



REVIEW PAPER

DOI: <https://doi.org/10.20883/jms.2017.242>

Mesotherapy – a method of facial skin rejuvenation from an interdisciplinary perspective on improving facial aesthetics

Teresa Matthews-Brzozowska¹, Monika Łącka², Magdalena Bernacka², Maciej Lichaj²

¹ Chair and Department of Maxillofacial Orthopaedics and Orthodontics, Poznan University of Medical Science, Poland

² Facial Aesthetics Laboratory, Chair of Maxillofacial Orthopaedics and Orthodontics, Poznan University of Medical Science, Poland

ABSTRACT

Mesotherapy has been used in medicine since the 1950s and for aesthetic procedures since the 1970s. In the medical literature there are numerous reports about the positive effect of mesotherapy with regard to rejuvenating and improving the appearance of facial skin (reduction of fine wrinkles and discolouration, facial contour correction, improvement in skin tightness and elasticity). The variety of formulations used and the different techniques for administering them mean that the subjectively observed effects of mesotherapy cannot be objectively verified. To date, only a few studies have been published in the international literature where histopathological, ultrasound, and electron microscopy examinations were performed to confirm the efficacy of this method. Most studies, however, have been based on assessing subjective improvement. The aim of this paper was to review literature on the subject, namely 15 full-text reports on the effects of mesotherapy in the treatment of facial skin. The findings of the review show that the studies published to date are based primarily on subjective assessment methods, presenting the results of mesotherapy procedures through an analysis of "before and after" medical photographic documentation. It would seem necessary that further research should be conducted based on a unified protocol.

Keywords: mesotherapy, revitalisation/rejuvenation, aesthetic medicine, face.

Introduction

In today's world, with its cult of broadly understood youth and a beautiful face, most researchers in this area agree that the aim is to retain and, if possible, restore the skin's moisture, structure and tissue volume. In this context, it seems that there is no alternative to aesthetic medicine and anti-aging treatments. Contemporary people, who very often lead fast and stressful lives, cannot afford to wait for slow improvement or undergo time-consuming preventive treatments, but need a quick instantaneous effect. This opens up possibilities for practitioners of aesthetic medicine, who have at their disposal an increasingly wide range of treatment options and more advanced

formulations, as well as a greater possibility for individualizing treatment and adjusting it to the needs of particular patients depending on the condition of their skin. In this context, mesotherapy should be regarded as one of the most important, and at the same time relatively simple, techniques [1–3].

For years, because of its safety and hydrophilic properties, non-crosslinked or, less frequently, cross-linked (or modified) hyaluronic acid has been used for intradermal administration. It is often combined with other substances such as vitamins (e.g. vitamin C, biotin); organic silica; DMAE (Dimethylaminoethanol); precursors of collagen and other structural and functional proteins; polynucleotides; minerals; or cofactors, which

can be used either individually or mixed into a cocktail. This makes it possible to create a formulation that will ensure the best results in terms of prevention or restoration of a lost function while minimizing the burden on the patient [4, 5]. However, these preparations require further research work and documentation to objectively verify their impact on young and ageing skin [6, 7].

Particular attention should be paid to the possible side effects and accompanying symptoms, especially if a patient receives several ingredients at the same time. It is essential that each patient should be correctly qualified for the treatment and that detailed medical interviews are conducted with regard to allergies, intolerances to various substances, chronic diseases and medications [8, 9, 10].

These problems can be minimized through the use of platelet-rich plasma (PRP) in mesotherapy, whose efficacy in revitalization is quite well-documented. Experts in this field appreciate its safety (no extraneous biological material is used) as well as very good results, confirmed by studies [11, 12]. These results are also appreciated by patients as this is probably the most effective hair loss treatment apart from hair transplants. For an even better therapeutic effect, PRP is often combined with the preliminary administration, also by means of mesotherapy, of medical carbon dioxide (carboxytherapy), which, among other things, promotes platelet activation [13].

In aesthetic treatment it is important not to go too far but to properly balance the number and frequency of procedures, depending on the age and needs of the patient's skin, so that the optimum therapeutic effect can be achieved while taking into account the economic burden on the patient [14]. Also, the ethical, psychological and social effects must not be ignored, being part of the definition of health formulated by the World Health Organization [1, 15].

Aim

The aim of this study is to show the influence of mesotherapy on improving the condition of ageing skin on the basis of literature reports.

Materials and Methods

The literature on the use of mesotherapy for skin revitalization, with particular attention to facial skin, was analysed. Following an analysis of the abstracts, fifteen full-text papers thematically related to the subject were selected and used in the study.

Results

Kubiak et al. [16] present mesotherapy (intradermotherapy) as a method of treating selected conditions and ailments by injecting small amounts of a drug (an active ingredient) directly at the place where the therapeutic effect is desired. The authors treat mesotherapy as a method for treating mesodermal tissue disorders. They believe that the most popular and most commonly used treatment is a "mesolift", a preventive procedure which aims to inhibit skin ageing processes and is applied using either the classic or the no-needle method. According to the authors, the cocktails of hyaluronic acid (often also used alone), embrioblasts, vitamins and polydeoxyribonucleotides which are used for biorevitalization form the basis of the aesthetic medicine. The above treatments, together with chemical peels, constitute first-line anti-ageing therapies which stimulate natural regenerative processes in the skin, thus leading to improvement in its appearance and properties. These authors, as well as others [17], also mention autologous mesotherapy, an innovative skin revitalization treatment which uses autologous platelet-rich plasma obtained from the patient's blood.

In recent years mesotherapy has become one of the most popular facial rejuvenation methods [18]. The treatment is performed by injecting a small amount of a substance into the dermis and subcutaneous tissue of the area to be treated. Mesotherapy is intended to stimulate elastic and collagen fibres by introducing active substances using microinjections. The effect of mesotherapy is the combined result of skin stimulation through microneedling and the therapeutic and regenerative properties of the administered substances [19]. The 1–2 mm deep microinjections create micro-channels through which active ingredients from individually designed high-concentration cocktails, such as organic silica, pyruvic acid, vitamin C, caffeine, penta-peptides, DMAE and hyaluronic acid, are delivered [20, 21]. Microinjection mesotherapy is performed on the face and neck to improve skin colour and enhance its elasticity, though it can also be applied to other areas of the body. Mesotherapy as a biorevitalizing and bioregenerative treatment method helps to increase the level of skin hydration and reduce facial wrinkles. The healing process stimulates the regeneration and repair of the treated skin. When qualifying a patient for the treatment it is essential to consider contraindications to mesotherapy, such as decompensated diabetes, autoimmune diseases, pregnancy or lactation. The side effects of the treatment can include local urticaria,

skin discolouration, the Koebner phenomenon, hardening of the skin (lumps) at the injection site, and minor hematomas [22, 23].

Mesotherapy is a treatment for people with dehydrated, dry, dull and grey skin in need of revitalization. It is used in the treatment of dark circles under the eyes as well as acne, wrinkles, skin discolouration and photoageing. It is worth mentioning that mesotherapy can also improve the condition of the hair and protect against hair loss by repairing and strengthening hair follicles. In addition, after an injection of low-molecular-weight peptides the skin does not need special protection from the sun. Mild inflammation with erythema or edema, or minor hematomas may appear, but these symptoms usually subside within 24 hours [24–26]. Aesthetic medicine procedures are followed and complemented by cosmetic treatments. Cooperation between the physician and cosmetologist can be of great benefit to a patient: first a patient undergoes an invasive treatment administered by a doctor, and then visits a cosmetologist to maintain the results [27]. Many cosmetic procedures performed with the use of formulations containing similar substances make it possible to continue the facial skin therapies initiated by the aesthetic medicine practitioner [28, 29]. Also, it is believed that free radicals are responsible for the ageing process. Under normal circumstances, the human body can self-regulate their levels by means of enzymatic and non-enzymatic reduction processes. Contemporary cosmetology offers patients a range of antioxidants that support the natural processes of skin regeneration and neutralize the harmful effects of free radicals [30].

Discussion

An analysis of the literature on the subject of mesotherapy shows that the studies published to date are based primarily on subjective assessment methods, presenting the results of procedures on the basis of analysing "before and after" medical photographic documentation [11]. Objective verification of the results solely on this basis is extremely difficult, especially since the photographs often differ considerably in terms of lighting or the position of the patient. As a rule, the "after" photographs are taken under more favourable conditions to enhance the outcome of the treatment [31]. Changes occurring in the skin as a result of mesotherapy require further broader research, as well as more objective research methods and tools. It seems necessary on the one hand to increase the number of

patients in the study and control groups, and on the other to make the groups more uniform through an appropriate selection of the administered treatments as well as the inclusion and exclusion criteria. Currently there seems to be a shortage of prospective studies, even though such studies could be extremely interesting and informative by showing the specific effects of a specific procedure in a certain patient population over a given period of time [32]. Additionally, there appears to be a shortage of original research in Polish publications. Instead, the authors refer to a small number of foreign studies, where the number of patients also usually tends to be small when compared to research in other fields of medicine [15].

In many scientific papers the authors focus their attention on the specific action of individual substances, which translates into knowledge about the ingredients themselves and their effects on the skin [20, 21, 29, 30]. Recently, however, authors have started to put more emphasis on combination therapies as they provide a better, faster and more synergistic effect. Such therapies involve not only combining different ingredients with specific properties into a cocktail that can be administered in one syringe, but also combining mesotherapy with other techniques, such as tissue fillers, botulinum toxin (mesobotox), thread lift, or physical methods such as laser treatment, carboxytherapy and others [3, 4, 16]. Various treatment combinations can be created to achieve better results. This is intended to make it more beneficial for the patient, but it also means that it is more difficult to unambiguously evaluate the results. It is rare for a patient to have mesotherapy used alone and with only one preparation. More uniform observations have only been made with regard to platelet-rich plasma [11, 17].

It should also be noted that the ability to absorb and utilize nutrients decreases with age, and that nutritional disorders are becoming increasingly common in young people, in which case they are usually related to stress, eating highly processed foods and other environmental factors. This can lead to a quantitative and qualitative imbalance in the intestinal flora as well as the so-called leaky gut syndrome. Research confirms that following a balanced nutrient-rich diet, even supplemented with some ingredients that the body is lacking (such as vitamins C, D3, K2; group B vitamins; collagen precursors and other structural and functional proteins; coenzymes; minerals, etc.), is not always sufficient. Sometimes it is necessary to administer some nutrients locally, for example with an injection, in which case mesotherapy can be invaluable for two main rea-

sons: firstly, because the effect connected with the supplied nutrients is combined with the physical effect associated with the use of a needle, during which tissue damage occurs but at the same time the tissue is stimulated to regenerate; and secondly, because this method enables the bypassing of the gastrointestinal tract and its possible dysfunction [3, 5, 8, 19].

The literature review reveals that this seemingly simple treatment technique is not yet sufficiently researched, despite having been used in aesthetic medicine for half a century.

Final remarks

The primary task of facial aesthetic treatments is to improve a person's appearance in the context of the quality of life, comfort, well-being and self-esteem. Treatment options are extensive, both in terms of the range of biologically active substances that can be applied and the techniques for improving their absorption. Thus they provide many opportunities for improving the condition of mature skin and preventing the signs of ageing. It is essential, however, that aesthetic medicine practitioners, in addition to interpersonal skills, should possess a knowledge of anatomy, physiology, dermatology, stomatology, chemistry, microbiology, allergology and other disciplines, supported by reliable scientific research.

Acknowledgements

Conflict of interest statement

The authors declare no conflict of interest.

Funding sources

There are no sources of funding to declare.

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Acceptance for editing: 2017-11-10
Acceptance for publication: 2017-12-23

Correspondence address:
Teresa Matthews-Brzozowska
Chair and Department of Maxillofacial Orthopaedics
and Orthodontics
Poznan University of Medical Sciences, Poland
70 Bukowska Street, 60-812 Poznań, Poland
phone/fax: +48 618547068
email: klinika.ortodoncji@ump.edu.pl