Platelet-rich plasma

Platelets are a rich source of growth factors that can be applied to facial aesthetics. The use of platelet-rich plasma for rejuvenation and augmentation is discussed by **Dr Sabine Zenker**

Dermal stimulation and augmentation continues to grow within the facial aesthetics industry. A bioresorbable material such as hyaluronic acid (HA) is commonly used. Many exogenous fillers rely on an autologous fibrotic response for volume augmentation—but disadvantages include the transient effects of temporary, resorbable fillers and foreign body reactions such as persistent erythema and swelling and encapsulation, granuloma formation and chronic or delayed infections. An autologous source for soft tissue augmentation is therefore a desirable alternative.

Human growth factors (GFs) have been extensively investigated, but there are now clinical applications of individual GFs: keratinocyte growth factor (Kepivance, Sweden) for oral mucositis; and platelet derived growth factor (Regranex, UK) for non-healing diabetic wounds. But applied outside their normal environment, these exogenous GFs may have untoward effects—for example, the FDA introduced a black box warning on becaplermin in 2008 for increased cancer mortality. The safety of palifermin has so far not been established.

Platelets

Platelets are an excellent source of GFs in their naturally-occurring and biologically determined ratio, and are successful in acute wound healing. The application of platelet-rich plasma (PRP) has been proven to enhance early wound healing and healing in diabetic ulcers. Concentrated platelet preparations have been used clinically since the 1990s to simulate the native wound healing environment compared with that after isolated growth factor application. There is also substantial clinical proof of PRP in other areas of medicine—platelet gel is widely used in orthopaedics and oromaxillofacial surgery.

Platelet recovery systems have been developed where erythrocytes are separated from white cells and platelets in distinct fractions. Platelet pellets are resuspended in recovered plasma, usually with 6–7 times the normal concentration of platelets in peripheral blood. This concentration is an autologous source of growth factors. After injection into the dermis and subcutaneous layers, the platelets are activated endogeneously by the body's own coagulation factors such as thrombine and collagen. This leads to platelet degranulation, releasing platelet GFs such as PGDF, ILGF, EGF and TGF-β. Activated platelets also release proteins such as the adhesive glycoproteins fibrin, fibronectin and vitronectin. These proteins and GFs interact with cells in the subcutaneous tissues, such as fibroblasts, endothelial cells and stem cells and after binding to their cellular receptors, they activate intracellular signaling events—mediating cell proliferation, migration, survival and production of extracellular matrix proteins. This results in tissue rejuvenation.

For the enhancement of skin texture, glow and hydration, PRP is applied via superficial dermal injection using a mesotherapy technique. When used as a filler, PRP is injected dermally or subdermally to volumise and reshape the skin. The autologous character of this agent means there are minimal side effects, but these usually take form of mild bruising, swelling or, theoretically, infection. Contraindications include pregnancy, breast feeding, autoimmune or blood disease and cancer.

There are several kits for PRP harvesting, including MyCells, Selphyl and Regen. The MyCells kit is designed for autologous PRP re-injection and has been approved by the FDA, the Medical Device Committee of the European Union and by the Israeli health ministry. PRP for facial rejuvenation is currently injected in three countries: Japan, England and Israel.

Studies

There is poor clinical data available to prove the safety and efficacy of PRP injections. An initial pilot study of 10 women showed that PRP injections for facial rejuvenation is an effective way to address some of the more difficult areas on the face, around the eyes and the neck.

MyCells performed a clinical investigation in Japan, the UK and Israel with over 400 patients. In this study, the clinical effects and potential side effects of MyCells PRP skin rejuvenation were evaluated. The patients were facially injected with the MyCells PRP skin rejuvenation kit. Follow up was performed three to six months after primary injections. Treatment was performed for the following indications and techniques:

- Layer specific transplant
- "Tenting" of the skin
- "Cul-de-sac" and needle bevel up
- Over-correction up to 50%
- Serial treatments, providing an accumulative effect
- Minimal-trauma technique using a long needle

Far left: Lower eyelid injections with Regen PRP and three months after treatment.
Left: Before and three months after full face Regen PRP treatment
Centre: Before and after full face Selphyl PRP treatment
Below: Frontal and side view of full face treatment using MyCells before and one month after third treatment



Patients were treated with intradermal injection using long 30G needles, injected in deep folds or wrinkles using the linear threading technique, and with superficial injection using the mesotherapy technique. Following injection, Auriderm XO gel (vitamin K) was applied.

Patients were reviewed at three-monthly intervals. Results were age-dependent. Younger patients less than 35 years were found to respond quickly with the main indication being skin rejuvenation and prevention—treatment every 12-24 months should suffice.

Patients up to 45 years required a second treatment 9-12 months later and annual booster injections. Patients aged 50–60 years required a second treatment at six months, a third at one year and three months, with a touch up two years after the first treatment. Patients over 60 needed a second treatment at three months, a third at nine months and a fourth treatment 1.5 years later. Over-corrections were performed on 30-50% of patients.

My clinical experience with PRP has shown that this modality may be an alternative or adjunctive therapy for tissue regeneration to any of the existing therapies. Its application for superficial or deep dermal stimulation leads to skin rejuvenation and global facial volumisation.

This biostimulation is safe, creates an immediate and long lasting volumetric effect and a natural result. It is easy to perform and the procedure has virtually no side-effects and high levels of patients satisfaction.

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