

Correction of volumetric aging of hands: comparative study between calcium hydroxyapatite and hyaluronic acid

Correção do envelhecimento volumétrico de mãos: estudo comparativo entre preenchimento com hidroxiapatita de cálcio e ácido hialurônico

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ABSTRACT

Introduction: Signs of aging usually arise more intensely on the face, neck, and hands, in the form of considerable loss of volume, which is a common indicator of aging.

Objective: To compare the duration, and adverse effects of two types of subcutaneous fillers in the treatment of the volumetric aging of hands.

Methods: Group A: four patients who used the same amount of the products in both hands; Group B: four patients who used greater amounts of calcium hydroxyapatite in one of the hands and Group C: four patients who used greater amounts of hyaluronic acid also in one of the hands. The patients were evaluated through changes in a validated scale for hand aging, recorded by digital photographs before and 1,3,6,9,12,15 and 18 months after the procedure.

Results: In Group A the patients had the same duration for both fillers; in Group B patients treated with hydroxyapatite calcium had longer duration; in Group C, the patients treated with hyaluronic acid presented longer duration. Adverse effects were more frequent with the use of calcium hydroxyapatite.

Conclusions: It can be concluded that the filler duration is proportional to the volume injected for both fillers, and that hyaluronic acid is safer for the treatment of this cosmetic irregularity.

Keywords: hyaluronic acid; hand dermatoses; rejuvenation

RESUMO

Introdução: Os sinais da idade costumam se evidenciar mais intensamente na face, no pescoço e nas mãos revelando perda considerável de volume, um indicador comum de envelhecimento.

Objetivo: Comparar o tempo de duração e os efeitos adversos de dois tipos de preenchedores subcutâneos para o tratamento do envelhecimento volumétrico de mão.

Métodos: Estudo prospectivo e comparativo, onde os pacientes foram divididos aleatoriamente em 3 grupos: Grupo A, composto por 4 pacientes que utilizaram o mesmo volume de hidroxiapatita de cálcio e ácido hialurônico em ambas as mãos; Grupo B, composto por 4 pacientes que utilizaram maior volume de hidroxiapatita de cálcio também em uma das mãos e Grupo C, composto por 4 pacientes que utilizaram maior volume de ácido hialurônico.

Os pacientes foram avaliados através de mudanças em escala validada para envelhecimento de mãos, registradas por fotografias digitais antes e 1,3,6,9,12,15 e 18 meses após o procedimento.

Resultados: No Grupo A os pacientes apresentaram o mesmo tempo de duração de ambos os preenchedores; no Grupo B os pacientes tratados com hidroxiapatita de cálcio apresentaram maior tempo de duração; no Grupo C os pacientes tratados com ácido hialurônico apresentaram maior tempo de duração. Os efeitos adversos foram mais frequentes com o uso de hidroxiapatita de cálcio.

Conclusões: Pode-se concluir que o tempo de duração é proporcional ao volume injetado para ambos os preenchedores, e que o ácido hialurônico é mais seguro para o tratamento dessa irregularidade cosmética.

Palavras-chave: ácido hialurônico; dermatoses da mão; rejuvenescimento

Original Articles

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INTRODUCTION

In the last 10 years, hand rejuvenation has become more popular in dermatologic medicine. The signs of age are usually more intense on the face, neck and hands, leading to a considerable loss of volume, a common indicator of aging.^{1,2}

Both intrinsic and extrinsic factors influence the aging of the hands, which is evidenced by a loss of the thickness of the epidermis and dermis, depigmentation, texture changes; seborrheic and actinic keratosis can also develop.³⁻⁵ Skin laxity and thinning are noticed due to the loss of the amount and quality of the collagen and elastin in the dermis with subsequent atrophy of the subcutaneous tissue, revealing tendons, ligaments and bony prominences.^{1,5} Genetics influences the speed and extension of the individual aging of patients. The course can also be influenced by extrinsic factors such as smoking, alcohol abuse, chronic sun exposure, excessive work, exposure to chemical toxins and rheumatologic conditions.^{3,6}

In the literature an extensive possibility of treatments for hand rejuvenation is found: ablative and non-ablative fractional lasers, intense pulsed light, microneedling radiofrequency, chemical peels, monopolar radiofrequency, micro-focused ultrasound, sclerotherapy to reduce the visibility of veins, permanent and absorbable fillers, among others.⁴⁻⁶

The objective of this study was to compare the duration, adverse effects and the level of therapeutic efficacy of two types of subcutaneous fillers for the treatment of volumetric aging of the hand, calcium hydroxyapatite (CaHA) and hyaluronic acid (HA).

METHODS

A prospective single center longitudinal analysis study of 12 patients who underwent treatment for the volumetric correction of the hands with two types of fillers, calcium hydroxyapatite and hyaluronic acid was conducted. The treated patients were followed by digital photography on the system of the clinic in determined periods: time zero (before the procedure), 30 days after the procedure and every three months (three months, six months, nine months, 12 months, 15 months and 18 months). The study was conducted according to the ethical principles from the declaration of Helsinki.

a) Selection of patients – inclusion criteria

The patients selected for the study should present grade III of hand aging. The criterion of hand aging used was the Merz Hand Grading Scale, with the following stratification: Grade 0 (no loss of subcutaneous tissue), Grade I (mild loss of subcutaneous tissue, mild visibility of veins and tendons), Grade II (moderate loss of subcutaneous tissue, mild visibility of veins and tendons), Grade III (severe loss of subcutaneous tissue, moderate visibility of veins and tendons) and Grade IV (very severe loss of subcutaneous tissue, marked visibility of veins and tendons).

b) Exclusion criteria

Patients who had already had treatment with fillers in the hands; who had excessive photoaging lesions such as solar me-

lanosis, seborrheic and actinic keratosis; with a history of allergy to the components of the fillers; and those interested in having treatment with technologies for the hands were excluded from the study.

c) Technique

The patients in the study were corrected for the volumetric aging of the hands with CaHA or HA, with each hand receiving one type of product. The choice of which hand would receive each product was random. Participants were also divided randomly into three different groups: Group A, with four patients who utilized the same amount of product in each hand (1.5 mL of CaHA or HA); Group B, with four patients were utilized different amount of product in each hand (1.5 mL CaHA and 1 mL HA) and Group C, with four patients who utilized different amount of product in each hand (1 mL CaHA and 1.5 mL HA).

Application

The HA used was Juvéderm Voluma[®] 1ml (Allergan Inc Irvine, CA, USA) and the CaHA was Radiesse[®] 1,5ml (Merz Aesthetics, São Paulo, Brazil). CaHA was mixed with 0.5ml saline 0.9% before the application. Both hands were treated at the same time. The technique chosen by the authors was application with microcannula 25 (DermaSculpt[®] 25G x 50mm), in the following order:

1. marking of risk areas such as tendons, blood vessels and bony prominences;
2. Anesthesia with lidocaine 2% with vasoconstrictor for the insertion of the microcannula;
3. opening with a 24G needle in the surface for insertion of the microcannula;
4. Homogeneous distribution of the product for correction of the volumetric aging;
5. gentle massage on the surface.

d) Statistical analysis

Sociodemographic variables included were gender, age and race. For the evaluation of the study, the Merz Hand Grading Scale was used before the procedure, 30 days after the procedure and every 3 months (3 months, 6 months, 9 months, 12 months, 15 months and 18 months) for each group. Grading was performed by two dermatologists not associated to the study. Post-treatment adverse effects were also registered for each group.

RESULTS

The study was performed with 12 patients, all female and Caucasian, Fitzpatrick skin type I and III, mean age of 42 years and age range of 37 and 51 years.

Regarding duration of the treatment, in Group A, represented by graph 1, either patients treated with HA or CaHA had a similar curve of duration: after 30 days both displayed the best result with mean severity degrees of 0.25 and 0.5, respectively. After 3 months, the mean degrees of severity started to increase, reaching a mean degree of 2 for both products 18 months after

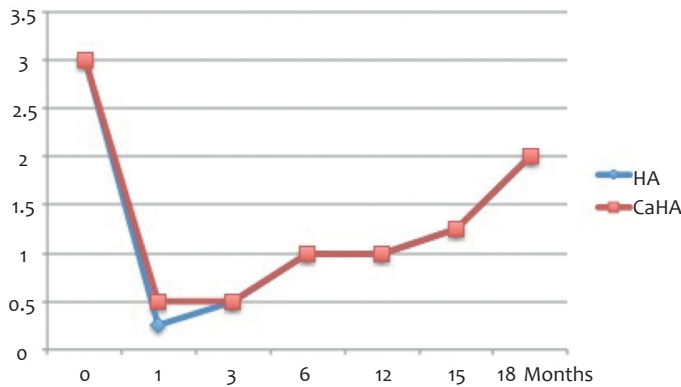
treatment. In Group B, represented in graph 2, patients treated with CaHA had a mean degree of 0, and those treated with HA had a mean degree of 1 30 days after the treatment. After 3 months, mean severity degrees started to increase, reaching a mean degree of 2.75n for patients treated with HA and a mean degree of 2 for those treated with CaHA 18 months after the treatment. In Group C, represented in graph 3, patients treated with CaHA presented a mean degree of 1 and those treated with HA a mean degree of 0 30 days after the treatment. After 3 months, the mean severity degrees started to increase, reaching the mean degree of 2 for patients treated with HA and mean degree of 3 for those treated with CaHA 18 months after the treatment.

The adverse effects for each type of product are represented in graph 4, where 60% of the patients treated with CaHA reported edema and 10% erythema, discomfort and hematoma. Of the patients treated with HA, only 10% reported hematoma after the procedure. No other adverse effects were reported during patient follow-up.

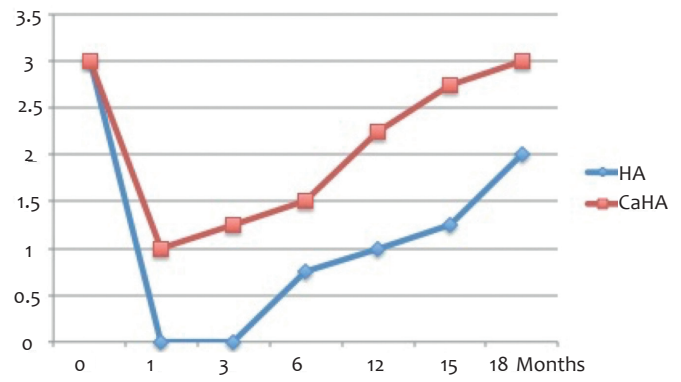
DISCUSSION

Along with the face and neck, hands are the most visible parts of the body and go through aging signs in a similar way. Senile spots and other depigmentations, the appearance of keratoses, laxity, loss of the subcutaneous tissue making tendons, blood vessels and bony prominences obvious are the main changes suffered by the hands with the action of the environment and also due to intrinsic factors. In parallel, rejuvenation of this structure has been increasing in the last 10 years.¹ All patients in the study were Caucasian, with a mean age of 42 years, ranging between 37 and 51 years. Since aesthetic procedures are sought more often by female patients, this can explain the predominance of females in this study. There are other studies in the literature demonstrating this female predominance for similar procedures.^{7,8} In Brazil, the Caucasian population has more buying power what could be correlated to the greater demand of these patients for treatment for the hand.^{7,8}

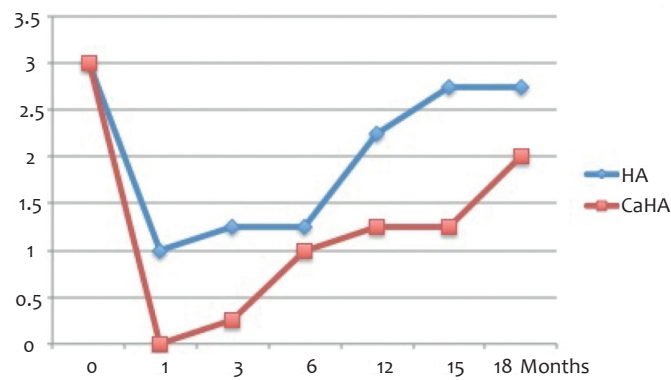
The patients in the study were represented in graphs of treatment duration, similar in all periods evaluated: 30 days after



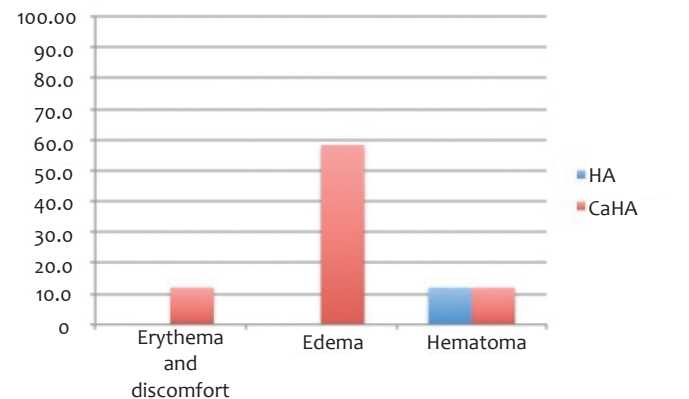
GRAPH 1: Group A: Mean of the degree of aging of the hands as a function of time in months



GRAPH 3: Group C: Mean of the degree of aging of the hands as a function of time in months



GRAPH 2: Group B: Mean of the degree of aging of the hands as a function of time in months



GRAPH 4: Frequency of complications according to the type of filler

the treatment was the best aesthetic results for all patients, with the highest reduction in severity degrees. At this moment, we observe that the amount of product was the main determining factor for the correction of volumetric aging of the hands, with the highest drops when 1.5 mL of either compared product was used: a reduction of 2.75 degrees for HA in Group A, of 2.5 degrees for CaHA in Group B, of 3 degrees for CaHA in Group B and 3 degrees for HA in Group C. This improvement is also observed in the literature with a mean volume of 1.63 mL of CaHA to improve a mean of 2.58 degrees of severity.³ This initial improvement is maintained in all studied groups until the third month post-treatment, moment characterized for the beginning of the loss of the initial efficacy of the fillers. From then on, there is an upward worsening curve in the degrees of severity in each evaluation, observing that the groups that utilized lower amounts of the product (1 mL) had a faster loss of effect than the patients who received 1.5 mL of product. The usage of a larger amount of HA for filling of the hands for highest degrees of severity of also reported in the literature.^{3,6}

Another observation of the study was the fact that in the groups that used a lower amount of the product, the patients

receiving CaHA lost the effect of volumetric correction faster than the patients who received HA. This is seen in the literature, with some articles reporting the duration of CaHA treatment between 8 to 12 months.^{4,5} This way, the authors of the study conclude that the factor amount of product would be the main determinant for an initial response of volumetric correction and for the final duration of the treatment.

In regards to adverse effects, patients treated with CaHA had a high rate of edema (60%), an expected reaction due to the type of product,⁴ that, however, causes concerns for the patients treated because it is not a product that can be destroyed as the HA.⁹ All patients in the study preferred the product that could be destroyed in case of any adverse event. Erythema and discomfort were only reported in the group treated with CaHA as well.

CONCLUSIONS

The authors conclude that the duration of calcium hydroxyapatite and hyaluronic acid corresponds to the volume injected and that hyaluronic acid is safer for the treatment of this aesthetic irregularity, either by the possibility of acute adverse events or by the reversion of unsatisfactory results. ●

DECLARATION OF PARTICIPATION:

Guilherme Bueno de Oliveira

Statistical analysis

Approval of the final version of the manuscript

Design and planning of the study

Active participation in the supervision of the study

Intellectual participation in propaedeutic and/or therapeutic of the cases studied

Critical review of the manuscript

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Critical review of the literature

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