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Coolifting® CoolCell®, A New Group of Highly Effective Active Ingredients for the Reduction of Cellulite in Women

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Abstract

Cellulite is a very frequent clinical condition that, despite not being serious, constitutes one of the greatest aesthetic concerns of a large number of women. In recent years, some of the technologies that have allowed the development of devices and key tools in aesthetic medicine treatments have been consolidated. The aim of this article is to test the effectiveness of CoolCell®, a new treatment for cellulite that is administered with Coolifting® technology. We included 24 women who received 8 sessions of Coolifting® CoolCell®, one per week. Thermographic measurements were taken and satisfaction questionnaires were completed. Thermographic analysis showed a statistically significant color variation and self-assessment reports revealed that more around 75% of the subjects witnessed great or spectacular changes on their skin.

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Introduction

Cellulite or Gynoid lipodystrophy is a metabolic disorder of the subcutaneous tissue that affects 80-90% of adult women.[1-5] It is characterized by an alteration of the skin and subcutaneous tissue of the affected areas, mainly thighs, buttocks and abdomen, in what is commonly called orange-peel.[2,3] It is a very common clinical condition that, although not serious, constitutes one of the greatest aesthetic concerns of a large number of women.[5]

Cellulite presents a complex and multi-factorial etiology. Its physiopathology depends on very diverse aspects such as: anatomy, genetic susceptibility, hormonal changes, efficiency of lymphatic drainage or alterations in microvasculature, extracellular matrix or adipocytes.[2,3]Although there are various products and treatments for reduction of cellulite, none of them is definitive. For this reason and given its complexity, it is always necessary to develop new methodologies to address this metabolic disorderin the best possible way.[1-4]

In the last years, some of the technologies that have allowed the development of devices and key tools in aesthetic medicine treatments have been consolidated.[6] Recently, the effectiveness of a device that improves the appearance of the skin by combining the therapeutic effects of avant-garde assets, pulsatile CO_2 and cold has been proven.[6]Both the effects of CO_2 on tissues and those of cold are well characterized. CO_2, in addition to playing an important modulating role in some physiological processes (such as the Bohr effect[7]), also increases blood perfusion[8], stimulates tissue oxygenation[9] and reduces adiposity.[10] During recent years, numerous studies have addressed its use in aesthetic medicine,[11,12] confirming it as a therapeutic method that is easy to apply and without significant side effects.[13,14] On the other hand, the use of cold for therapeutic purposes is widely known in medicine, whether as a vasoconstrictor,[15-17] anti-inflammatory, adipocytolytic, or analgesic, among others.

The aim of this work is to test the effectiveness of CoolCell®, a new treatment for cellulite that is administered with Coolifting® technology and thus, non-invasively and through a flow of pulsed, high-pressure CO_2 and low temperature.

Materials and Methods

24 healthy women from 35 to 50 years of age were included. Inclusion criteria: without systemic, severe or skin pathologies and not receiving chronic treatment. 8 sessions of Coolifting® CoolCell® were carried out at the rate of one per week. Each session lasted 10 minutes, in which 1 CoolCell® kit was applied: 2 Coolifting® CO_2 cartridges, two CoolCell® active vials and a specific topical product.The session did not require any special preparation. All sessions were performed by the same professional and in the same areas: thigh and abdomen.

Coolifting® device (BeautyGun S.L., Spain) was used to apply the treatment. This is a 1.2 kg gun that is loaded with a 33gr CO_2 cartridge and a 3 ml vial. In this work, the effects of the active ingredients that make up the CoolCell® product have been evaluated, according to technical specifications.

Thermographic measurements were taken with the Cell Meter® professional kit (International Product & Services S.R.L., Italy) immediately before the first therapeutic session (control measure, S0) and 2 months after the 8th session (S1). The Thermoplate®30 was used under controlled temperature and humidity conditions. Thermographic images were analyzed with the Knime analytics software (Knime GmbH, Switzerland). With this software, termographies´ colors were separated by RGB channels (figure 1). Once labeled and grouped in the correct way, variations of the colors green, blue, red and black could be analyzed.

For this analysis, only 80% (approximately) of the area represented by the thermographic photo was taken into account. The colors outside the frame were not included in the analysis (figure 2).

Additionally, both the patients and the professional who made the applications completed satisfaction questionnaires, with only one closed-ended question. The question was: Have you noticed any improvement in the treated skin? The possible answers were: No; I do not know/ I'm not sure; Yes; Yes, great changes and Yes, spectacular changes.

For the description of the sample, means and standard deviations were the respective indexes of

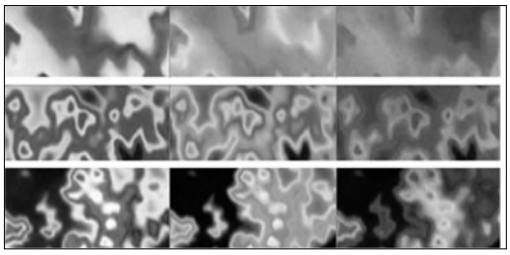

Figure 1. Color analysis. Channels obtained with Knime® Software.

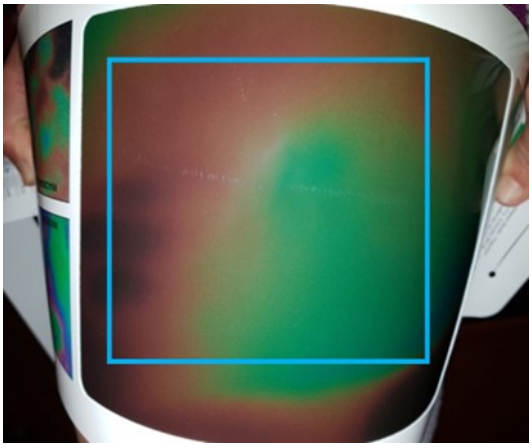

Figure 2. Thermography of the thigh. Blue frame: inside, the area included in the colorimetric analysis.

central tendency and dispersion selected. For the comparison of means, Student's T was used (paired samples and two tails).

Results

Of the 24 women who started this treatment, only one had to interrupt it. The interruption was not due to any side effect. Of the 23 women who received the 8 sessions, 1 (4.34%) reported not being sure of having noticed improvements in her skin; 4 (17.39%) reported noticing the changes, 11 (47.83%) reported noticing great changes and 7 (30.44%) reported spectacular changes (figure 3).

The color variation of black, red and blue was not statistically significant (figure 4). The variation to green went from 51% (20.25) pre-treatment to 62.25% (17.01) after treatment. This difference was statistically significant: $p = 0.043$.

These results suggest an important improvement in patients´ cellulite evolution. Thermography shows statistically significant changes and questionnaires patient satisfaction and clinical significance.

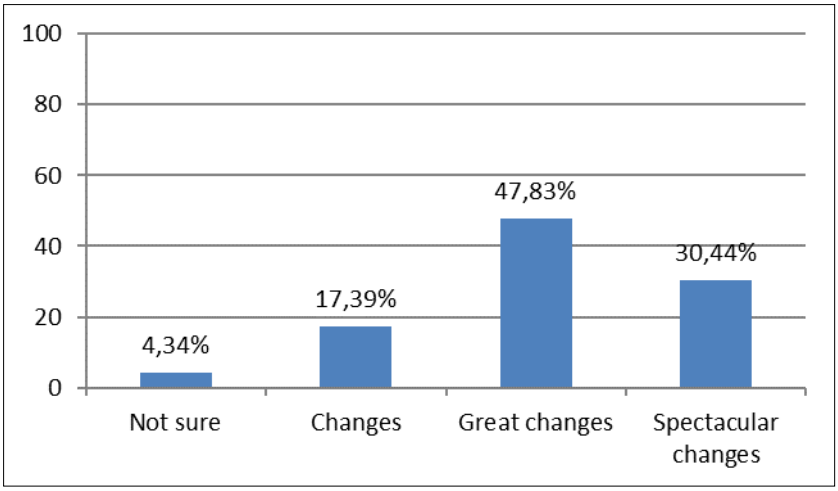

Figure 3. Skin changes reported by 23 women.

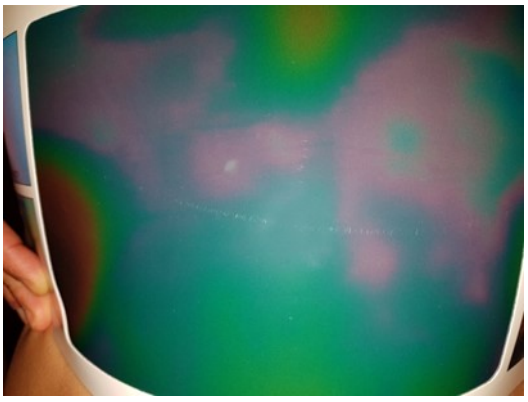

Figure 4. Abdominal thermography (left flank). Range of colors displayed with the Thermoplate®30 (standard): blue, red and green.

Discussion

In this work we have tested the effectiveness of the Coolifting® device with the new CoolCell® active ingredients for the reduction of cellulite (although without taking into account cellulite sub-classifications). Future designs should corroborate or rule out a greater or lesser action when one or another physiopathological component (eg.: edema, adipose tissue) primes.

A healthy thermographic picture, without cellulite, is homogeneous. The exact color of this situation of normality will be in the central area of the thermographic scale, but will depend on the plate used and the general conditions of the environment in which the measurements are taken. In this case, the homogeneous color seen in patients without cellulite was light green. The quantification of the color channels of the thermographic images showed some non statistically insignificant differences, but also significant and important color variations. The non-significant variation of the colors red and light blue is understandable, while these two colors represent intermediate categories in the thermographic scale. That is to say, that the decrease of a certain color (eg.: pink to green) can be compensated by the variation of another color (eg.: purple to pink). On the other hand, this study shows a significant variation towards the green and towards the homogeneity of the color. This, clinically, results in an improvement of cellulite and a reduction in edema, which is typically visualized as images of large, diffuse spots. These edematous spots and micro-nodules were visualized with different shades of red, purple and light blue.

On the other hand, the results of the questionnaires carried out are very positive, with 78.27% of the patients reporting great or spectacular changes. However, the fact that these data have been obtained in a self-referential manner is subjective and far from an ideal condition. Future studies should confirm these findings, using objective methodologies to obtain the data. All in all, this type of information is very useful.

The results presented in this work indicate that the Coolifting® CoolCell® is an effective method for the treatment of cellulite. However, it will be necessary to carry out additional studies with a larger number of subjects and a robust methodology to confirm these findings. On the other hand, the CoolCell® effect was monitored until 2 months after the eighth session. In the near future, it would be interesting to extend the monitoring of the results up to 6 months. Finally, although cellulite mainly affects women, it is important to emphasize that the conclusions of this work can only be extended to the female population. A study that includes men would allow extrapolation or discard the findings of this work.

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