

Official Publication of Brazilian Society of Dermatology
 October / November / December ● Volume 4 ● Number 4
 ISSN:1984-5510

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Comparative assessment of CO₂ fractional laser and dermabrasion in the treatment of acne scars

Avaliação comparativa do Laser de CO₂ fracionado e da dermoabrasão no tratamento de cicatriz de acne

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Received on: 21/11/2012
Approved on: 06/12/2012

This study was carried out at the Dermatology Service of Hospital de Clinicas, Universidade Federal do Paraná (HC-UFPR) – Curitiba (PR), Brazil.

Financial support: None
Conflict of interest: None

ABSTRACT

Introduction: Acne scars are common, and their treatment is challenging. Several techniques have been used to remove, reposition, and flatten acne scars to improve the appearance of the skin's surface. More recently, fractional CO₂ laser has been used to correct such scars due its good results and shorter recovery time.

Objective: To evaluate and compare fractional CO₂ laser vs. dermabrasion-based treatment of acne scars.

Methods: Nine patients were assessed – six received fractional CO₂ laser and three were treated with dermabrasion. Subjective and objective parameters were evaluated for both treatment modalities.

Results: Both patient groups showed objective and subjective improvement.

Conclusions: This study has demonstrated that fractional CO₂ laser and dermabrasion-based treatments have similar efficacy in moderate to severe acne scars.

Keywords: cicatrix; acne vulgaris; laser therapy.

RESUMO

Introdução: Cicatrizes de acne são frequentes e de tratamento desafiador. Diversas técnicas têm sido utilizadas para remover, reposicionar e aplainar cicatrizes de acne, melhorando o aspecto da superfície da pele. Recentemente a utilização do Laser de CO₂ fracionado foi incluída entre as opções para a correção dessas cicatrizes com bons resultados e menor tempo de recuperação.

Objetivo: Avaliar e comparar a resposta do tratamento de cicatrizes de acne com Laser de CO₂ fracionado e dermoabrasão em pacientes com cicatrizes de acne.

Métodos: Foram analisados nove pacientes, seis submetidos a Laser de CO₂ fracionado, e três a dermoabrasão. Avaliaram-se parâmetros subjetivos e objetivos dos dois tratamentos. Resultados: Os dois grupos de pacientes mostraram melhora objetiva e subjetiva.

Conclusões: Foi demonstrada eficácia semelhante dos tratamentos para cicatrizes de acne moderadas a graves com as duas técnicas.

Palavras-chave: cicatriz; acne vulgar; terapia a laser.

INTRODUCTION

Acne has a 90% prevalence rate among adolescents,¹ persisting into adulthood in 12–14% of cases, with severe social and psychological implications.^{2,3} Inflammatory lesions may result in permanent scarring.⁴ Roughly 1% of the population develops acne scars, although only one in seven people deem it a disfiguring condition.⁵

Acne scars can be of three types: hypertrophic (keloidal, papular and bridges), dystrophic, and depressed (distensible and non-distensible). The latter can be further subdivided into superficial, medium or crateriform and deep (icepick and tunnel scars).⁶ The severity of these scars can be classified into four grades,⁷ with the type and severity of the scars determining the viable treatment options (Table 1).^{8–10}

Resurfacing (i.e. remodeling of the skin surface) involves the removal of the epidermis and superficial dermis, leaving the skin appendages (sebaceous glands, hair follicles and sweat ducts) untouched, and promoting the production of collagen and the regeneration of the skin.^{11,12} Resurfacing methods include phenol or trichloroacetic acid based chemical peelings, dermabrasion, or ablative lasers.

Dermabrasion is a classic method of ablative resurfacing that was first described in the mid twentieth century.¹³ It is a mechanical method that employs either an electronic device with rotating diamond fraises, or the manual use of sandpaper, which allows more control of the treated depth. The risk of unsightly scarring depends on the depth reached – which is operator-dependent – and means that proper training is crucial. Reepithelialization begins at the wound’s borders and from the epidermis of the skin appendages (particularly the hair follicles). Healing is therefore slower, and adverse effects, such as erythema and edema, can be more prolonged.¹⁴

One or two sessions are recommended for the treatment of acne scars. The most commonly reported complication is hyperpigmentation.¹⁵ Bagatin et al. described the use of dermabrasion in conjunction with isotretinoin as a treatment that will not result in hypertrophic scars, and leading to the improvement of atrophic lesions.¹⁶

Treatments using new technologies have become popular in recent years for correcting acne scars. Ablative CO₂ laser had long been considered by most authors to be the gold standard for the correction of depressed, icepick type scars. However, due to complications inherent in this method and also the long recovery time, its use was discontinued. With the introduction of fractional technology, CO₂ laser has recovered its main role in the treatment of acne scars.^{17–23} The concept of fractional photothermolysis – treating zones in the epidermis and/or dermis while leaving some areas untouched following a grid pattern – was introduced by Manstein et al. in 2004.²⁴ Those intact areas, located between the treatment zones, help lead to a faster reepithelialization (about five days) and a decreased risk of unsightly scars and dyschromia.^{8,17,25} This technique has lent safety to the treatment of extrafacial areas and for patients with higher phototypes. The number of sessions has an inverse relationship with the level of laser energy used (i.e. higher energy levels are capable of achieving good results with fewer sessions), however with a correspondingly higher rate of complications. In an attempt to reduce these limitations, Metelmann et al.²⁶ described the Croll’s localized technique (reconstructive surgery of acne scars using a localized laser), which by reducing the laser device’s spot area and adapting it to the lesion’s shape, decreases the distance between points and increases the depth of the shots.

Table 1: Severity of acne scars and corresponding treatment options	
Grade I or macular scars: related to the skin surface and color: erythematous, hyper or hypopigmented, visible from any distance.	Home treatment with topical retinoids, whiteners and sunscreen, or even intense pulsed light or lasers for pigment.
Grade II or mild scars: related to the skin surface, atrophy or mild hypertrophy, not easily visible from “social distances” (≥ 50cm), can be covered with makeup.	Localized: fractional non-ablative resurfacing, subcision or filling. Generalized: fractional resurfacing treatment complemented by localized treatment methods.
Grade III or moderate scars: with more significant depression, mild to moderate hypertrophy or papular, highly visible from “social distances” (50cm), not easily camouflaged, being distensible when atrophic.	Fractional resurfacing, deeper fillings, ablative lasers, dermabrasion; if hypertrophic: intralesional injection of corticosteroids or vascular laser.
Grade IV or severe scars: dystrophic, icepicks, bridges, tunnels scars and keloids, highly visible from “social distances”, not easily masked and non-distensible.	If atrophic or icepicks: the CROSS technique (chemical reconstruction of skin scars), and fractional resurfacing or surgical techniques associated with ablative resurfacing methods can be used. If in bridges and tunnels: excision is recommended; intralesional injection for hypertrophic and keloids.

OBJECTIVE

The present study's objective was to evaluate the efficacy and side effects of the fractional CO₂ laser and dermabrasion-based treatment of acne scars, comparing the two methods.

METHODS

A retrospective study of patients with acne scars and treated with fractional CO₂ laser and dermabrasion at the Cosmiatry Outpatient Clinic of the Hospital de Clinicas of the UFPR, was carried out between July and December 2010. All procedures were performed by resident physicians under the supervision of a preceptor physician.

Nine patients were included – seven women and two men, aged 27–58, with acne scars grade III or IV, no history of previous ablative treatment, and with no active acne lesions.

The patients were divided into two groups, according to their personal preference for treatment type after receiving an explanation of the two types of procedures (fractional CO₂ laser and dermabrasion). An informed consent contract was signed by each patient, according to the specific type of procedure he or she would undergo.

Six patients received three sessions of fractional CO₂ laser treatment at 30-day intervals. Three patients received a single dermabrasion session.

The patients' skin was prepared with triple formulation (0.05% tretinoin, 4% hydroquinone and 0.01% fluocinonide acetone) at least 15 days before the procedure. An anti-herpetic therapy (acyclovir 400mg, 8/8h) was started one day before the procedure, and maintained for five days.

The patients treated with fractional CO₂ laser (n= 6) were instructed to use a topical anesthetic cream (Dermomax[®], Laboratório Aché, São Paulo, Brazil, lidocaine 4%) 30 to 45 minutes before the procedure. This was removed immediately before the laser application. The device used was the SmartXide Deka[®], with 30MJ-power, and following the parameters described below. A reduced space and a greater depth in the scars were maintained (when compared with the remaining areas of the face), according to the patients' respective phototypes (Table 2). After treatment, the patients were instructed to wash their face two times a day and apply solid petrolatum for five days.

Patients undergoing dermabrasion received anesthesia with 2% lidocaine before the treatment, followed immediately by local application of 35% trichloroacetic acid across the face, and subsequent sanding with electric dermoabrasor and a manual finish with sandpaper number 180 on the scars' sites. Dressing with neomycin and tulle was put in place on the treated area, and kept in place for 40 hours. Moisturizer cream was applied on the remaining areas of the face. After the removal of the dressing, patients were instructed to clean the face three times a day at home and apply antibiotic cream for five days. Both groups were instructed to resume the use of the triple formula after

Table 2: Fractional CO₂ laser – parameters used (spacing in μm / dwell time in μs)

Phototypes	1 st session	2 nd session	3 rd session
II and III			
Scars	200/1500	200/1500	200/1500
Full face	700/1500	700/1600	500/1500
Phototype IV			
200/1500	200/1500	200/1500	
500/300	500/500	700/1000	

medical evaluation (between seven to 14 days of the procedure) and sunscreen seven days after the procedure.

Subjective evaluations were carried out with patients regarding the discomfort and pain tolerance during procedures, the results, and the side effects. The objective assessment was carried out by three experienced dermatologist physicians, and was conducted through the analysis of photographs taken from five different angles, in order to evidence the depth of the scars (30° and 45° to the right, 0° central, 30° and 45° to the left).

RESULTS

The discomfort described during the procedure varied from moderate to significant among patients treated with CO₂ laser. Each of the three patients who underwent dermabrasion described a different degree of discomfort: absent, moderate, and significant. Crusts developed with 67% and 100% of patients treated with CO₂ and dermabrasion, respectively. Of those, 67% also presented with petechiae, all with complete resolution within seven days. Only one dermabrasion patient (one from a grand total of nine) had post-inflammatory hyperpigmentation, which receded within eight weeks under treatment (4% hydroquinone and 0.05% clobetasol cream).

The subjective assessment, carried out with a questionnaire given 30 days after the treatment with fractional CO₂, suggested 50% of patients had moderate improvement and 50% significant improvement – an evaluation that has persisted for at least 90 days after the procedure. Of the patients who underwent dermabrasion, only two were evaluated after 30 days, describing moderate to significant improvement. All three patients answered the questionnaire in the 90-day follow up, with 33% reporting moderate improvement, and 67% reporting significant improvement.

In the general review, carried out 90 days after the procedure, the treatments were described as very good and excellent by CO₂ and dermabrasion patients, who stated they would recommend the therapies.

In the objective evaluation, carried out through photographs (Figures 1 and 2), one evaluator physician reported one instance of an absent answer from a single



Figure 1: Patient at pre-treatment and at 90 days, after three fractional CO₂ laser sessions

patient, while another reported one significant answer in another patient, at 30 days after treatment with CO₂. All other evaluations reported moderate to significant improvement. Ninety days after, however, some degree of improvement was reported in all patients treated with fractional CO₂ or dermabrasion, most of them moderate.

The Wilcoxon test indicated an absence of statistical difference between treatments after 30 and 90 days. The Kendal test, used to analyze the existence of agreement between evaluators, suggested there was no statistical difference between the evaluator physicians 1, 2, and 3. On the other hand, there was statistical difference ($p = 0.036$) between patients and evaluators in the comparison of the degree of improvement 30 days after treatment. In this case, the patients' subjective assessment was better than the those of the physicians, which can be explained by the difficulty in photographically recording the improvement in the relief height of scars. The Mann-Whitney U-Test was used to compare the two treatments in light of the results. There was a difference between the treatments regarding erythema and swelling (greater in dermabrasion, with $p = 0.005$ to 0.034 , depending on the items evaluated), nonetheless there was no difference in the improvement degree and general evaluation of the treatments.

DISCUSSION

The treatment of acne scars requires the use of multiple related techniques,²⁴ with fractional CO₂ laser and dermabrasion being recommended for resurfacing grades III and IV scars. These techniques can be used in conjunction with surgical corrections, chemical peels and fillers.

The present study demonstrated that fractional CO₂ laser and dermabrasion are effective in the treatment of acne scars. Responses to the treatments are comparable, though with different recovery times, with all patients reporting moderate to significant improvement (51–100%). The data obtained is consistent with the literature, which shows minimum improvement of 26–50% in the texture, atrophy, and general appearance of scars in patients treated with two or three fractional CO₂ sessions.^{18, 20, 23, 27}

The objective of these treatments is long-term improvement for the patients. The edema and the dyschromias seem to interfere with the physicians' proper assessment of patients during the first weeks of treatment. The most obvious improvement – observed both objectively and subjectively three months after the end of the treatment – is consistent with studies that show that neocollagenesis persists for at least three months after the end of the treatments.^{23, 28} Long-term studies suggest a progressive improvement in the first six months after the end of the treatments.¹⁸



Figure 2: Patient at pre-treatment and at 90 days, after one dermabrasion session

The most frequent side effect reported in the literature, following fractional CO₂ laser, is post-inflammatory hyperpigmentation. This side effect is more frequently associated with higher phototypes and when more aggressive parameters are used.¹⁸ In the present study, none of the patients treated with this technique showed post-inflammatory hyperpigmentation, which may have been prevented by the use of triple formulation in the preparation of the skin and/or the use of more aggressive parameters, in a focused way on the scars only, as described by Mettelmann et al.²⁶

Regarding the evaluation of dermabrasion as a treatment for correcting acne scars, only a few studies have been published on the subject over the past 15 years.²⁹ Fulton and Rahimi¹⁴ evaluated 25 volunteers who underwent the procedure, describing satisfied patients who reported minimal complications (hyperpigmentation being the most frequent, reported in 36% of cases). In the present study one dermabrasion patient (33%) had this complication, with the remaining three reporting moderate to significant improvement of scars.

In the literature, only one prospective study has compared the use of fractional CO₂ laser and dermabrasion in the treatment of surgical scars on the face (coinciding with the present study's objective), and concluded that the laser modality is safer, notwithstanding the efficacy of both methods.³⁰

CONCLUSION

Recognizing that the small number of patients in this study presents limitations for interpreting its results, the study has nonetheless demonstrated a similar efficacy (absence of statistical difference) for the treatment of acne scars with fractional CO₂ laser and dermabrasion. New technology-based treatments, which are progressively less dependent on operator-physicians, are becoming increasingly popular, since parameters pre-set by the device manufacturers can be used instead. Nevertheless, it is important to note that the treatment of acne scars is multimodal and varied, and better responses result from a combination of techniques, with dermabrasion still providing excellent outcomes and low complication rates, albeit with a longer recovery time. □

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Clinical evaluation of a topical formulation to help prevent stretch marks during pregnancy

Avaliação clínica de uma formulação de uso tópico como auxiliar na prevenção de estrias na gestação

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Received on: 04/10/2012
Approved on: 24/11/2012

This study was carried out at Medcin Instituto da Pele – Osasco (SP), Brazil.

Financial support: Study material supplied by Bayer S.A., São Paulo, SP, Brazil.
Conflict of interest: Study material supplied by Bayer S.A., São Paulo, SP, Brazil.

ABSTRACT

Introduction: Stretch marks occur due to the rapid stretching of the skin, which is typical in pregnancy. Several topical treatments to prevent them have been studied.

Objective: To evaluate the effectiveness of a topical formulation (lactic acid and sodium lactate in an emulsion with caprylic and capric acids' triglycerides) in the prevention of stretch marks.

Methods: Seventy-five pregnant women aged 18–40 were assessed. The treated area was the abdomen and the control area was the inner forearm, with and without the application of the tested product. Softness, hydration, and elasticity – and biophysical measurements for hydration and elasticity – were evaluated.

Results: Of the 52 women who completed the study, 9.6% presented stretch marks in the treated abdominal area. There was a significant improvement in all clinical parameters assessed ($p < 0.001$). There was a significant improvement – compared the control area – in the instrumental measurements of hydration and elasticity in the abdomen. A significant improvement was also verified in the treated forearm area compared to the untreated forearm area for both parameters evaluated ($p = 0.001$).

Conclusions: The formulation improved the skin's elasticity and hydration, reducing the striae incidence more than previously reported in the literature.

Keywords: striae distensae; pregnancy; relaxin.

RESUMO

Introdução: As estrias ocorrem pelo rápido estiramento da pele, típico da gestação. Tratamentos tópicos vêm sendo estudados para prevenir seu aparecimento.

Objetivo: avaliar a eficácia preventiva de estrias de uma formulação tópica.

Métodos: Avaliaram-se 75 gestantes entre 18 e 40 anos. A área tratada foi o abdome, e a área-controle, a face interna do antebraço, com e sem o produto de teste, avaliando-se: maciez, hidratação e elasticidade além de medidas biofísicas para elasticidade e hidratação.

Resultados: Das 75 gestantes, 52 finalizaram o estudo; destas, 9,6% apresentaram estrias na área abdominal tratada. Houve melhora significativa em os todos parâmetros clínicos avaliados ($p < 0,001$). Nas medidas instrumentais, houve melhora significativa da hidratação e elasticidade na área abdominal, superior à da área-controle; quanto ao antebraço, também houve melhora significativa da área tratada em relação ao controle para ambos os parâmetros avaliados ($p = 0,001$).

Comentários e Conclusão: A associação dos ingredientes da formulação (ácido láctico e lactato de sódio em emulsão com triglicérides do ácido caprílico e cáprico) foi capaz de aumentar os níveis de elasticidade e hidratação, reduzindo a incidência de estrias em comparação ao relatado em literatura.

Palavras-chave: estrias de distensão; gravidez; relaxina.

INTRODUCTION

Stretch marks (distensae striae) are caused by the rupture of collagen and elastic fibers in the dermis, when subjected to fast and intense distension. They can occur in any individual during situations of cutaneous distension, such as weight gain, physical exercise with fast increase in muscle volume, corticosteroids use etc. However, they are especially common in pregnancy.^{1,2} Stretch marks occur in up to 90% of pregnancies, especially in the third quarter, being a multi-factorial phenomenon. They can be linked to constitutional pre-disposition, weight gain, and the age of the mother.³

The appearance of stretch marks is clinically characterized by linear macules that are initially erythematous or violaceous. They may present mild pruritus, and then progress to atrophic areas of pearly appearance. They can be variable in size and number, and sometimes lead to deformities, causing psychological disorders in the patient.⁴ There are several treatment modalities for attenuating striae distensae, however once they have occurred, their complete eradication from atrophic areas is still virtually impossible.⁵ For this reason, some studies have been conducted with the aim of assessing the value of topical treatments ineffectively preventing the formation of stretch marks during pregnancy. Topical formulations that could act on the mechanical properties of the skin – especially on elasticity – could possibly mitigate the onset of stretch marks.⁶

In order to accurately evaluate this possible affect, biophysical measurements of parameters such as skin elasticity and hydration can be gathered using safe, accurate, and non-invasive equipment.^{7,9} Alpha-hydroxy acids have been studied for their therapeutic effect on stretch marks via topical use or peelings. Their safety profile at low concentrations is encouraging for use during pregnancy.¹⁰ The product evaluated in the present study is an emulsion containing lactic acid. To date, there is an absence of studies on the preventive effects of the alpha-hydroxy acid molecule on striae distensae. The present study is aimed at evaluating the efficacy of a topical formulation containing lactic acid in preventing stretch marks during pregnancy.

METHODS

This was a prospective, controlled, comparative study, conducted between May and September 2010, at a private clinical research laboratory in the city of Osasco (SP), Brazil. Seventy-five pregnant women aged 18–40, without previous abdominal striae, were assessed. The patients were invited to take part in the study, from immediately after their third full month of pregnancy (13 + 1 completed weeks) and ending at the beginning of their 36th week of pregnancy. Patients who had not attended prenatal care, those carrying twins, those considered high-risk by the assistant obstetrician, those with hormonal disorders or using oral or topical corticosteroids (as well as any type of hormone) were not included in the study.

At baseline, the skin of all patients was evaluated using the clinical parameters of smoothness, hydration and elasticity, and was classified according to a four-grade scale of intensity, with the higher grades representing higher intensities. Biophysical

measurements were collected using a Cutometer® MPA 580 (Courage & Khazaka, Germany) device, designed for the evaluation of elasticity. The stratum corneum's hydration was assessed with a Corneometer® MPA 580 (Courage & Khazaka, Germany) device. The instrumental measurements were then repeated at the last study visit. The treated area (for ethical reasons) was the abdomen. In order to evaluate skin elasticity, random sections of the inner right or left forearm were chosen as the control area, and areas both with and without the application of the tested product were compared. In addition to the initial assessment, three more clinical and subjective evaluations were carried out during the course of the study (at 28 + 2 days, at 70 + 2 days, and at 140 + 2 days), corresponding to approximately 120 days of continued use of the product in the tested areas.

The evaluation of stretch marks that emerged on the patients during the study followed a five-grade rating scale, which included size, color, and depth of stria, where Grade 1 corresponded to the highest intensity of the parameter and Grade 5 corresponded to the lowest (the latter meaning improvement of the striae). A specific abdominal area (the lower right and left quadrants located near the umbilicus) was chosen for the observation and counting of the stretch marks. The use of the product was standardized at one to two times daily. The study protocol, as well as the Free and Informed Term of Consent, was previously approved by an independent Ethics Committee.

RESULTS

Of the 75 pregnant women invited for the study, seven did not meet the criteria for inclusion and/or exclusion. The study began with 68 volunteers; one was excluded for not using the product as instructed and eight gave up participating for personal reasons unrelated to the study, which proceeded with 59 volunteers going forward. Of those, two patients had their data disregarded for not returning for the final evaluation. Of the 57 remaining, five developed adverse events during the study, resulting in valid data collected from 52 pregnant women who completed the study. The mean age in the study group was 28.4 years. Adverse events observed are detailed in table 1:

EFFICACY EVALUATION

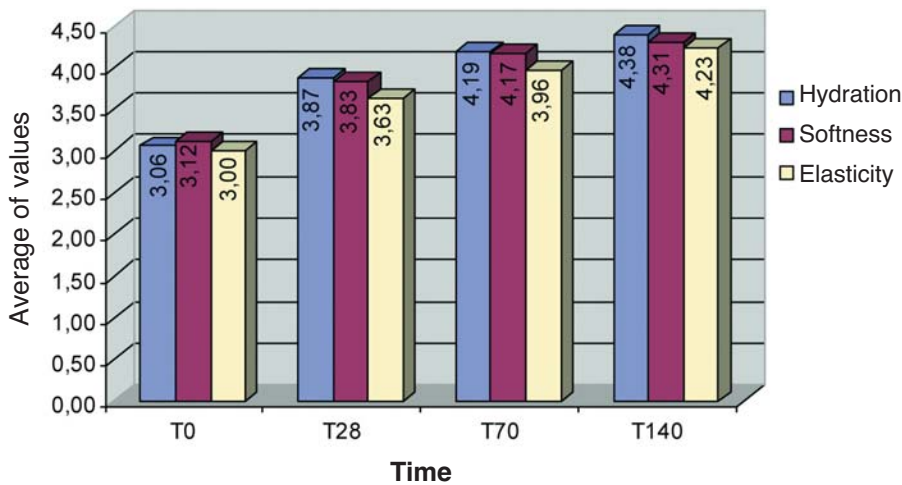
Statistical evaluation: All data was statistically analyzed using a Student's t-test, with a 5% significance level.

1. Clinical evaluation

All parameters evaluated clinically (hydration, softness and elasticity), presented a statistically significant increase ($p < 0.001$), as shown in figure 1.

Table 1: Adverse reactions observed (n=59)

Adverse reaction	Number of patients
Spontaneous abortion	01 (1.7 %)
Preterm birth	03 (5.0 %)
Pregnancy prurigo	01 (1.7 %)
TOTAL	05 (8.4%)



Graph 1: Clinical Evaluation: average scores taken at experimental time frames for hydration, softness, and elasticity. Abdominal area (n = 52)

2. Striae occurrence

The counting of new striae was carried out in the right and left lower quadrants of the abdomen, and only in the clinical evaluations of return visits: Visit 2 (T28 + 7 days), Visit 3 (T70 + 7 days) and Visit 4 (T140 + 7 days).

Of the 52 volunteers who completed the study, five patients developed striae (9.6%) when using the product. Table 2 details the data obtained.

Striae with sizes and depths considered moderate were observed, with 11.2 new striae having emerged, on average.

3. Instrumental evaluation

Measurement through corneometry:

There was a significant increase of the corneometric average between the initial and final time frames of the study, therefore meaning greater skin hydration. This data is depicted in graph 2.

In the forearm control area, the measurements of the two sites (those with and without the formulation applied) were taken at the beginning and end of the study. Although there was improvement in the control area, it was not considered significant when compared to observations of the treated site ($p < 0.001$), as shown in graph 3.

Measurement of elasticity through cutometry:

The elasticity parameter in the abdominal area presented a statistically significant increase of the values obtained, as shown in figure 4.

The elasticity parameter was evaluated in the forearms (in the treated and in the untreated areas), evidencing a significant increase in elasticity over time ($p = 0.001$) in the areas where the product had been applied, as compared with the control area, as shown in figure 5.

DISCUSSION

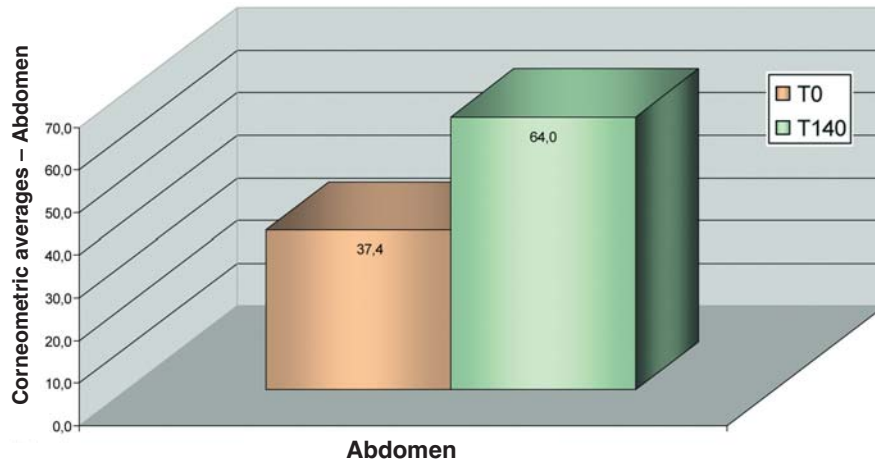
The occurrence of striae distensae during pregnancy can be attributed not only to mechanical effects, but also to hormonal estrogenic alterations and the activity of relaxin, as well as to some constitutional (e.g. age group) and genetic components.^{11,12}

The improvement in the skin's elasticity could be one of the contributing factors in the partially mitigated appearance of striae, given the multi-factorial nature of this process.¹³

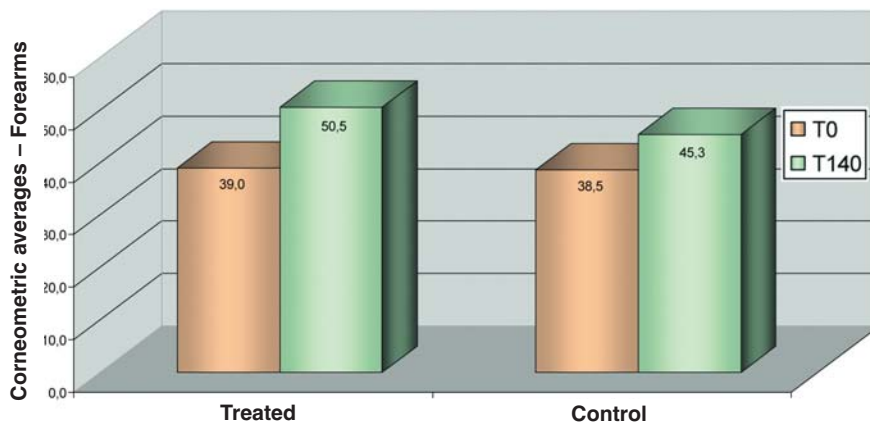
In the latest review article published by The Cochrane Library, there were a few comparative studies (with placebo or control-groups) demonstrating that some compounds have had a positive effect in decreasing the appearance of striae. The use of

Table 2: Results obtained in the volunteers who presented recent formation of striae in the abdominal area (n=52).

Number of volunteers	Quantity	Size	Color (Score)	Depth (Score)	Return visit on which it appeared (Score)
23	8	5	2	4	T70+7D
67	16	2	2	2	T140+7D
17	10	2	2	2	T140+7D
12	7	2	2	2	T140+7D
9	15	2	2	2	T140+7D
Média	11.2	2.6	2	2.4	



Graph 2: Average of corneometric measurements in the abdominal area at experimental time frames (n = 52) ($p < 0.0001$)



Graph 3: Average of corneometric measurements between time frames T0 and T140, in the forearms – treated and control areas (n = 52) ($p < 0.001$)

Asian centella, tocopherol and collagen hydrolysates, and elastin reduced the occurrence of stretch marks in a group of 130 pregnant women. Another study involving 50 patients assessed the use of a compound containing tocopherol, panthenol, hyaluronic acid, elastin, and menthol, in tandem with massage, and also suggested a reduction in the incidence of striae.¹⁴

Lactic acid is an alpha-hydroxy acid commonly used in dermatology, for it has the ability to act in the epidermis (desmolytic effect, with increased epidermal turnover) and dermis (stimulation of collagenesis and elastinogenesis), to improve scarring when used in peeling, for example.¹⁵

Sodium lactate is a molecule with hydration properties superior to those of glycerin, and which also provides microexfoliation (keratolysis). As it is the lactic acid's salt form, sodium lactate helps to isolate the activity to the epidermis and prevent the risk of irritation during continued use.^{16,17}

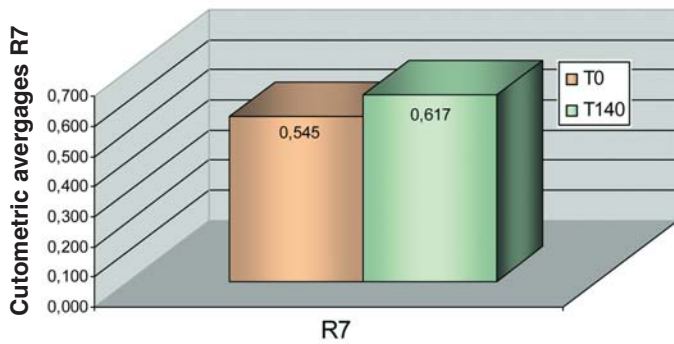
Caprylic and capric acids' triglycerides are oils of natural origin with emollient activity and are used extensively in cosmetics due to their compatibility with the skin, making them safe for use during pregnancy.¹⁸ The formulation evaluated in the pre-

sent study contained lactic acid and sodium lactate combined in an emulsion containing mainly triglycerides of caprylic and capric acids, as well as glycerin, all of which are compatible for use on the skin.

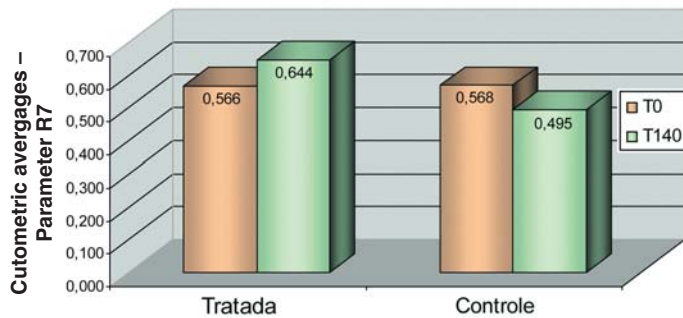
At the clinical evaluations, significant improvement in the amount of hydration, skin elasticity, and softness was observed in the treated area. Although there is no evidence that preventing dryness helps to avoid the formation of striae distensae, the comfort provided by the application of the emulsion did improve the patients' adherence to the continued use of the product, favoring its potential effect on skin elasticity.

Approximately 9.64% of pregnant women in the studied group developed stretch marks, which were observed mainly during the 20 weeks of evaluation. Such incidence is lower than that reported in the literature (around 70% in women under 25-years-old, and about 29% in women above 25-years-old).¹⁶

There is evidence that improved levels of elasticity are correlated to the integrity and functionality of elastic and collagen fibers. A recent study suggests there is a correlation between cutaneous distention capacity and cutometric and elasticity mea-



Graph 4: Average of cutometric measurements of elasticity (R7) at experimental time frames - statistically significant increase ($p = 0.008$)



Graph 5: Average of cutometric measurements of elasticity (R7) in the forearms - significant improvement in the treated area ($p = 0.001$)

surements. The ability to increase elasticity seems, therefore, to be present throughout the tegument, both in the distended and in the control area (which has not undergone distension) in pregnant women who are less prone to develop striae.¹⁷

In the present study, the significant increase in the elasticity of the skin treated (both in the abdomen and forearm) when compared to the untreated area, allows us to infer that the use of the formulation has a positive influence on the improvement of elasticity. This in turn may also be an influencing factor in the lower incidence of stretch marks in the group of patients studied.

CONCLUSION

The studied formulation led to a significant reduction in the occurrence of stretch marks in the population studied when compared to the literature. This preventive effect is possibly related to the improvement in the skin's elasticity level in the application areas, meaning it has interfered with one of the striae distensae's etiological factors. ●

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Original Article

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Received on: 02/11/2012

Approved on: 04/01/2013

This study was carried out at the Centro de Estudos da Unha of the Instituto de Dermatologia Professor Rubem David Azulay of the Santa Casa de Misericórdia do Rio de Janeiro – Rio de Janeiro (RJ), Brazil.

Financial support: The present study was funded with proprietary resources of the Santa Casa de Misericórdia do Rio de Janeiro (Research Ethics Committee Protocol/ 2009: 0025.0.346.000-09)

Conflict of interest: None

Benefits of the alpha stitch technique in surgical closure in onychocryptosis

Utilidade da técnica de fechamento cirúrgico "ponto em alfa" na onicocriptose

ABSTRACT

Introduction: A poorly described aspect of onychocryptosis – the main cause for nail unit surgeries – is how to perform its surgical closure. The present article describes a new technique denominated alpha stitch that allows the straightening out of the nail fold by positioning it at or below the nail plate's level.

Objective: To demonstrate the benefits of the alpha stitch surgical closure technique in the surgical matricectomy for onychocryptosis.

Methods: Twenty patients with onychocryptosis grades II and III underwent surgical matricectomy and were followed up for six months. The surgical closure was performed using the alpha stitch technique.

Results: A total of 27 lateral nail folds were operated, with 81.8% yielding the expected result, and 18.1% presenting uncertain outcomes.

Conclusions: The alpha stitch allows the proper healing of the straightened out nail fold, which is positioned at or below the nail plate's level, with good results, fast recovery, minimal morbidity and a small number of recurrences. The technique can also be used in surgical procedures involving other nail disorders.

Keywords: nail diseases; ambulatory surgical procedures; surgical procedures, minor; suture techniques.

RESUMO

Introdução: Aspecto pouco avaliado da onicocriptose – principal causa de cirurgia do aparelho ungueal – é como deve ser realizado o fechamento cirúrgico. Descreve-se nova técnica denominada "ponto alfa" que permite a retificação da dobra ungueal por posicioná-la no nível da placa ou abaixo dela.

Objetivo: Demonstrar a utilidade da técnica de fechamento cirúrgico "ponto alfa" na matricectomia cirúrgica da onicocriptose.

Métodos: Selecionados 20 pacientes com onicocriptose graus II e III, submetidos à matricectomia cirúrgica com acompanhamento durante seis meses. O fechamento cirúrgico foi realizado com a técnica "ponto alfa".

Resultados: No total, 27 dobras ungueais laterais foram operadas, 81,8% delas com resultado esperado, e 18,1% com resultado duvidoso.

Conclusões: O "ponto alfa" permite correta cicatrização da dobra ungueal retificada, posicionada no nível da placa ungueal ou abaixo dela, com bons resultados estéticos, rápida recuperação, mínima morbidade e baixo número de recidivas. Poderá ser usado em procedimentos cirúrgicos de outras afecções ungueais.

Palavras-chave: doenças da unha; procedimentos cirúrgicos ambulatoriais; procedimentos cirúrgicos menores; técnicas de sutura.

INTRODUCTION

Subcutaneous onychocryptosis is one of the most common diseases of the nail unit, having a high morbidity rate and a disabling clinical picture. It is more prevalent in adolescents and young male adults, at a ratio of 3:1.¹⁻⁴ Several factors determine this condition: heredity, constitution, disproportionate nail plate and nail bed widths, and increased transverse curvature of the nail plate. Other additional aggravating factors are: medial deviation of the hallux, thinning of the nail plate, periungual tissue thickening, hyperhidrosis of the feet, convex cut of the free distal fold of the nail plate, and the wearing of pointed or excessively tight shoes.¹⁻⁵

The clinical picture, classified by Heifetz according to the degree of severity, is characterized by the presence of inflammatory signs such as erythema, mild edema, and pain caused by pressure on the lateral nail fold (Grade I onychocryptosis). These symptoms are caused when a nail plate with an inward pointing lateral spike advances into the periungual tissue, triggering an inflammatory reaction.

If the injury persists, inflammatory reactions increase, possibly leading to the emergence of exudate, secondary infection, and local drainage (Grade II onychocryptosis). If the process continues further, the symptoms intensify, with the formation of granulation tissue and hypertrophy of the lateral nail fold (Grade III onychocryptosis).¹⁻⁶

Diagnosis is mainly clinical, with imaging-based analysis being necessary when there is a suspicion of bone alteration or local infection. X-ray examination is an inexpensive and effective way to screen for bone alterations. Infectious alterations become apparent through X-rays only when 50–60% of the bone in the vertebral body is destroyed, therefore it shows as normal during the initial infection period. Bone scintigraphy is effective for observing osseous remodeling. The most sensitive and specific imaging study for the detection of infections is the MRI.⁷⁻⁹

The therapeutic approach can be carried out in two ways: conservative and surgical. For Grade I, the guidance is to follow a conservative approach, with different treatment modalities available.⁷⁻¹⁶ On the other hand, for Grades II and III, the alternative that yields the best outcomes is the surgical approach.³⁻⁵ The more frequently used techniques are surgical matricectomy (surgical excision of the lateral matrix horn) and chemical matricectomy (phenolization). In the latter approach, healing takes place by secondary intention. In surgical matricectomy, the removal of the matrix is carried out after surgical incision of the proximal fold in order to remove the matrix horn, nail spike and/or to resect the lateral fold's fibrosis (if present) aiming at normalizing the architecture of the affected area.^{3-5,17-30} In the latter approach, surgical closure is of paramount importance, and is the central subject of the present study.

How the surgical closure should be performed – often described with the use of simple stitches – is a poorly evaluated aspect in the treatment of onychocryptosis.¹⁷⁻³⁰ The authors believe that the use of simple stitches has the disadvantage that the lateral nail fold heals in intimate contact with the nail plate, where local friction between the plate and the fold can precipi-

tate a possible clinical recurrence. In order to address this issue, the authors developed a surgical closure technique denominated the alpha stitch. The goal is to position the lateral fold at the nail plate level or below it; in other words, to rectify the nail fold, obtaining healing and thus preventing recurrence.⁵

METHODS

General research

The present paper details a prospective, descriptive study of a series of cases of patients diagnosed as having Grade III onychocryptosis, who underwent surgical matricectomy wherein surgical closure was performed through the alpha stitch. The patients were selected from among a group who had sought treatment spontaneously at the outpatient clinic of a center specializing in nails, and were later invited to participate in the study. In all cases authorization has been granted via the signing of a term of informed consent. The study was submitted for prior review of the Research Ethics Committee of the institution where the study was carried out.

Inclusion criteria were: patients of both genders, older than 21 years of age, diagnosed with Grade II onychocryptosis (due to the presence of a nail spike in the proximal region) and Grade III onychocryptosis (due to hypertrophy of the lateral fold). Patients who had the condition to a lesser degree, had a local infection requiring prior drainage, were allergic to the anesthetics provided, had coagulation disorders, hypertension, diabetes, or were pregnant, were excluded.

Clinical controls were carried out through photographic records before and immediately after the procedure, 24 hours after the procedure, and 15, 30 and 180 days after the surgery. Patients were instructed to keep their feet elevated on the days immediately after the surgery and were instructed in the use of analgesics and daily dressing with antibiotic cream. The stitches were removed on the 15th day of the post-operative period. Also, other clinical and epidemiological information was obtained through a specifically developed questionnaire. Data were tabulated in Microsoft Excel 2003, for further analysis.

Lateral surgical matricectomy technique:

- Patient in supine position, with knees bent
- Cleansing of the affected foot with povidone-iodine solution
- Sterile field preparation, exposing the affected toe
- Anesthetic nerve block
- Application of tourniquet at the base of the affected toe, for a bloodless operative field
- Removal of granulation tissue through elliptical incision in the affected lateral nail fold, from the proximal nail fold up to the anterior border, allowing better visualization of the underlying structures, and matrix horn and proximal nail spike. If there is hypertrophy of the lateral fold (Grade III onychocryptosis), excision of fibrosis is carried out
- Detachment of the lateral fold of the nail plate, from the free border to the lateral nail matrix
- Cutoff the lateral plate, in a straight line directed to the nail

matrix, surpassing the proximal fold, reaching the lateral matrix horn

- Attachment of the entire plate and nail matrix horn, already cut with long straight forceps, and subsequent rotation in a continuous circular motion until the incised nail plate and matrix horn breaks loose

- Curettage of the visible lateral nail bed, where the excess granulation tissue is located

Technique of surgical closure with alpha stitch:

- Drilling of the dorsal surface of the nail plate with needle 21G, at 2-3mm from the lateral fold of the affected side, with rotational movements (Figure 1A)

- The 4.0 nylon threaded needle penetrates the previously prepared opening, passing between the nail bed and nail plate (the nail bed is not traumatized), coming out flush with the free border of the nail plate (Figure 1B)

- The needle crosses the lateral fold at 3-4mm from the free border of the fold (Figure 1C)

- The nylon thread returns over the lateral fold; the needle passes through the center of the nail plate (between the nail bed and the nail plate) (Figure 1D), exiting through the opening prepared at the beginning of the procedure (Figure 1E)

- After passing through the central orifice of the nail plate, the thread must be pulled in such a way as to approximate the free border of the lateral fold, positioning the latter at the nail plate level or below it, in a rectified manner

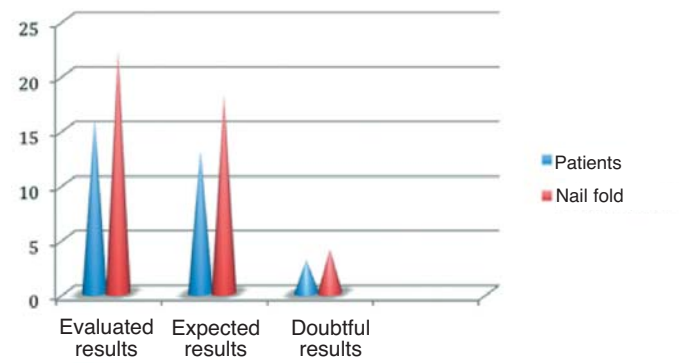
- Completion of the suture (Figure 1F). The final aspect resembles the letter alpha of the Greek alphabet

RESULTS

Twenty patients were included in the study, with 27 nail folds having undergone surgical closure with the alpha stitch technique. Four patients (five nail folds) did not return for the 180-day follow-up and were excluded from the final analysis of

results. The final results evaluation, comprising 16 patients and 22 operated nail folds, was carried out six months after the end of the treatment. In the final analysis, 13 patients (18 operated nail folds) (81.8%) had results as expected (i.e. rectified nail fold, positioned at the level of or below the nail plate (Figure 2). In 3 patients (4 operated nail folds) (18.1%), results were less certain with the nail folds positioned at a higher level than that of the nail plate. The surgical procedure performed to resolve the onychocryptosis was successful in 100% of the cases (Graph 1).

The gender distribution was 13 men and seven women. The patients' age varied from 21 to 53 years (mean = 31.2 years). Twelve patients reported previous history of onychocryptosis (with 11 reporting it occurring at the same site). Ten patients had undergone previous treatment (5 underwent conservative techniques, 3 underwent surgical techniques, and 2 underwent both). The details of the measures taken were unknown in most cases. Etiological antecedents were also investigated (Graph 2).



Graph 1: Final analysis of results

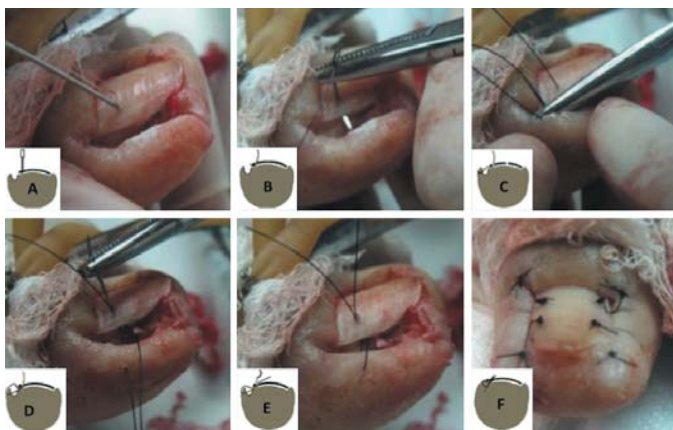
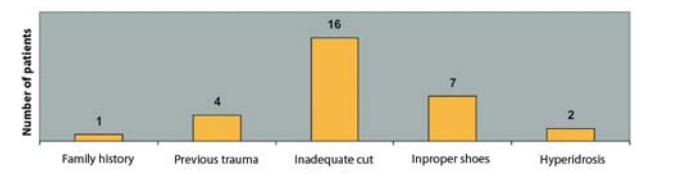
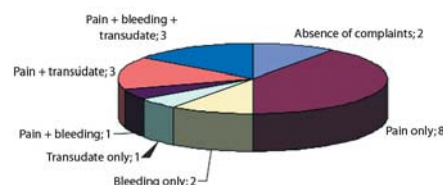


Figure 1: Demonstration of the alpha stitch technique of surgical closure. **A.** Perforation of the nail plate's dorsal surface; **B.** Nylon thread and needle entering through the previously prepared opening; **C.** Needle passing through the lateral fold; **D.** The thread returning over the lateral fold and through the center of the plate; **E.** Needle exiting through the previously prepared opening; **F.** The final step in the technique, the rectified lateral fold



Graph 2: Etiological antecedents researched in the group of 20 previously selected patients



Graph 3: Post-operative complaints reported in the first 24 hours

In the 24-hour post-operative control period, 18 of the 20 patients initially included in the study reported complaints. The distribution of patients according to the combinations of complaints described can be seen in Graph 3. The most common symptom was a mildly intense pain, which responded well to an analgesic.

No suture dehiscence was observed in the 15-day post-operative control; five patients still reported complaints during this timeframe. Two patients described pain, two were still experiencing transudate, and one described both symptoms – of mild intensity in all cases. There were no signs of active infection. In all cases it was possible to remove the stitches.

In the 30-day post-operative control period, only two patients reported complaints – one of pain and another of transudate, both mild. None of the patients required the use of analgesic medication. Also, no infection was observed and there was no need for antibiotics in the same period. All reported satisfaction with the aesthetic result of the treatment. The average time for the patients to return to their daily activities was 16.8 days.

One patient experienced recurrence six months after the procedure. Both corners of the patient's toe were affected, with the recurrence located in one of the lateral folds. The patient admitted to having cut the nail convexly, having worn boots, and having not rested as instructed. (Figure 2)

DISCUSSION

Men were more frequently affected than women (approximate ratio of 2:1). Sixty percent of patients have reported a history of onychocryptosis, with 41% having had three or more episodes, corroborating the findings in the literature.^{1-6,18,29}

Regarding the study's main objective, the authors believe that the proposal of rectifying the nail fold using the alpha stitch

in surgical matricectomy, when treating Grade II and III onychocryptosis, was clearly demonstrated.

There was good control of post-operative symptoms, with minimal morbidity and excellent healing. Pain was the main symptom reported by patients, followed by transudate and bleeding. The pain was mild in most cases, with good response to the administration of a light analgesia (paracetamol). Eighty-five percent of patients used the medication for only one day, and a maximum of three days in two cases. Fifteen days after the surgery only five patients reported some complaints, always of mild intensity and without the need for medication. Thirty days after the surgery, only two patients reported symptoms: one pain and the other, transudate, both of mild intensity. Interestingly, those latter cases did not present symptoms in previous controls. This degree of morbidity after the procedure is consistent with several case series in the surgical matricectomy technique.^{18-21,25,27}

Bleeding was reported in only six patients during the 24-hour control period. In the main reference literature, transudate is described as the primary post-operative symptom, lasting from three to four weeks.^{1,4,6} The patients in the present case series did not report transudate as the main symptom. Seven patients had this symptom – mostly mild – on the day after the surgery (five 15 days after and only two 30 days after). This good result was due possibly to the surgical closure of the nail fold in a rectified manner, obtained with the alpha stitch – as the lateral fold is positioned at the level of the nail plate or below it, exerting good compression and local hemostasis. Furthermore, there is no perforation of the nail bed. The stitch's tension force may have also contributed to the good result, since there was no suture dehiscence in any case.

The average time that it took patients to return to normal activity was 16.8 days (varying between 7 and 25 days). This time frame is slightly shorter than that described by Bostanci et al., who performed matricectomy through phenolization (mean: 18.02 days).¹⁹

During the surgical procedure, the attention given for the complete removal of the lateral region of the nail matrix influenced the low recurrence rate, which was reported by only one patient after the study course (180 days), and moreover being caused due to induced factors (i.e. convex cut of the nail plate).

Recurrence is common after matricectomy, with incomplete removal of the lateral nail matrix being the main cause.²⁹ All patients reported satisfaction with the surgery's aesthetic outcome.

The authors believe that nail unit surgery should be treated with more precision due to its special anatomy and physiology. This includes such fundamental aspects as the implementation of a specific stitch for the onychocryptosis surgery. Using the alpha stitch for surgical closure allows the proper healing of the nail fold, by fixing its position at the level of or below the nail plate. This stitch technique produces good cosmetic results, faster recovery times, minimal morbidity, and a small number of recurrences.

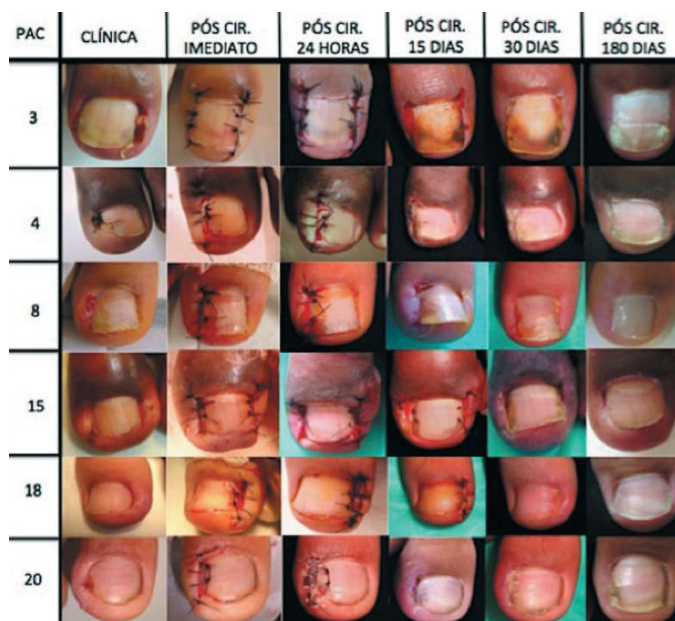


Figura 2: Seguimiento fotografico até 180 dias de 6 casos tratados

CONCLUSION

The alpha stitch technique of surgical closure is simple and easy to learn, and can be easily incorporated into the dermatologist's daily practice in the surgical treatment of onychocryptosis. It would also be possible to use it in surgical procedures to correct other nail disorders, such as lateral longitudinal biopsy

and tumor excisions, suggesting that this closure technique has a promising future. The authors believe that the technique resulted in good outcomes in the present study, however due to the small sample size, further studies must be carried out to corroborate their findings. ●

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Etiopathogenic classification of infraorbital dark circles and filling with hyaluronic acid: description of a new technique using a cannula

Classificação etiopatogênica de olheiras e preenchimento com ácido hialurônico: descrição de uma nova técnica utilizando cânula

ABSTRACT

Introduction: The aging process in the infraorbital region involves a loss of volume, gravitational and skin changes.

Objective: To describe the etiopathogenic classification and treatment of dark circles caused by lower eyelid contour changes.

Methods: A new technique of hyaluronic acid filling, using a blunt cannula through a unique orifice is presented.

Results: Reformulating the dark circles classification is useful for making the best therapeutic options. The technique's advantages are its safety and good aesthetic results.

Conclusion: Filling with hyaluronic acid using this new technique has proven safer than other pre-existing techniques.

Keywords: eyelids; rejuvenation; hyaluronic acid/administration & dosage.

RESUMO

Introdução: O processo de envelhecimento na região infraorbital envolve a perda de volume, mudanças gravitacionais, e alterações de pele.

Objetivo: Apresentar a classificação etiopatogênica e tratamento de olheiras causadas por mudanças no contorno da pálpebra inferior.

Métodos: Uma nova técnica de preenchimento com ácido hialurônico é apresentada usando cânula roma através de um único orifício.

Resultados: A reformulação da classificação das olheiras é útil para a decisão sobre a melhor opção terapêutica. A técnica descrita utilizando cânula com ponta roma se revelou segura e com bons resultados estéticos.

Conclusão: O preenchimento com ácido hialurônico empregando esta nova técnica provou ser seguro, em comparação com outras pré-existentes.

Palavras-chave: pálpebras; rejuvenescimento; ácido hialurônico/administração e dosagem.

Original Article

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Received on: 24/07/2012
Approved on: 24/11/2012

This study was carried out at the Faculdade de Medicina da Universidade de São Paulo (FMUSP) – São Paulo (SP), Brazil.

Financial support: none
Conflicts of interest: none

INTRODUCTION

The aging process in the area around the eyes involves a loss of volume and skin changes that cause aesthetic problems. The literature proposes the following etiopathogenic classification of infraorbital dark circles:

1. Hyperpigmentation of the eyelid, subdivided into:

a) Idiopathic primary cutaneous hyperchromia: a congenital, idiopathic condition resulting from the deposition of melanin in the epidermis and dermis, predominantly in dark-eyed, dark-haired adult females,¹ with autosomal dominant inheritance and variable penetrance.²

b) Hyperchromia secondary to post-inflammatory hyperpigmentation, caused by atopic dermatitis,³ allergic contact dermatitis,⁴ or excessive friction.⁵

c) Hyperchromia secondary to physiological and pathological conditions that stimulate the deposition of melanin in the skin: exogenous⁶ or endogenous estrogens and progestins, pregnancy, breastfeeding,³ and systemic diseases such as Addison's disease, pituitary tumors, thyroid disorders, Cushing's syndrome, hemochromatosis (due to increased melanin in the basal layer), and others.

d) Photosensitivity caused by drugs, such as arsenic, phenothiazines, phenytoin, antimalarials, and aromatic hydrocarbons.

e) Increase (250-fold) in the deposition of melanin granules in epidermal melanocytes, and a sixfold increase in dermal melanocytes, caused by the use of local prostaglandin analogues (bimatoprost, lanatoprost) in a 0.03% solution.⁷ Kohl, a black pigment containing lead that is used around the eyes, especially by Indian women, is also deposited in the dermis and stimulates the deposition of melanin in the epidermis.⁸

f) Ultraviolet radiation causes skin atrophy, increased blood vessels, and darkens the skin, due to the presence of ephelides or melanoses.

The main differential diagnoses of infraorbital dark circles are acanthosis nigricans,⁹ periorbital amyloidosis,¹⁰ ecchymosis, melasma, Riehl melanosis, lentiginos, and nevi (Ota). There is a complete absence of hemosiderin in the pathogenesis of dark circles.¹¹

2. Visible musculature and superficial blood vessels in the lower eyelid: the hypervascular appearance is due to excessive subcutaneous vascularization and hypertransparency of the skin, with little subcutaneous tissue,⁴ which allows greater visibility of the underlying vessels and the orbicular muscle.¹²

The vascular factor seems to explain the worsening of dark circles in cases of dehydration, acute illnesses, sleep, systemic diseases, and stress. Due to dehydration, in an area with little subcutaneous tissue, the effect of light on the tissue promotes a bluish shaded color.⁵

In atopy, allergic rhinitis causes eyelid venous stasis, due to the prolonged edema of the nasal and paranasal mucous membranes, which is aggravated by the allergic spasm of Müller's muscle (superior palpebral muscle), which affects the eyelids' venous drainage.¹³

3. Lower eyelid contour changes:

a) Eyelid laxity due to photoaging, with skin atrophy due to the loss of collagen and fat.^{4,14}

b) Bone configuration of the orbit, with formation of deeper palpebromalar and nasojugal folds, which produce a shadow on the lower eyelid.

c) Lower eyelid bag, caused by orbital septum laxity and retro-septal fat bulging, forming a fold under the bag.³ This is the most common causal factor of dark circles due to the natural aging of the periorbital region.

Treatment of Infraorbital Dark Circles

Treatment should be based on the subtype. When dark circles are caused by melanin deposition, the following treatments are recommended: chemical peels (phenol, TCA), retinoic acid, topical bleaching products (hydroquinone, kojic acid),¹ intense pulsed light¹¹ and lasers that target melanin (Q-Switched Ruby - 694 nm,^{4,14} Alexandrite -755 nm,¹⁵ Nd:Yag -1064 nm),^{14,15} ablative and non-ablative (CO₂ -10,600 nm and Erbium -1540, 1550, 2940 nm), and fractional^{16,17} and non fractional lasers.¹⁸

For dark circles predominantly caused by hypervisibility of the musculature and vasculature, no treatment is recommended, because the cosmetic benefit is minimal.

In cases of contour changes due to eyelid skin laxity, chemical peels (phenol, TCA), intense pulsed light, non-ablative and ablative, non-fractionated and fractionated lasers may be used.

When contour changes are due to alterations in orbital volume, transconjunctival blepharoplasty¹⁹ and filling techniques can be employed. Filling is useful when the orbital septum laxity forms a fat bag, with a corresponding deepening of the nasojugal and palpebromalar folds, or when the orbital bone configuration predisposes the formation of deep nasojugal and palpebromalar folds, causing shadows to appear.

Anatomy of the Periorbicular Region

The lower eyelid structure has a free upper margin comprised of anterior, middle, and posterior lamellae layers. The anterior lamella consists of skin and the orbicularis muscle (divided into orbital and palpebral portions). The middle lamella is composed of the orbital septum, orbital fat, and the sub-orbicular fibrotic fatty tissue. The orbital septum is an inelastic fibrous tissue that separates the orbital contents (orbital fat) from the external (pre-septal) contents, acting as a diaphragm. The weakening of this structure leads to post-septal fat prolapse, causing a pseudo-herniation. The sub-orbicularis oculi fat (SOOF) is located below the orbital portion of the orbicularis muscle and anterior to the orbital septum. The SOOF clings to the arcus marginalis of the inferior orbital rim. During youth, the more superior position of the SOOF allows the orbicularis muscle to override it.²⁰⁻²² The posterior lamella is composed of the tarsus, conjunctiva, and retractor muscles.²²

The main arterial supply to the eyelids comes from the distal branches of the internal (lacrima, supraorbital, ophthalmic, nasal, and frontal arteries) and external carotid system, which

contributes to the vascularization of the mid-face and lower eyelids (superficial temporal, infra-orbital, and angle arteries). The angle artery is located on the nasal dorsum, in the region of the lacrimal sac. In the lower lid, there is a poor network of anastomoses, which forms the marginal arcade. Laterally, there are lacrimal artery anastomoses (internal carotid system) with the zygomaticofacial artery, a branch of the superficial temporal artery (external carotid system)²² (Figure 1).

The central retinal artery is a proximal ramification of the ophthalmic artery. The filler penetration and retrograde and anterograde movements within vessels, including the internal carotid and ophthalmic arteries and their ramification, could cause the occlusion of the central retinal artery.

Pathophysiology of the Aging Process of the Lower Periorbital Region

The nasojugal fold becomes more prominent over time because it has little subcutaneous fat. This concave deformity consists of thin skin attached to the orbicularis muscle near its insertion in the orbital rim. The accentuation of this concavity is often associated with the herniation of lower eyelid fat pockets and ptosis of the SOOF.

The pseudo-herniation of orbital fat due to the weakening of the orbital septum, associated with hypotrophy of the orbicularis muscle and SOOF ptosis, leads to the skeletonization process of the inferior orbital rim. The orbital-malar and zygomatic-cutaneous retaining ligaments adhered to the inferior orbital rim and the skin support the orbicularis muscle and orbital fat pockets. Thus, there is a separation between the periocular and mid-face regions, deepening the nasojugal and palpebromalar folds, respectively, which creates a double appearance of convexity²²⁻²⁴ (Figure 2).

OBJECTIVES

This study focuses on the etiopathogenic classification and treatment of dark circles caused by lower eyelid contour changes. A new technique of hyaluronic acid (HA) application is presented that uses a blunt cannula, emphasizing anatomical sites of application, safety, and aesthetic results.

METHODS

Fillers Previously Used in the Lower Eyelid

Calcium Hydroxyapatite

Radiesse[®], calcium hydroxyapatite spheres in a sodium carboxymethylcellulose gel (Bioform Medical Inc, Fransville, WI, USA), can be injected²⁵ by a single supraperiosteal puncture at the inferior orbital rim, or jaw, followed by molding to adjacent regions. It presents a high risk of complication²⁶ and does not always provide regular contour. Reinjection might be difficult because the tissue becomes hardened.

Autologous Fat

Filling with autologous fat is laborious, and is done under local anesthesia and intravenous sedation. Donor areas are the abdomen and the medial and lateral regions of the thigh. The

application is supraperiosteal or subcutaneous, using a cannula. Approximately 3 ml of fat are used in each periorbital area (maximum 6 ml). The injected volume stabilizes at around 12 weeks.

Complications include contour alterations²⁷ (excessive volume injected, or too superficial an injection), persistent malar edema, overcorrection, infection, cerebral and ocular arterial embolism,²⁸ neural injury,²⁴ and periorbital lipogranulomas.²⁹

Hyaluronic Acid

Filling techniques for the nasojugal and palpebromalar folds are diverse and use needles or cannulas. Most articles describe techniques using needles, with topical anesthesia (25 mg lidocaine, 25 mg prilocaine,) or an infraorbital nerve block.^{4,25,30-34} In one of the techniques described, the authors used a 30 G or 31 G needle to puncture 3-8 sites on each side of the eyelid (on the edge of the orbital rim). The needle went through the supraperiosteal region and HA was injected in a retrograde fashion, in small quantities, after preventive aspiration. Approximately 0.1 ml was injected on each side.

One study describes a technique using 25-50 punctures,³² while another describes punctures in the lateral to nasal regions.³⁴ During and after the injections, massages are performed, to correctly mold the HA.^{4,25,31-34}

In another technique described, HA was injected with a 30 G cannula through a 25 G needle hole punctured in the nasojugal fold.³⁰ Small volumes (0.01-0.05 cc) were injected in a retrograde manner. The injection was intraorbicular, superficial to the periosteum of the orbital rim, and discontinuous (medial to lateral) in small quantities. To avoid injecting a large volume in a single pathway, more entry points were used: two or three in the central and medial regions, and one or two in the lateral region.

Description of Hyaluronic Acid

Non-animal stabilized hyaluronic acid (NASHA) is produced from the fermentation of strands of *Streptococcus*. The product is stabilized by a series of cross-linkings. It is biocompatible, easy to store, and non-immunogenic. The use of Restylane[®], Perlane[®], Sub-Q (Q-MED AB, Uppsalla, Sweden), Juvederm[®], Juvederm Voluma (Allergan, Irvine, CA), Hylaform[®] (Genzyme Corporation, Ridgefield, NJ, USA), and Teosyal global[®] (Teoxane, Geneva, Switzerland) for the pre-orbital area filling has already been described in literature.

Application Technique

After local asepsis (chlorhexidine gluconate 2-4%), the patient is reclined at 30 degrees from the vertical position and is asked to look up, to make the nasojugal and palpebromalar folds most visible. Sterile gloves and gauze are used and a blunt cannula (26-27 G/ 35-37 mm) is introduced through a skin orifice with a 22 G needle, through the entire skin thickness.

A "curtain maneuver"³¹ may be necessary as the cannula is introduced, pressing the skin to the front of the cannula to make sure the administration is not too shallow. The cannula is

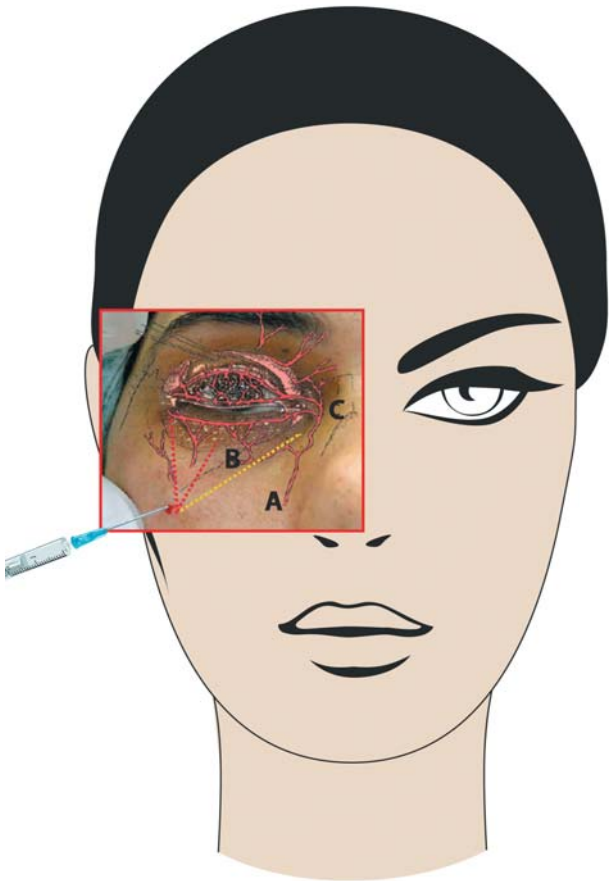


Figure 1. The main arterial supply to the eyelids near the procedure:
A – Facial; **B** – Infraorbital; **C** – Angular



Figure 2. **A** – Nasojugal fold; **B** – Palpebromalar folds; **C** – Local filler injection was made in the malar area, 3 cm below the latero-canthal angle; **D** – Orbicularis muscle near its insertion in the orbital rim

introduced perpendicularly to the skin and directed to the nasojugal fold in the intramuscular area. It easily slides through the medial region after going through the orbicular muscle, with minimal pressure. The tip can be viewed through its depression, following it through the upper portion of the nasojugal fold up to the lacrimal points. In a second movement, it can be directed at a laterosuperior angle up to the more lateral portions of the malar fold.

A slow, discontinuous retroinjection of the product is made at the supraperiosteal level (0.5-1 ml per eyelid). Then the filler is molded with the fingers' pressure. To minimize the risk of vascular embolism, the procedure must be interrupted if bruises appear.

Corrective procedures with HA must use a 1:1 ratio; that is, the quantity of filler injected that can be viewed promotes a volume increase that should be kept after the end of the edema caused by HA injection. Caution must be used during injection in the medial area of the nasojugal fold in order to avoid the angular vein. It must be lateral to the lacrimal point, for medial filling at this point can lead to artificial results. It is necessary to act relatively quickly, so that the edema caused by the injection does not distort the area's anatomy.

Recommendations to be followed after the procedure include placing ice on the area while the patient is lying down and elevated. Local massaging should be avoided until the resolution of the edema (on average, 7-10 days). If bruises develop, tinted solar protection agents or corrective make-up are recommended for 24 hours after the procedure to avoid skin hyperpigmentation.

Procedures with botulinum toxin in the same region must be avoided for 10 days, so that the edema caused by the filling does not cause an infero-medial displacement of the toxin.

Possible Complications

1. Diffused malar edema, which may last up to three weeks or be persistent and resistant to hyaluronidase. HA should not be used in patients with a tendency to retain fluid in the orbital area. Treatment is made using oral prednisone, 0.5 mg/kg for 1 to 3 days after the procedure. More persistent cases may need a local injection of hyaluronidase, 5-20 units per point of injection (Hyalozima® 200 U/ml), totaling to 25-50 units per side. Improvements in contour irregularities or edema begin to show 24 hours after treatment.³⁵

2. Ecchymosis. This type of complication is rare with cannulas and lasts, on average, 7-10 days. The placement of ice and compression immediately after the procedure, and the avoidance of prior use of anti-platelet agents and anticoagulants, minimize the occurrence of ecchymosis.

3. Contour changes. One of the most common complications; such changes are more likely to occur in patients with thin and flaccid skin. Superficial application of HA, as well as its use in bigger particles, must be avoided. The risk decreases with deeper injections (supraperiosteal area). Massage can resolve surface irregularities related to deep injections, while those caused by more superficial injections may require hyaluronidase.

4. Erythema.

5. Granulomas.²⁹

6. Hypersensitivity reaction – 0.02%.

7. Color changes (5% of cases): bluish or grayish coloration due to superficial injection, or sometimes with deeper injections as well. The filler becomes visible, causing a light refraction effect known as Tyndall.

8. Cellulitis – 0.7%.^{31,34}

9. Headache – 0.3%.³¹

Most adverse effects are self-limited and resolve spontaneously. There are no reports in the literature of amaurosis with HA injected in the face.^{36,37}

DISCUSSION

This technique differs from the ones already studied, since we used only one entry into the skin for injection with a blunt cannula. The puncture is located temporally and inferiorly to the infraorbital foramen, which provides both ease of access to the nasojugal and palpebro-malar folds and safety against vascular accidents when opening the entry into the skin. Using this technique, the cannula goes through the intramuscular plane, passing superiorly and superficially to the components of the infraorbital foramen.

Blepharoplasty to remove fat tissue, whether removing skin or not, does not treat the cause of the problem. Combined treatments that include removing fat pouches, orbital septum strengthening under the Lockwood ligament, and insertion of filling substances (such as HA) in the nasojugal and orbital-malar folds have better results than exclusively surgical methods. In many cases, treatment with HA only is sufficient to meet the patient's aesthetic needs.

Theoretically, HA is reabsorbed within about one year. However, we have verified through clinical observation that a partial volumetric effect lasts longer than this. The mechanism through which HA promotes filling involves the attraction of water molecules to the extracellular matrix of its injection point. In addition, it improves dermis elasticity as it stimulates neocollagenesis. NASHA significantly increases the production of type-1 procollagen and the gene expression of types 1 and 2

procollagen, as well as profibrotic growth factors during weeks 4 and 13 after HA injection.³⁸

In addition to being biocompatible, easy to store, and non-immunogenic, HA offers a strong benefit over all other skin fillers: it can be dissolved with hyaluronidase. This allows the correction of excessive injections and the total removal of the product in case of any chronic reactions.

The palpebromalar fold must be filled in to promote a “lifting” effect and allow the injection of lesser quantities of the filler into the nasojugal fold, as well as restore the convex shape of the cheeks.

The superficiality of the injection is inversely proportional to the quantity of filler needed to attain the same volumetric effect. The combination of a deep (supraperiosteal) injection and a more superficial one, at the plane between the deep dermis and the orbicularis muscle, can be used. Filling the medial-malar area (a central and triangular depression) may help achieve a more uniform face volume and correct malar pouches.

The satisfaction level after initial treatment reaches 80% and the treatment effect duration reaches two years in some cases. Recurrence may occur due to product absorption, associated with the natural continued aging of the area. It is difficult to determine how much each of these factors contributes to recurrence.

Advantages of the New Technique

1. It is safer than using needles, helping to eliminate the risk of accidental intravascular injection. Hematomas represent a risk of embolism, loss of volumetric parameters for filling, and a possible decrease in the duration of the filler effect. Although we have not found cases of amaurosis by HA injection in the face in the literature, unreported cases are a possibility.

Some reports of vascular embolism causing strokes, amaurosis, and cutaneous necrosis related to the injection of autologous fat, silicon, collagen, polymethylmetacrilate, Cymetra (LifeCell Corp., Branchburg, NJ, USA), and corticosteroids can be found in the literature.³⁹⁻⁴⁸

2. The technique does not require the use of local anesthesia, which lowers the risk of skin or ocular reactions.

3. Pain is minimal.

4. The technique uses only one entry orifice.

5. The satisfaction level is very high, due to the aesthetic results and the ability to immediately resume normal activities.

CONCLUSIONS

The reformulation of the ranking system for dark circles is useful for choosing the best therapeutic modality. We also conclude that filling with HA in the inferior orbital area using this new technique with a blunt-tipped cannula has proved safe, effective, and beneficial in our practice compared to other techniques. ●

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Continuing Medical Education



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Received on: 15 June 2012
Approved on: 2 August 2012

This study was carried out at the Faculdade de Medicina de São José do Rio Preto (Famerp) – São José do Rio Preto (SP), Brazil.

Financial support: None
Conflict of interest: None

Hormones in rejuvenation: a review of their true effectiveness

Hormônios no rejuvenescimento: revisão de sua real eficácia

ABSTRACT

Hormones are very important in the aging process because some of their levels decrease. Therefore it can be hypothesized that hormone replacement therapy might slow aging. In light of the increasing interest in rejuvenating treatments that can yield good results, hormone replacement therapy has dawned in scientific circles. This review examines the roles of growth hormones melatonin and dehydroepiandrosterone, as well as those of bioidentical hormones in rejuvenation. The authors have also sought to evaluate the results of studies on hormone replacement therapy, considering the risks and benefits of using those hormones, which are seen as the "fountain of youth."

Keywords: hormones; rejuvenation; growth hormone; melatonin; dehydroepiandrosterone.

RESUMO

Os hormônios possuem grande importância no envelhecimento devido à diminuição de alguns durante esse processo. Dessa forma, existe a hipótese de que a reposição hormonal possa retardar o envelhecimento. Diante do crescente interesse em tratamentos rejuvenescedores que apresentem bons resultados, a terapia de reposição hormonal tem-se destacado no meio científico. Esta revisão analisa o papel do hormônio do crescimento, da melatonina, da desidroepiandrosterona e dos hormônios bioidênticos no rejuvenescimento. Buscamos, também, avaliar resultados de estudos de terapia de reposição hormonal, observando riscos e benefícios do uso desses hormônios considerados "fonte da juventude".

Palavras-chave: hormônios; rejuvenescimento; hormônio do crescimento; melatonina; desidroepiandrosterona.

INTRODUCTION

Aging is a natural biological process that leads to the decline of physical and mental abilities over the years. The effects of aging occur in different body systems, including the endocrine system, which suffers the decline of several hormones, known for endocrine senescence.¹ Hormones play an important role when it comes to aging because there is decrease in production, efficacy and clearance effect of some hormones during that process. Hence, the hypothesis that hormones may delay the aging process has existed for thousands of years.²

Due to the increase in human life expectancy over the last century and the resulting increase in the elderly population, interest in anti-aging treatments (or therapies aimed at ensuring a healthier aging process) has increased. In this way, hormone replacement therapy has brought enthusiasm to the scientific community as an anti-aging alternative.³

The present review aims at examining the role of four types of hormones – GH, melatonin, dehydroepiandrosterone and bioidentical hormones – in rejuvenation. It also seeks to evaluate the results of studies involving hormone replacement therapy, noting risks and benefits of using those hormones, which are deemed as the "fountain of youth".

GROWTH HORMONE (GH)

GH is a peptide produced by the anterior hypophysis in a pulsatile way, with peaks of greater amplitude in phases three and four of deep sleep. Its pulsatile characteristic is controlled mainly by two hypothalamic proteins: the GH releasing hormone (GHRH), which acts by stimulating the secretion, and the inhibitory action somatostatin. GHRH and somatostatin, in turn are influenced by many factors, such as physical activity, nutrition, sleep, stress, sex steroids and thyroid hormones.

The action of GH takes place both directly – through binding to its receptor in the growth plate – and indirectly –through stimulating liver and tissular production of the insulin-like growth factor-1 (IGF-1). GH and IGF-1 are involved in the regulation of somatic growth in children. In adults, they have the role of maintaining normal body composition, skeletal mass, cardiovascular risk factors and physical and physiological functioning.

The secretion of GH decreases, concurrently to the decline of IGF₁ at around the age of 30. This decrease reaches roughly 14% per decade in normal adults, due to neurological disorders correlated to the individual's age. After the age of 60, many normal individuals have 24-hour GH secretion that is indistinguishable from that of adult patients with GH deficiency due to pituitary-hypothalamic lesions (DHGA).

Some of the clinical features of aging – alterations in body composition, such as increased total fat mass, decreased lean body mass and decreased bone mass, as well as a higher prevalence of cardiovascular risk factors and decreased cardiac function – resemble pathological manifestations of GH deficiency.⁴As a result, it is hypothesised that some signs of aging maybe due, at least partially, to low GH and IGF-1 levels, condition also described as somatopause.⁵

Since recombinant human GH replacement has been shown useful in reversing the symptoms of DHGA deficiency, several studies have directed the use of GH to "healthy" elderly patients, aiming at verifying whether the same benefits could be achieved.

GH REPLACEMENT

GH was first used in patients in 1958 and during the ensuing 25 years it was only available from corpse sources. In 1985, GH production through recombinant DNA techniques

became available. Since then, there have been U.S. Food and Drug Administration (FDA) approved indications for use in some states of GH deficiency. In 2003, the FDA approved the use of GH for idiopathic short stature. Nonetheless, GH therapy coverage is currently more frequently used for other indications, such as to treat chondrodystrophy syndrome, and to heal wounds and burns. Other uses that have been studied include aging and physical performance, the latter due to the interest shown by athletes in using GH.⁵

Observations on attenuation of GH/IGF associated with age induced clinical trials to seek to answer the question of how physiological alterations, such as reduced muscle mass, reduced strength and aerobic capacity, central adiposity, reduction of bone mass and slow wave sleep, could be reversed through supplementation of GH/GHRH.¹

In one of the pioneering studies, Rudman et al. used a dose of GH which brought IGF-1 levels found in 60 year-old men to the average found in 20 year-old men. That paper described the effect on body composition of administering human GH for six months to older men and to a group of 12 healthy men between 61 and 81 years old who had IGF1 serum concentrations lower than those found in normal young men. Administration of GH resulted in an increase of 4.7 kg of lean body mass, a decrease of 3.5 kg in fat mass and an increase of 0.02 g/cm² in muscle density in the lumbar spine, in addition to a significant increase in blood pressure and fasting glucose. The study, however, had drawbacks: it was not double blind, and only 12 individuals were studied. The weekly GH dose used was approximately twice higher than that used in patients with GH deficiency, leading to adverse effects typical of excessive GH action, such as hypertension and arthralgia. Moreover, there was no assessment of muscle strength, endurance exercises or quality of life. Notwithstanding, the study served as the basis for the claims that GH reverses aging.⁶

A study by Blackman et al. (double-blind, placebo-controlled) involving 27 women and 34 men between 68 and 88 years old, who received GH or placebo for 6.5 months, confirmed the effects of GH in body composition. Those effects, however, did not lead to a change in muscle strength or maximal oxygen uptake during exercise in both groups.⁷ Similarly, Papadakis et al. showed that administration of GH in elderly over 70 years old for six months led to a small increase in lean mass, not accompanied by an increase in muscle strength.⁸ In the study by Taaffe et al., physical training of patients led to increased muscle strength and endurance, which was not higher, however, in those who used hormonal therapy.⁹ Thus, the effects caused by GH on body composition do not translate clinically into increased muscle strength or endurance. Nevertheless, although several studies have demonstrated an increase in lean body mass with GH therapy, the increase of muscle mass and strength was not greater than that that could be achieved with exercise. That finding reaffirms that exercise is an inducer of physiological secretion of GH.¹

Another important point to be taken into account in connection to hormone replacement is its various possible side

effects. Bronstein et al. listed the major adverse effects of GHRH replacement in the elderly: fluid retention, arthralgia, carpal tunnel syndrome, glucose intolerance and possibly tumorigenesis and hypertension.

Several clinical studies have evaluated whether there is a risk for GH triggering neoplasia. Though, the mitogenic effects of GH and IGF1 are still debatable. So far some studies have linked elevated IGF-1 with increased risk of ovarian, breast, prostate, colorectal and other cancers.¹ Chan et al. showed that the risk of developing prostate cancer was 4.3 times greater in men with higher serum concentration of IGF1, highlighting a GH replacement GH in older men.

In this manner, the use of GH as an antiaging agent in patients who do not have deficit of GH provides evidence that suggest no real benefit. For that reason, studies using GH replacement in somatopause have been disappointing.¹¹ Davidson et al.'s meta-analysis (involving 15 studies in the period between 1985 and 2004), observed no evidence that GH treatment improves the patients' quality of life and well-being.

There is no definitive evidence that older individuals actually benefit from treatment with GH. Strategies aimed at increasing spontaneous GH secretion, such as sleeping and exercising, are safer and certainly less expensive than the GH supplementation scheme.¹² The high cost of the treatment (roughly US\$ 1,300 per month for three weekly injections), and the lack of consistent scientific evidence on the actual or potential benefits of that therapy in the elderly are the main limitations for its clinical use.

In this manner, the adoption of a lifelong healthy style, guided by simple measures, such as a balanced and varied diet, weight control, regular physical activity, leisure and entertainment, among others, can promote aging with fewer health problems and better quality of life.

DEHYDROEPIANDROSTERONE

Dehydroepiandrosterone (DHEA) and its sulfated derivative DHEAS are the most abundant steroid hormones, being derived from the adrenal cortex's reticular zone.¹³ The adrenal secretion of DHEA has a pulsatile pattern and follows a diurnal rhythm similar to that of cortisol, being under the stimulus of the corticotropin releasing hormone (CRH) and the adrenocorticotropic hormone (ACTH).¹⁴ Nevertheless, in contrast to cortisol levels that have linear increase with increasing age, DHEA levels persistently decline. The fetal adrenal gland synthesizes great amounts of DHEA, but the production of that steroid declines in the post-natal. The adrenarche (it takes place at between 6 and 8 years of age) is characterized by increased biosynthesis of DHEA and circulating levels of DHEAS, peaking at the age of 30.¹³ The maximum DHEA concentration in the third decade of life is followed by a subsequent decline of about 2% per year. That continuous decline ends between the age of 70 and 80, when DHEA levels remain between 10-15% - the normal concentration for that age group.¹⁵ That continuous decrease in serum DHEA and DHEAS levels over the years has been linked to the cognitive decrease typical of aging. Thus, epi-

demiological studies suggest an association between low levels of DHEA concentration and certain effects of aging.

Although that hormone's physiological and pathophysiological roles are not yet fully identified, several features are attributed to it. Both DHEA and DHEAS are biotransformed into biologically active androgens and estrogens in peripheral tissues. Thus, in addition to being precursors of sex hormones, they are important in the production of all other hormones secreted by the adrenal gland. They are linked to increased insulin's sensitivity, helping to improve glucose capture, acting mainly through the skeletal muscle, liver and adipose tissue. In addition, several studies have documented the association between the decline of DHEA and various adverse effects of aging.¹³

DHEA REPLACEMENT

Several studies have demonstrated the beneficial effects of DHEA on dementia, obesity, lipid metabolism, diabetes mellitus, atherosclerosis, and osteoporosis.¹⁶ Sunderland et al. were the first to report that DHEA concentration in Alzheimer's disease is lower as compared to controls.¹⁶ Barret-Connor et al. showed an inverse relationship between DHEA levels, and cardiovascular disease and mortality in men.¹⁷ Low levels of DHEA were also found in patients with osteoporosis and breast tumors.

Due to DHEA's anti-aging and pro-cognitive effects observed in rodents, attempts have been made to evaluate this hormone replacement in humans. There is consensus on the fact that DHEA replacement can have effects on mood and well-being of people with adrenal insufficiency, suggesting that its replacement could improve the cognitive function in the elderly. To date, however, studies have failed to promote evidence supporting that hypothesis.

Despite low levels of DHEA being related to the impairment of memory,¹⁸ a study conducted by Kritz-Silverstein et al. showed a negative effect of DHEA replacement for the memory.¹⁹ Wolkowitz et al. concluded that there was no benefit in Parkinson's disease. A review conducted by Maninger et al. concludes that in spite of the positive expectations for DHEA, no beneficial neurobiological and neuropsychiatric effects were found in healthy patients, including those at advanced age and/or with low concentrations of DHEA. Some studies have demonstrated increased muscle mass and decreased fat mass with a 50mg/day DHEA supplementation.²⁰ However, according to the study carried out by Nair et al., although there was an increase in lean body mass and a decrease in fat mass in patients receiving treatment with DHEA, there was no difference in endurance and muscular strength between the actual experiment and the placebo groups.²¹ Another placebo-controlled study that evaluated the DHEA's effect on muscle strength in the elderly showed no benefit with the use of 50mg/day of DHEA for 12 months, as compared to the placebo.²² Thus, in spite of the fact that low levels of DHEA are related to low muscle mass and strength, there is little evidence that DHEA replacement improves the signs of aging.

Regarding atherosclerosis, although administration of DHEA has demonstrated a decrease in the atherogenic process

in rats,²³ clinical studies have not found difference in the values of DHEA when comparing patients with and without atherosclerosis.²⁴ More recently, Boxer et al. carried out DHEA replacement, using 50mg/day for six months in elderly women, with no significant change found regarding cardiovascular risk factors, such as lipid profile, body or abdominal fat, fasting glucose or blood pressure.²⁵

Baulieu et al. conducted a study with 280 healthy individuals (men and women between 60 and 79 years old) who received 50 mg of DHEA or placebo for one year. Results included increased libido in women, and improvements in bone density, skin hydration, sebum production and pigmentation.²⁶ Labrie et al. also observed an improvement in bone density in postmenopausal women treated with DHEA for one year.²⁷

In the study by Morales, 50mg DHEA replacement for six months in both men and women above 50 years showed significant increase in well being in both genders.²⁸ In a study by Arlt et al., replacement of 50mg of DHEA for four months showed little improvement in mood and no alteration in the well being of patients. Nair et al.²⁹ showed that there had been no improvement in the quality of life of elderly patients receiving DHEA for two years, when compared to the placebo group.²¹

It is important to highlight that DHEA in elderly men leads to increased testosterone, which in transforming desidrotosterona can induce growth of prostate cells, both normal and tumoral, being hormone replacement therapy therefore completely contraindicated in prostatic hypertrophy. In women, on the other hand, attention should be given to the fact that DHEA is transformed into estrogen, which required strict control of the hormone and evaluation of risk factors for breast cancer.

In the 90's, the Journal of Clinical Endocrinology and Metabolism has called the DHEA hormone the youth hormone. Although many studies have shown positive effects of DHEA replacement in elderly, others do not offer evidence of that benefit, with its use being still controversial in rejuvenation.²¹ In this way, there is insufficient evidence to recommend routine treatment with DHEA.

MELATONIN

Melatonin is a hormone that is synthesized from tryptophan by the pineal gland, located in the human brain. It is also produced in the retina, thymus, bone marrow, respiratory epithelia, skin, intestine and other locations. It is secreted in a circadian rhythm according to the light and dark cycle. The maximal secretion occurs during the night and the exposure of the retina to light leads to the fast collapse of melatonin to very low levels. Melatonin takes place in the regulation of important physiological and pathological processes and is considered the hormone that regulates circadian rhythm and seasonal biorhythms through the biological clock. Moreover, it has recognized action in the immune response's modulation, body weight, reproduction, tumor inhibition and anti-jet lag effects.³⁰

The night peak amplitude of melatonin secretion reaches the highest levels between the ages of four and seven. After that peak, the melatonin concentration declines up until puberty,

when values remain stable up until the age of 35 to 40. After that age, melatonin levels decrease gradually, reaching nighttime levels equivalent to daytime concentration by the age of 70. Thus, with increasing age, many individuals do not show differences in melatonin secretion between day and night. As a result, it is proposed that melatonin would have an important role during the life cycle – i.e. during the growth, development and maturation phases, as well as during the aging process.

The cause of the decline in melatonin production is unknown, however it has been assumed that the variation in the concentration of that hormone during the life signals the aging of the human body. Some studies have shown that pinealectomy leads to the acceleration of many aspects of aging, which can be partially reversed or reduced through treatment with melatonin.³¹ In this manner, some evidence suggests that that hormone can act to prevent aging. Based on that knowledge, melatonin replacement therapy has been proposed and practiced worldwide by many people.³²

MELATONIN REPLACEMENT

The melatonin's antioxidant effect has been described in several studies.³³ Not only melatonin itself, but also several of its metabolites can detoxify free radicals and their derivatives.³⁴ Due to the melatonin's antioxidant capacity, it can be an effective medicament employed to reduce aging, prolong life and contain age-related disorders. Some benefits of the antioxidant property of melatonin were observed in the treatment of rheumatoid arthritis in infertile women, elderly patients with essential hypertension,³⁵ neurodegenerative diseases,³⁶ and for reducing cholesterol levels.³⁷ Nevertheless, some studies have challenged the antioxidant benefit of melatonin-based therapies.³⁸

Another role of melatonin is its immunomodulating action, already described in several studies. Guerrero and Reiter suggested that the immunomodulatory properties are mediated via nuclear and membrane receptors.³⁹ It was also demonstrated the role of melatonin in the activation of B and T lymphocytes, Natural Killer cells (NK), monocytes and cytokines. Aligned with that, studies in rats were able to demonstrate that melatonin injections recovered the immune function in elderly or immunocompromised rats, in addition to antagonising the effects of immunosuppression generated by stress.⁴⁰ The immunomodulatory effects – both prophylactic and therapeutic – of melatonin were also observed in patients with asthma and rheumatoid arthritis, inhibiting the inflammatory response. Other studies, however, have demonstrated that melatonin is able to promote rheumatoid arthritis by acting as an immunomodulating agent, stimulating pro-inflammatory cytokines.⁴¹ It follows that the effects of melatonin in the immune system are complex, sometimes contradictory, and depend on several factors, such as the prescribed dose, the patient's immune system, the immunity's circadian rhythm, and the state of the pineal gland.⁴²

There is some evidence showing that melatonin is involved in preventing the emergence, development and progression of tumors.⁴³ The increased incidence of breast, endometrial and colorectal cancers noted in nurses and other shift workers sug-

gest the possibility of connection between the decrease in melatonin secretion and increased exposure to light at night.⁴⁴ Ansimov et al. demonstrated that continuous treatment with melatonin in rats decreased the incidence and the size of breast tumors, as well as the incidence of lung metastasis.⁴⁵ In patients with prostate cancer, melatonin levels are reduced by two-thirds as compared with those in patients with benign prostatic disease.⁴⁶ The presence of binding sites for melatonin in human colonic tissue suggests that melatonin may play a role in colorectal cancer.⁴³ However, there are studies describing some question the effects of melatonin on cancer that still need to be answered,⁴⁷ and the necessity to conduct clinical trials before this hormone can be accepted as an anticancer drug.⁴⁸

It is known that sleep disorders occur with aging. Due to its effect on the circadian regulation, melatonin is linked to the maintenance of sleeping, hence, many studies have shown decreased levels of melatonin in elderly patients with insomnia.⁴⁹

In addition to those effects, melatonin has anticonvulsant activity and appears to be involved in the modulation of brain function. While patients with Alzheimer's disease have reduced levels of melatonin,⁵⁰ that hormone was demonstrated to have cognitive benefits in such patients.⁵¹

In light of those facts, melatonin has a reputation as miracle drug, and many elderly and middle-aged people have been using it daily.³² Although there are many theories linking melatonin to aging, its role in that process remains unclear. In brief, the reasons why melatonin could participate in aging process are the following: decreased production during life, a powerful antioxidant activity, reduced sleep efficiency associated with the decrease of its production, circadian rhythm deterioration with increasing age, and immunomodulatory properties.

Notwithstanding, more clinical evidence must become available before any precise recommendation regarding melatonin can be made.⁴⁸ Further studies and clinical trials are necessary to evaluate both the effectiveness and the safety of using this hormone in humans.

BIOIDENTICAL HORMONES

Menopause is the permanent cessation of menstruation, resulting from the loss of ovarian function, which stops the production of estrogens. It can occur naturally or as a result of surgery or medical intervention. The alteration in the hormonal medium, associated with perimenopause and menopause can lead to a variety of symptoms that could negatively affect the quality of life of women. The most common symptoms include hot flashes, night sweats, emotional lability, poor concentration and sleep disorders, which can range from mild to severe.⁵² Other symptoms that menopause can cause are vaginal atrophy and accelerated bone loss due to the fast decline of estrogen, the latter being associated with more serious risk of vertebral and hip fractures.

The postmenopausal therapy is an effective and well-tolerated treatment for menopausal symptoms. Various FDA approved hormonal preparations are available for the treatment of women with menopausal symptoms. Nonetheless, despite

hormone therapy has proved effective, the use of estrogen-based therapies has fallen significantly since the publication of the findings of the clinical trial Women's Health Initiative (WHI).⁵³ Between 1993 and 1998, over 160 thousand women took part in that trial, which involved the combined hormone replacement therapy (estrogen and progesterone) and showed that the treatment's benefits did not outweigh its deleterious effects. In 2002, the WHI's results suggested an increased risk of breast cancer, cardiovascular disease and thromboembolic events in women using conjugated estrogen and medroxyprogesterone acetate as compared to a placebo group.⁵⁴

Those findings led many women to discontinue hormone therapy and look for a safer alternative for the treatment of menopausal symptoms. In that sense, the search for complementary and alternative therapies included natural hormones, also known as bioidentical compounds.⁵² Those compounds have a chemical and molecular structure exactly equal to that of the hormones produced by the human body. More recently, those substances have attracted great interest due to the possibility of relieving menopausal symptoms and offering increased safety when compared to conventional therapy.

REPLACEMENT OF BIOIDENTICAL HORMONES (ALTERNATIVE HORMONE REPLACEMENT THERAPY)

The alternative hormone replacement therapy has been widely discussed and disseminated, as in the U.S. alone conventional hormone replacement therapy decreased by 91 million in 2001 to 57 million in 2003, and continues to fall since the publication of the Women's Health Initiative (WHI) study in 2002. In Brazil, there was a 25.2% reduction in indications of synthetic hormones, and approximately 46% of gynecologists began prescribing other medications to fight natural menopausal symptoms.⁵⁵ In this line, many studies have been intensified for scientific investigation of the action of natural hormones against the effects of menopause.

Bioidentical hormones have been known for over 20 years, through the extraction and manipulation of hormones contained in plants. Phyto-hormones are found in different parts (leaves, fruits, roots and seeds) of plants such as *Cimicifuga racemosa*, Mexican yam, licorice, flax, red clover, nonetheless soy is their best known source. Whilst only the chemical precursor of those hormones is natural, they are characterized as natural hormones due to their identical structure to that of endogenous hormones, although produced by recombinant genetic engineering.⁵⁶ In this manner, the use of those substances assumes that the human body tends to better accept substances similar to those it produces naturally.

Salgado et al. point out that soy offers vast benefits for the human body, since studies comparing Eastern populations – who eat soy daily – with Western groups – who consume very little of that grain – showed that Asian women suffer less from the effects of menopause and are less likely to have breast cancer, osteoporosis and heart disease.⁵⁶ Clapauch et al., and Nahas et al. highlighted that only 20% of Eastern women – who consume between 20 and 150mg of isoflavone, a substance present

in soy – have hot flashes during menopause. On the other hand, 80% of Western women – who consume 1 to 3mg per day of that substance- have that symptom.⁵⁷

In the study by Fonseca, 78 and symptomatic postmenopausal women were divided into two groups: the first was treated with 60g of soy/day, and the second received a conventional hormone replacement therapy. After four months of treatment, it was concluded that the group which had received soy had controlled the menopausal symptoms in the same way that the group treated with synthetic hormone did, however the adverse reactions observed in the conventional treatment, such as mastodynia, thrombophlebitis and other, did not occur in the group treated with soy.⁵⁸ Carmignani also concluded that the soy-based food showed good acceptability and few side effects, with an efficacy comparable to conventional HRT and greater than that of the placebo in relieving hot flashes, joint and muscle pain, and vaginal dryness in postmenopausal women.⁵⁵ Sousa et al. showed that the ingestion of isoflavone capsules reduced menopausal symptoms in 45% of women.⁵⁹

In an observational study, a decrease in breast cancer was observed in patients who underwent treatment with estrogen and progesterone's bioidentical hormones, when compared to those treated with synthetic hormone.⁶⁰ Other studies using doses of natural estrogen and testosterone showed benefits in postmenopausal bone loss, however, despite the claims made in favor of that therapy, none of those assertions was proved, because they were not directly fundamented on bioidentical hormones in addition to requiring clinical studies for its proof.⁵²

The most common bioidentical hormones are estradiol, estriol, progesterone and testosterone, which can be present in

various formulations, allowing individualized hormone therapy according to the patients' needs to relieve menopausal symptoms.⁵² Although the use of bioidentical hormones is theoretically interesting due to their similarity to endogenous hormones and the practicality of pharmaceutical dispensing, there is lack of publications that present randomized controlled clinical trials, proving its superiority over the conventional therapy based on more concrete evidence.⁵⁶ The benefits of the therapy should therefore be discussed for each patient, who should use only products that have been thoroughly tested and offer increased safety.

CONCLUSION

The hormone replacement therapy in the elderly is the subject of increasing interest in medicine, due to the decline in hormone production and function with aging. In this manner, many people have bet on hormone replacement as a current source of youth. That correlation is however still uncertain, with controversial study results so far. In line with that, only a few randomized, placebo-controlled trials have been carried out, and most studies do not cover a large number of patients or an extended period of time. As a result, the safety of hormone replacement therapy, the benefit/risk ratio and side effects have not been established yet. The use of alternative antiaging tools that have proven beneficial effects to the organism and can assist in hormone production – such as good sleep, correct eating, and the practice of physical exercises, lead to more accurate results and do not present risks when the it comes to aging and quality of life. ●

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Questions for continuing medical education – CME

1. In general, considering the aging process and hormones, it is wrong to say:

- Hormones play an important role in the aging process, as there is decreased production, efficacy and clearance effect of some hormones during that process.
- The effect of the administration of hormones with antiaging purpose is still much controversial regarding the risk/benefit ratio.
- Although several studies have demonstrated an increase in lean body mass resulting from GH therapy, the increase of muscle mass and strength was not greater than that which could be achieved with exercise.
- The administration of hormones does not lead to side effects because the body eliminates its excess.
- The safety of hormone replacement therapy, as well as the risk/benefit ration and side effects, have not been established yet.

2. About GH, it is incorrect to state:

- It is a peptide produced by the anterior hypophysis in pulsatile way.
- It has higher amplitude peaks in phases one and two of deep sleep.
- Its pulsatile characteristic is controlled mainly by two hypothalamic proteins: GH-releasing hormone (GHRH), which acts by stimulating the secretion and the inhibitory action somatostatin.
- In adults, it has the role of maintaining the normality of body composition, skeletal mass, cardiovascular risk factors, and physical and physiological functioning.
- Physical exercise is a well-known inducer of physiological secretion of GH.

3. About GH production, it is correct to state:

- The GH-releasing hormone (GHRH) inhibits the secretion of excess GH.
- Somatostatin has stimulatory action on GH.
- The action of GH takes place both through a binding with its receptors in the growth plate and the stimulation of hepatic and testicular production of the insulin-like growth factor-1 (IGF-1).
- IGF-1 is not involved in the regulation of somatic growth in children.
- Some clinical characteristics of aging do not resemble the pathological manifestations of GH deficiency.

4. About the secretion of GH hormone, it is wrong to state:

- The secretion of GH decreases concomitantly to the decline of IGF₁ around the age of 30.
- The decline of that hormone is around 14% per decade in normal adults.
- Many individuals older than 60 have normal GH 24-hour secretion, which is indistinguishable from that of adult patients with GH deficiency due to hypothalamic-pituitary lesions (DGHA).
- It is stimulated by somatostatin.
- Physical exercise is a well-known inducer of physiological secretion of GH.

5. Regarding GH replacement aimed at reversing of aging, it is correct to state:

- GH was first used in patients in 1998.
- Its production became available in 1985, through recombinant DNA techniques.
- It has indications approved by the U.S. Food and Drug Administration (FDA) for use in aging.
- The administration of GH provides greater volume of GH than the natural production of GH, stimulated by physical exercise and

deep sleep.

e) There were no symptoms, such as arthralgias or fluid retention, due to the administration of GH in the elderly.

6. About the side effects of GH administration, all of the below may occur except for:

- Increase in lean body mass.
- Fluid retention.
- Arthralgias.
- Carpal tunnel syndrome.
- Possibility of stimulation of neoplasias.

7. About dehydroepiandrosterone, it is wrong to state:

- Together with its sulfated derivative DHEAS, it is the most abundant hormone steroid.
- It is derived from the reticulate zone of the adrenal cortex.
- Its secretion is pulsatile and mainly nocturnal.
- The maximum concentration of DHEA occurs at the age of 30, whereafter there is a decline of 2% per year.
- It does not help intellectual memory, as claimed by some scientific studies.

8. Regarding scientific studies addressing advantages of DHEA, all of the below are described, except for:

- Parkinson's Disease.
- Obesity.
- Lipid metabolism.
- Diabetes mellitus*.
- Osteoporosis.

9. About Melatonin, it is wrong to state that:

- It is a hormone synthesized from tryptophan by the pineal gland, which is located in the human brain.
- It is also produced on the retina, thymus, bone marrow, respiratory epithelium, skin, intestine and other body sites.
- It is secreted in circadian rhythm, according to the light and dark cycle.
- Maximum secretion occurs during the day.
- The peak amplitude of nocturnal melatonin secretion reaches the highest levels between the ages of four and seven years old.

10. About bioidentical hormones, it is incorrect to say:

- They are compounds that have chemical and molecular structures exactly similar to those of the hormones produced by the human body.
- Its use is growing fastly.
- The use of conventional hormone therapy is also growing.
- The source of most of them is in leaves, fruits, roots and seeds.
- Soy, as reported, promotes bioidentical effect because it reduces the effects of menopause and the incidence of breast cancer.

Key

Adverse events in injectable hyaluronic acid, 4(3):259-63.

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

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Received on: 20/06/2012

Approved on: 24/11/2012

This study was carried out at the Dermatology Clinic, Department of Medicine, Irmandade da Santa Casa de Misericórdia de São Paulo (SCMSP) – São Paulo (SP), Brazil.

Financial support: None

Conflict of interest: None

In search of treatments for striae rubra and striae alba: a dermatologists' challenge

Em busca dos tratamentos para Striae Rubra e Striae Alba: o desafio do dermatologista

RESUMO

A estria atrófica cutânea ou *striae distensae* (SD) é dermatose muito comum, constituindo causa frequente de consulta ao dermatologista. Devido a seu caráter inestético, pode trazer importantes consequências psicossociais e na qualidade de vida. O objetivo do trabalho foi revisar as possibilidades de tratamento preconizadas na literatura para estrias recentes e antigas. Diante da multiplicidade de fatores etiológicos envolvidos, a literatura é divergente e ampla sobre o tratamento.

Palavras-chave: estrias de distensão; terapêutica; terapia a laser.

ABSTRACT

Cutaneous atrophic striae (or striae distensae) is a very common skin condition that frequently motivates dermatological consultations. Due to its unaesthetic appearance, it can have a significant impact on patients' psychosocial status and quality of life. This study reviews the literature involving possible treatments for more recent and older cutaneous striae or stretch marks. Given the great number of etiological factors involved, the literature is abundant and divergent regarding the treatment of the condition.

Keywords: *striae distensae; therapeutics; laser therapy.*

INTRODUCTION

Atrophic cutaneous stria or striae distensae (SD) is a very common dermatosis and is a frequent reason for consultation with dermatologists. Due to its unsightly appearance, it can lead to significant psychosocial consequences and can have a negative impact on a patient's quality of life, especially for women.^{1,2} Its etiology remains uncertain, meaning its treatment is challenging.^{3,4}

The incidence of striae distensae is described in the literature as occurring at rates of 40-70% during puberty and at 70-90% during pregnancy.⁵⁻⁷ It appears predominantly on the arms, hips, abdomen and lumbosacral region, though it can affect other body sites when linked to Cushing's syndrome or to the use of exogenous corticosteroids.^{2,8}

Also referred to as stretch marks, striae distensae are composed of linear atrophic plaques, usually soft and depressible, and

are associated with the stretching of the skin. Their clinical appearance varies with their development stage: initially linear, erythematous to violaceous and edematous (striae rubra or recent), they become white, pale, atrophic, and deep with time. The direction of the striae corresponds to the tension lines of the skin, and their histology follows this developmental characteristic. An inflamed appearance is typical at the outset of the condition, with dermal edema and perivascular lymphocytic infiltrate, which later develops into atrophy of the epidermis, the reduction of epidermal ridges, and loss of skin appendages. In the area of the striae, it is possible to observe an increase of glycosaminoglycans, in addition to verticalization collagen fibers adjacent to the dermal-epidermal junction, and a significant reduction of elastic fibers in the papillary dermis. With ultrastructural analysis, the striae's dermal matrix appears diminished and with floccular texture.^{9,10}

SD occurs in a number of physiological and pathological situations (such as pregnancy, adolescent growth spurts, obesity, rapid loss or gain of weight), and states of cachexia (such as tuberculosis), anorexia nervosa, and after strenuous diets. It is also associated with the use of medications, such as protease inhibitors (indinavir) in patients with HIV, as well as with chronic liver disease and adrenal hormonal alterations (such as hypercortisolism) and use of exogenous steroids. Genetic predisposition also plays a role, with greater frequency in monozygotic twins, and individuals with genetic syndromes such as Ehlers-Danlos' and Marfan's.^{11, 2, 12}

SD's etiology remains controversial, with local and systemic pathological factors described as having an impact on alterations in the connective tissue. There are reports of alterations in the quantity, quality, and configuration of elastic fibers, collagen, and fibrillin in the dermis, leading to the loss or rupture of elastic fibers in the affected region due to the skin's mechanical condition of stretching or strain. Like Rosenthal, other authors describe four mechanisms involved: insufficient development of integument, including impairment of elastic properties, fast stretching of the skin, endocrine and other – possibly toxic – alterations.^{3,13}

Given the multiplicity of etiologic factors involved, the literature is wide in scope and divergent regarding its treatment. As a result, numerous options have been proposed, with some practitioners suggesting the use of more than one consistently effective treatment, and others recommending just one isolated and sufficient therapy.

OBJECTIVE

The present study's objective was to review the treatment options recommended in the literature for treating recently formed as well as older stretch marks.

METHODS

The authors researched and selected academic papers during the period from June to October 2011. The literature review was carried out using the PubMed, Cochrane, and Lilacs databases, in the English, Portuguese, and Spanish languages. The

researched keywords were: striae distensae, stretch marks, estrias cutâneas. Cross-references that were researched included: treatment/tratamento, laser, radiofrequency/radiofrequência, peeling, retinoic acid/ácido retinóico and microdermabrasion/microdermabrasão. Additional research strategies were: examining the selected articles' references and a manual search of leading dermatologic journals.

Criteria for the selection of studies:

One hundred forty-two articles about striae distensae were found on PubMed,⁷ on Cochrane, and 1 on Lilacs. Seventy-three of them analyzed treatment methods.

Methodologic quality:

The selected studies' methodologic quality was assessed according to the following criteria: adequate randomization, use of a control group, clearly described inclusion and exclusion criteria regarding the study population, proper and clearly described technique, and use of histological methods for comparison and evaluation. A special focus was put on studies based on controlled clinical trials, meta-analysis, reviews, and randomized trials.

RESULTS

For didactic purposes, the treatment modalities were itemized into: diet and exercise, topical medications (retinoic acid, moisturizing creams, glycolic acid, ascorbic acid and chemical peels), combination therapy UVB/UVA1, lasers, microdermabrasion, radiofrequency, and intradermotherapy.

Diet and exercise

There are few studies in the literature about the correlation between SD, diet, and physical exercise. Schwingel et al. conducted a study monitoring 80 obese women,²⁴⁻⁵³ years of age, with SD who followed a weight loss program for three months. The volunteers were divided into three groups: twenty-nine followed a diet only,³¹ followed a diet and practiced aerobic exercise, and 20 followed a diet and an endurance exercise program. There was no statistical difference between the degree of weight loss and the improvement of SD, when this type of program was followed.¹⁴

Topical treatments

Tretinoin

Tretinoin is a well-established therapeutic modality for treating acne and photoaging conditions. It is believed to cause fibroblast stimulation and increased collagen production and angiogenesis in SD, however these results are still controversial. Most of the published articles describing its use refer to patients with pregnancy-related striae.¹⁵

In 1994, Pribanich et al. conducted a double-blind, placebo-controlled trial, which demonstrated the ineffectiveness of 0.025% tretinoin for seven months in the treatment of striae rubra related to pregnancy. However, several studies correlate a better appearance and reduced width of pregnancy striae with

the use of tretinoin. In a 1996 article, it was histologically demonstrated that the use of tretinoin improved the clinical appearance of stretch marks during the active phase (striae rubra) – though with little effect during the mature stage (striae alba). That study evaluated 22 patients who used 0.1% tretinoin (n = 10) versus placebo (n = 12) daily, for six months in the affected areas. Clinical and histological results (pre- and post-treatment) demonstrated decreases of 14% in the length and of 8% in the width of striae rubra in patients who used tretinoin as compared with an increase of 10% in length and of 24% in width in patients who received placebo. 15, 16 In 2001, through an open multi-centric study, Rangel et al. showed that 0.1% tretinoin cream applied daily on one side of the abdominal region of women with pregnancy-related striae, led to a clinical decrease of 20% in length and 23% in width, as compared with striae on the other side, where the placebo was applied. 16

A study comparing 20% of topical glycolic acid and 0.05% of tretinoin versus 20% of glycolic acid and 10% of L-ascorbic acid in women between 23–49 years of age, with striae alba, demonstrated that both doses can improve the appearance of SD, without significant statistical differences.¹⁷

In 2002, Garcia showed that the improvement in the appearance of stretch marks following the use of topical 0.1% tretinoin remained for about one year after the end of the therapy.¹⁸

Moisturizing creams

Specific moisturizing treatments are numerous and unproven. Despite the consensus that proper hydration is necessary to maintain the skin barrier's integrity and function, there is little literature available on the use of creams for the prevention and treatment of striae. The lack of clarity on the available data and scientific studies makes it difficult to make conclusions about the effectiveness of creams. In addition, more thorough studies are necessary in order to determine the efficacy and safety of these products in the treatment of stretch marks. Studies found in the literature are, in general, sponsored by the companies that have developed them.¹⁹

A study involving 80 women was aimed at investigating the effect of massage with a cream containing Asian Centella extract, vitamin E, and collagen-elastin hydrolysates (Trofolastin®, Novartis, Barcelona, Spain) in the prevention of stretch marks in pregnant women. Forty-one volunteers used the cream, and 39 used a placebo. The results showed that 56% of placebo patients and 34% of the effectively treated group developed SD during pregnancy. That study demonstrated that the active component in Asian Centella induced significant prevention of the development of stretch marks. The mechanism of action was precisely identified as being the stimulation of fibroblast activity. In addition, a defensive effect against glucocorticoids was also reported.¹⁹

Another study with 50 women (without a placebo control), examined a cream containing vitamin E, panthenol, hyaluronic acid, elastin, and menthol (Verum®). The treatment was associated with fewer SD during pregnancy. A third of women

in the treated group and two thirds of those who received no treatment developed stretch marks during pregnancy. Even though the study did not involve a placebo and the benefits of isolated massage have not been evaluated, the results suggest that the product might be useful.¹⁹

Alphastria® is a cream composed of hyaluronic acid, allantoin, vitamin A, vitamin E, and dexpanthenol. Hyaluronic acid is a major constituent responsible for stimulating the activity of fibroblasts and the production of collagen. Only one study showed its efficacy and safety: thirty pregnant women used the cream, while a placebo was given to a control group of equal size. In the group that used the cream, only three women developed SD, compared to 21 in the placebo group. The study concluded that the incidence of striae was reduced with the use of topical cream, and that better results were found in those with less tendency to gain weight.²⁰

The preventive application of oil or water-based massage creams was tested on a group of 24 pregnant women (control group = 26 patients). In the untreated control group, the SD were observed in two thirds of patients, whereas in the treated group, the SD developed in only one third of the volunteers. 21

Glycolic acid (GA) and trichloroacetic acid (TCA)

GA is an alpha-hydroxy acid widely used in various dermatological conditions, although few studies in the literature demonstrate its use in SD. There is a lack of epidemiological studies on the use of GA in pregnant women. As previously mentioned, the topical use of 20% GA, and 0.05% tretinoin as compared with 20% AG and 10% L-ascorbic acid were equally effective, with no significant differences.¹⁷

TCA (10–35%) has been used for many years and is safe for use in low concentrations. At higher concentrations (e.g. 50%) it presents a trend to produce scarring and is less manageable than other agents used for superficial peelings. Further studies are necessary to better understand the subject. Some authors have had success with TCA in low concentrations (15–20%) in the papillary dermis, and with carrying out chemexfoliation sessions at monthly intervals with reported improvement in the texture and color of striae.⁴

Peelings

In spite of the use of retinoic acid being considerably popular in dermatological practice as an adjuvant therapy and for treating other dermatoses, there is a lack of information in the literature about its use as a peeling treatment for SD.

Laser and Pulsed Dye Laser (PDL) based technologies

The 585nm flashlamp-pumped pulsed dye laser is one of the most well established lasers for treating SD, particularly striae rubra. It has a non-ablative approach, which operates in dilated blood vessels, increasing the level of extracellular matrix collagen. In 1996, McDaniel et al. showed optimal fluency in the 3 J/cm² band, using a 10mm spot, compared to a placebo and other fluencies ranging from 2.0 to 4.0 J/cm² and spot sizes of 7 to 10mm.²² In 2003, Jimenez et al. demonstrated improvement

in SD ranging from pink to erythematous – as compared with striae alba – and even with biopsies, showing increased collagen, even at a stage not clinically evident. Due to the fact that, as chromospheres, melanin competes with hemoglobin for the energy radiation of the 585nm laser, many authors do not recommend the use of this laser for patients with skin type IV to VI, given the risk of post-inflammatory hyperpigmentation.²³ In 2007, Suh et al. demonstrated improved clinical appearance of SD and elasticity in patients with striae alba who underwent sessions of associated RF and 585nm pulsed dye laser in patients with Fitzpatrick skin type III and VI (with only one of the 37 patients having post-inflammatory hyperpigmentation, which resolved spontaneously after 12 weeks).²⁴ In 1999, Nouri used pulsed dye laser and short pulse CO₂ laser and placebo in three body sites, in a study of four patients with abdominal striae alba (two phototype IV patients and two phototype VI patients). None of the treatments was satisfactory, with no improvement of striae, and even a result of post-inflammatory hyperpigmentation in two phototype VI patients, when using the two types of laser. In one phototype IV patient, the laser also caused persistent erythema, still observed after 20 weeks of follow up.²⁵

Copper Bromide Laser

Copper bromide laser is a 577nm non-ablative laser described in the literature only for treatment of SD. A study with 15 phototype I to III patients who underwent 4 J/cm² laser on SD on the breast region and 8 J/cm² in other body sites, demonstrated effectiveness in reducing the striae's size.^{26,4}

1,450 nm Diode Laser

1,450 nm diode laser is a non-ablative, infrared light-based laser with an integrated cooling unit, which exerts controlled thermal damage leading to the subsequent production of collagen and remodeling of the extracellular matrix, thus preserving the epidermis and leading to the clinical improvement of rhytides and scars. In 2003, Tay et al. conducted a study with 15 patients with striae alba (9) and striae rubra (2), in Fitzpatrick phototypes II and III, using biopsies before and after the treatment and a double-blind photographic analysis. The laser did not offer efficacy in treating hyperpigmentation, in addition to causing intense post-inflammatory hyperpigmentation.^{4,27}

1,064nm Nd:YAG (Neodymium-Doped Yttrium Aluminium Garnet) Laser

1,064nm Nd:YAG is a non-ablative infrared light-based laser, which acts primarily on melanin and hemoglobin. It can be used to treat recent striae or striae rubra safely, even in higher phototypes, as it has been linked with increased levels of dermal collagen. By acting especially on blood vessels, it ensures beneficial effects on the appearance of striae rubra, yet limited (though still positive) effects on the atrophic appearance of lesions. In 2008, Goldman described a study with 20 patients bearing striae rubra who underwent Nd:YAG, based on photographic analysis. Both the investigator and patients reported improvement in 40% and 55% of cases, respectively.^{4,28,29}

Intense Pulsed Light (IPL)

IPL is characterized by the emission of non-coherent, pulsed, and broad spectrum light, ranging from visible light to infrared (400 to 1,200nm). It is regarded as the first line option in vascular lesions, and can also be used for treating SD. Hernandez et al. studied abdominal striae alba in 20 Fitzpatrick skin types III and IV patients. After 5 treatment sessions, and pre- and post-treatment biopsies, there was an increase in dermal thickness and an improvement in the texture of lesions in all cases. Studies have shown that there is a replacement of dermal elastolysis with neocollagenesis, improving the striae's appearance.¹¹

UVA / UVB1 combined therapy

This method is carried out with an appliance that combines UVB and selective UVA1, emitting high-intensity light, which is not coherent with 313nm, 360nm and 420nm peaks. In a study of nine patients with striae alba who underwent 10 treatment sessions and pre- and post-treatment biopsies, and where there was histologic alteration regarding the remodeling of collagen, there was transient repigmentation without the compromise of perilesional tissue. Further studies are necessary to assess the efficacy and side effects.^{11,4}

1,550nm Erbium Glass Laser

1,550nm Erbium Glass Laser is a non-ablative, fractional resurfacing laser that uses 1,550nm wavelength, creating micro-zones or microthermal zones (MTZs) of injury in the skin (containing localized epidermal necrosis and collagen denaturation), which are later expelled, giving rise to the neocollagenesis. It simultaneously maintains areas of normal skin, accelerating the healing process. There are few studies on its use in SD.³⁰

In 2008, a Korean study with 6 patients demonstrated significant clinical improvement after 8 weeks of treatment. Histologic analysis showed a significant increase in epidermal thickness, which became close to that of areas without striae, and in addition there was a substantial increase in elastic fibers after 8 weeks. Discrete hyperpigmentation was observed and resolved 8 weeks after the treatment.³¹

In 2009, in a study of 22 women with white striae who underwent 2 sessions in 4-week intervals, Hana Bak et al. demonstrated that 6 of the patients showed good to excellent improvement (27%). The other 16 (63%) had mixed results, as compared to the histological analysis of the dermis' and epidermis' thickness before and after 1 month of treatment. Side effects were not reported.³²

In yet another Korean study, published in 2011 and including 22 patients, 1,550nm Erbium Glass laser and fractional CO₂ laser were compared, with all patients undergoing both treatments – one in each half of the abdomen. Three sessions were carried out in 4-week intervals. The study suggested physician-evaluated clinical improvement, and patient satisfaction, which were statistically similar in both methods. Histologically, there was an increase of the mean thickness of epidermis (slightly greater with CO₂ laser), with the amounts of collagen and

elastic fibers significantly increased after the treatment with both lasers. The treatment was well tolerated. There were no long-lasting, significant adverse effects, except for mild and transient erythema and pigmentation. The fractional CO₂ laser-based treatment was considered more painful.³³

Ablative Fractional CO₂ Laser (10,600nm)

The ablative fractional CO₂ laser works by having water as its main target, resulting in tissular damage through thermal treatment and vaporization of cells, stimulating neocollagenesis. It has recently been adopted as a treatment of rhytids, facial rejuvenation, and acne scars. There are few articles in the literature regarding its use in SD.

Alexiades-Armenakas et al. have recently analyzed the use of CO₂ in different cutaneous modalities – among them striae alba – in five patients who underwent three or four monthly application sessions. The clinical results were inconclusive –

Three patients had no improvement, 1 had improvement considered good (3 on a scale of 4) and 1 had moderate improvement (2 on a scale of 4) – thus the results of this treatment have been deemed inconsistent and unpredictable.³⁴

In another study, Lee et al. analyzed 27 patients treated with a single session of fractional CO₂ laser (10,600nm), demonstrating the following clinical outcomes three months after the treatment: two of 27 participants (7.4%) had a Grade 4 improvement, 14 (51.9%) had a Grade 3 improvement, nine (33.3%) had a Grade 2 improvement, and two (7.4%) had a Grade 1 improvement. None of the participants experienced a worsening of the condition according to this improvement scale, where 0 = worsened, 1 = minimal improvement or steady state (0-25%), 2 = moderate improvement (26-50%), 3 = considerable improvement (51-75%), 4 = almost complete improvement (75-100%). The average score of clinical improvement was 2.6. Research into overall patient satisfaction after the treatment suggested that six of 27 participants (22.2%) were very satisfied, 14 (51.9%) were satisfied, five (18.1%) were slightly satisfied, and two (7.4%) were dissatisfied.³⁵

In 1999 Nouri compared the use of 585nm pulsed dye laser with CO₂ laser in the treatment of striae in Fitzpatrick skin type IV to VI patients. In all cases there was no improvement, but side effects ranging from persistent erythema to hyperpigmentation did occur, indicating that for patients with these skin types, laser-based treatment should be avoided.²⁵

Microdermabrasion

Microdermabrasion is a procedure that has been used in certain skin conditions, such as acne scarring, mottled pigmentation, and fine rhytids. There are reports of induction of epider-

mal transduction signals, typically associated with the remodeling of the dermal matrix. However, this technique is not approved by the FDA, and there is no evidence available from double-blind studies of controlled trials.

Radiofrequency

Radiofrequency produces electricity that heats the dermis, resulting in the moderate shrinkage of collagen, in turn inducing the formation of new collagen. According to some authors, this is a non-invasive and effective technique. Its use in SD was reported in association with 585nm pulsed dye laser in 37 patients by DongHye by Suh et al. in 2007. Nine patients underwent three PDL sessions, the first combined with radiofrequency. Histological analysis demonstrates increased collagen fibers in all patients, and increased collagen and elastic fibers in six of them.^{24,4}

CONCLUSION

In the face of the multiplicity of etiologic factors involved, the literature on the treatment of SD is wide and divergent. Numerous treatments have been proposed and while several were reported as consistently effective, no one single therapy modality was described as being completely efficient on its own.

The studies suggested the importance of preventing the emergence of stretch marks, especially during pregnancy. Such prevention can be accomplished with the use of moisturizing creams containing hyaluronic acid or Asian Centella.

0.1% tretinoin as well as 20% glycolic acid associated to 0.05% tretinoin or 10% of L-ascorbic acid can be used as topical treatments to improve the clinical condition of SD during its active development phase (striae rubra).

Regarding laser based treatments:

Pulsed dye laser (PDL) was demonstrated to improve SD – with appearance ranging from pink to erythematous, as compared to striae alba. This laser is not recommended for patients with Fitzpatrick skin types IV to VI, due to the risk of post-inflammatory hyperpigmentation.

Copper bromide laser has increasingly been shown to be effective in reducing the size of striae.

Nd:YAG was the subject of a study in which improvement in striae rubra was evidenced in 40-55% of cases.

Intense pulsed light (IPL) was shown in several studies to cause the replacement of dermal elastolysis with neocollagenesis, improving the appearance of stretch marks.

Fractional photothermolysis has led to improvements in texture and appearance of old stretch marks. Good to excellent improvement was reported in 27% of cases. ●

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New techniques

Blepharoplasty with correction of senile entropion in the lower eyelid

Blefaroplastia com correção de entropio senil da pálpebra inferior

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Received on: 31/01/2012
Approved on: 09/09/2012

This study was carried out at the Instituto de Dermatologia Professor Rubem D. Azulay of the Santa Casa de Misericórdia do Rio de Janeiro - Rio de Janeiro (RJ), Brazil.

Financial support: None
Conflict of interest: None

ABSTRACT

This study describes a technique for correcting entropion based on the case of a female patient who had that alteration in the left lower eyelid, in addition to sagging and fat pseudo-herniation in the left and right eyelid areas. Bilateral upper and lower blepharoplasty was performed, with wedge resection of the orbicularis muscle and tarsus in both lower eyelids, followed by reconstruction. The patient presented good functional and aesthetic results, with no complications.

Keywords: blepharoplasty; entropion; reconstruction.

RESUMO

Descreve-se a técnica para correção do entropio, relatando-se o caso de paciente que apresentava essa alteração na pálpebra inferior esquerda, além de flacidez e pseudo-herniações de gordura nas regiões palpebrais direita e esquerda. Foram realizadas blefaroplastia superior e inferior bilaterais, e ressecção total em cunha do músculo orbicular e do tarso de ambas as pálpebras inferiores, seguida de reconstrução. A paciente evoluiu com bom resultado funcional e estético, livre de complicações.

Palavras-chave: blefaroplastia; entropio; reconstrução.

INTRODUCTION

Entropion is a senile disorder in which the eyelid turns in toward the eyeball, which can cause irritation, tearing, hyperemia and even corneal ulcers and scarring.¹

It is associated with horizontal eyelid laxity, which is caused by the weakening and laxity of the orbicularis muscle, tarsus and chantal ligaments, or by the detachment of the capsulopalpebral fascia.¹⁻³

CASE REPORT

A seventy-six-year-old female patient with sagging and excess skin in the upper and lower eyelid regions. She also presented inversion of eyelashes towards the eyeball (entropion) in the left lower eyelid, causing hyperemia, irritation and great local discomfort (Figure 1).

METHODS

Following local anesthesia, the excision of the lower eyelids' skin was performed along the ciliary margin, with the visualization of the orbicularis muscle. For the correction of the entropion, the wedge excision was carried out with an iris scissors, encompassing the orbicularis muscle and tarsus, exposing the eyeball. After hemostasis, the repositioning and reconstruction of the palpebral border was carried out with simple suture of the muscle and tarsal borders in multiple levels, using 6.0 Vicryl absorbable sutures (Figure 2). The last stage of the surgery consists of the excision of the lower eyelids' excess skin and the suture with 6.0 nylon thread. The patient also underwent upper blepharoplasty during the procedure.



Figure 1 - A and B: Patient with bilateral blepharochalasis and entropion in the lower left eyelid. Note the inversion of the eyelashes.

RESULTS

The suture was removed after seven days with absence of complications in the post-operative period. There was a good aesthetic result two months after the surgery, with the maintenance of the correct eyelid position and absence of irritative symptoms in the eyeball (Figure 3). Follow up visits are carried out every six months.

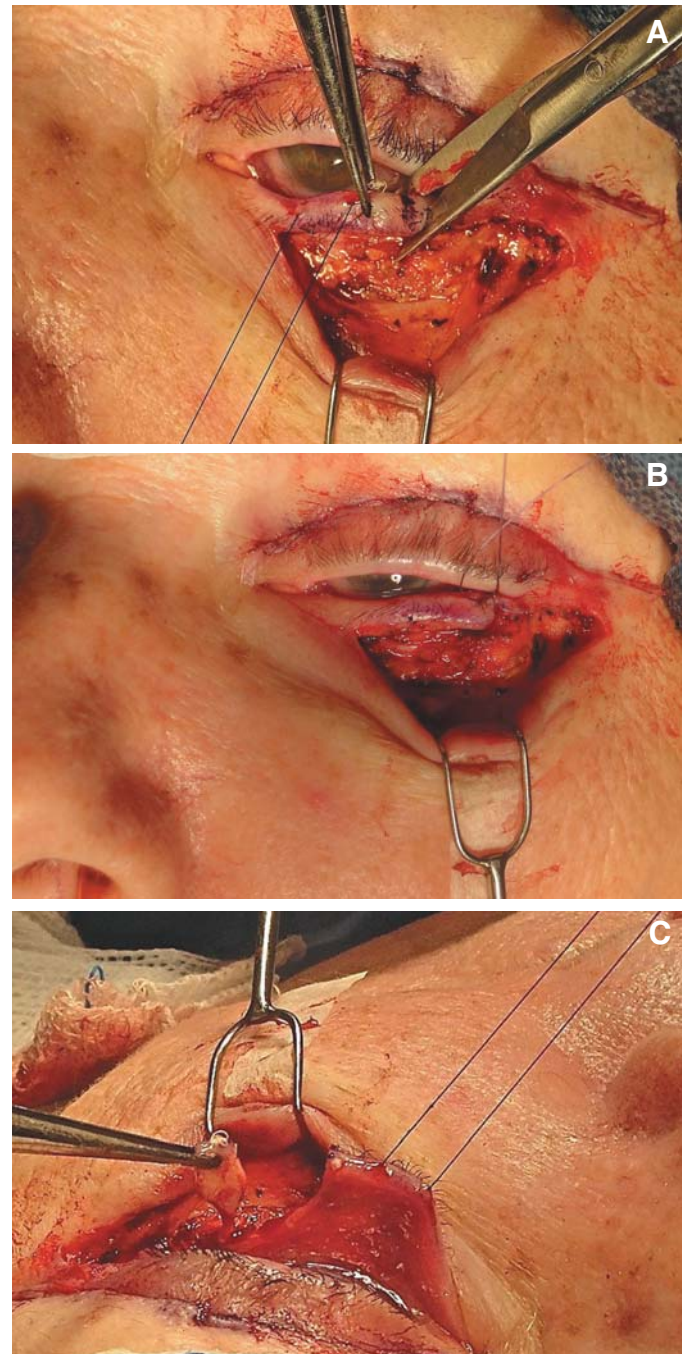


Figure 2 - A: Wedge resection of the orbicularis muscle and tarsal cartilage. **B -** Wedge removal of the tarsus. **C -** Reconstruction of the edges of the orbicularis muscle and tarsus.



Figure 3 - A and B: Sixty-day post-operative with full resolution of entropion and improvement of complaints.

DISCUSSION

Senile entropion occurs in individuals older than 60, being more frequent in women, possibly due to the relatively smaller size of the tarsal plate in women. The lower eyelids are most affected, usually with complete involvement of the eyelid margin.³

Surgery is the only effective and definitive treatment.² Thorough knowledge of eyelid anatomy is essential to determine the etiology and carry out the surgical intervention of the lower eyelid abnormalities.

The eyelid is divided into an anterior and a posterior lamella. The anterior lamella consists of skin and orbicularis muscle. The posterior lamella consists of the retractor eyelid system, tarsus and conjunctiva. The first is the fascia that splits to encapsulate the inferior oblique muscle and then re-joins to form the dense fibrous sheet (fascia capsulopalpebral),⁴ which inserts in the lower edge of the tarsal plate. The failure of this

fascia to insert in the lower eyelid's tarsus commonly causes instability in the rotation movement and entropion.⁵

The tarsal plates are composed of dense connective tissue. The lower eyelid's tarsus is 4-5mm high 16-20mm long and 1mm thick. They are anchored medially and laterally to the orbital rim by ciliary tendons. The posterior surface is covered by densely adherent conjunctiva.⁵

Senile entropion is caused mainly from muscle and tarsal laxity and sagging, causing the edge of the eyelid to lose its correct positioning. Performing the resection of the lower eyelid's muscle band causes the horizontal shortening of the orbicularis muscle and tarsus, lending them more firmness and allowing their return to the correct position.²

The most common complications in the post-operative period are hematomas and, less frequently, ectropion, dehiscence and recurrence of entropion, with the possibility of further surgery.²

CONCLUSION

Based on the main causes of the condition, the procedure was demonstrated to be a simple, safe and effective option, yielding good functional and aesthetic result for the treatment of the senile entropion. ●

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Surgical treatment of xanthelasma using blepharoplasty

Tratamento cirúrgico do xantelasma com técnica de blefaroplastia

ABSTRACT

Xanthelasma is a frequent complaint in dermatology, especially among women. Clinically, the condition has the appearance of flat or slightly raised yellowish plaques in the eyelid region. There are several procedures described for treating this condition. Blepharoplasty is the most commonly used technique to correct extensive xanthelasmas, particularly in patients with excess skin.

Keywords: xanthomatosis; blepharoplasty; surgical procedures, elective.

RESUMO

O xantelasma é queixa frequente nos consultórios de dermatologia, principalmente entre as mulheres. Clinicamente apresenta-se como placas amareladas, planas ou ligeiramente elevadas, na região palpebral. Há diversas modalidades descritas no tratamento dessa condição, sendo que, para correção de xantelasmas extensos, particularmente em pacientes com excesso de pele, a técnica mais utilizada é a blefaroplastia.

Palavras-chave: xantomatose; blefaroplastia; procedimentos cirúrgicos eletivos.

Xanthelasma (from the Greek xanthos = yellow and elasma = metal plate) is a frequent complaint in dermatologic practices, especially among women. It is the most common type of plane xanthoma, and can indicate possible abnormalities in serum lipoprotein levels (occurring in approximately 50% of cases). There is deposition of xanthomatous cells in the superficial dermis, associated with inflammation and fibrosis.¹ Clinically, it has the appearance of yellowish plaques, flat or slightly elevated, in the eyelid region.

Case Report

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Received on: 17/04/2012
Approved on: 09/02/2012

This study was carried out at the Dermatology Service of the Hospital Naval Marcílio Dias (HNMD), Rio de Janeiro (RJ), Brazil.

Financial support: None
Conflict of interest: None



Figure 1: Bilateral eyelid xanthelasma affecting the upper and lower eyelids; an hypochromic area is observed in the right upper eyelid, a site which has previously undergone TCA application and electro-surgery.



Figure 3: Immediate post-operative with primary running suture of the lesions using 6-0 nylon monofilament thread

CASE REPORT

A 36-year-old female patient experiencing bilateral xanthelasma for three years (Figure 1). Previously treated with punctual electrocoagulation and application of 70% trichloroacetic acid (TCA), developing into residual hypochromia, she underwent surgical removal of the lesions through the blepharoplasty technique, with local anesthesia and removal of skin only, leaving the subcutaneous tissue untouched. Primary closure was carried out without the need to rotate the flap or implement grafts (Figures 2, 3, and 4). The procedure was performed without complications.

Several therapeutic options have been described for the treatment of xanthelasma. It is a difficult to manage condition because each method may be associated with undesirable side effects, such as hyper- or hypochromia, recurrence, persistence, and hypertrophic scarring. The most frequently used modalities are the chemical cauterization, fractional electrocoagulation,



Figure 4: Two months after the procedure.



Figure 2: Marking of lesions with narrow margins; a small amount of lesion was left in the lower eyelids to help maintain their functional closing movement.

laser therapy, cryosurgery, and surgical excision.^{1,3-8}

Blepharoplasty – the generic term used to describe the surgical intervention carried out to remove excess skin of the upper and/or inferior eyelids – is the most commonly used technique to correct extensive xanthelasmas, particularly in patients with excess skin.³ The vast majority of procedures are carried out for aesthetic reasons – in order to reverse the effects caused by the aging of the skin⁹ – nonetheless the technique has been employed to correct skin lesions located on the eyelids. The closure can be primary or, in the most exuberant cases, through flaps and grafts.

A rigorous assessment as to the amount of excess skin, texture, and laxity must be made from the outset, in order to achieve the correct surgical marking. The presence of scars, nevi and palpebral bags must also be taken into account.¹⁰ The surgical markings must not surpass the orbital region.

In the present surgical procedure, the marking was carried out narrowly and with precision, bilaterally around the xanthomatous lesions. Anesthesia (2% lidocaine with vasoconstrictor) was applied locally, with the incision being carried out with the removal of the skin only, without the subcutaneous tissue and fat pads. After conducting local hemostasis, 6-0 nylon monofilament thread was used to carry out the primary running suture, with the stitches being removed five days after the procedure. As the patient presented only a small amount of excess skin, it was possible to carry out the procedure without the need for rotation flaps or grafting. There was no functional compromise, only residual hypochromia, which did not prevent the patient classification of the procedure as yielding excellent results. There was a high level of patient satisfaction, with reports of improvement in self-esteem and social inclusion. ●

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Case Report

Exuberant bilateral pyogenic granuloma: surgical treatment

Granuloma piogênico exuberante bilateral: tratamento cirúrgico

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Received on: 04/06/2011
 Approved on: 10/04/2012

This study was carried out at the Department of Dermatology, Hospital Universitário Pedro Ernesto (UERJ) – Rio de Janeiro (RJ), Brazil.

Financial support: none
 Conflicts of interest: none

ABSTRACT

Pyogenic granuloma is a common vascular proliferation that can be found on skin and mucous membranes. Its clinical presentation is that of a nodular, friable and erythematous lesion, with fast growth history. The nail bed pyogenic granuloma is generally related to onychocryptosis and trauma, being very painful in that site. There are several treatment options, including surgical excision, cryotherapy, electrocautery, curettage, lasers, application of trichloroacetic acid, imiquimod and microembolization. The present study reports a case of bilateral pyogenic granuloma in the halluces with exuberant growth, leading to the occlusion of the nail plate. The surgical excision of the lesion was performed with good cosmetic results.

Keywords: pyogenic granuloma, surgery, trichloroacetic acid, cryotherapy.

RESUMO

Granuloma piogênico é uma proliferação vascular comum, que pode ser encontrada na pele e mucosa. Clinicamente se apresenta como lesão nodular, friável, eritematosa e com história de crescimento rápido. O granuloma piogênico ungueal está, geralmente, relacionado à onicocriptose e trauma, sendo muito doloroso nesta localização. Há várias opções de tratamento, incluindo excisão cirúrgica, crioterapia, eletrocauterização, curetagem, lasers, aplicação de ácido tricloroacético, imiquimode e microembolização.

Relatamos um caso de granuloma piogênico bilateral nos háluces, de crescimento exuberante, levando a oclusão da placa ungueal. Foi realizado exérese cirúrgica da lesão com bom resultado estético.

Palavras-chave: granuloma piogênico, cirurgia, ácido tricloroacético, crioterapia.

INTRODUCTION

Pyogenic granuloma or lobular capillary hemangioma is a benign vascular proliferation that occurs mainly in body sites exposed to frequent traumas, such as hands, arms, feet and face. From the clinical perspective, it is a nodular, or vegetating, friable lesion, varying in color from red to blackish-blue. It can be sessile or pedunculated and has a history of rapid growth. In general it bleeds with minimal trauma and tends to recur.^{1,2}

Its etiology is still unknown, with factors such as trauma, viral infections, chronic ulcers and female sex hormones having been implicated. It may be also found in patients who are using isotretinoin, capecitabine or indinavir, due to the stimulus for angiogenesis.^{2,3}

The differential diagnosis occurs mainly with Kaposi's sarcoma, amelanotic melanoma, metastatic carcinoma, inflamed seborrheic keratosis and eccrine poroma.⁴

The diagnosis is essentially clinical, with histopathological examination being useful to rule out other dermatoses. The main structure observed in the pyogenic granuloma is a lobular circumscribed aggregate of capillary proliferation within an edematous stroma, infiltrated by numerous neutrophils, with an often-eroded epidermis.^{1,3}

There are several treatment options, including surgical excision, cryotherapy, electrocautery, curettage, lasers, application of trichloroacetic acid, imiquimod and microembolization.^{4,7}

CASE REPORT

A 27-year-old female patient described the emergence of a vegetating lesion in the halluces 15 years before, following a local trauma. The patient had already undergone topical treatment with partial improvement and surgical excision of the lesion, nonetheless it recurred a year before. There was occlusion of nail plates with the growth of the lesion. The lesion's histology was consistent with that of pyogenic granuloma.

The dermatological examination revealed a vegetative, erythematous, friable lesion of approximately 5x3cm in the right hallux, with distortion of the nail plate. In the left hallux were observed small vegetative lesions on its tip and proximally in the nail fold, with complete epithelialization of the hallux and a complete lack of visualization of the nail plate (Figures 1 to 3). Radiographs and bone scintigraphy of the halluces were carried out, excluding the presence of osteomyelitis. A decision was made to carry out the surgical excision of the lesions, leading to good cosmetic results.

METHODS

In the present case, the surgical excision was the best treatment option due to the size of the lesions and the fact that both halluces were affected. The asepsis and antisepsis were carried out. Nerve block anesthesia with 2% lidocaine without vasoconstrictor and a tourniquet were applied to the hallux. The skin was incised with a number 15 scalpel blade in order to remove the vegetative lesion (Figure 4), which covered the left hallux entirely. After the removal of the lesion's tissue, the presence of the nail plate, which was beneath the vegetative tissue, could be observed. The excision of the skin in the lateral nail



Figure 1: Vegetating lesion occupying the entire nail bed of the halluces



Figure 2: Left hallux with a vegetative lesion in the tip and another in the region of the proximal nail fold, with no exposure of the nail plate



Figure 3: Right hallux with vegetating lesion occupying the area of the nail plate, causing its distortion



Figure 4: Removal of the vegetating tissue after nerve block anesthesia and tourniquet of the hallux



Figure 5: Exposure of the nail plate



Figure 6: Wide skin "U" technique and nail fold electrocauterization

folds was carried out in a wide "U" shape, in order to remove the hypertrophied hyponychium.⁸ The electrocauterization of the nail fold (Figures 5 and 6) and subsequent suture with 3.0 mononylon threads were carried out (Figure 7). The same pro-



Figure 7: Suture with mononylon 3.0 thread



Figure 8: Results 30 days after

cedure was then performed in the opposite hallux. The occlusive dressing was carried out with the patient being instructed to rest for 48 hours and cephalixin orally was used for seven days.

RESULTS

The post-operative follow up was conducted on a weekly basis, and the stitches removed 15 days after the procedure. The patient presented a good surgical outcome with no complications post-operatively. It was possible to observe the good cosmetic results (Figure 8) 30 days after the procedure. However, there was an increase of the right hallux's distal hyponychium, which was corrected with the application of 50% trichloroacetic acid and topical steroids. The patient is receiving outpatient treatment, with no recurrence of the lesion to the moment.

DISCUSSION

Some pyogenic granulomas subside spontaneously, however most require treatment. The nail pyogenic granuloma is usually the result of onychocryptosis or local trauma.³ It is a painful condition that prevents patients from carrying out daily

activities. Pain and inflammation result from the penetration of the nail plate in the subcutaneous tissue. Surgical excision is a good therapeutic option because it offers low recurrence, heals the condition in one session and allows that the material be sent for histological examination.^{2,4,8} In the present case, the pyogenic granuloma was so exuberant that the authors suspected that there had been destruction of the nail plate. With the surgical removal of the lesion, it was possible to visualize the nail, which had its growth hampered by the excess of overlying tissue. The surgical technique employed consisted of removing the vegetating lesion, associated with the wide "U" shaped technique, which features the elliptical removal of the skin of the distal lateral nail fold, with the posterior suture of the borders.^{8,9}

Among the therapies available for treating pyogenic granuloma, the choice of the best treatment will depend on the specific case and on the experience of the physician in charge of the case. ●

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Case Report

Solitary keratoacanthoma after intense pulsed light in the treatment of melanoses on the dorsum of hand

Ceratoacantoma solitário após luz intensa pulsada para tratamento de melanoses solares no dorso das mãos

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Received on: 16/06/2012
Approved on: 16/12/2012

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Financial support: none
Conflicts of interest: none

ABSTRACT

The keratoacanthoma is a fast growing benign skin tumor that is composed of squamous cells and has clinical and histopathological features similar to those of the squamous cell carcinoma, and may undergo spontaneous regression without any treatment. It mainly affects elderly and immunosuppressed males who have fair skin, occurring in body sites that have been chronically exposed to sunlight, such as the face, forearms and backs of hands. The differential diagnosis with squamous cell carcinoma is particularly important. The recommended treatment is its surgical excision. Other treatment modalities, such as cryotherapy, electrocoagulation and intralesional injection of chemotherapeutic agents, are also available.

Keywords: keratoacanthoma; laser therapy; skin.

RESUMO

O ceratoacantoma é tumor cutâneo benigno, de rápido crescimento, composto por células escamosas e possui características clínicas e histopatológicas semelhantes ao CEC, podendo sofrer regressão espontânea sem qualquer tipo de tratamento. Acomete principalmente idosos e imunossuprimidos do sexo masculino e que possuem pele clara, em locais do corpo que sofreram exposição crônica à luz solar, como rosto, antebraços e dorso das mãos. O diagnóstico diferencial com o CEC é importante. O tratamento preconizado é a excisão cirúrgica, sendo as outras formas: crioterapia, eletrocoagulação e aplicação intralesional de agentes quimioterápicos.

Palavras-chave: ceratoacantoma; terapia a laser; pele.

INTRODUCTION

Intense pulsed light (IPL) is a non-ablative technology that employs light for various applications. IPL systems are high intensity pulsed sources that emit polychromatic light in a broad spectrum of wavelengths, between 515 and 1,200nm.^{1,2} These sources generate heat in the skin, reaching targets such as melanin and blood vessels, allowing the correction of various pigmented lesions and stimulating collagen production by dermal fibroblasts. Through the dissipation of energy, it acts on various chromophores in a process that promotes non-coherent tissue renewal through intense filtered light, based on the principle of selective photothermolysis.³

The use of lasers and IPL can cause several complications. Among the slight complications possible are prolonged erythema, acne, millia, purpura, superficial erosions and contact der-

matitis. Among moderate complications are infections, altered pigmentation (such as hyper and hypocromias), toxicity due to the use of topical anesthetic and keratoacanthomas (KA). Severe complications include hypertrophic scarring, disseminated infection, and ectropion formation, among others.

The development of a KA following the use of IPL is described in the present study.

CASE REPORT

A Caucasian, 59-year-old physician male patient sought care at the Dermatology Service of the Faculdade de Medicina de Presidente Prudente (Unoeste) – Presidente Prudente (SP), Brazil, in July 2011 hoping to improve the appearance of his hands. The dermatologic examination suggested the patient had Fitzpatrick Phototype I and hyperpigmented brownish patches, ranging from light to dark hues, on the back of the hands, a feature characteristic of solar melanoses (Figure 1). The patient underwent an IPL session with the equipment Harmony® (Alma Lasers, Caesarea, Israel), using a 540nm filter, program 12, energy at 18J/cm², which resulted in improvement of the lesions' appearance. Three weeks later, however, a pinkish papule with regular borders, and smooth surface, with a crusted and hardened mass in the center emerged on the dorsum of the right hand (Figure 2).

Due to the presence of symptoms suggestive of KA following IPL, the differential diagnosis for squamous cell carcinoma (SCC) through histology was not necessary.

The patient was treated topically with topical 5% imiquimod three times per week for eight weeks. There was complete resolution of the lesion after three months (Figure 3). The patient was satisfied with the aesthetic result achieved.

DISCUSSION

KA is a common, fast-growing benign skin tumor with histological features similar to those of the squamous cell carcinoma (SCC), with a tendency to spontaneous regression.⁵ It is more frequent in fair-skinned adults between 55- and 65-years old, and rarely occurs in African or Asian descendent patients. It



Figure 2: Three weeks after IPL

affects both genders equally, with a slightly higher incidence in men.⁵ It has a higher incidence in the elderly and immunocompromised patients.⁶

Many factors are involved in its development. The chronic exposure to ultraviolet radiation plays an important role, which is demonstrated by the higher occurrence in areas exposed to the sun. Among other causes are the HPV virus, chemical carcinogens, mechanical trauma, association with other skin diseases and genetic factors.⁵

Little is known about the KA's pathogenesis and the exact mechanism of regression of the lesion in the absence of any treatment. Studies have revealed the presence of the expression of the p53 oncoprotein in most cases, suggesting a possible role of that gene in the development of KA.⁵

Characteristically, it presents a lesion that grows in a few weeks, followed by slow involution during a period that varies from two to six months. The proliferative phase is characterized by the formation of a firm papule with erythematous or pigmented border, that grows over a period of two to six weeks, reaching about 2cm in diameter. The lesion is most frequently



Figure 1: Melanoses before the application of IPL



Figure 3: Complete resolution of the lesion

diagnosed during its maturation phase, which presents as an erythematous nodule with a keratin central area. Its resolution is characterized by the expulsion of keratin, leaving a hypopigmented scar.⁵

KA's histology depends on the stage of the tumor. Its characteristic architecture includes hyperkeratosis and acanthosis, atypical cells and mitoses figures. Inflammatory infiltrate may be present due to necrosis of keratinocytes.⁵ The differential diagnosis with SCC is key: KA is a rounded tumor composed primarily of well-differentiated squamous epithelium with little pleomorphism and a strong tendency to form keratin. It presents with epithelial infiltration, smooth, regular and well-defined surface. On the other hand, SCC presents greater anaplasia and keratin production is scarce or absent.⁵

Only a few KA patients have impaired humoral or cellular immunity. Some KAs present changes in Class II HLA antigens. The role of immunity in spontaneous regression has been researched, with the appearance of an erythematous halo around some KAs in regression being clinically observed. Histology shows a dense mononuclear infiltrate and fibroblastic reaction in the site, with the presence of Langerhans cells and the detection of anti-squamous cells antibody associated with the regression.⁶ There is, however, increasing evidence that it is not immunologically mediated, implying similarity to the pattern of natural regression seen within the normal hair follicle.⁶

Regression of KA can happen spontaneously, nevertheless it would cause an aesthetically undesirable scar. Therefore, the treatment must be initiated as soon as possible, with complete surgical excision recommended in most cases.⁵

Other forms of treatment include cryotherapy, electrocoagulation and intralesional injection of chemotherapeutic agents (methotrexate, bleomycin, 5-fluorouracil, interferon- α and triamcinolone). Radiotherapy is indicated for lesions of difficult surgical access.⁵

Systemic treatment includes retinoids, methotrexate, cyclophosphamide or 5-fluorouracil.⁵ Photodynamic therapy with aminolevulinic acid presents good therapeutic and aesthetic results.⁵

Topical imiquimod, an immunomodulator belonging in the agonist receptors 7 and 8 group, is effective. Four to 11 weeks of use are necessary, with side effects possible as a result of inflammation from an immune response (e.g. burning sensation, erythema, and erosions).⁷ The time required for the complete clinical resolution may be longer than that required for the histological remission, because the imiquimod-induced inflammation can hamper the physician's capacity to judge the clinical cure.⁷

After review of the literature, three KA cases associated with laser therapy were found: 4 one with eruptive KAs in the face two months after facial rejuvenation treatment with CO₂ laser, 8 with the other two cases occurring in the legs, following fractional photothermolysis with 1,550nm laser (Fraxel).⁹ Some authors speculate that trauma on the follicular unit during the treatment may induce tumors, however that hypothesis is not yet fully clarified.⁴

The case described in the present study differs from previous ones due to the fact that it is an isolated KA, which has not yet been described in association with IPL applied to the hands. The authors have chosen to use topical imiquimod in an attempt to prevent scarring at the site, since the patient was initially looking for a cosmetic procedure. The authors believe that imiquimod is effective and can be used safely when correctly applied by well-oriented patients who return for follow up visits.

CONCLUSION

The correct handling of the various techniques used in dermatology is of paramount importance and, in addition to the proper use and experience in dealing with devices, physicians must be able to diagnose and treat possible complications. Providing previous guidance and obtaining patient consent before performing any procedure is critical. Likewise, monitoring the development of the lesion during the treatment and after it, with follow-up visits to assess the results, are essential for early detection of possible complications. ●

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Oral involvement in a patient with neurofibromatosis type I

Acometimento oral em portador de neurofibromatose tipo I

ABSTRACT

Neurofibromatosis type 1, also known as von Recklinghausen neurofibromatosis, is an autosomal dominant disorder that affects 1 in 3,000 newborns. Approximately 50% of neurofibromatosis type 1 patients have no family history of the disease. The tongue, the alveolar ridge of the buccal mucosa, gums, lips, palate, floor of the mouth, and pharyngo-maxillary fossa can be affected by tumors associated with this condition; the tongue is the most common site. We report the case of a 29-year-old female patient with neurofibroma in the tongue, highlighting the possibility of disease manifestations in the oral cavity and differential diagnoses.

Keywords: neurofibromatosis 1; neurofibroma, plexiform; neurofibroma; tongue neoplasms.

RESUMO

A neurofibromatose do tipo 1, também conhecida como neurofibromatose de von Recklinghausen, é doença autossômica dominante, que afeta 1:3000 recém-nascidos. Aproximadamente 50% dos pacientes de NF1 não apresentam história familiar da doença. Língua, rebordo alveolar da mucosa bucal, gengivas, lábios, palato, assoalho da boca e o espaço faringomaxilar podem ser acometidos por tumores em associação com NF1, sendo a língua o local mais comum. Relata-se o caso de paciente do sexo feminino, de 29 anos, apresentando neurofibroma na língua, ressaltando-se a possibilidade de manifestações da doença na cavidade oral e seus diagnósticos diferenciais.

Palavras-chave: neurofibromatose 1; neurofibroma plexiforme; neurofibroma; doenças da língua.

INTRODUCTION

Neurofibromatosis type 1 (NF1), also known as von Recklinghausen neurofibromatosis, is a dominant autosomal disease that affects 1 in 3,000 newborns. Approximately 50% of NF1 patients have no family history of the disease, 1 which is clinically characterized by the presence of café-au-lait spots, axillary ephelides, Lisch nodules, and multiple neurofibromas. It can be associated with optic gliomas, neurofibromas in peripheral and spinal nerves, neurological or cognitive deficit, scoliosis, oral and maxillofacial abnormalities, malignant nerve sheath tumors, pheochromocytoma, and vasculopathy.¹⁻⁴

Case Report

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Received on: 15/05/2012

Approved on: 06/12/2012

This study was carried out at the Dermatology Department, Universidade Federal de Uberlândia (UFU) - Uberlândia (MG), Brazil.

Financial support: none
Conflicts of interest: none

A clinical radiological study has detected soft tissue oral manifestations in 72-92% of NF1 patients, including intraoral tumors in approximately 25% of cases. The tongue, alveolar ridge of the buccal mucosa, gums, lips, palate, floor of the mouth and pharyngeal maxillary space can be affected by tumors in association with NF1, with the tongue being the most common site.^{1,3,5}

CASE REPORT

A 29-year-old female patient, born in the city of Imperatriz (in the northeast Brazilian state of Maranhão) but then living in the city of Araguari (in the Brazilian state of Minas Gerais), with grayish-brown skin, sought care at the Dermatology Service of the Universidade Federal de Uberlândia (MG), Brazil, complaining of unsightly skin lesions that had emerged in childhood and had grown gradually. The patient reported a previous diagnosis of neurofibromatosis, having denied any family history of the disease. Dermatological examination showed papulonodular and soft tumors with a hernial ring perceptible to the touch, slightly brownish in color, and located in different areas of the skin; café-au-lait macules located in the trunk and limbs; and the presence of axillary ephelides. Intraoral examination also evidenced an erythematous, yellowish, soft, painless nodular lesion, roughly 1 cm in diameter, and located on the right lateral border of the tongue (Figures 1A, B and C).

The histology of the oral lesion suggested mesenchymal nature, lined by stratified squamous epithelium, with focal areas of hyperparakeratosis, spongiosis and hydropic degeneration. Specific examination of the sections evidenced interwoven bundles of cells with elongated nuclei, distributed around nerve bundles and slightly fibrillar conjunctive tissue, with focal areas of myxoid material (Figure 2). A similar situation was found in the material collected from the lesion located on the right hand (Figure 3).

Given the clinical and histologic features presented by the patient, the diagnosis of neurofibroma was established.

DISCUSSION

NF1 is a dominant autosomal genodermatosis associated with deletions, insertions or mutations of the tumor suppressor gene NF1, located in the pericentromeric region of the chromosome 17. In general, NF1 is clinically diagnosed based on the cutaneous manifestations and family history.¹ Oral alterations of NF1 were reported to vary from four to 92% of cases, with the tongue being the most common site.^{3,4,6}

The considerable difference in oral manifestations can be attributed to the heterogeneity of the patients examined at specialized hospitals, and to differences in the investigated symptoms and research methods.¹ Early diagnosis of asymptomatic neurofibromas in the tongue requires a high index of clinical suspicion. Symptomatic oral lesions are more easily diagnosed when the tumor exerts compression or other types of discomfort. A significant positive correlation was found between the delay in the diagnosis and the oral location of lesions. The presence of discomfort is reported by most patients with lesions on the tongue, with pain being the most common complaint.¹



Figures 1 - A. Café-au-lait spots with brownish nodules (neurofibromas) present in the dorsal and lumbar regions; **B.** Presence of erythematous, yellowish nodule, 1 cm in diameter, in the right lateral border of the tongue; **C.** Brownish tumoration on the back of the patient's right hand, with elastic consistency, measuring between 4 and 6 cm in diameter.

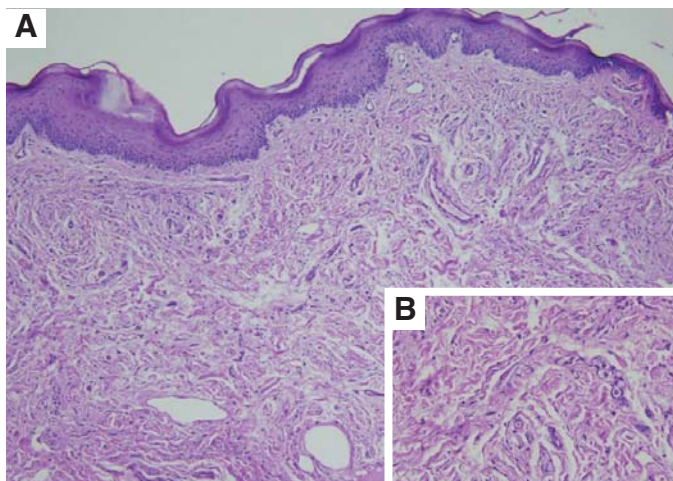


Figure 2 - Histological examination of the material collected from the lesion on the tongue, showing: **A.** Peripheral nerve sheath cell neoplasm with imprecise limits, the presence of elliptical, fusiform, and ovoid cells, permeating the fibrillary stroma and forming fairly organized bundles (HE, 10xmagnification); **B.** Tumor in greater detail (HE, 40xmagnification).

Lesions located on the tongue develop slowly. Nevertheless, tumor growth can be accelerated by puberty, pregnancy and growth, with the clinical and histological findings being key to distinguishing between neurofibromas and other soft tissue tumors.

The differential diagnosis of tumors located in the tongue includes plexiform neurofibroma, lipoma, angiolipoma, chondroid lipoma, myolipoma, hamartoma, schwannoma, lymphangioma, granular cell tumor, leiomyoma, hemangioma, rhabdomyosarcoma, neurofibroma and localized amyloidosis.^{1,5,6}

A thorough histological analysis, assisted by the use of immunohistochemistry is essential for the correct diagnosis of soft mouth tumors. S100 protein, type IV collagen and the molecule CD34 are useful biomarkers in the analysis of NF1 with oral manifestations.¹

Partial or total surgical exeresis of tumors can be carried out to resolve aesthetic and functional problems. However, waiting for the end of a tumor's growth cycle is recommended in order to reduce the risk of recurrence, always keeping in mind the possibility of malignant degeneration (occurring in one to 29% of cases) with the appearance of peripheral nerve sheath malignant tumors.¹

Such tumors are not radiosensitive and, given their slow growth rate, limited benefit has been seen with the use of chemotherapy. Alternatives to surgical treatment of plexiform neuromas are still largely experimental, but include: retinoic acid, ketotifen fumarate, antiangiogenic drugs (alpha-interferon), thalidomide, pirfenidone (drugs with antifibrotic action) and tipifarnib (a farnesyl transferase inhibitor, since high levels of that enzyme are found in plexiform neuromas). Nonetheless, evidence of the efficacy of each of these treatments remains limited. Additional research with pharmaceutical alternatives should improve survival rates and quality of life for patients with plexiform neuromas.⁶

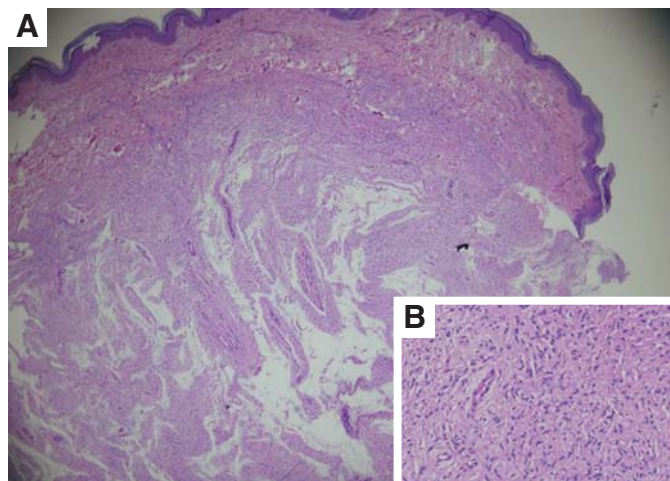


Figure 3 - Histological examination of a skin lesion fragment originating from a lesion on the dorsum of the right hand: **A.** Tumoration present in the dermis (HE, 4x magnification); **B.** Detail showing the presence of elliptical, ovoid, and spindle-shaped cells in bundles (HE, 40x magnification).

CONCLUSION

Searching for oral lesions in patients with NF1 is of paramount importance, and given that the examination of mucous membranes is increasingly relevant in the daily routine of dermatologists, it provides new tools for the elaboration of diagnostics. It is therefore necessary that the specialist dermatologist be familiarized with the different types of lesions that may be found in the various genodermatoses. ●

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Case Report

Treatment of atrophic scar in Asian patient with non-ablative fractional 1,550 nm Er: Glass laser

Tratamento de cicatriz atrófica em paciente asiático com laser fracionado não ablativo Er: Glass 1550nm

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ABSTRACT

Fractional photothermolysis was developed as an alternative to ablative lasers (which are effective but pose a high risk of complications) and non-ablative lasers (which have limited effectiveness). Fractional photothermolysis has been successfully used in diverse dermatological conditions. This study describes the case of an Asian male patient with atrophic scarring secondary to trauma in the left paranasal region, who underwent treatment with 1,550 nm non-ablative fractional Erbium Glass laser, which led to a significant improvement in the lesion. This case corroborates the use of less-invasive procedures in difficult-to-treat dermatoses and in treating Asian skin types safely and effectively.

Keywords: lasers; therapeutics; cicatrix; atrophy.

RESUMO

A fototermólise fracionada foi desenvolvida como alternativa aos lasers ablativos, efetivos e com alto risco de complicações, e aos lasers não ablativos, de eficácia limitada. Tem sido utilizada com bons resultados em diversas condições dermatológicas. Relata-se o caso de paciente com cicatriz atrófica secundária a trauma, localizada na região paranasal esquerda, que foi tratado com laser fracionado não ablativo Erbium Glass de 1550nm e evoluiu com melhora importante da lesão.

Palavras-chave: lasers; terapêutica; cicatriz; atrofia.

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Received on: 07/06/2012
Approved on: 09/12/2012

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Financial support: Nenhum
Conflicts of interest: Nenhum

INTRODUCTION

Fractional photothermolysis was introduced in 2003 as an alternative to ablative laser treatments (which are effective but have a high risk of complications) and non-ablative lasers treatments (which have limited effectiveness).¹

Erbium fractional lasers target the water and emit beams that cause small tri-dimensional areas of thermal damage, called thermal microzones (TMZ). The surrounding tissue is not involved, enabling migration of viable keratinocytes and faster healing of coagulated tissue, with the homogenization of the dermal matrix and extrusion of microscopic epidermal necrotic debris. The stratum corneum remains functionally intact above the lesion column. This tissular repair mechanism decreases discomfort, the risk of infection, and patient recovery time.^{2,3}

The Erbium fractional laser has been used safely and effectively in various dermatological conditions including dyschromia, poikiloderma of Civatte, rhytids, photoaging, acne scars and surgical scars.⁴

Atrophic scars are dermal depressions most commonly caused by collagen destruction that occurs with inflammatory skin diseases, such as cystic nodular acne or chickenpox, or after trauma, burns, and surgery. Scars of this type are difficult to treat, and usually require corrective surgery. Recently, less-invasive treatments have been used with relative success.⁵

CASE REPORT

A 33-year-old businessman of Asian origin, with Fitzpatrick skin type IV, had developed a scar in the left paranasal region following an insect bite a month-and-a-half prior. Initially, there was local pruritus and exulceration, when Trofodermin® was used until the wound healed. The patient denied previous treatments. Physical examination revealed skin lesion located in the left paranasal region, characterized by an erythematous depressed area of approximately 0.6 cm in diameter, and surrounded by slightly elevated borders in the shape of a star (Figure 1).

The diagnostic hypothesis of atrophic scarring secondary to trauma was chosen, and a biopsy of the lesion was carried out in order to exclude other diagnoses. Histopathological examination evidenced chronic perivascular and periannexal dermatitis, without signs of malignancy. Fungi research came out negative. The result was consistent with the initial diagnosis, and the treatment with non-ablative fractional 1,550nm Erbium Glass laser (Mosaic of HP Lutronic®) was proposed.

METHODS

Before each laser session, topical anesthesia (4% lidocaine cream, Dermomax®) was used at the site to be treated. Four laser sessions were carried out (at 30-day intervals) with the following parameters: 6x10mm tip, Static mode, 40J/cm² fluence, 100TMZ/cm² density in the first session (and 200MTZ/cm² in the

others), with eight passes at each session. The patient used Skimatix® and 50 SPF sunscreen during the intervals between visits.

RESULTS

At the end of the four sessions, the patient experienced significant improvement of the lesion, which no longer had a raised surface. Only post-inflammatory hyperpigmentation was observed at the scar's site (Figure 2).

The patient was instructed to use Glyquin® nightly for a month, on alternate days, in addition to sunscreen. There was resolution of the hyperpigmentation, with excellent aesthetic results (Figures 3-4).

DISCUSSION

The non-ablative fractional 1,550nm Er:Glass laser has proved to be a fast, safe, effective, and non-invasive treatment of atrophic scars, and additionally, does not lead to the loss of facial volume at the scar site.

Because the laser pulse energy is proportional to the TMZ' depth, high energy levels lead to deeper tissue coagulation and dermal remodeling, which is desirable for the treatment of atrophic scars.

Non-ablative fractional lasers have been studied for the treatment of acne scars and atrophic scars in patients with Asian skin types. One of the most common side effects of laser treatment in pigmented skin is post-inflammatory hyperpigmentation. The pulse's density is a critical factor in the development of that complication. In severe cases however, it is necessary to use high-density pulses depending on the desired result.^{1,5,6}

As compared to ablative resurfacing, fractional photothermolysis creates localized islands of thermal injury, which are associated with a lower incidence of post-inflammatory hyperpigmentation. Furthermore, the 1,550nm wavelength has water



Figure 1:
Atrophic scar with borders in the shape of star, at the first visit



Figure 2: After four laser sessions the scar no longer has a raised surface, but has developed localized, post-inflammatory hyperpigmentation

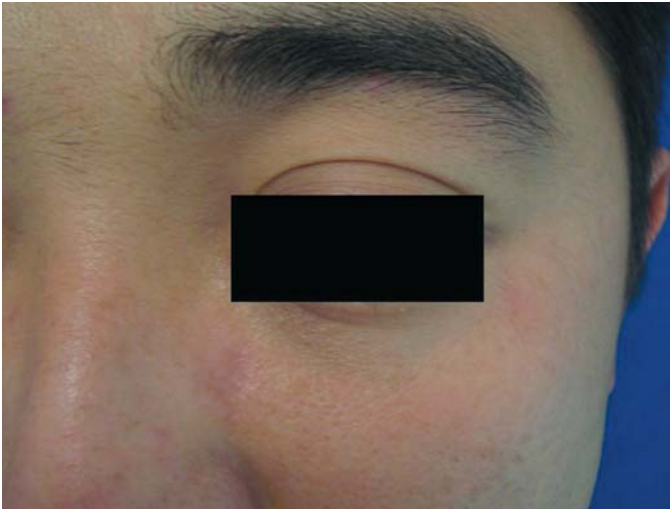


Figure 3: Final result after using Glyquin®, with resolution of hyperpigmentation



Figure 4: Aesthetic result after treatment with non-ablative fractional 1,550 nm Er: Glass laser

as its main chromophore (without significant absorption by melanin) thereby reducing the risk of pigment disturbance, especially in patients with dark skin.⁷

CONCLUSION

The present case report corroborates the use of less-invasive treatments, such as non-ablative fractional lasers, in difficult-to-treat dermatoses and in treating Asian skin types safely and effectively. ●

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Acquired digital fibrokeratoma: report on a clinical case of a clinical case

Fibroqueratoma digital adquirido: a propósito de um caso clínico

ABSTRACT

Summary: Acquired digital fibrokeratoma is a rare benign fibroepithelial condition, which typically occurs as a solitary asymptomatic nodule in fingers and toes. The authors report the clinical case of a female patient affected by two digital fibrokeratomas in the 4th and 2nd left fingers, respectively.

Keywords: neoplasms, fibroepithelial; fibroma; finger injuries.

RESUMO

O fibroqueratoma digital adquirido é tumor fibroepitelial benigno, raro, que, tipicamente, se apresenta como nódulo solitário assintomático nos quirodáctilos e pododáctilos. Relata-se o caso clínico de uma paciente do sexo feminino que apresentava duas lesões de fibroqueratoma digital no quarto e no segundo quirodáctilos esquerdos.

Palavras-chave: neoplasias fibroepiteliais; fibroma; traumatismos dos dedos.

INTRODUCTION

Acquired digital fibrokeratoma (ADF) is a benign, fibrous tissue tumor that was first described by Bart et al. in 1968.¹ Its etiology is still unknown, with trauma being regarded as the most important predisposing factor. ADF usually presents as a single, smooth, asymptomatic, fingerlike monochromic nodule, that can be sessile or pedunculated. An important differential clinical sign is the presence of a collarette at the base of the lesion. ADF tumors do not undergo spontaneous regression, and are more common in adults.²

Case Report

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Received on: 04/12/2012
Approved on: 04/12/2012

This study was carried out at the Complexo Hospitalar Padre Bento de Guarulhos – Guarulhos (SP), Brazil.

Financial support: none
Conflicts of interest: none

Diagnosis is carried out through histology in all cases, and is characterized by orthokeratosis, acanthosis and hyperkeratosis. Surgical excision is the treatment of choice.^{3,4}

CASE REPORT

A 52-year-old female patient with a history of diabetes mellitus, hypertension, and dyslipidaemia reported asymptomatic lesions in the fourth left finger for seven years and in the second left finger for a year. No correlation with trauma was described. Physical examination evidenced two elongated horn-like lesions of different dimensions. The lesion located on the fourth left finger measured 1.0 x 0.8 x 0.8 cm. The second tumor (second left finger), measured 0.3 x 0.2 x 0.1 cm. Both were located in the hyponychium, emerging distally, in the shape of a finger (fingerlike) (Figure 1). After dermatological examination, the following diagnostic hypotheses were considered: supernumerary finger, Köenen's tumor, verruca vulgaris (common wart), cutaneous horn, fibroma, and acquired digital fibrokeratoma. The patient was referred for surgical excision of the lesions (Figure 2), at which time a subsequent histological examination revealed a fingerlike type lesion (Figure 3), covered by an epidermis, with parallel collagen bundles observed in the stroma and an absence of nerve bundles with blood vessels (Figure 4).

DISCUSSION

This kind of tumor predominantly affects adult males over 40 years of age. It develops in the distal extremities, especially in fingers and toes, and can also occur on the lower lip, nose, elbow, pre-patellar region, nail bed, and heels.

With some exceptions, most cases reported in the literature describe lesions that are less than a centimeter long.⁵ According to Baykal et al., despite the scarcity of cases reported in medical literature, the frequency of ADF may be underestimated due to the fact that that tumor resembles many benign lesions that usually do not require routine histopathological examination.⁶

All extremity tumors that present elongated ends in the shape of projectiles (fingerlike), should be considered for ADF during a differential diagnosis. Other possible diagnoses are: supernumerary finger, common wart, cutaneous horn, pyogenic granuloma, Köenen's tumor, soft fibroma, neurofibroma and eccrine poroma.^{5,6}

A supernumerary finger, also called polydactyly, is described as a congenital lesion usually located at the base of the fifth finger, with a histopathology suggesting abundant nerve bundles.

In turn, the common wart often displays a roughened surface. Both the common wart and the supernumerary finger have an epidermal collarette, which is also seen in ADF.

A Köenen's tumor can be difficult to differentiate histopathologically and can be considered a variant of the disease because it often presents a small distal segment, with loose collagen,

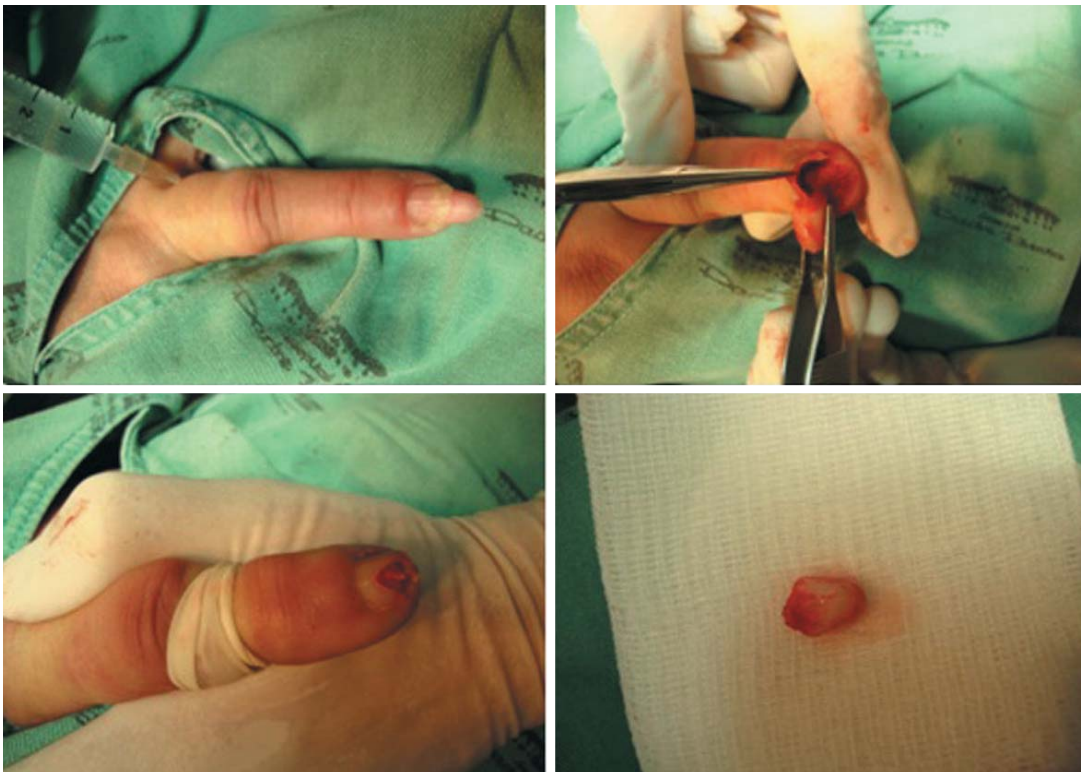


Figure 1: Acquired digital fibrokeratoma, fingerlike type lesion



Figure 2: Intraoperative

several blood vessels, and a large proximal portion consisting of dense collagen bands and few capillaries. A Köenen's tumor is a lesion characteristic of tuberous sclerosis: not arising before puberty, emerging from the nail folds, being usually multiple and of pinkish or skin color, and located predominantly on the feet.

As with ADF, pyogenic granuloma presents with an epidermal collarette, however it is usually more friable and onsets suddenly. The cutaneous horn has a rough or warty surface, and has its main differential diagnosis in histopathology.^{2,6} Fibrokeratomas are benign fibroepithelial tumors marked by hyperkeratosis and acanthosis. The dermis is filled with thick collagen bundles occurring parallel to the tumor's axis. Elastic fibers will be thin, and while sparse, not completely absent and often very vascularized.^{4,7}

Kint et al. described three histological types: "dome shaped" lesion with elastic fibers and numerous dermal capillaries (Type I); particularly high and hyperkeratotic lesion with many fibroblasts and few elastic fibers (Type II); edematous lesion that alternates between a flat and "dome" reliefs, with few cells and no elastic fibers (Type III).⁸ The present case was compatible with Type I.

Surgical treatment leads to healing in most cases, and recurrence is rare (Figures 3 to 4).

CONCLUSION

The present case emphasizes the importance of this benign tumors' categorization – with fingerlike format – since it can be easily misdiagnosed for other common tumors during differential diagnosis. The present case has also shown the rare occurrence of the same kind of lesion arising in two different fingers. ●

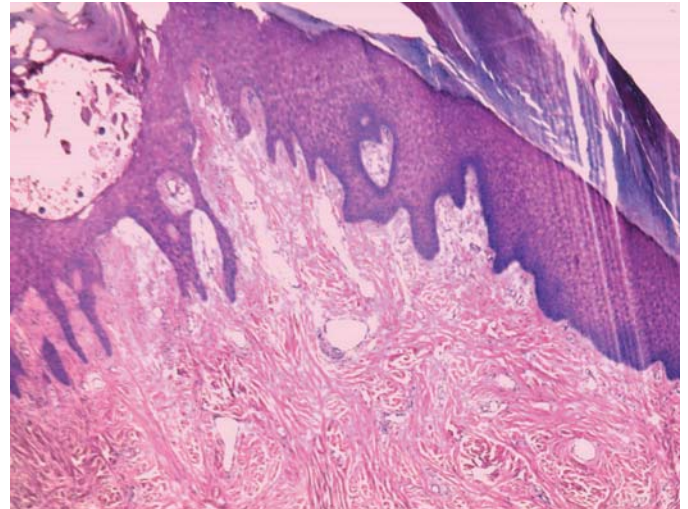


Figure 3: HE 4X: Fingerlike lesion's epidermal level histopathology

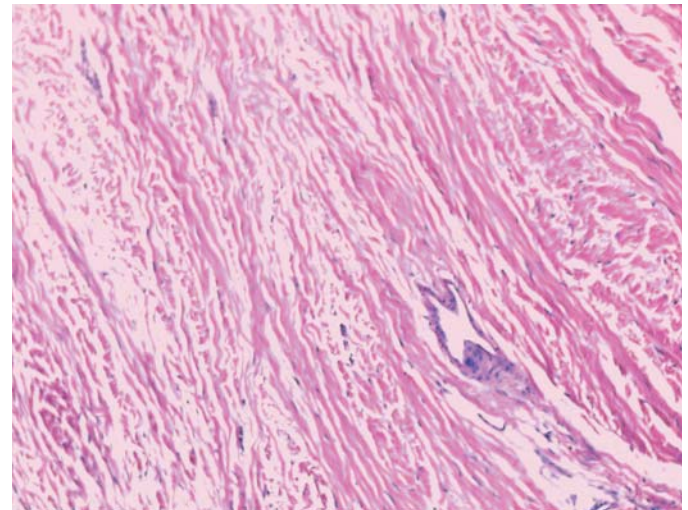


Figure 4: HE 10X: Histopathology evidencing parallel bundles of collagen with absence of nerves

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Case Report

Multiple cutaneous miliary osteomas of the face: a case report

Osteomas cutâneos miliares múltiplos da face – relato de caso

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Received on: 13/06/2013
 Approved on: 04/01/2013

This study was carried out at the Dermatology Service of the Universidade Federal de Uberlândia (UFU) – Uberlândia (MG), Brazil.

Financial support: none
 Conflicts of interest: none

ABSTRACT

Summary: Multiple cutaneous miliary osteoma is a rare condition characterized by ectopic bone tissue in the dermis and/or hypodermis. It usually occurs on the face, in individuals of 17 to 79 years old. Its etiology is still unknown. The present article reports the case of a female patient affected by a hardened, poorly delimited, papular plaque of dark brown hue and irregular surface, affecting the malar and mentonian regions. The patient sought medical care two years before the publication of this study, describing untreated acne since the age of 16. The papular plaque was composed of hyperchromic papular nodular lesions – some with white-yellowish hue. The diagnosis was confirmed histopathologically. Satisfactory therapeutic results were achieved with the use of 0.1% tretinoin cream.

Keywords: osteoma; decalcification, pathologic; ossification, heterotopic.

RESUMO

Introdução: Osteoma cutâneo miliar múltiplo é doença rara, caracterizada por tecido ósseo ectópico na derme e/ou hipoderme. Usualmente ocorre na face, em pessoas entre 17 e 79 anos. A etiologia é ainda desconhecida. Relata-se caso de paciente do sexo feminino, apresentando placa papulosa de coloração castanho-escura, endurecida, acometendo regiões malaras e mentoniana, mal delimitada, com superfície irregular, formada por lesões papulonodulares, hipercrômicas, algumas branco-amareladas, há dois anos, referindo acne, desde os 16 anos de idade, não tratada, tendo o diagnóstico sido confirmado histopatologicamente e apresentado resultado terapêutico satisfatório com uso de tretinoína creme 0,1%.

Palavras-chave: osteoma; descalcificação patológica; ossificação heterotópica.

INTRODUCTION

Multiple cutaneous miliary osteomas (MCMO) is a rare disorder characterized by the presence of ectopic bone tissue in the dermis and/or in the hypodermis.¹ It usually occurs on the face, affecting people between 17 and 79 years old (mean = 47 years old). Its etiology is still unknown.² Cutaneous ossification can be classified as primary when bone tissue develops in the skin and is observed early after birth or during childhood, with the absence of preexisting skin lesions or calcium and phosphorus metabolic abnormalities. This condition may possibly be associated with Albright's hereditary osteodystrophy, fibrodysplasia ossificans progressiva, progressive osseous heteroplasia and Gardner's syndrome. It may also arise in isolation, with no association to other diseases, manifesting as a single small osteoma, a single large plate-like osteoma, multiple disseminated osteomas, or multiple miliary osteomas on the face.^{1,4-6} Secondary cutaneous osteomas are more common, accounting for 70-85% of cases and occurring when bone tissue develops in preexisting skin lesions. Secondary cutaneous osteomas can be of neoplastic origin (such as melanocytic nevi, pilomatricoma and basal cell carcinoma) or inflammatory origin (such as scleroderma, systemic erythematosus lupus and dermatomyositis). It can also appear on post-operative scarring, or following folliculitis, chronic venous insufficiency, calcinosis, or trauma.^{1,5} Multiple idiopathic osteomas are most commonly reported on the faces of women with no history of acne. Nonetheless, the precise correlation between cutaneous osteoma and acne remains unclear.⁷

CASE REPORT

A 47-year-old female patient came to a medical appointment complaining of facial darkening (which had been taking place for about 24 months), and a history of untreated acne

(since the age of 16).

Dermatological examination showed a hardened, poorly-defined papular plaque of dark-brown hue and an irregular surface affecting the malar and mentonian regions. The papular plaque was formed by papulonodular hyperchromic lesions, some of them of yellowish-white hue (Figure 1). Following an incisional biopsy, histological examination revealed fragments of mineralized tissue with an osteoid characteristic located within the dermis, in addition to the presence of an epidermal cyst (Figure 2). Histopathologic diagnosis suggested an epidermal cyst associated with cutaneous osteoma. Serum levels of calcium/phosphate, alkaline phosphatase and parathyroid hormone proved unaltered. Following the initial consultation, the patient was instructed to apply 0.1% tretinoin cream. Four months later, there was significant improvement in hyperpigmentation (Figure 3).

DISCUSSION

The term osteoma cutis was originally described by Wilkins in 1858, corresponding to the presence of mature bone tissue, in the dermis and/or hypodermis. The condition is a rare, benign dermatosis, classified as primary when arising early in life in healthy skin, and secondary when associated with preexisting neoplastic or inflammatory skin lesions (representing 70-85% of cases).^{1,6} Secondary ossifications of the face occur almost exclusively in women with a history of long-lasting inflammatory acne, as in the present case. However, the precise correlation between cutaneous osteoma and acne remains unclear.⁷ MCMO arise in locations that coincide with those of the onset of acne vulgaris lesions (most often on the face) and when there is a history of this condition (55% of cases). It has been suggested that osteomas are secondary to dystrophic alterations in acne



Figure 1: **A** - Confluent hyperchromic lesions presenting small yellowish papules, involving the mandibular, malar and mentonian regions; **B** - Presence of hyperchromic plaque with irregular surface in the left hemiface, with brownish nodule and small whitish dots

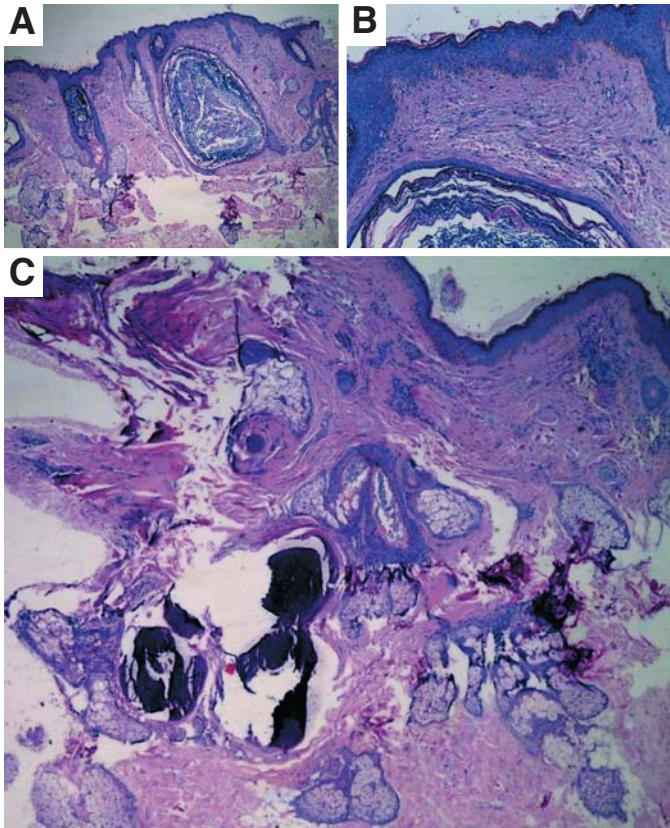


Figure 2: **A** - Cutaneous fragment indicating the presence of epidermal cyst located in the dermis (HE 40x); **B**: Greater magnification showing the cystic cavity filled by keratin blades (HE, 100x); **C**: Mineralized tissue of osteoid appearance located in dermis, close to the sebaceous glands (HE, 40x)

scars. The role of estrogen has been discussed, however it does not seem to be crucial in the formation of osteoma, since postmenopausal women, and some men also develop such lesions. 2 Several MCMO cases have been reported in patients without a history of acne or other inflammatory conditions, such as that of a 75-year-old female patient with an incidental histological finding of exogenous ochronosis, resulting from the use of hidroquinone.^{3,7}

In the present case, the patient sought medical care due to hyperchromia in the affected areas. No confirmation was available as to whether she had previously used any medication to treat acne, or used skin lighteners containing hydroquinone.

The main histological features are multiple bone spicules of varying shapes and sizes in the dermis, extending as far as the subcutaneous tissue. Such bone spicules contain numerous osteocytes, as well as cement lines. Havers ducts containing blood vessels and connective tissue can be observed in some areas. Osteoblasts with elongated nuclei can be seen along the margin of some osseous spicules. Some osteoclasts with multiple hyperchromatic and elongated nuclei can be found in the so-called Howship lacunae, while some osseous spicules also contain mature adipocytes aggregates.^{1,8}

The pathogenesis of cutaneous ossification remains uncertain. It has been suggested that chronic inflammation leads to the development of small calcifications and metaplastic ossification. Stimulation of mesenchymal cells by different factors may induce their differentiation into osteoblastic cells, resulting in bone formation. While it can occur in isolation, the presence of ossification should be seen as a possible indication of the presence of associated diseases, including fibrodysplasia ossificans progressiva (McCune-Albright syndrome), hereditary osteodystrophy, progressive osseous heteroplasia and Gardner's syndrome.



Figure 3:
A, B, C - Initial picture
D, E, F - Whitening and regression after treatment with 0.1% tretinoin

In this case report there was no evidence of clinical, metabolic characteristics or endocrine abnormalities corresponding to those conditions, with only a history of acne being confirmed.

Facial MCMO treatment methods are limited. The surgical technique involving incision and curettage of bone fragment, followed by suture, has been shown to be less invasive, and provides excellent results. The technique of extirpation of bone fragments after needle microincisions, followed by primary closure, is straightforward, effective, and cost effective.⁶ Dermabrasion or CO₂ laser or Erbium:YAG lasers are mentio-

ned as epidermis ablation processes.⁹ The topical application of tretinoin may in some cases have a favorable effect by promoting the transepidermal elimination of osteomas.⁶ The patient studied responded satisfactorily to use of 0.1% tretinoin, in daily and nightly applications, which proved to be an efficient, safe and non-invasive method for treating MCMO. The potential development of osteoma cutis should be considered in all patients with chronic inflammatory acne, because the identification of the first condition plays an important role in the treatment of the MCMO. ●

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Contribuição do mapeamento corporal total e dermatoscopia digital para o diagnóstico precoce do melanoma

The contribution of total body mapping and digital dermoscopy for the early diagnosis of melanoma

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Received on: 09/09/2012
Approved on: 24/11/2012

This study was carried out at Hospital AC Camargo of the Fundação Antonio Prudente - São Paulo (SP), Brazil.

Financial support: none
Conflicts of interest: none

ABSTRACT

The prognosis of cutaneous melanomas depends mainly on the lesions' thickness; early detection is of paramount importance for patient longer survival rates. An accuracy of approximately 90% can be achieved using dermoscopic assessment. Since early melanomas might not present specific dermoscopic features, they can only be diagnosed by observing alterations over time through total body mapping and serial digital dermoscopy. Patients with atypical nevus syndrome and multiple familial melanoma presented a higher sensitivity for the detection of melanoma using that technique.

Keywords: melanoma; dermoscopy; dysplastic nevus syndrome.

RESUMO

O prognóstico do melanoma cutâneo depende principalmente de sua espessura, sendo a detecção precoce do melanoma extremamente importante para a maior sobrevida dos pacientes. Com a utilização do exame dermatoscópico, pode-se alcançar acurácia de aproximadamente 90%. Melanomas iniciais podem não apresentar características dermatoscópicas específicas, sendo apenas diagnosticados pela mudança ao longo do tempo, observada pelo mapeamento corporal total e dermatoscopia digital seriados. Os grupos que apresentam maior sensibilidade para detecção do melanoma com esse exame são os de portadores de síndrome do nevo atípico e melanoma múltiplo familiar.

Palavras-chave: melanoma; dermatoscopia; síndrome do nevo displásico.

INTRODUCTION

The incidence of melanoma has been increasing considerably in recent decades. Although it is the least common of the skin cancers, it is responsible for most deaths. The best treatment is still early diagnosis, with the surgical removal of the primary lesion.^{1,2} Dermoscopy is a noninvasive method that can aid in the diagnosis of melanoma in early stages.^{1,3}

Some melanomas do not show typical characteristics under dermoscopy, with the diagnosis being carried out only by the analysis of the alterations observed over time through serial digital dermoscopy.

CASE REPORT

The present paper reports the case of 35-year-old, white male patient living in Sao Paulo, Brazil. The patient's family history included a mother with a history of skin melanoma.

The patient sought care at the Hospital A.C. Camargo in São Paulo (SP), Brazil, to undergo total body mapping and digital dermoscopy in January 2011, due to the family history of melanoma and the presence of multiple common and atypical nevi. In the first examination, 117 lesions were observed, four of them with removal indication (Figure 1). The histologic analysis suggested the presence of three atypical nevi and one melanoma of the superficial spreading type. The latter was located in the posterior cervical region, having been identified as number 76 of the body mapping, with a 0.85 mm Breslow index thickness, a mitotic index of 0/10 high-power fields (HPF), 0mm2, absence of ulceration or regression, and association with compound melanocytic nevus (Figure 2).

The patient did not return for follow-up treatment, three months later, as instructed. In October 2011, in the second digi-

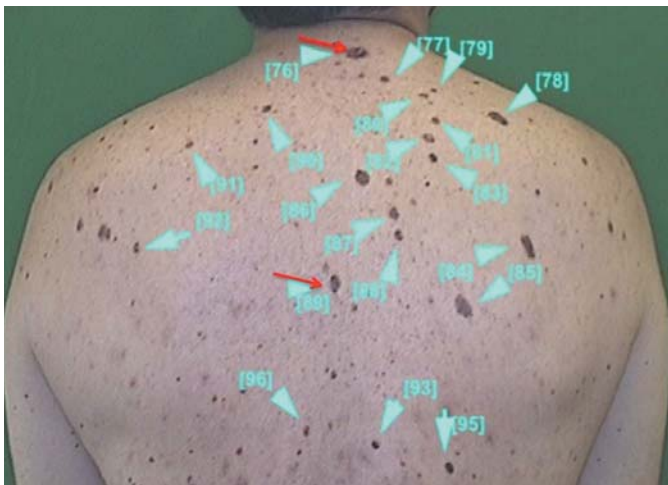


Figure 1: Macroscopic view of the dorsum of the patient, with multiple atypical nevi and melanomas in the posterior cervical region (number 76) and interscapular (number 89) (red arrows).

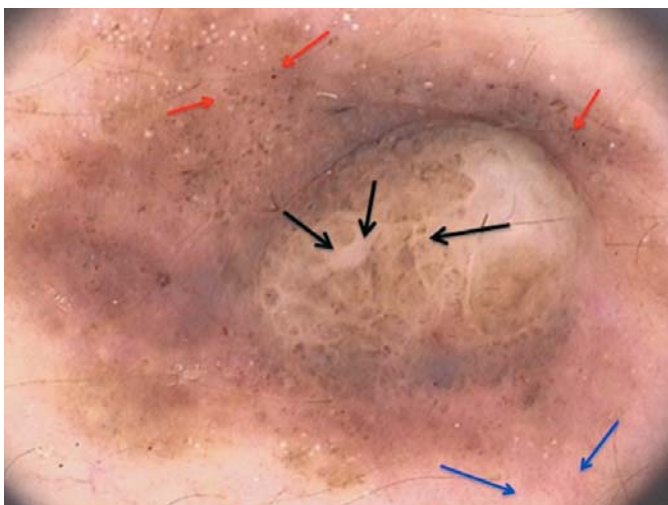


Figure 2: Posterior cervical melanoma's dermoscopy: multiple colors, inverted network (black arrows), and heterogeneous peripheral brownish spots (red arrows), in addition to the atypical vascular pattern, with pinpoint vessels (blue arrows).

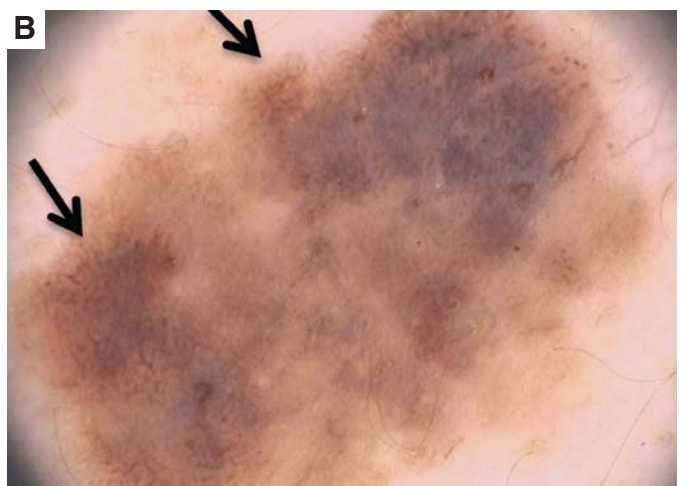


Figure 3: **A.** Photograph in January 2011; **B.** Photograph in October 2011; growth and significant darkening of the lesion, as well as the emergence of a heterogeneous pigmented network (black arrows) were observed.

tal dermoscopy – nine months after the first examination – growth and alterations in the pigmentation and pigmented network of three additional lesions were observed, with removal indication. The histopathological results suggested two atypical nevi and one additional melanoma of the extensive superficial type, the latter identified as number 89 of the body mapping, being located in the interscapular region, with a Breslow thickness of 0.4 mm, mitotic index of 0/10 HPF, 0mm², absence of ulceration or regression, and association with pre-existent melanocytic nevus (Figures 3A and 3B).

DISCUSSION

Dermoscopy offers an increase of 10 to 27% in the accuracy in melanoma diagnosis as compared to the naked eye examination, allowing the detection of lesions in early stages and improving patient survival rates.^{4,5}

Nevertheless, early melanomas can be uncharacteristic under dermoscopy in the first examination, only being recognizable through alterations over time.⁵ The first follow-up visit in digital dermoscopy, three months after the first examination, is of paramount importance for the detection of fast growing melanomas, with any alteration in the size, shape, dermoscopic structures or color that might occur in that monitoring interval being indicative for exeresis.⁴

The body mapping and digital dermoscopy allow the detection of thinner and incipient melanomas, 3,5 with patients at the most risk of developing melanoma (such as those with atypical nevus syndrome and multiple familial melanoma, similar (to the patient described) benefitting most from that type of examination.³

At the time this article went to press, the patient studied was being followed up, clinically and dermoscopically, at the outpatient clinic of the Núcleo de Câncer de Pele e Dermatologia do Hospital A.C. Camargo (Center for Dermatology and Skin Cancer of the Hospital A.C. Camargo). ●

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Surgical & Cosmetic Dermatology
Outubro / Novembro / Dezembro de 2012

Impresso em Dezembro de 2012