

## Case Report

# Treatment of Facial Ageing with Ozone Therapy: Clinical Case Report

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**Introduction:** Ozone therapy has been used as an effective alternative for aesthetic treatments and facial aging, as it induces changes in facial cells, stimulates collagen synthesis, activates peripheral circulation and microcirculation, and slows down the processes of oxidation and skin aging.

**Objectives:** This study aims to evaluate the effects of ozone therapy in treating facial aging through a clinical case report.

**Case Description:** A case report on the treatment of facial aging with ozone therapy is presented. Six clinical sessions were conducted, with seven-day intervals between them, applying one ml of medical ozone to each demarcated area. The ozone concentration increased over time, starting at five mcg/mL and reaching 12 mcg/mL.

**Results:** The six-session ozone therapy protocol showed promising results in treating facial aging by reducing expression lines and stimulating collagen synthesis.

**Conclusion:** Ozone therapy is an effective alternative for the biostimulation of collagen and other mechanisms that improve facial tissue aesthetics, helping to restore the appearance of aging skin.

## Introduction

Currently, a youthful and healthy appearance is the goal of many people. Aging is a slow, progressive, and irreversible process influenced by various intrinsic and extrinsic factors<sup>[1]</sup>. These factors cause a decline in the functions of connective tissue, where collagen becomes more rigid, with an annual percentage lost and a decrease in the number of fibril anchorage points. Elastic fibers lose strength due to reduced elasticity; there is a decrease in glycosaminoglycans associated with a reduction in water, which, in turn, decreases adhesion, migration, development, and cellular differentiation<sup>[2]</sup>.

This deterioration of connective tissue prevents the maintenance of a uniform fat layer beneath the skin, and the weakening of elastic fibers, combined with slower tissue exchange and oxygenation, leads to skin dehydration, resulting in wrinkles<sup>[3]</sup>. The loss of tissue support in the face and the appearance of wrinkles are determining factors in the reduction of patients' self-esteem.

Ozone therapy is a promising, low-cost treatment alternative with few reported adverse effects and is considered safe. When applied in the correct concentration for facial aesthetics, ozone therapy can alleviate the signs of skin aging by improving peripheral circulation and microcirculation, oxygenating tissues, and stimulating collagen production, thus slowing down the oxidation process and skin aging<sup>[4]</sup>.

Ozone's medicinal properties include enhancing metabolism and the healing process, delaying aging, and boosting the immune system<sup>[5]</sup>. Due to its antioxidant actions, ozone also exhibits excellent tissue-regenerating properties<sup>[6]</sup>. It aids in the formation of arachidonic acid and the recruitment of fibroblasts, which are responsible for synthesizing collagen, glycosaminoglycans, and proteoglycans—the key components of the extracellular matrix that provide skin firmness<sup>[7]</sup>.

Thus, this study aims to report a clinical case of facial aging treatment using a clinical protocol with ozone therapy.

## Clinical Case

### *Patient Selection, Anamnesis, and Clinical Examination*

A 55-year-old patient with aesthetic concerns, including expression lines, rosacea in the jaw region, and dark circles under the eyes, was selected for treatment. The patient is a smoker, has undergone bariatric surgery, and leads a sedentary lifestyle. During the initial consultation, the patient signed a Free and Informed Consent Form (FICF), granting permission for the treatment and for photographic documentation to monitor progress throughout the study.

### *Treatment Protocol*

The treatment consisted of six sessions of applying ozonized gas to the affected areas at predetermined points on the face. The ozone concentrations used, along with the application protocol details and home care guidelines, are provided in Table 1. The patient also used the Nutritive Facial

Serum – Orofacial Harmonization (Philozon Inc., Balneário Camboriú, Santa Catarina, Brazil), which is indicated for the treatment of facial aging.

Gas concentration in mcgrs/mL		
Session s	Acne	Aging
1 <sup>o</sup>	5	5
2 <sup>o</sup>	5	5
3 <sup>o</sup>	12	10
4 <sup>o</sup>	12	10
5 <sup>o</sup>	15	15
6 <sup>o</sup>	15	15

Table 01 - Description of the ozonized protocol

#### *Medical ozone production and application*

The medical ozone was generated using specialized equipment (Philozon, Balneário Camboriú, Santa Catarina, Brazil), following the manufacturer's concentration guidelines. Before each session, the patient's skin was cleansed with a facial cleansing foam (Philozon Inc., Balneário Camboriú, Santa Catarina, Brazil).

The facial areas showing the most signs of aging were mapped, and the gas was applied to the epidermis of these regions using a 20 ml disposable syringe and a 30G hypodermic needle (BD, Becton Dickinson Indústrias Cirúrgicas S.A., Juiz de Fora, Minas Gerais, Brazil).

At each designated point, one ml of ozonized gas was administered, following the concentrations outlined in Table 1. After the application, the face was massaged with ozonized oil to ensure even distribution of the gas across the skin surface.

The sessions were held at seven-day intervals, with a total of six applications throughout the treatment protocol.



## Discussion

In the context of facial aging prevention, ozone therapy is considered a safe, low-cost treatment option with few adverse effects, capable of efficiently restoring facial harmony with natural results<sup>[7]</sup>. Ozone stands out for its ability to reduce inflammatory responses and improve blood circulation, which stimulates tissue healing and the synthesis of type I collagen, while also providing antioxidant effects. This positions ozone therapy as a viable alternative compared to other collagen bio-stimulation techniques and facial aging treatments<sup>[8]</sup>. Additionally, its ability to enhance cellular oxygenation helps smooth wrinkles, even out skin texture, and treat skin sagging.

An essential factor for maintaining skin firmness is the recruitment of fibroblasts, the cells responsible for producing collagen, glycosaminoglycans, and proteoglycans. Bas and Yula (2018) demonstrated that the intradermal application of ozone can significantly stimulate fibroblast activity<sup>[9]</sup>. In their study, they used a protocol with 10 sessions (twice a week), starting with a volume of five  $\mu\text{g}$  per point in the first two sessions, increasing to 10  $\mu\text{g}$  in subsequent sessions, and finishing with 15  $\mu\text{g}$ . This protocol was effective in boosting the production of type I collagen, known for its rapid absorption and smaller molecular size, which resulted in the reduction of fine wrinkles and significant bio-stimulation of collagen in the treated areas.

Makita et al. (2015) supported these findings by observing the reduction of hyperpigmented spots induced by melanocytes, such as melasma, along with a significant improvement in the dermal appearance of the face and neck, and the complete elimination of expression lines after ozone therapy treatment<sup>[5]</sup>.

In the present case report, the treatment yielded a satisfactory result, with a minimally invasive approach that contributed to restoring the patient's self-esteem. The combination of different forms of ozone application, such as dermocosmetics, ozonized oil, ozonized gas, and ozonized water, may offer even more promising results. However, there remains a lack of studies that thoroughly explore the benefits of combining these approaches.

## **Conclusion**

Ozone shows promising and safe results, standing out in the treatment of facial aging, promoting a younger and healthier appearance, through its mechanisms of action of collagen synthesis and delaying the oxidation process of facial tissue cells. Ozone is an effective alternative, with significant benefits in revitalizing skin tissues and improving facial aesthetics.

## **Statements and Declarations**

### *Ethical Approval Statement*

This study was approved by the Certificate of Presentation for Ethical Consideration, reference number 62388522.7.000.0.107.

### *Consent Statement*

Informed consent was obtained for all aspects of this study, including the publication of identifiable images, in accordance with ethical guidelines. The inclusion of full-face photographs in this study is essential to clearly and objectively demonstrate the results achieved with ozone therapy in the treatment of facial aging. These images are crucial for highlighting the aesthetic and clinical changes described in the case report, allowing direct visualization of the treated areas and the outcomes achieved. Furthermore, presenting these images contributes to a more detailed and practical understanding of the intervention's impact, which is indispensable for the critical and scientific evaluation of the case.

## Conflicts of Interest

The study presents no conflicts of interest with any brand or company.

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## Declarations

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**Potential competing interests:** No potential competing interests to declare.