



REVIEW PAPER

DOI: <https://doi.org/10.20883/jms.2016.225>

Revitalization of facial skin based on preparations of patient own blood

Teresa Matthews-Brzozowska¹, Aleksandra Krzyżanowska¹, Maciej Lichaj²

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

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

ABSTRACT

Aging is a natural, unavoidable physiological process of every human being. Aesthetic medicine, a rapidly growing on field of medicine, slows down this process. Autonomic mezotherapy is a specific type of needle mezotherapy using autologous platelets suspended in a small amount of plasma. Possibilities of use of blood preparations were discussed using 9 items of national literature and 5 foreign reports. The role of the plaques is not only a hemostatic function but also a function of cellular repair by the content of biologically active substances. The biostimulating effect consists in the activation of different cell types by growth factors. The technological change of the gel formulation creates new possibilities for the extension of aesthetic medicine.

Keywords: plate rich plasma, PRP, GPS, PROF, CGF Harmony, facial revitalization.

Introduction

One of the stages of the life is aging of the whole organism. Aging is a natural, unavoidable physiological process of every human being. It would be most beneficial if aging was the slowest possible process, in the best possible health and without any ailments. Aesthetic medicine, a rapidly growing field of medicine, supports this process by slowing it down. The philosophy of Aesthetic medicine is firstly the prevention and treatment of coexisting diseases, and in the rest is the correction, that is, the correction of minor beauty defects, but it disseminates. Also a healthy lifestyle and health prevention in people undergoing specific treatments. Aesthetic medicine offers in a minimally invasive way and accessible to everyone, effectively getting rid of various minor defects, which improves the quality of life. It should be emphasized that the most often corrected skin is the face. In addition, ensuring the well-being through the use of specific aesthetic medicine treatments can meet the need for self-care [1]. The aim of the work is to show

the possibility of improving the condition of the facial skin based on the preparations of their own blood. Material and method

Material consisted of 9 articles from the Polish literature and PubMed 2 literature reviews and 3 articles on clinical case studies and their assessment in the aspect of therapeutic use, improvement of facial skin condition, blood plasma obtained from aesthetic medicine patients.

Results

Analysis of 9 items of Polish literature has shown that platelet-rich plasma (PRP) is one of the safer, less invasive facial and neck conditioning treatments.

Plate-rich plasma therapy is very widely used in medicine. Platelet rich plasma contains 1 mm³ of autologous patient platelets, 1 million platelets and proteins: fibrin, fibronectin and vitronectin. After activation, thrombocytes release numerous platelet-derived growth factors (PDGF_{aa}, PDGF_{bb} and PDGF_{ab}),

transforming growth factor beta (TGFb1 and TGFb2), epidermal growth factor (EGF), vascular endothelial growth factor (VEGF), and fibroblast growth factor [2].

In aesthetic medicine, PRP treatments are used for revitalization treatment of various types of baldness and prevention of hair loss, treatment of venous ulcers and the removal of many other minor imperfections, affecting healing of wounds by increasing the number of cells and angiogenesis. PRP has proven properties of beneficial biostimulation of skin cells, including fibroblasts, to produce new elliptical collagen fibers and to create a network of new blood vessels (angiogenesis). It affects the healing by increasing the number of cells (mitogenesis), and thus supports regenerative processes. Platelet-rich treatments are used as monotherapy or in combination with other treatments, such as laser therapy, for example, in the removal of scars, stretch marks [3].

Plasma preparation involves taking the right amount of blood from the patient into an anticoagulant syringe, for example: sodium citrate. Then the blood is centrifuged using a special centrifuge, and to boost the degranulation of the growth factor activator – calcium chloride – CaCl₂ or thrombin. This preparation is administered by intradermal injection or by mesotherapy using a roll. PRP is also used regeneratively after the treatment of aesthetic medicine in the form of a mask [2]. The effect of using a series of treatments using platelet rich plasma is to improve flexibility, texture, skin tension, smooth wrinkles, and rejuvenate skin tone. Improving the condition of the skin using mesotherapy with autologous plasma is one of the basic suggestions for face aesthetic medicine. This treatment can also be used to improve the eye area, increasing the firmness of the eyelid and removing the dark circles under the eyes after a single application – **Figure 1**.

Surowiak et al. [6] found that PRP treatments are a reliable method of skin revitalization. Augustyniak and co-authors [4] suggest that the use of PRP plasma after the first treatment improves skin firmness and coloration, stimulates collagen synthesis and fibroblast divisions. This noticeable improvement in the skin, which becomes tense, should continue as it gives better results according to Szpringer's [5] thesis that the stimulation of dermal fibroblast proliferation by PRP is dose-dependent. In addition, the author describes the use of rich platelets next generation GPS in skin regeneration. Surowiak [6] emphasizes that the use of platelet-rich plasma is a well-documented method. The author compared the expression of procollagen type 1 and intensified proliferation in fibroblasts incubated with PRP using the MyCells-PRP kit. Studies were conducted in cell culture conditions where stimulation of fibroblast divisions was stimulated and collagen synthesis stimulated.

Many authors believe that platelet-rich plasma belongs to modern regenerative procedures that rejuvenate the skin. This so-called. Anti-aging therapy serves to rebuild the tissues by utilizing the body's own capabilities. High-protein plasma is defined as a growth factor concentrate because it contains high levels of growth cytokines that stimulate certain stages of tissue regeneration [7]. PRP also has plasma proteins in addition to platelets. Platelet degranulation starts at the injection site, releases growth factors and causes cell proliferation, capillary formation and the formation of new collagen fibers that gradually improve the firmness, color, and elasticity of the skin. Plate-rich preparation also has the ability to maintain an adequate level of hydration in the skin [8]. PRP as aesthetic medicine is injected in points, exactly in the skin of the neck, neckline or face, and even hands, but rich plasma has a much broader application in various



Figure 1. Documentation of the patient's face prior to PRP, during exercise, one month after a single treatment in the lower eyelids. Documentation from own collections of Facial Aesthetics Laboratory Chair of Orthopedics and Orthodontics of Poznan University of Medical Sciences

fields of medicine especially in orthopedics such as in damaged Achilles tendon, During the treatment of diabetic foot ulcer, after facial surgeries such as face-lifting, as well as transplants of adipose tissue, exzema, hyperpigmentation, skin atrophy, hair loss and consequent baldness. [7, 8]. The authors emphasize that platelet-rich plasma is a tissue of its own and thus exhibits high levels of safety and reduces the risk of side effects. PRP should be taken and injected under sterile conditions. Due to the fact that the preparation is autologous, there is no allergic and immune reaction. All treatment with PRP is painless and patients can immediately return to their daily activities after the injection. The treatment of rich plasma can be combined not only with laser therapy, but also with carboxytherapy or lipolifting, and even mesotherapy with rich plaque on the scalp.

Autonomic mesotherapy is a specific type of needle mesotherapy using autologous platelets suspended in a small amount of plasma. Tile role is not only a hemostatic function, as Szpringer and Szpringer [8] state, but thanks to the content of biologically active substances, cell repair function. The biostimulation effect of PRP is the activation of different cell types by GFs growth factors. Activation, or granulation degeneration with growth factors, also occurs automatically by tissue contact (possible without activator). Due to the high content of growth factors and stem cells, the plasma revitalizes and regenerates the skin, stimulates fibroblasts to produce new collagen, comes to the so-called autologous cell renewal (regeneration of skin cells, through the action of own growth factors and stem cells), thus firming the skin and smoothing wrinkles. Growth factors included in PRP are shown in **Table 1**.

The authors further state that there are many plasma systems available on the market. They differ in the way of recovery of platelets and growth factors from blood, the presence of leukocyte fractions and the medical apparatus included in the kit. PRP is applied to the skin of the face area and especially to the eye by mesotherapy. Several series are recommended at intervals of

1 month followed by maintenance 1 time for 3 months. Post-operative complications include swelling, hematoma, and redness that resolve spontaneously within a few days. Contraindications for the treatment are: blood disorders, HIV, AIDS, cancer, pregnancy, lactation, autoimmune diseases and local inflammatory processes and skin infections. A slightly different preparation is platelet rich fibrin (platelet rich fibrin) is also obtained from the patient's blood, through a longer spinning treatment. Contains blood platelets, growth factors, mesenchymal stem cells, all components that promote healing and neovascularization. The advantage of PRF is the absence of infectious complications due to the presence of immune enhancing factors. Indications and contraindications are similar to those of PRP [10]. The range of possibilities to use your own blood in regeneration is steadily increasing, which confirms that it is still one of the most effective facial revitalizing remedies available.

The analysis of two English-language literature reviews [12, 13] did not provide a clear answer for the clinical use of PRP. In both articles, the authors underline the need for further studies on the efficacy of plate-rich plasma with the additional suggestion that it is preferable to give plasma to other medicaments in one patient and the patient's face should be divided into right and left sides as comparative to obtain a more objective outcome after the procedure without Share of individual variability.

Just as the Aesthetic medicine is growing rapidly in the world, its branches are growing rapidly. This dynamic development is also related to platelet-rich plasma therapy, as evidenced by three articles informing about the new formula of this preparation. New in PRP treatments is low-platelet protein agglutination and agitation with growth factors and CD34 + CGF – Concentrated Growth Factor – isolated from the patient's blood stem cells and concentrated CGF growth factors are injected into the skin with mesotherapy. CGF growth factors are proteins that regulate complex healing processes and increase tissue regeneration without side effects. The treatment pro-

Table 1. Growth factors included in PRP [11]

Name of growth factor	Effect of stimulation
EGF epidermal growth factor	Stimulates the proliferation and differentiation of epidermal cells, stimulates angiogenesis
FGF fibroblast growth factor	Stimulates endothelial cell proliferation, fibroblasts, stimulates angiogenesis, stimulates collagen and HA synthesis
IGF insulin growth factor	Stimulates the proliferation and differentiation of fibroblasts
PDGF plateled derivet growth factor	Stimulates cell mitosis, epithelialization, angiogenesis, ECM synthesis (extracellular matrix)
TGF-β1 transforming growth factor	Stimulates DNA synthesis, collagen and proliferation of various cell types
VEGF vascular endothelial growth factor	Stimulates angiogenesis

vides a natural, safe, firm and more radically healthy complexion, accelerating the regenerative processes [16]. CGF is a perfect supplement to other Aesthetic medicine treatments such as laser treatments, chemical peels, carboxytherapy, fillings. Additionally, CGF improves fat and hair survival [14].

The treatment involves the administration of own CD34 + stem cells and Activated Plasma Albumin Gel delivered from blood proteins under the skin. Thanks to this technology, the physician performing the procedure can adjust the density of the gel to the needs of the patient. Growth factors are released longer in a controlled manner, which results in stronger stimulation and regenerative effects. CGF Harmony is perfect for revitalizing your face, neck, back and hands. To perform the CGF Harmony and the entire kit consist of the Medifuge 200 (Centrifuge). Medifuge is additionally equipped with UVC decontamination mode. The second device is the Activated Plasma Albumin Gel (APAG), a low-platelet plasma heating device for obtaining a biologically compatible polymeric material used as a filler in Aesthetic Medicine [15]. Research results on CGF and CD34 + have been developed, published and published in many fields of medicine such as Biology, Biochemistry, Orthopedics, Maxillofacial Surgery, Dentistry, General Surgery, Gynecology, Sports Medicine and Aesthetic Medicine.

Summary

PRP can be applied to the skin of the whole body being a biocompatible product with no risk of allergy or intolerance, which is not irrelevant in facial skin treatments. Plasma (PRP and PRF) are alternative treatments for patients who may not be able to apply other aesthetic facial treatments such as hyaluronic acid to achieve satisfactory results after the first administration and are safe for prolonged use. Research on the effectiveness of facial rejuvenation therapy after administration of the patient's own blood specimen should be continued on the basis of a unified protocol.

Acknowledgements

Conflict of interest statement

The authors declare no conflict of interest.

Funding sources

There are no sources of funding to declare.

References

1. Marchewka A, Dąbrowski Z, Żołądź JA. Fizjologia starzenia się. Profilaktyka i rehabilitacja. PWN, 2012.

- Pietrzykowska A. Osocze bogatopłytkowe – perspektywy klinicznego zastosowania w medycynie estetycznej. *Acad Aesth Anti-Aging Med.* 2010;3:16–18.
- Kubasik P, Adamski Z. Możliwości terapii osoczem bogatopłytkowym (Platelet – Rich Plasma) w praktyce dermatologicznej. *Dermatol Prakt.* 2014;6(5):13–20.
- Augustyniak A, Rotszejn H. Metody odmładzania skóry powiek i okolicy oczu stosowane w kosmetologii i dermatologii estetycznej. *Dermatol Estet.* 2014;16(4/5):244–249.
- Szpringer E. Zastosowanie osocza bogatopłytkowego nowej generacji – GPS w zabiegach regeneracji skóry. *Dermatol Estet.* 2011;13(6):378–384.
- Surowiak P. Mezoterapia versus osocze bogatopłytkowe. *Acad Aesthet Anti-Aging Med.* 2011;2:7–10.
- Tazbir M. Primum preventio – osocze bogatopłytkowe w medycynie estetycznej. *Aesthetica.* 2015;7(1/2):48–54.
- Szpringer A, Szpringer E. Zastosowanie osocza bogatopłytkowego w medycynie estetycznej. *Aesthetica.* 2015;8(3/4):12–19.
- Szpringer E, Szpringer A. Zastosowanie osocza bogatopłytkowego w medycynie estetycznej. *Aesthetica.* 2015;2(8):32–35.
- Koczorowski D. Od mezoterapii do biostymulacji. *Rynek estetyczny.* 2016;2(4–6):36–38.
- Wójcik A. Zabiegi medycyny estetycznej korygujące oprawę oczu w wieku dojrzałym ze szczególnym uwzględnieniem powieki dolnej. *Studia Podyplomowe „Estetyka Twarzy”.* 2017.
- Leo MS, Kumar AS, Kirit R, Konathan R, Sivamani RK. Systematic review of the use of platelet-rich plasma in aesthetic dermatology. *J Cosmet Dermatol.* 2015;14(4):315–323.
- Lynch MD, Bashir S. Applications of platelet-rich plasma in dermatology: A critical appraisal of the literature. *J Dermatolog Treat.* 2016;27(3):285–289.
- Rodella LF, Favero G, Boninsegna R, Buffoli B, Labanca M, Scari G, Sacco L, Batani T, Rezzani R. Growth Factors, CD34 Positive Cells and Fibrin Network Analysis in Concentrated Growth Factors Fraction. *Microsc Res Tech.* 00:000–000, 2010.
- Bonazza V, Borsani E, Buffoli B, Castrezzati S, Rezzani R, Rodella LF. How the different material and shape of the blood collection tube influences the Growth Factors Production. *Wiley* 23.08.2016. DOI 10.1002/jemt22772.
- Borsani E, Bonazza V, Buffoli B, Cocchi MA, Castrezzati S, Scari G, Baldi F, Pandini S, Licenziati S, Parolini S, Rezzani R, Rodella L. Biological Characterization and In Vitro Effects of Human Concentrated Growth Factor Preparation: An Innovative Approach to Tissue Regeneration. *Biol Med.* 2015;7:5.

Acceptance for editing: 2017-01-10
Acceptance for publication: 2017-03-27

Correspondence address:

Teresa Matthews-Brzozowska
Chair and Department of Maxillofacial Orthopaedics and
Orthodontics, Poznan University of Medical Sciences,
Poland
email: klinika.ortodoncji@ump.edu.pl