The whole flap is undermined until the postauricular sulcus and a Burow's triangle is taken from the posterior ear (Figures 2B and 2C). The initial suture of the flap places it into the right position (Figure 2D). After that, using 5.0 nylon, the rest of the flap is sutured starting from the helix all the way down to the preauricular area (Figure 3).

RESULTS

The sutures were removed after seven days. No anatomic distortions were noted. The ear maintained its rounded, convex shape, its size, and no trapdooring occurred. Both the physicians and the patient were satisfied with the cosmetic outcome (Figure 4).

DISCUSSION

Repairing the superior helix usually requires flaps or grafts in order to maintain its rounded shape. Side-to-side sutures usually result in distortion of the local anatomy, with narrowing and notching of the helix. Second intention healing would have a very negative outcome because of the convexity

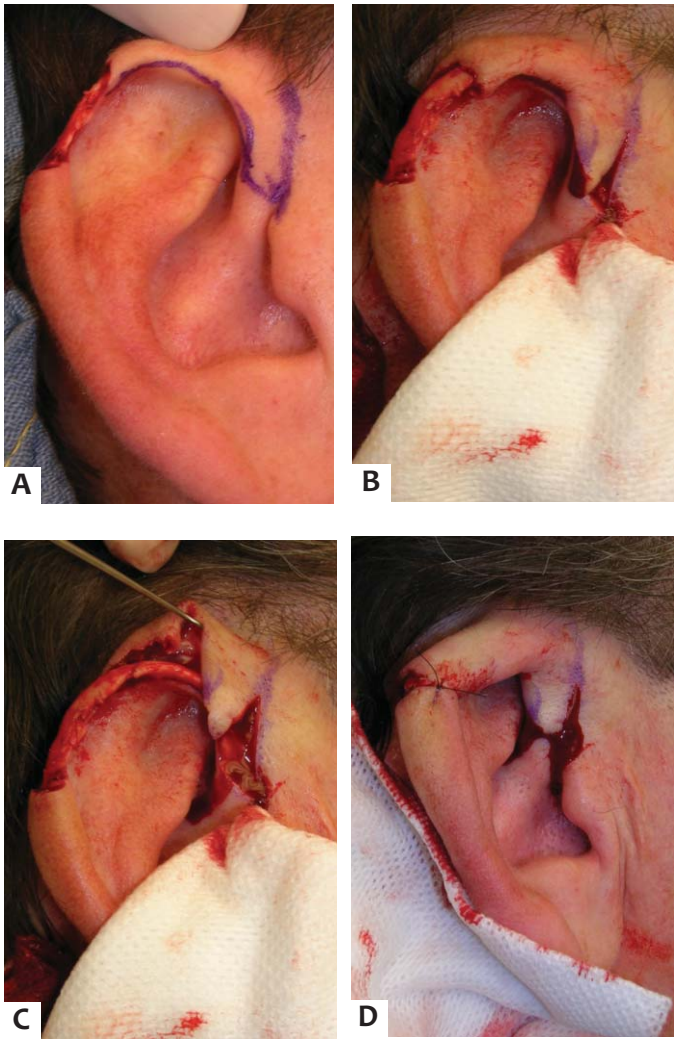

Figure 2: A: Planning the flap; **B:** Detail of the incision; **C:** The flap is undermined; **D:** Initial suture of the flap

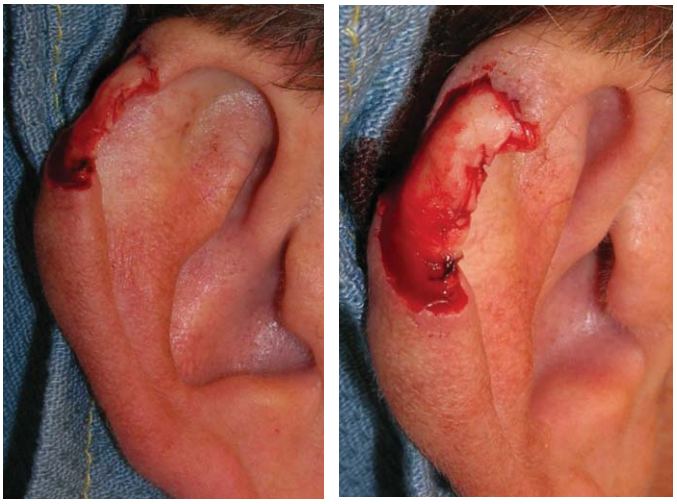

Figure 1: Final surgical defect

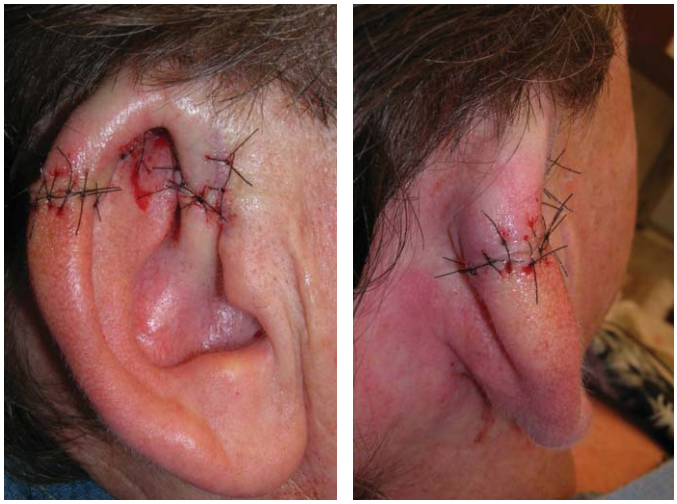

Figure 3: Flap sutured into place

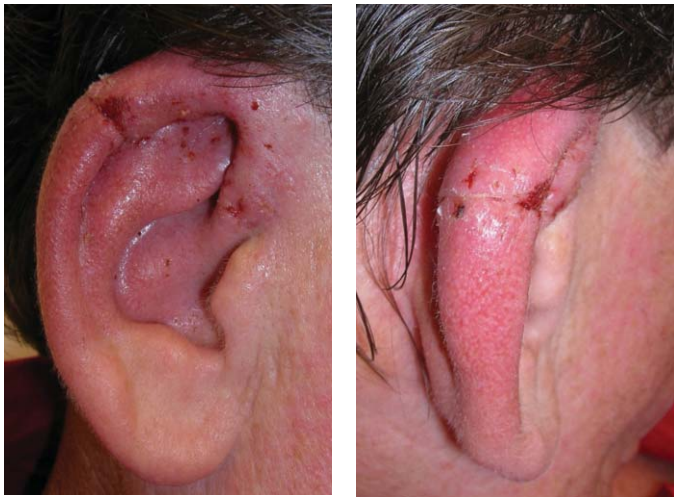

Figure 4: Postoperative result (after seven days)

of the area. Hence, many different techniques have been proposed to repair this region.

A wedge shaped resection of the lesion and primary suture would result in shortening of the ear, loss of the ear contour, and in unnecessary manipulation and loss of cartilage[1]. Full thickness skin grafts also do not work well because of the convex shape and slender width of the area, making it difficult to properly place a pressure dressing needed to allow imbibition, and increasing the possibility of necrosis (which is already great since the graft might be placed over bare cartilage). A bilobed flap was recently described[2] in the reconstruction of this area with good cosmetic results.

In our opinion though, the flap described here is much easier and less time consuming to perform, and achieves better cosmetic results since most of the incision is placed very close to the ear and in the same direction of a natural crease of the ear. Transposition flaps (from the preauricular region or postauricular sulcus) are also an option, but the risk of distal flap necrosis is greater, and it does not take advantage of the available spare skin of the proximal helix as the described flap does. The interpolation flap[3] has the disadvantage of requiring two surgical stages—while the demands of most patients today are for only one—and the cosmetic results can be disappointing. There is also the traditional helical advancement flap[4] (which can also be a condrocutaneous flap if necessary), which achieves excellent results when repairing the lateral helix but does not have the same outcome when dealing with defects located in the superior third of the helix. Moreover, there are numerous other techniques that can be used according to the preference of each physician.

The superior helical advancement flap described here has many similarities in its mechanism with the traditional helical advancement flap. The most important difference is that the superior flap uses the available preauricular skin, thus it advances from a region closer to the superior defect, whereas the traditional technique uses the available skin from the earlobe.

CONCLUSION

The superior helical advancement flap is an excellent technique when reconstructing surgical defects of 1.0 cm to 2.5 cm in the superior helix as long as the cartilage is preserved. It is simple to perform and its most important characteristic is that it provides outstanding cosmetic results.●

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Thioglycolic acid peeling in Schamberg's disease

Peeling de ácido tioglicólico na doença de Schamberg

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Arthur Conelian Gentili[2]
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ABSTRACT

Schamberg's disease is a progressive pigmentary dermatosis of chronic course. The present article describes the use of thioglycolic acid peelings in Schamberg's disease, with histological and photographic analyses. A 43-year-old female patient with clinical and histological diagnoses of Schamberg's disease underwent five sessions of 10% thioglycolic acid peeling in gel with an interval of 15 days between each session. The patient had considerable whitening of the lesions, with clinical improvement of 68.7%. Thioglycolic acid solubilizes the haemosiderin, being a treatment option that leads to the whitening of the lesions with good tolerance and few side effects.

Keywords: *purpura; hemosiderim;therapeutics; hyperpigmentation.*

RESUMO

A doença de Schamberg é dermatose pigmentar progressiva de curso crônico. Apresentamos o uso de peeling de ácido tioglicólico nessa manifestação, com estudo histológico e análise fotográfica. Paciente do sexo feminino, 43 anos, com diagnóstico clínico e histopatológico de doença de Schamberg. Foram realizadas cinco sessões de peeling de ácido tioglicólico 10% em gel com intervalo de 15 dias entre cada sessão. A paciente apresentou significativo clareamento das lesões com melhora clínica de 68,7%. Solubilizante hemossiderínico, o ácido tioglicólico é opção de tratamento, mostrando clareamento das lesões com boa tolerância e poucos efeitos colaterais.

Palavras-chave: púrpura; hemossiderina; terapêutica; hiperpigmentação.

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INTRODUCTION

First described in 1901, Schamberg's disease is a progressive pigmentary dermatosis of chronic course that is characterized by reddish-brown, irregular maculae associated with petechiae, resembling grains of cayenne pepper. It is asymptomatic and usually affects the legs, however it can affect the trunk and upper limbs.[1,2] The observed lesions appear to be the result of hemosiderin deposits associated with melanic hyperpigmentation. It is believed that there is melanocytic activation secondary to ferric pigment deposition in the dermis.[3] Thioglycolic acid peelings have been shown to be a safe and efficient treatment option for dermatoses of ferric origin.[4]

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The present study was carried out at the Dermatology Service, Hospital das Clínicas da Universidade Federal do Paraná (UFPR) – Curitiba (PR), Brazil.

Financial support: None
Conflict of interest: None

CASE REPORT

A 43-year-old female patient presented complaining of the sudden onset of stains on the legs and feet, one year earlier. The stains worsened after exposure to the sun. The patient denied comorbidities and use of medication. The examination showed irregular brownish maculae—some confluent—in the legs and dorsum of the feet, bilaterally. The dermoscopy of the lesion evidenced a brownish pigment with areas of erythema (Figure 1). The histologic analysis (Figure 2) showed an increase of melanin pigment in the keratinocytes, as well as dermis with edema and discrete perivascular lymphohistiocytic inflammatory infiltrate with the presence of hemosiderin—evidenced by Perls staining— confirming the diagnosis of Schamberg's disease.

In order to prepare the skin, 10% glycolic acid + 4% hydroquinone + 1% alpha-bisabolol was prescribed for three weeks prior to the procedure. Five sessions of 10% thioglycolic acid (in gel) peeling were carried out at intervals of 15 days. Prior to performing the procedure, it is recommended that the skin be cleansed with a mixture of alcohol, ether and acetone, followed by the application of the acid, which is removed from the skin with soap and water after 20 minutes of contact. The patient did not report pain or any discomfort during the procedure. Slight peeling was observed beginning three days after the procedure, lasting up to ten days. There was a significant whitening of the lesions (Figures 3-8) and patient satisfaction (with a 90% improvement rate reported). Pre- and post- treatment photographic records were evaluated by 20 dermatologists who reported average improvement of 68.7% (ranging from 55-80%). A control biopsy after the fifth session showed an absence of hemosiderin deposition through Perls staining.

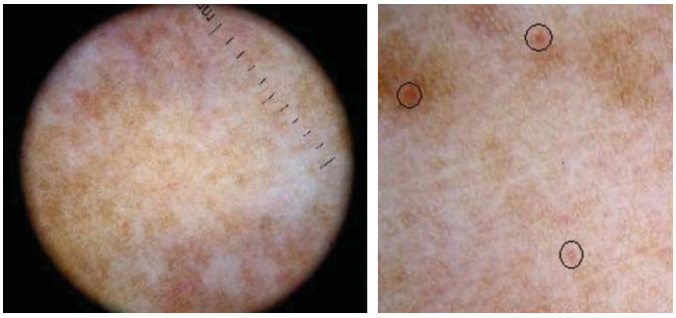

Figure 1: Dermatoscopic examination. Brownish pigment with areas of erythema, lesser magnification on the left and greater magnifications on the right hand side of the figure. Punctiform areas of erythema can be observed

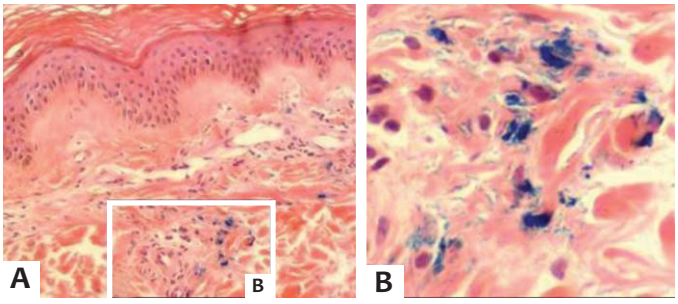

Figure 2: Histologic analysis. Presence of hemosiderin confirmed by Perls staining. **A:** Magnification = 100x (2.0x optical zoom). **B:** Magnification = 400x (2.0x optical zoom)

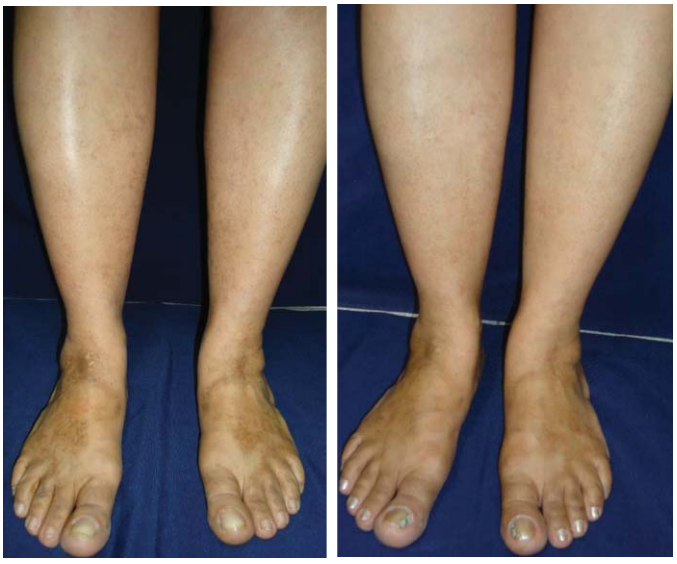

Figure 3: Anterior face of the legs. Left: pre-peeling. Right: post-peeling

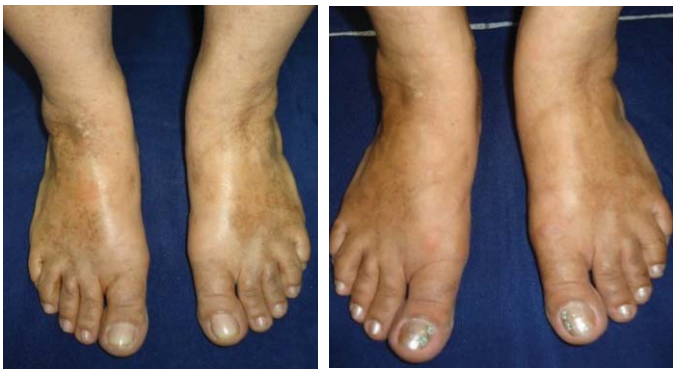

Figure 4: Dorsum of the feet. Left: pre-peeling. Right: post-peeling

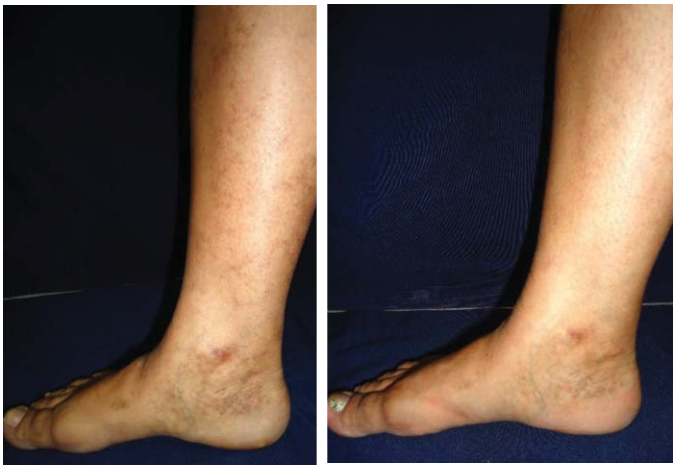

Figure 5: Medial face of the right leg and right foot. Left: pre-peeling. Right: post-peeling

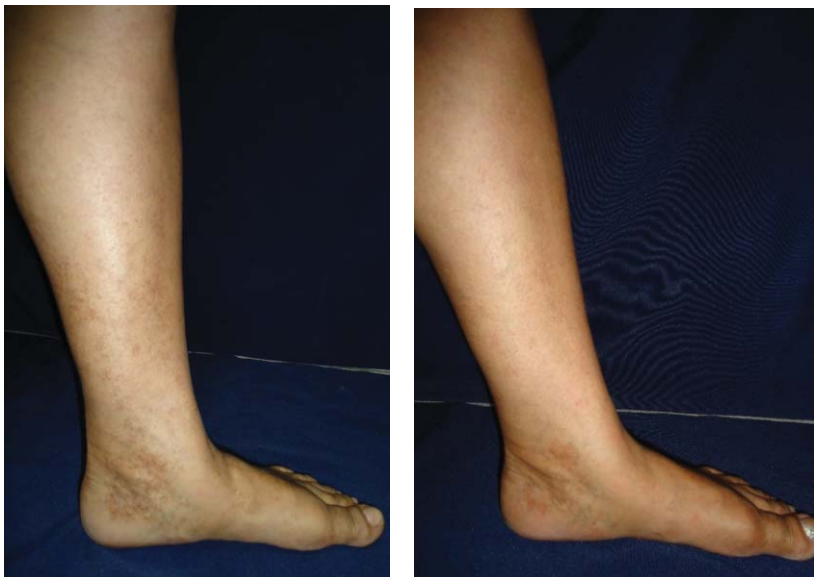

Figure 6: Medial face of the left leg and left foot. Left: pre-peeling. Right: post-peeling

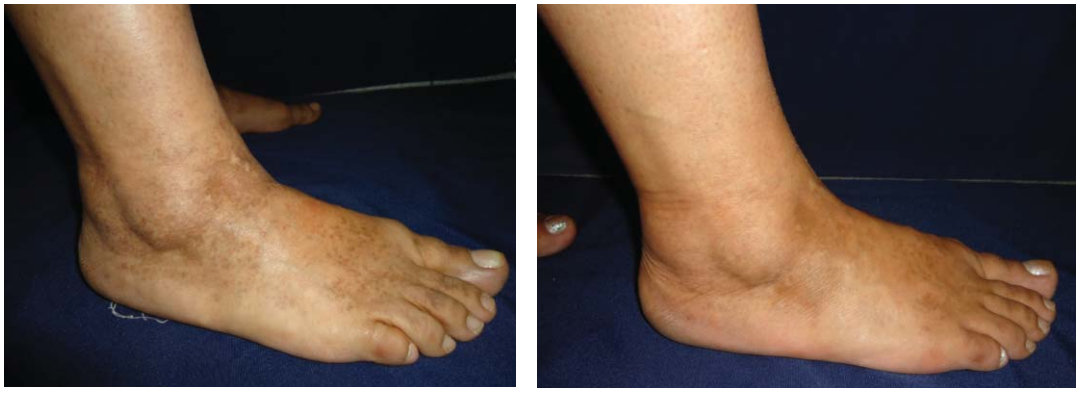

Figure 7: Lateral face of the right foot. Left: pre-peeling. Right: post-peeling

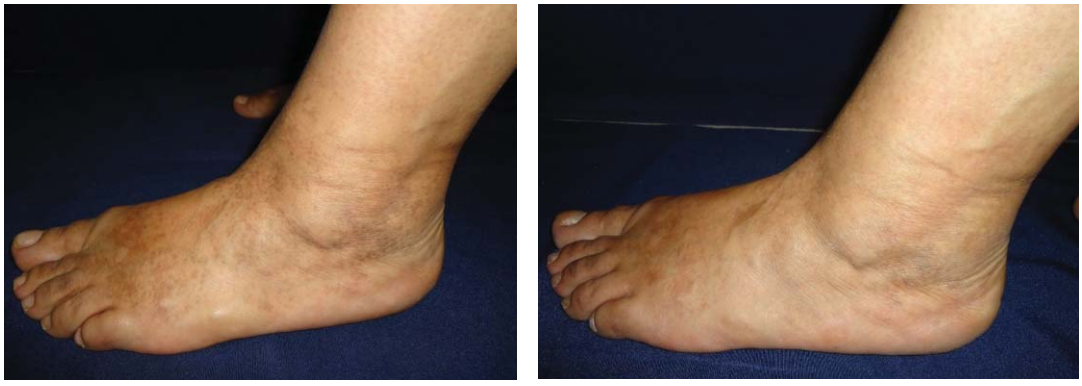

Figure 8: Lateral face of the left foot. Left: pre-peeling. Right: post-peeling

DISCUSSION

The etiology of Schamberg's disease is still unknown.[5] Triggering factors—such as hypersensitivity to drugs; and stasis, contact, and factitious dermatitis—were reported.[1] Although the exact pathogenesis is unknown, the capillary damage and entailed leakage of erythrocytes, seem to be the result of a lesion mediated by localized immune cells that is induced by a specific subtype of T helper lymphocytes[2,6] Histologically, perivascular mononuclear infiltrate can be observed in the upper dermis with extravasation of erythrocytes and hemosiderin deposition, however without fibrinoid necrosis of vessel walls[1]—a fact verified in the present case. To date, no treatment has demonstrated consistent beneficial effect. There are reports of improvement with topical steroids, griseofulvin, pentoxifylline, PUVA, anti-allergic drugs, colchicine, ascorbic acid, and oral rutosides.[1,5,6]

The residual stains common to this condition are a cause of distress for many patients, especially women. They seem to be

the result of hemosiderin deposits associated with melanic hyperpigmentation, since it is believed that there is melanocytic activation secondary to ferric pigment deposition in the dermis.[3]

Thioglycolic acid peeling is one of the treatment options for pigmentary disorders of ferric origin.[4] Serial and progressive peelings of 10% thioglycolic acid were proven to be a safe, efficient, and cost-effective therapeutic tool in the treatment of constitutional periorbicular hyperpigmentation.[7]

Thioglycolic acid—also called mercaptoacetic acid—is a representative of the thioglycolates class, and is considered a hemosiderin solubilizing substance.[3] Thioglycolates have long been used in the cosmetic industry as components of body epilators, chemical hair straighteners, and hair color.[8] Used topically, (from 5-12%) thioglycolic acid has the advantage of not causing pain or redness (sometimes mild), rare sensitization, and only mild and transient desquamation.[8] The literature recommends weekly applications, in gel, totaling five to six sessions. The procedure starts with local cleansing, followed by application of the product. The product is left on the skin for a period of 10-30 minutes and is then neutralized with water.[8] In the present case, the product was kept on the skin for 20 minutes, without the patients reporting any discomfort. Only mild erythema was observed after applying the product. The authors decided on biweekly sessions, given that mild desquamation occurred for up to ten days after the application sessions. The result obtained was significant, with the complete whitening of the stains in the lower third of the legs and on much of the dorsum of the feet (68.7% improvement) with high patient satisfaction. The absence of hemosiderin in the control biopsy may indicate a positive response to the treatment, since the sample was collected near the area of the previous biopsy, where there were previous stains. Despite the chronicity of the condition and probable recurrence of the lesions in the long-term, thioglycolic acid peeling was proven to be an efficient tool in the whitening of the lesions, with good tolerance and few side effects.●

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Case Reports

Treatment of folliculitis decalvans with Nd: YAG laser

Tratamento da foliculite decalvante com laser Nd:YAG

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The present study was carried out at the Dermatology Outpatient Clinic of the Hospital Universitário Oswaldo Cruz (Houp) of the Universidade de Pernambuco (UPE)—Recife (PE) Brazil.

Financial support: None
Conflict of interest: None

ABSTRACT

Treatment of folliculitis decalvans is a major challenge, with a great number of recurrences and required maintenance of disease activity over a long period. Laser-based hair removal has been used in the management of scarring follicular disorders. The present case report aims to illustrate the case of a patient bearing folliculitis decalvans in the lower limb who underwent five therapeutic sessions of neodymium:YAG laser (Nd:YAG), achieving complete remission of the inflammatory lesions with the treatment.

Keywords: *folliculitis; laser therapy; dermatology; alopecia.*

RESUMO

O tratamento da foliculite decalvante representa grande desafio, com inúmeras recidivas e manutenção da atividade da doença por longo período. A remoção de pelo com laser vem sendo utilizada no manejo de desordens foliculares cicatriciais. Este relato tem por objetivo ilustrar o caso de paciente portador de foliculite decalvante em membro inferior que realizou cinco sessões terapêuticas com laser neodímio:YAG (Nd:YAG) e assim obteve remissão completa das lesões inflamatórias.

Palavras-chave: foliculite; terapia a laser; dermatologia; alopecia.

INTRODUCTION

Treatment of folliculitis decalvans is challenging, with numerous recurrences and disease activity persisting for long periods. Many treatment options have been recommended: systemic and topical antibiotics; topical, systemic, and intralesional corticosteroids; isotretinoin and dapsone.[1] However, there is no consensus on the treatment of this dermatosis. Other therapeutic alternatives, such as topical calcineurin inhibitors[2], biological drugs[3], and laser-based epilation[4], have been described.

Laser-based hair removal is a fairly commonplace procedure in dermatologic practice, and some inflammatory and scarring follicular disorders have shown satisfactory response to this therapy.[4-7]

The present report is aimed at illustrating the case of a patient bearing folliculitis decalvans who underwent treatment with neodymium:YAG laser (Nd:YAG), achieving complete remission of inflammatory lesions.

CASE REPORT

An 18-year-old male patient experienced the emergence of follicular lesions in the right lower limb about five years before the present report was prepared. The examination evidenced follicular papules and pustules with peripheral desquamation (Figure 1), a clinical picture compatible with that of folliculitis decalvans.

The patient underwent treatment with Nd:YAG laser in a test area with the following parameters: 40J/cm² fluence, 30mseg pulse duration and 10mm spot size. The patient recovered uneventfully, and subsequent sessions were carried out with an adjustment of the fluence to 45J/cm², totaling five sessions to completely remove the hair of the affected area. After the treatment there was complete regression of the lesions and absence of inflammatory signs suggestive of folliculitis (Figure 2), a clinical picture that was sustained for at least ten months without the necessity for adjuvant treatments.

DISCUSSION

Folliculitis decalvans represents approximately 11% of cases of primary cicatricial alopecia.[8] It prevails in adolescents and young adults, especially in dark-skinned male patients.[8] It manifests clinically as erythematous follicular papules that develop into pustules, resulting in centrifugal cicatricial alopecia. The appearance of "tufts" is usually observed, in which numerous strands of hair emerge from a single dilated follicular ostium.

The etiology of this primary neutrophilic cicatricial alopecia is not fully understood.[1] *Staphylococcus aureus* seems to have an important role in the pathogenesis of folliculitis decalvans and can be isolated in almost all patients without treatment.[9]

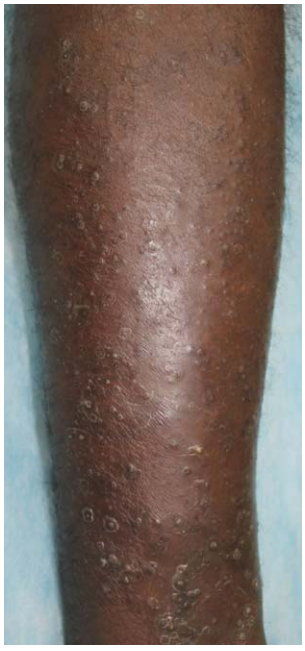

Figura 1: Pústulas e pápulas foliculares com descamação periférica em membro inferior direito (antes do tratamento)

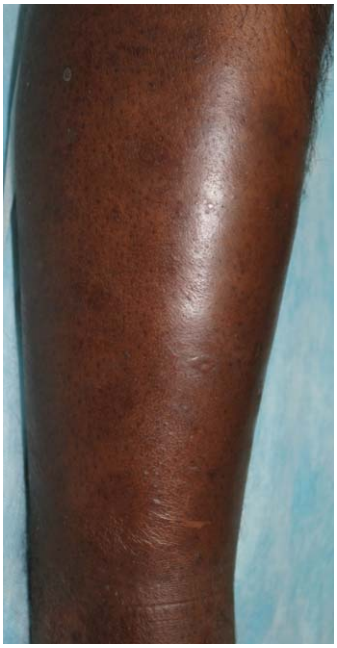

Figura 2: Após cinco sessões terapêuticas com laser Nd:YAG nota-se resolução completa das lesões

It has been suggested that superantigens or cytokines binding to the major histocompatibility complex type II, play some role in the pathogenesis.[9,10] The possibility of genetic predisposition has also been suggested.[10]

Treatment of folliculitis decalvans is challenging, with the presence of prolonged disease activity even after several therapeutic attempts. Since *S. aureus* has been suggested to have an important role in the pathogenesis of decalvans folliculitis, treatment options are aimed at eradicating that agent. Many oral antibiotics (and their combinations) have proven effective in the treatment. Nevertheless, 300mg rifampicin twice a day during a 10- to 12-week period was reported as the best anti-staphylococcic agent, offering a more enduring remission period.[9,10] Association with a300mg dose of clindamycin twice a day is recommended in order to prevent bacterial resistance.[9] Topical antibiotic therapy, such as mupirocin, clindamycin, fusidic acid, or erythromycin, can be associated with the oral antibiotic or, in mild cases, be carried out as a monotherapy.[1] Use of shampoo with antiseptic, such as triclosan, also contributes to the treatment.[1]

The use of topical or intralesional corticosteroids may be helpful in reducing inflammation and symptoms such as pruritus, burning sensation, and pain. Oral prednisone should only be considered in cases of rapid progression and for short treatment courses.[1]

Dapsone, combined with antibiotics or as monotherapy, may also be considered as a therapeutic option due to its antibacterial and anti-inflammatory activity, which is directed to neutrophils.[1]

Laser-based hair removal has been used in the management of follicular scarring disorders. A long period of remission was achieved with the use of a810nm diode laser in African-American patients bearing dissecting cellulitis of the scalp.[5] The long pulsed ruby laser has also proved effective in treating dissecting cellulitis of the scalp, keratosis follicularis spinulosa decalvans and pseudofolliculitis barbae.[6]

The 1,064nm Nd:YAG laser was used for reducing hair and the formation of papulae in pseudofolliculitis barbae, in Fitzpatrick's skin phototypes IV, V, and VI.[7]

The target of laser-based hair removal is the hair bulb's melanin, which is located in the dermis. The melanin absorbs the light emitted by the laser, and the energy is then converted into heat, resulting in the destruction of the bulb.

In dark-skinned patients—as in the case described—there is a challenge in carrying out the laser-based epilation, given that the epidermal melanin competes as a chromophore, thereby absorbing the light and causing the epidermis to heat, which can lead to the formation of blisters, pigmentation alterations, and scarring, in addition to reducing the procedure's effectiveness.

The absorption of light by melanin in the 800nm range is three times greater than in the 1,064nm range. Regardless of the wavelength, the selective heating can be achieved in individuals with darker pigmentation because the epidermis is usually

fairer than the hair. Nonetheless, due to the dispersion of light at shorter wavelengths, longer wavelengths (1,064nm) penetrate deeper and therefore provide a wider security window in dark-skinned patients.[4] The epidermal damage can also be reduced with the use of longer pulses and cooling systems.

Based on the optical properties of light on skin, the best combination of hair removal and epidermis preservation is achieved with a long pulsed laser. Thus, the Nd:YAG laser is a good option to treat follicular disorders in individuals with dark skin,[4] as is the case in the present case report, where the patient had an excellent response to the treatment, with no side effects reported.

CONCLUSION

The treatment of folliculitis decalvans represents a major challenge, with frequent recurrences of lesions. Laser-based hair removal seems to be a good therapeutic option for this condition, as demonstrated in the present case report. The choice of the laser is of paramount importance, for it must be aimed at decreasing the possibility of adverse effects of the procedure without compromising its effectiveness. Given that most patients with folliculitis decalvans are of a high Fitzpatrick phototype, it is appropriate to employ a long pulsed laser, such as the Nd:YAG laser. The good clinical response obtained in the present case expands the therapeutic options for this difficult to control condition. ●

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Dermatofibrosarcoma protuberans: atypical location and the importance of Mohs micrographic surgery

Dermatofibrossarcoma protuberans: localização não usual e a importância da cirurgia micrográfica de Mohs

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RESUMO

O dermatofibrossarcoma protuberans é neoplasia de células fusiformes de malignidade intermediária, mas que apresenta alto risco de recidivas locais. Acomete principalmente tronco e membros, sendo raro na face. O tratamento do tumor pode ser feito com cirurgia convencional com amplas margens cirúrgicas ou cirurgia micrográfica de Mohs. Em casos selecionados pode-se indicar radioterapia e quimioterapia. Relata-se o caso de paciente do sexo masculino, de 39 anos, apresentando na fronte pápula amarelada de 0,7 cm, cujas biópsia e imuno-histoquímica confirmaram o diagnóstico desse tumor. A lesão foi tratada através da cirurgia micrográfica de Mohs com bom resultado estético.

Palavras-chave: dermatofibrossarcoma; sarcoma; cirurgia de Mohs.

ABSTRACT

Dermatofibrosarcoma protuberans is a spindle cell neoplasm of intermediate malignancy, nonetheless it presents a high risk of local recurrence. It mainly affects the trunk and limbs, and is rare on the face. The treatment of the tumor can be carried out using conventional surgery with wide surgical margins or Mohs micrographic surgery. Radiation and chemotherapy can be indicated in selected cases. The present article reports the case of a 39-year-old male patient with a 0.7cm yellowish papule on the forehead, whose biopsy and immunohistochemistry confirmed the tumor's diagnosis. The lesion was treated through Mohs micrographic surgery with good aesthetic results.

Keywords: *dermatofibrosarcoma; sarcoma; Mohs surgery.*

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INTRODUCTION

Dermatofibrosarcoma protuberans (DFSP) is a spindle cell neoplasm of unknown etiology, first described in 1890 by Taylor, and as a distinct entity by Darier and Ferrand in 1924. It is an uncommon tumor with an incidence rate of 0.8 to 5 cases per million inhabitants/year, corresponding to less than 0.1% of all malignancies and to approximately 1% of soft tissue sarcomas. Most studies have found similar incidence rates in both genders. Some, however, have showed a predominance in men, with DFSP occurring up to four times more frequently in that group, especially in elderly patients. The most affected age group is 30-50 year-olds.[1-7]

The most common site of occurrence is the trunk (40-60%), followed by the limbs (20-30%), and head and neck (10-

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15%). When occurring on the scalp and in the supraclavicular region, the tumors are associated with higher morbidity and an increased risk of local recurrence.[1, 4,6]

The tumor is clinically characterized by a skin-colored papule or plaque, erythematous or yellowish, and usually asymptomatic. Areas of atrophy, induration, or telangiectasia may be present from the outset or arise with the development of the tumor. Growth is slow, infiltrative, with high rates of local recurrence, however with low rates of metastases.[1-6, 8]

Histological characteristics that suggest DFSP are a dense and uniform collection of spindle cells with a characteristic storiform arrangement. The stroma has varying amounts of collagen and capillaries. Recent lesions may have areas of untouched dermis or Grenz zone just below the epidermis. The tumor can infiltrate the subcutaneous tissue, distorting the adipose tissue's architecture with a honeycomb appearance. Deep projections towards the fascia and muscle hamper its delimitation and subsequent surgical removal.[1, 4,6,7]

The treatment of DFSP is mainly based on surgical resection, however, in selected cases, radiotherapy and chemotherapy can be used.[2]

The present paper describes the case of a patient with DFSP in an uncommon location, treated with Mohs micrographic surgery.

CASE REPORT

A thirty-nine-year-old male patient, living in the city of Belo Horizonte (MG), Brazil, had had an asymptomatic lesion on the forehead for about three years. Physical examination showed a yellowish, well-defined papule of fibrous consistency and 0.7 cm in diameter, in the right frontal region (Figure 1).

The total excision of the lesion was carried out without surgical margin, revealing undifferentiated spindle cell neoplasm with compromised margins (Figure 2), suggesting immunohistochemistry for diagnosis. Immunohistochemistry resulted positive for CD34, vimentin and Ki 67, being compatible with DFSP. Mohs micrographic surgery was indicated due to the location of the lesion and the risk of tumor recurrence (Figure 3).

Three stages were necessary to complete the excision of the tumor during the Mohs micrographic surgery. The first stage identified tumor involvement at the deep and medial margins, with the increase in margins being made in this direction (Figure 4). The second stage demonstrated the tumor only in the deep margin (Figure 5), and in the third and last stage the deep margin was expanded with removal of muscle tissue, reaching the galea (Figure 6). No histological signs of tumor were identified in that tissue. The closing of the surgical wound was carried out using a type O-T advancement flap, with good aesthetic result (Figure 7). When the present report was written, the patient had four months of post-operative follow up with no signs of local recurrence (Figure 8).

DISCUSSION

DFSP is a neoplasm of intermediate malignancy and low risk of metastasis. This tumor's high rate of local recurrence, in

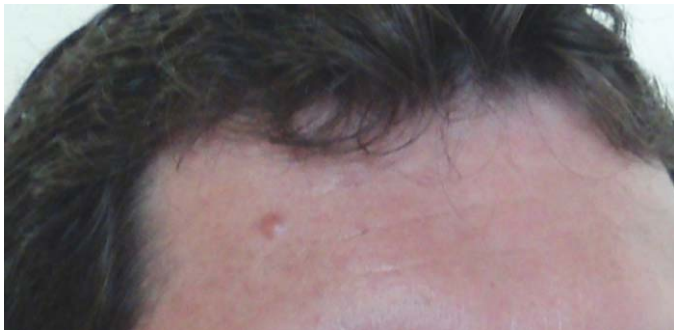

Figure 1: Yellowish papule 0.7cm in diameter located in the right frontal region

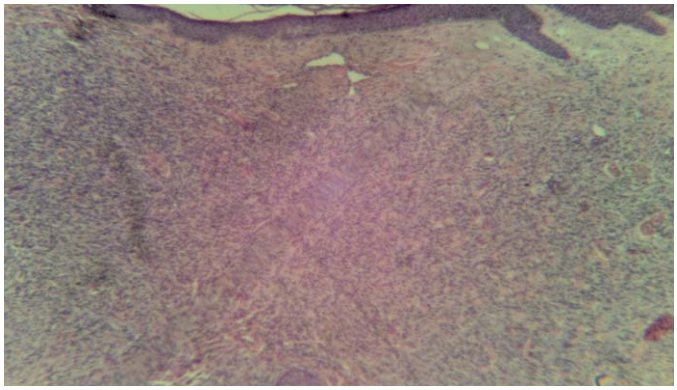

Figure 2: Presence of spindle cells in storiform arrangement

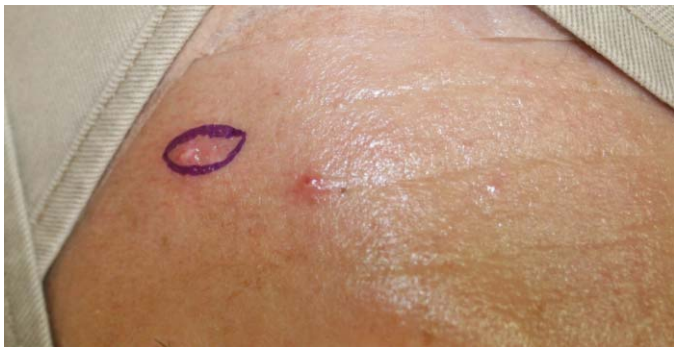

Figure 3: Pre-operative marking of the previous tumor's area (over excisional biopsy's scar). Patient with inflammatory acne lesions over scar on the surgery day

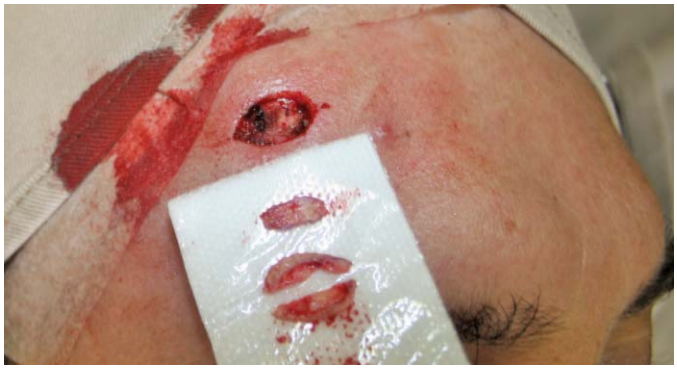

Figure 4: First stage: The lesion's deep and medial margins showed positivity

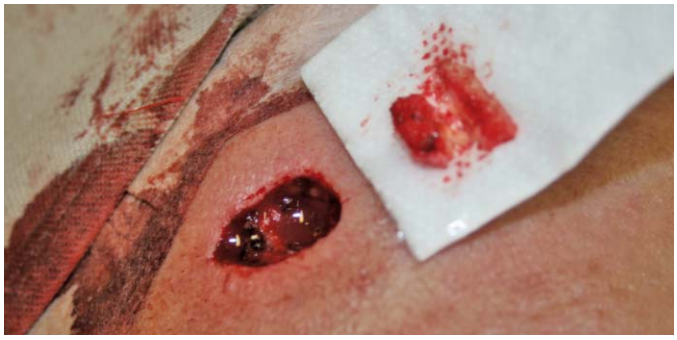

Figure 5: Second stage: Deep margins were compromised

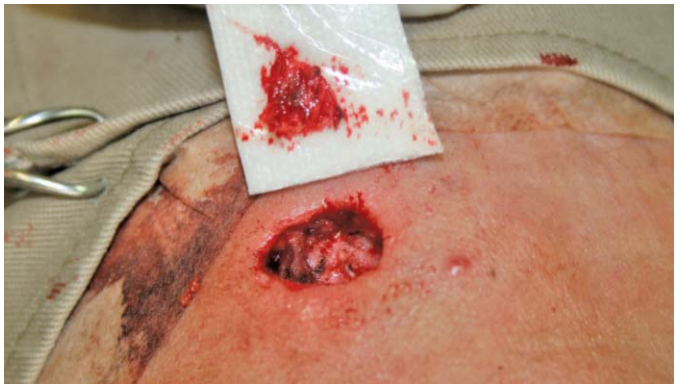

Figure 6: Third stage: Deep tissue was removed, including muscle tissue reaching the galea. There was no residual tumor

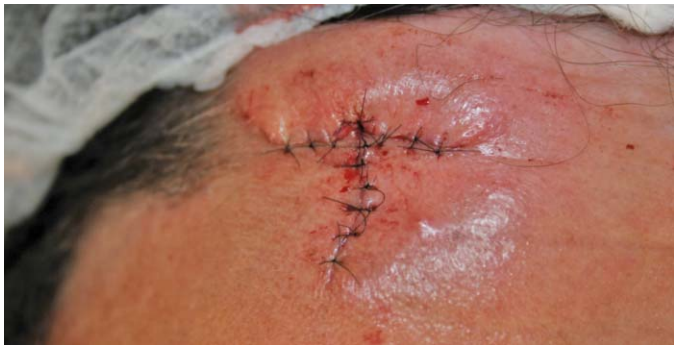

Figure 7: Immediately post-operative: O-T flap

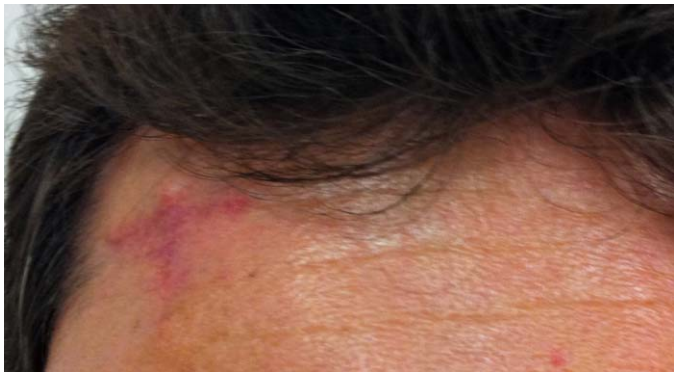

Figure 8: Two months after surgery: excellent aesthetic results with absence of recurrence signs

addition to high morbidity, nevertheless justifies the effort directed towards early diagnosis and the need for initial treatment that allows greater cure rates.

Given that in most cases it is a non-specific and asymptomatic lesion, the initial DFSP may not be perceived by the patient or can be mistaken for a benign lesion.[6] The size of the tumor depends on the development time. At diagnosis, it is usually between one and 5cm.[1] Cai et al.[2] found among a group of 260 studied patients an average tumor size of 3.1 cm at diagnosis. In the case described by the present report, it is important to emphasize that the diagnosis was attained considerably early, given that the tumor was less than 1cm in diameter.

In doubtful cases—as in the present report or in order to confirm the diagnosis—immunohistochemistry analysis must be carried out. CD34 is the most useful marker to differentiate DFSP from other fibro-histiocytic tumors, and its positivity ranges from 92-100%.[1,2,6,8] CD34 positivity can, however, be found in other tumors, such as melanoma, neurofibroma and perineuroma. The most important differential diagnosis is against dermatofibroma, which typically is positive for the Factor VIII and negative for CD34.[1] Loss of positivity for CD34 can be observed in DFSP with sarcomatous transformation.[8]

Surgical resection is the primary treatment for patients with DFSP, however simple local excision is not an adequate approach[2,4,6] Approximately 50% of patients with wide local excision still present residual tumors in the histology.[2]

Recurrence rates can reach up to 60% of cases and wide excision can entail a reduction of 10-33%. The factors associated with a higher risk of local recurrence are: histological subtype, mitotic index, cellularity, size and depth of the tumor, location in the head and neck, extension of the surgical margin, and recurrent lesions.[2,3,5] Regarding surgical margins, a study showed that patients treated with margins greater than 3cm have a recurrence rate of 5.7%, while those with margins of 1.5-3 cm had a 13.6% recurrence rate. This difference was statistically significant.[2] Lesions with multiple recurrences after initial treatment seem more prone to dedifferentiation in sarcomas with a high degree of malignancy, resulting in an increased risk of metastasis.[3]

Mohs micrographic surgery has demonstrated the highest cure rates for this tumor[4,9] and should be given serious consideration when there is involvement of the head, neck, face, or hands and feet; locations in which complete resection with the narrowest required margin is the best option to in order to avoid aesthetic and functional damage.[2,4] Cure rates reported for head and neck using this method were 91.2%. A 94% rate was obtained for the trunk. Other studies have shown recurrence rates even lower than this, in the range 0.8-3% when employing micrographic surgery.[1,3,6] In addition to the higher cure rate, a study showed that the average final defect with traditional surgery and a 3cm margin, was of 17.78 cm^2, as compared to a 7.49 cm defect after micrographic surgery.[2,3]

Other treatments that can be used include radiotherapy and chemotherapy. Conventional chemotherapy has poor results, while that using tyrosine-kinase inhibitors, such as ima-

tinib, entailed partial or complete regression of DFSP in up to two-thirds of patients.[1,4,5] Radiation therapy can be indicated in isolation for patients with unresectable macroscopic disease or where wide surgical excision may lead to significant functional and/or aesthetic compromise.[1,3-5]

The survival rate at five years is roughly 98.3%, and 95.7% in ten years.[2] Metastases are rare (1-5%) and affect lymph nodes, lungs, and bones. The main prognostic factors are: inadequate surgical removal with positive margins, large tumors located in the head, and the presence of areas of fibrosarcoma in the histology.[1]

Biopsy of clinically undefined lesions is critical for the early diagnosis of tumors like DFSP. Micrographic surgery offers the highest cure rates with greater tissue preservation in the treatment of DFSP and should be highly considered as the first choice treatment.

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Case report: Palisaded encapsulated neuroma simulating a Basal Cell Carcinoma

Neuroma encapsulado em paliçada – simulando carcinoma basocelular: Relato de caso

Case report

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ABSTRACT

Palisaded encapsulated neuromas are solitary neural skin tumors characterized by the presence of compact and parallel bundles of Schwann cell fascicles. The present article reports a case of this type of tumor, which was confirmed by anatomic pathological examination of a 55-year-old female patient who reported hypochromic macula growth, which had evolved into a smooth domed superficial papule with telangiectasias, simulating a basal cell carcinoma. Having knowledge of this entity is crucial in order to carry out differential diagnoses—comparing it to other lesions—especially basal cell carcinomas, skin appendage tumors, nevi, and epidermal cysts.

Keywords: neuroma; skin neoplasms; Schwann cells.

RESUMO

Os neuromas encapsulados em paliçada são tumores neurais solitários da pele caracterizados pela presença de feixes compactos e paralelos de fascículos de células de Schwann. Apresenta-se um caso desse tumor, confirmado por exame anatomopatológico, em paciente do sexo feminino, de 55 anos, que relatou mácula hipocrômica de crescimento que evoluiu para pápula de superfície lisa e em domo, com telangiectasias, simulando carcinoma basocelular. Ter conhecimento dessa entidade é importante para a realização de diagnósticos diferenciais com outras lesões, em especial com o CBC, tumores de apêndice cutâneo, nevos e cistos epidérmicos.

Palavras-chave: *neuroma; neoplasias cutâneas; células de Schwann.*

INTRODUCTION

In 1972, Reed et al. described forty-four cases of a different type of neural tumor, which they denominated palisaded encapsulated neuroma of the skin (PEN), also known as solitary circumscribed neuroma.[1-3] It is a solitary neural tumor of the skin, meaning it is not associated with other stigmata of neurofibromatosis. It is encapsulated and characterized by the presence of compact bundles of parallel fascicles of Schwann cells.[1]

It is clinically characterized by slow growth, and occurs mainly on the face of men and women aged 30-60 years.[1,2] The typical lesion is a solitary, painless, non-pigmented papule or sessile papule-nodule, which arises in the central facial region.[1,2] It constitutes a rigid and firm lesion that when examined through palpation, appears to be in the dermis.[1] When pressed, it does not suffer herniation into the dermis, as is the case with neurofibromas.[1]The skin on the tumor is smooth and pearly, and seems as if it is being stretched by the pressure of the subjacent tumor.[1] Telangiectasia can be present in the lesion, but they are not

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prominent or common—as they are with basal cell carcinomas (BCC). 1 Terminal hair is rarely observed in this tumor, contrary to what is found in some nevi.[1,2]

Histologically, the neoplasia appears confined to the dermis and partially or completely surrounded by dense fibrous tissue that forms a capsule.[1,2] When properly formed, that capsule resembles the perineurium and, in some sections presents itself in continuity with it, being stained with epithelial membrane antigen (EMA).[1,2] Some of these tumors are separated from the epidermis by a band of normal dermis, however others extend to the epidermis, which may present acanthotic.[1,2] The lesion is formed by numerous fusiform fascicles of Schwann cells with eosinophilic cytoplasm that stain intensely for protein S100.[2] These fibers are characteristic of neural tumors and are described as "wire-like" due to their spatial arrangement.[1]

The main differential diagnoses of the PEN are: BCC, chondrodermatitis nodularis helix, pyogenic granuloma, leiomyoma, chalazion, neurofibroma, seborrheic keratosis, actinic keratosis, cysts, sebaceous adenoma, trichofoliculoma, eccrine spiradenoma, fibrous papulae of the face, nevus and verruca vulgaris.[1-3]

CASE REPORT

A white, 55-year-old female patient being treated at a private practice, reported a long history of asymptomatic hypochromic macula in the right supralabial region. Slow growth had been noticed in recent months, with the transformation of the lesion into a beige circular papule, with a smooth and dome-shaped surface, which had fine telangiectasias (on the surface), simulating a BCC (Figure 1). The therapy chosen was exeresis and suture of the lesion, followed by anatomical histological examination (AP).

Observed was a benign, well-delimited neoplasia of neural nature constituted by cells with elongated nuclei and fusiform cytoplasm forming bundles and fascicles oriented in various directions, often with nuclei arranged side by side. The supra-adjacent epidermis appeared tapered, with rectification of interpapillary crests (Figures 2 and 3).

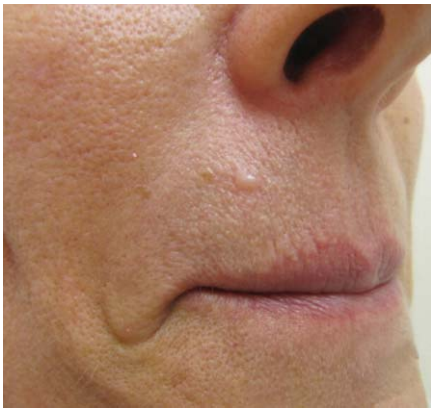

Figure 1: Well-circumscribed, stiffened papular lesion, similar to basal cell carcinoma, in the right supralabial region

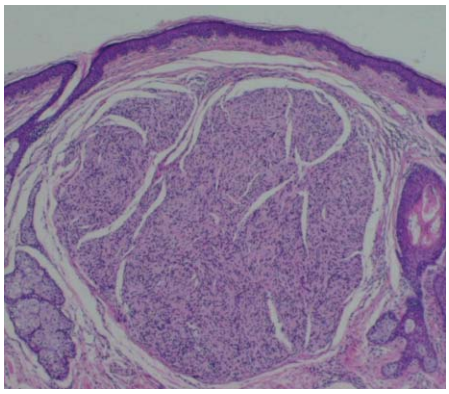

Figure 2: Benign neoplasm of neural nature constituted by cells with elongated nuclei and fusiform cytoplasm forming bundles of fascicles. The neoplasia is well-delimited and an artifactual image can be observed through the bundles

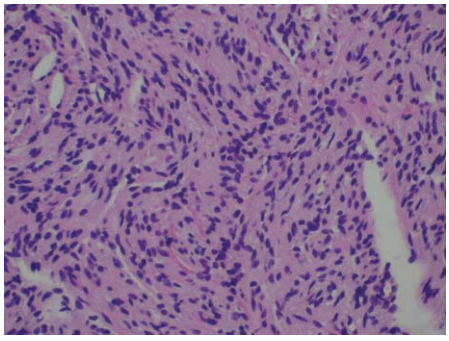

Figure 3: Detail of bundles and fascicles oriented in varied directions, many times with nuclei arranged side by side

DISCUSSION

Benign tumors of the nerve sheath are divided into three categories: schwanommas (neurilemmomas), neurofibromas, and true neuromas.[1] The absence of axons in most schwanomma cases, allows its differentiation from the other two categories.[1] However, the differentiation between neurofibromas and neuromas is more difficult to attain.[1] The presence of axons is shown in some or many of the fascicles of Schwann cells in neurofibromas, however the proportion of axons as compared to fascicles is not anywhere near 1:1.[1] Yet in true neuromas, this relationship approximates the ratio of 1:1.[1]

The PEN of the skin is a benign, well-circumscribed, solitary tumor most often found on the face of middle-aged adults.[1,2] Nonetheless, these lesions have also been described in other body regions, such as the trunk, shoulder, arm, hand, foot, oral mucosa, nasal cavity, and glans penis.[1,2] It can be easily mistaken for BCC, melanocytic nevus, epidermal cysts, or tumors of skin appendages.[1-3]

The long duration of the tumor, the sparse telangiectasias and the absence of ulceration assist in the differentiation from BCC, while distinction from nevus is done through analyzing the lesion's rigidity and the absence of terminal hair, which can be observed in PEN.[1-3] However, the differentiation from tumors of skin appendages is extremely difficult, often only being performed through histologic analysis.[1,2]

Histologically, PEN is a well-circumscribed and encapsulated tumor that has interwoven fusiform fascicles, usually separated by artifactual clefts.[2] Tumor cells stain positively for S100 protein, type IVcollagen, and vimentin, which show staining in Schwann cells.[2] The lesion's capsule contains perineural cells that stain positively for EMA.[2]

CONCLUSION

True solitary and spontaneous neuromas are rare, and seldom reported. In the authors' opinion, having knowledge of this entity is key for carrying out differential diagnosis against other lesions, especially with BCC, tumors of skin appendages, nevi, and epidermal cysts.

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