

# THE INFLUENCE OF HYALURONIC ACID-BASED NO-NEEDLE MESOTHERAPY ON SKIN HYDRATION IN ANTI-AGING PREVENTION. A PRELIMINARY REPORT

## WPŁYW MEZOTERAPII BEZIGŁOWEJ Z UŻYCIEM KWASU HIALURONOWEGO NA NAWILŻENIE SKÓRY W PROFILAKTYCE PRZECIWSTRARZENIOWEJ. DONIESIENIE WSTĘPNE

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**A** – przygotowanie projektu badania | study design, **B** – zbieranie danych | data collection, **C** – analiza statystyczna | statistical analysis, **D** – interpretacja danych | interpretation of data, **E** – przygotowanie maszynopisu | manuscript preparation, **F** – opracowanie piśmiennictwa | literature review, **G** – pozyskanie funduszy | sourcing of funding

### SUMMARY

**Background:** Aging is a slow and inevitable process, which starts around age 30 when collagen fibres begin to slowly lose the ability to absorb water. As a result the first fine lines appear. In recent years, improving the image and thus the quality of life, has become a priority issue for many women. Both aesthetic medicine centres and beauty parlours try to meet their customers' needs, offering newer and newer treatments, which improve the condition and quality of the skin. Recently, no-needle mesotherapy treatment, which is an alternative to needle mesotherapy, has become very fashionable. The former is chosen by clients who are not ready for more invasive treatments, which use injections.

**Aim of the study:** The aim of this paper was to analyse the impact of treatments using hyaluronic acid-based no-needle mesotherapy on hydration of women's skin, as well as the study population's subjective assessment of the condition of their skin.

**Material and methods:** The study was conducted on a group of 22 women, aged between 40 and 55 years. Skin moisture level was taken before and after a series of no-needle mesotherapy, in order to verify the effectiveness of the hyaluronic acid preparation and the no-needle mesotherapy device.

**Results:** Before the treatments, the percentage of skin moisture oscillated from 10% to 63% ( $\bar{x} = 28.4\%$ ,  $SD = 10.9\%$ ) and after from 16% to 60% ( $\bar{x} = 37.7\%$ ,  $SD = 9.8\%$ ). The comparison of the results showed statistically significant difference ( $p < 0.0001$ ).

**Conclusions:** The study shows that treatments using hyaluronic acid-based no-needle mesotherapy has a significant impact on the improvement of moisture, condition and structure of the skin. The study subjects, based on their subjective assessment, have found that the treatments have been successful and the state of their skin has improved significantly.

**KEYWORDS:** non-needle mesotherapy, hyaluronic acid, antiaging prevention

## STRESZCZENIE

**Wstęp:** Starzenie się jest procesem powolnym oraz nieuniknionym, rozpoczynającym się około 30. roku życia, gdy włókna kolagenowe zaczynają tracić powoli zdolność do pochłaniania wody, czego skutkiem jest pojawianie się pierwszych drobnych zmarszczek. Poprawa wizerunku, a co za tym idzie jakości życia stały się w ostatnich latach wręcz priorytetową sprawą dla wielu kobiet. Zarówno gabinety medycyny estetycznej, jak i kosmetologiczne starają się wyjść naprzeciw klientom, stwarzając możliwości korzystania z coraz to nowszych zabiegów poprawiających kondycję i jakość skóry. W ostatnim czasie bardzo modny stał się zabieg mezoterapii bezigłowej, który jest alternatywą dla mezoterapii igłowej. Ten pierwszy wybierają klientki, które nie są gotowe na zabiegi bardziej inwazyjne, w których wykorzystuje się iniekcje.

**Cel pracy:** Analiza wpływu zabiegów z wykorzystaniem mezoterapii bezigłowej oraz preparatu z kwasem hialuronowym na nawilżenie skóry probantek, a także subiektywna ocena badanych stanu ich skóry.

**Materiał i metody:** Badanie przeprowadzono na grupie 22 kobiet w wieku 40–55 lat. Przed i po serii zabiegów z wykorzystaniem mezoterapii bezigłowej wykonano pomiar poziomu nawilżenia skóry, by zweryfikować skuteczność użytego preparatu oraz aparatu do mezoterapii bezigłowej.

**Wyniki:** Przed zabiegami procent nawilżenia skóry oscylował w granicach od 10 do 63% ( $\bar{x}$  = 28,4%, SD = 10,9%), po od 16 do 60% ( $\bar{x}$  = 37,7%, SD = 9,8%). Porównywane wyniki różniły się istotnie statystycznie ( $p < 0,0001$ ).

**Wnioski.** Badanie pokazuje, że zabieg przy wykorzystaniu aparatury do mezoterapii bezigłowej oraz preparatu z kwasem hialuronowym ma istotny wpływ na lepsze nawilżenie, kondycję oraz strukturę skóry. Klientki na podstawie subiektywnych odczuć stwierdziły, że zabiegi przyniosły pozytywne efekty, a stan ich skóry znacznie się poprawił.

**SŁOWA KLUCZOWE:** mezoterapia bezigłowa, kwas hialuronowy, profilaktyka przeciwstarzeniowa

## BACKGROUND

Aging is an inevitable process, which can be slowed down, inter alia, by avoiding or limiting exposure to onerous factors. Premature aging of the skin can be caused by, e.g.: unhealthy lifestyle (smoking cigarettes, drinking alcohol), genetic predisposition and lack of proper care for the skin or no care altogether. Usually around age 40, the thickness of the skin and the subcutaneous tissue decreases, which causes a thinning of individual skin layers and a decrease of the subcutaneous fat layer. As a result, the skin is thinner, it loses its tightness and the fine lines become more pronounced. The skin becomes less hydrated and the most significant factor in this process is the premenopausal period, when the body loses glycosaminoglycans, inter alia hyaluronic acid, which is responsible for binding water in the dermis. The Langerhans cell count decreases, which makes the skin prone to irritation and weakens the immune system [1].

No-needle mesotherapy is an alternative method for patients who want to undergo a non-invasive treatment and have reservations about needle mesotherapy. During the procedure, active substances are transported into the skin with the use of electroporation (electric field) and ultrasounds. Electroporation is achieved through high voltage electrostatic field. The effect of the field is very short, only milliseconds long, and causes pores several nanometer wide to open in the cell membrane. The process is completely safe and reversible, and allows to introduce into the cells particles of a cosmetic preparation with meticulously chosen param-

eters to temporarily open the pores and not cause cell death. The effectiveness of electroporation depends, inter alia, on the volume and polarization of the introduced substance, temperature, size of the electric field, and the thickness of the cell membrane [2–3].

Furthermore, during no-needle mesotherapy pinocytosis, i.e. the absorption of the active substance into the cell, occurs. Afterwards, the particles of the cosmetic preparations work up to 48 hours after the procedure was completed, about 1 to 4 mm deep. The preparation should have proper volume and particle size and the base used should be liquid or gel. The procedure is performed using specialised equipment and the frequency of the procedures in a series of 5 to 8 procedures should be once a week [4–6].

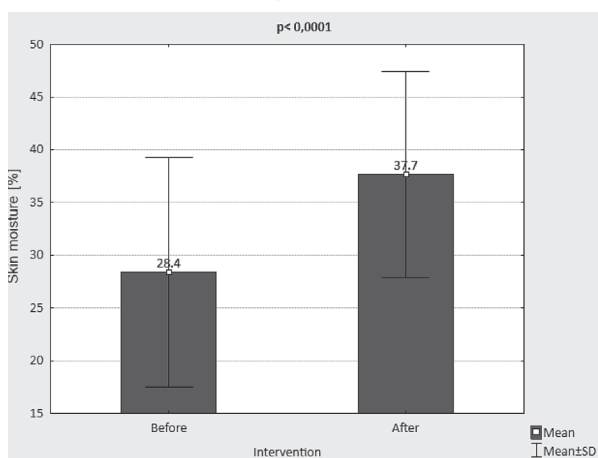
In recent years, hyaluronic acid (HA) has become very popular in both aesthetic medicine, cosmetology and in multinational pharmaceutical companies. It is mainly responsible for the cohesion of the connective tissue and, furthermore, for skin elasticity and healing of wounds [7–10]. HA has high water binding properties – one particle can bind up to 500 particles of water. Moreover, it has an occlusive effect, which helps limit transepidermal water loss [11]. Unfortunately, the volume of hyaluronic acid decreases with age, with such symptoms as fine lines and decreased skin hydration. Using preparations containing HA increases fibroblast activity and as a result increases collagen and elastin production. Furthermore, hyaluronic acid interrupts free radical reactions which damage lipid structures [12–14].

## AIM OF THE STUDY

The aim of this paper was to analyse the effect of hyaluronic acid-based no-needle mesotherapy procedures on skin hydration among the subjects from the study group and the study population's subjective assessment of their skin condition.

## MATERIAL AND METHODS

The study population consisted of 22 women between 40 and 55 years old, who came to a beauty parlor with such problems as: dry skin, rough skin and visible fine lines. Skin hydration was measured using the Nati Alaizer device from Beauty of Science in the morning in the T-zone (forehead), because this area was the most frequently reported as dry by the clients. The study subjects were asked to not wash the face in the morning and to not apply any skin-care products, in order to obtain reliable measurements. The subjects were advised to use two preparations, a face cleaning gel and cream with hyaluronic acid at home, to maintain the effects of the procedure. The measurements were performed before the hyaluronic acid-based no-needle mesotherapy procedures and after the series of procedures was complete (about a month after the first procedure). The study subjects underwent cosmetology diagnostics (taking history, skin diagnostics under a magnifying glass). The following counter indicators were taken into consideration: neoplasm, up to 5 years after successful treatment for neoplastic disease, viral, fungal and bacterial infections, cardiovascular system disorders, and active herpes.



Source: Own study.

**Figure 1.** Comparison of the level of skin hydration prior and post series of hyaluronic acid-based no-needle mesotherapy procedures

## RESULTS

Chart 1 shows the comparison of the effects of no-needle mesotherapy on skin hydration (T-zone, %). Prior to the procedures, the percentage of skin hydration was between 10% and 63% ( $\bar{x}$  = 28.4%, SD = 10.9%), after the procedures between 16% and 60% ( $\bar{x}$  = 37.7%,

SD = 9.8 %). Comparison of the results showed statistically significant difference ( $p < 0.0001$ ). The hyaluronic acid-based no-needle mesotherapy procedures significantly improved skin hydration in the study subjects. All subjects determined, based on their subjective assessment, that their skin was less dry, its structure improved and the fine lines reduced.

## DISCUSSION

Nowadays, cosmetology procedures and the devices used in them allow the prevention of skin aging for people who have still not elected to use aesthetic medicine. According to the available sources, procedures such as needle mesotherapy can cause a number of adverse effects, therefore many patients who want to improve the condition of their skin chose to go to a beauty parlor for less invasive procedures [15].

In modern times people, especially women, feel the pressure to maintain youth for as long as possible, to eliminate fine lines and other skin defects. In recent years, researches became more interested in the quality of life of people who undergo cosmetic and aesthetic medicine procedures.

The results of this study, conducted on a group of 22 subjects, show that a hyaluronic acid-based no-needle mesotherapy procedure had positive effect, which were visible after a series of five procedures. According to the subjects' subjective assessments, the condition of their skin significantly improved and the fine lines were less pronounced. We also surmised that the procedure improved the subjects' quality of life, seeing as it is commonly known that physical appearance is closely connected with our psychological well-being. The author did not find any sources assessing the improvement of the level of skin hydration after a series of hyaluronic acid-based no-needle mesotherapy procedures.

Many clinical studies on the effect of hyaluronic acid on the condition of the skin are conducted using needle mesotherapy, i.e. administering the preparation via micropunctures. According to the study by Baspeyras et al. on hyaluronic acid-based needle mesotherapy procedures, the skin quality, and the resulting decrease in fine lines, improved by even 27.3% [16]. Thanks to joint procedures using hyaluronic acid and fractional laser, Ribé et al. noted an improvement in skin structure, firmness and less visible fine lines, and histological examination showed significant improvement in the quality of collagen and elastin fibres [17]. El-Samahy et al. also documented good results from the effect of hyaluronic acid-based needle mesotherapy on decreasing surface fine lines (decreased by 10%), skin discoloration (decreased by 15%) and showed that such procedures can slow the process of ageing [18].

## CONCLUSIONS

1. Cosmetology procedures using hyaluronic acid in an ampule and no-needle mesotherapy significantly improved skin hydration among the studied women.

2. The study group subjectively assessed their skin as less dry, with better structure, firmness and their fine lines less pronounced after a series of hyaluronic acid-based no-needle mesotherapy procedures.

3. Hyaluronic acid-based no-needle mesotherapy constitute an alternative for more invasive procedures and can prevent ageing of the skin in a non-invasive way.

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The authors report that there were no conflicts of interest.

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