It is important to understand the evolution of the use of platelet-rich plasma (PRP) to establish credibility for its use in hair loss (alopecia). Platelet-rich plasma has been well established as an option in orthopedics for the treatment of tissue and tendon injury as well as the reduction of scar tissue development postoperatively. Platelet-rich plasma regenerates tissue via growth factors that promote healing (Hsu et al., 2013).

Autologous platelets include many different growth factors, which each have a specific function, such as transforming growth factor-β, vascular endothelial growth factors, fibroblast growth factor, hepatocyte growth factor, and others. This concentrated serum provides natural healing of tissue in the body, and each element plays a role in the recovery of injury throughout the body (Middleton, Barro, Muller, Terada, & Fu, 2012).

Following the success of PRP in orthopedic treatments, its utilization in the treatment of trauma to, or aging of, the epidermis and subcutaneous tissue of the face has also shown positive outcomes. Medical injection aesthetics has evolved as a profession from the reactionary treatments of the signs of aging, such as basic wrinkle corrective injections and augmentation where adipose loss exists, to a more holistic management including the restorative and preventative approach that can reduce the process of aging by nourishing the skin and improving the existing infrastructure to delay degradation of the viable tissues.

The physiological and histological changes derived from PRP treatment are documented to be a result of the soft and hard tissue needle injury of the dermis combined with the activation of various growth factors on the stem cells. This triggers reparative responses in the tissue, resulting in neovascularization, epidermal development, and follicle development (Khatu, More, Gokhale, Chavhan, & Bendsure, 2014). It is with this concept in mind that PRP therapy for hair loss was developed.

Several randomized-controlled trials have produced impressive results that validate the anecdotal success of the procedure. Gentile et al. (2015) studied the impact of PRP on 20 patients, with the results showing that PRP treatments produced an increase in the number of individual hair follicles, as well as improved hair growth. As well, a pilot study by Trink et al. (2013) reviewed the results of PRP on 44 patients utilizing a half-head treatment control. Despite the positive results, the study recommended further clinical investigation to evaluate PRP’s potential as a valid treatment modality for hair loss. Another randomized-controlled trial by Alves and Grimalt (2016) compared half-head hair treatments utilizing PRP. The study showed significant outcomes for androgenetic alopecia (AGA) through the evaluation of hair density. Researchers have determined that further study is needed.

PHYSIOLOGY AND CAUSE FOR HAIR LOSS

Hair loss in men and women may occur due to various reasons, including hormonal fluctuations, genetic predisposition, trauma or mechanical loss, side effects of various treatments with PRP include changes to skin turgor, as a result of degradation of adipose tissue and collagen loss; visible epidermal scarring from the infective process of acne; as well as skin discoloration resulting from hormonal changes. Medical injection aesthetics has evolved as a profession from the reactionary treatments of the signs of aging, such as basic wrinkle corrective injections and augmentation where adipose loss exists, to a more holistic management including the restorative and preventative approach that can reduce the process of aging by nourishing the skin and improving the existing infrastructure to delay degradation of the viable tissues.
plants, or psychologically induced manifestations (Harrison & Bergfeld, 2009; Strough et al., 2005; Thiedke, 2003).

In the evaluation of alopecia, a health care assessment technique will include the hair pull test, whereby the health care provider will lightly pull about 100 hair strands to determine whether there is excessive loss. If more than three hair strands are removed with this technique, then the patient likely can be diagnosed with excessive hair loss.

A thorough patient–doctor evaluation of all potential medical causes must be undertaken to determine any pathology and develop a treatment regimen. Blood work should review the following hormone levels: DHEA (dehydroepiandrosterone), testosterone, androstenedione, prolactin, follicular stimulating hormone, and luteinizing hormone, thyroid levels (T3, T4, TSH), as well as serum iron levels, ferritin, and a complete blood cell count. If the condition has been determined to be hormonal, then the patient should undergo medicinal therapy for at least 1 month before initiating PRP for hair treatment to ensure resolution of the precipitating cause of hair loss.

At this time, the patient may initiate the supportive treatments of PRP to stimulate the follicles and improve the subdermal infrastructure that supports optimal hair growth.

Platelet-rich plasma injection is the use of a systematic treatment regimen to promote hair growth where follicles exist. Men or women who have experienced hair loss are able to undergo the minimally invasive procedure as a treatment to either prevent or delay the need for the more invasive options such as hair transplant. Traditionally, the only solution for hair restoration was topical or oral medicines or invasive transplant procedures. The emerging PRP therapy for hair loss has provided a fiscally reserved and invasively minimized option that had not been available in the past.

Extrapolated from the data produced from the use of PRP in orthopedics, combined with the growing data from the treatment of alopecia outlined earlier, these facts would suggest that PRP stimulates stem cells and other cells in the microenvironment of hair follicles. It is these platelets that promote healing and augment tissue healing and regeneration in response to an injury. Through this process, begins new cellular growth and promotes the active growth phase of follicles.

**TREATMENT METHOD AND TREATMENT PROTOCOL**

A full consultation and assessment must be done to identify areas of thinning, presence or absence of hair follicles, and/or previous trauma or scarring in the scalp area. The patient must also understand that each individual will respond differently and the results will vary, based on the patient’s follicle distribution. Health care profession-
It is not uncommon for the first few days after treatment to allow for the injection sites to begin the healing process. The patient should be reminded that posttreatment the hair will appear wet due to the residual plasma and that this is a normal postprocedure result. The patient should also be instructed postprocedure regarding any superficial bleeding or bruising as a result of the treatment, which may leave blebs or areas of redness and/or bruising. A posttreatment instruction sheet along with clinic contact information should be given to the patient for any follow-up concerns. The instruction should include that the patient should avoid washing the hair for 4 hours after the treatment and then the hair can be gently washed to remove plasma and blood from the hair. It is not uncommon for the first few days after treatment that the scalp may feel dry and tight. Optimal treatment includes a series of three initial treatments at 2 weeks' intervals, followed by a reassessment at 6 months with a retreatment at that time, if warranted. The recommended maintenance regimen is PRP treatment 1 to 2 times per year. It is also suggested that supplemental treatments, such as Viviscal hair, be considered as a supportive management regimen for a minimum of 6 months. Each treatment involves a clinical assessment, medical history, review of patient allergies and medications, prior treatment review, as well as consent. The initial visit should also include prephotographs of the front and crown hair, as well as any specific areas of concern. Follow-up should include photographs of the same photo angles for outcome comparison.

It is essential that the practitioner engage the patient in conversation related to expectations and outcomes at each treatment to ensure that the patient has realistic goals and an understanding of the physiology of the procedure and its capabilities. Many patients are looking for the “quick fix” and “instant gratification” due to the standards of our current society; however, a careful and clear description of the procedure and its outcome will ensure that the patient does not have false or inflated expectations.

After the PRP injections, hair growth will occur only in the presence of hair follicles and will occur over time. Patients will yield different results based on their own available follicles and the status of their hair loss. It is common for patients to have “patchy” growth due to the availability follicles and that follicles do not necessarily diminish uniformly.

Outcomes

Histologically, the growth factors in PRP will target hair follicles directly to stimulate growth of the hair and improve its quality, fullness, and integrity over time. Several randomized-controlled trials have produced impressive results that validate the anecdotal findings of the aesthetic clinics that conducted the procedure. Gentile et al. (2015) studied the impact of PRP on 20 patients via a randomized-controlled methodology, and results showed that the treatment produced a consistent increase in the number of individual hair follicles and improved growth.

Similar results were found by Alves and Grimalt (in 2016), who conducted a randomized-controlled trial that compared half-head hair treatments utilizing PRP. Significant outcomes were found for patients they identified as having AGA. There results were subject to the evaluation of hair density.

Typical results are seen with both growth patterns and density. The photographs are taken at the time of the initial treatment setting (Figure 1) and at 4 months post-initial treatment (Figure 2).

Many clinicians are attempting to augment the results of PRP treatment to produce even more significant changes. However, further research to measure which additives will yield the most significant results is still pending and warranted.

Investigation into the additional use of oral supplementation, such as Viviscal, is currently being conducted. Such studies produce documentation of the benefit of this oral supplementation, which includes glycoaminoglycans of oyster and shark as well as lipids and proteins. Hornfeldt et al. (2015) reviewed studies that evaluated the use of Viviscal. Both randomized and third party trials show significant improvement with the use of Viviscal in both hair restoration and preventing further shedding.

Well-established medications, such as Rogaine, appear to be in a steady use state, but oral supplements appear
to be increasing to levels that are in competition with traditional over-the-counter therapies (Hornfeldt et al., 2015).

In summary, PRP therapy for hair loss involves a full and collaborative assessment by both the health practitioner and the medical aesthetic practitioner to ensure the underlying cause of the alopecia is determined and treated whenever possible. The series of three treatments of PRP to the affected area, with a fully informed consent, follow-up, and posttreatment completion, should also be conducted at 6 months, and maintenance treatments may be implemented, as necessary, to continue development of the subdermal infrastructure. Treatment satisfaction is dependent on the patient’s realistic expectations, diligence in treatment protocol, and the availability of the patient’s follicle distribution; however, the overall results appear to produce a considerably positive outcome for patients seeking a nonsurgical option for hair loss. Oral supplementation appears to show a positive impact on overall hair health. Further long-term data would be an asset to determine the lasting effects of treatments.

REFERENCES


