



PRP: AN UPGRADING OF OUR HAIR TREATMENT EXPERIENCE. FIGURES, STATISTICS, SCIENTIFIC FINDINGS

EXPERIMENTAL PHASE. We started carrying out research on equivalent growth factors (Mimicking Growth Factors) in dermatology more than 20 years ago. We studied the effect of autologous cultivated skin cells (keratinocytes and cultivated fibroblasts) in chronic diabetic and decubitus ulcers (4 scientific publications, a clinical trial conducted in cooperation with the University of Padua, Italy).

We performed some researches into molecular biology and studied the effect of the cytokines and growth factors extracted from horse colostrum and cow's milk in the therapy of Cicatricial Alopecia scalp inflammatory lesions due to Lichen Planopilaris and Discoid Lupus Erythematosus (scientific publications written in cooperation with the Faculty of Immunology, University of Milan, Italy).

In the last 5 years we conducted some *in vivo* and *in vitro* studies (*in vitro* cultivation of bulbs, Philpott method) to evaluate how Mimicking Growth Factors can control the anagen phase of hair bulbs during hair transplantation and in the therapy of Alopecia Areata and Androgenetic Alopecia (scientific publications).

In the last 4 years we carried out a scientific evaluation of the effectiveness and safeness of the PRP (Platelet-Rich Plasma) technique (including the biological and clinical aspects) in the therapy of certain hair conditions (AGA, Alopecia Areata, Cicatricial Alopecia). The **PRP technique was performed in association with hair transplantation to preserve the bulbs during transplantation, improve the healing of the donor area, stimulate the regrowth of the transplanted hair and prevent hair loss after transplantation.** These studies were performed with a standard analytical validation method (scientific publications, International Congress, January 2011, Milan, Italy). In addition, the findings of some clinical studies were evaluated by a double-blind procedure (average follicular concentration, video-epiluminescence, confocal microscopy, biological evaluation of apoptotic fragments, mitotic cell activity, expression of the Ki67 protein in bulbs signalling the activation of stem cells). In 2011 we took part in six international congresses to present the findings of our research.

CLINICAL PHASE. So far we have performed 1440 PRP treatments to treat several hair conditions.

Specifically,

- 1) 1033 cases of Androgenetic Alopecia (AGA)
- 2) 335 cases of Alopecia Areata
- 3) 57 cases of Cicatricial Alopecia
- 4) 15 cases of other conditions

AGA: We have treated:

568 men (56%) aged from 18 to 72.

465 women (44%) aged from 16 to 78.

The PRP treatment is indicated in cases of male AGA, **Hamilton** – Norwood grades I-V. The treatment should be avoided in the presence of IV grade AGA as the possibility of stimulating the growth of new hairs is significantly smaller. In cases of feminine AGA, the treatment is indicated with **Ludwig grades I-III**.

The earlier the treatment is performed, the more likely is a significant stimulation of hair regrowth.

A **significant response** (i.e. an increase in the number of hairs after the treatment) was obtained in **80% of cases** (both in male and female subjects). In 93% of cases a therapeutic effect was obtained and a significant improvement of hair miniaturization, hair loss, itching or trichodynia (discomfort or pain in the scalp or hair) - if present – was observed.

To get satisfactory results, 2 - 3 treatments should be performed at intervals of 4 months.

FOLLOW-UP (a subsequent examination for the purpose of monitoring the therapeutic result). 312 subjects received PRP for 38 months. A miniaturization and a loss of hair (a recurrence of the AGA symptoms) were observed in 21% of subjects at an average of 14 months after the end of the treatment. 68% of subjects have NOT YET experienced the symptoms of a relapse of AGA.

NOTE: On average, a relapse of AGA usually occurs at 6 – 12 months after the suspension of a therapy considered to be effective (finasteride, minoxidil, other agents). A relapse of the symptoms of Androgenetic Alopecia usually occurs after a significantly different period. However, it seems PRP is NOT YET capable of stimulating the hairs which do not show the gene expression of the condition. This fact was discussed at the last international course (IHTMC) held in Paris by Professor Pierre Bouanna.

ALOPECIA AREATA: We have treated:

335 cases of Alopecia Areata. Specifically,

- 1) 239 cases of chronic Alopecia Areata with 3 or more patches
- 2) 86 cases of total chronic Alopecia Areata
- 3) 10 cases of Alopecia Universalis

201 women (60%) and 134 men (40%) aged between 16 and 62.

1) All the subjects had been experiencing a chronic form of Alopecia for at least one year, with several relapses. No subject showed only one patch of AA. **In fact, we think PRP should not be performed as a first line treatment: It should be administered to subjects showing a scarce response or no response at all to standard therapies (corticosteroids, cyclosporine, sensitizing therapy, minoxidil).**

All subjects received PRP in association with the application of vials containing Mimicking Growth Factors at high concentrations (specific polypeptides 5-10%) for 2 months after the treatment.

A **significant response** (i.e. a significant growth of hair in Alopecia patches) was obtained in **63% cases** (both in male and female subjects). In 74% cases a therapeutic effect with a significant improvement of the disease progression (reduction in hair loss, itching and burning if present, reduction in the number of dystrophic hairs and exclamation point hairs) was observed.

To get satisfactory results, 3 - 4 treatments should be performed at intervals of 1 or 2 months. This shorter interval between the treatments is due to the different duration of the bulb cycle (anagen /catagen) in the presence of Alopecia Areata.

In 103 cases we also treated **eyebrows with Alopecia Areata** and a positive result was obtained in 63% cases. 3 women requested to have the treatment performed **in the pubic area**, with a positive and aesthetically acceptable result in two subjects.

The healing rates of AA with standard therapies (see Guidelines) are significantly lower.

FOLLOW-UP: 34% of subjects experienced the reoccurrence of one or more patches after 10 months (average, range 5 - 17 months). 22% of subjects experienced the reoccurrence of one patch after 26 months (average). Up to now, 44% have NOT experience any relapse.

NOTE: Unfortunately, the reoccurrence of patches is a characteristic of AA. In most cases patches reoccur continuously with rare remission phases. The subjects treated with PRP experience significantly less frequent relapses. However, as the administration of Platelet-Rich Plasma does not alter the characteristics of the disease, relapses are unavoidable.

2) In the 86 cases of Alopecia Universalis a total healing of the treated areas (scalp, beard, eyebrows) was obtained in 38% of subjects, while a partial, aesthetically acceptable healing was obtained in 25% of subjects.

3) Of the 10 subjects treated with Platelet Growth Factors (5 treatments), only one woman with Alopecia Universalis obtained a significant and acceptable regrowth of hair.

Therefore, we came to the conclusion that **PRP is INEFFECTIVE in case of Alopecia Universalis.**

Further studies are needed to evaluate why PRP is ineffective in cases of Alopecia Universalis and the possible amendments to the treatment protocol. However, no treatment can be considered really useful in such cases.

3) **CICATRICIAL ALOPECIA:**

We treated 57 cases of Cicatricial Alopecia. Specifically,
29 subjects with Lichen Planopilaris of the scalp
12 subjects with Discoid Lupus Eithematosus (DLE)
16 subjects with Folliculitis Decalvans

All the subjects underwent specific clinical evaluations and a histological examination of the skin in order to confirm the dermatological diagnosis. All the subjects had already received some other traditional therapies (local or systemic corticosteroids, immunosuppressants, antibiotics), but a satisfactory result was obtained in no cases. 35 women and 22 men aged between 19 and 71.

Every subject received 3 PRP treatments, each at an interval of 1 month. A **significant response** (i.e. the resolution of the inflammatory reaction, of the skin tenderness and burning and of the clinical characteristics of the disease, such as follicular hyperkeratosis and pustules or papules) was obtained in **82% of cases** (both in male and female subjects). **Moreover, in 17% of cases a regrowth of hair was obtained in big areas of the scalp with Cicatricial Alopecia.** **NOTE:** Cicatricial Alopecia is an **IRREVERSIBLE** dermatological condition. Cicatricial Alopecia involves inflammation directed at the upper part of the hair follicle where the stem cells and sebaceous gland are located. If the stem cells and sebaceous gland in the bulge region are destroyed, there is then no possibility for regeneration of the hair follicle, and permanent hair loss results. The traditional therapy of Cicatricial Alopecias is often not successful and the disease progression is not even stopped. However, the use of Platelet Growth Factors has resulted in a high number of positive results in the control of the inflammation and the disease progression. **That means that the administration of PRP can effectively control the skin symptoms leading to Cicatricial Alopecia.** The regrowth of hairs in 17% of cases is of note: The PRP technique successfully stimulated those stem cells which were still active and not yet completely destroyed by the inflammation due to Cicatricial Alopecia. Obviously, Growth Factors have no miraculous effect! (Actually, we do not know yet...)

4) OTHER HAIR CONDITIONS: We have treated:

- A) 4 cases of PERSISTENT POST-RADIOTHERAPY ALOPECIA
- B) 11 cases of PERSISTENT POST-CHEMOTHERAPY ALOPECIA
- C) 1 case of CONGENITAL ECTODERMAL DYSPLASIA

A) The treatment was administered to 1 girl (radiotherapy of the skull following brain cancer) and 1 adolescent (radiotherapy of the skull following meningioma). A very positive response was obtained in the girl, while an aesthetically significant partial regrowth of hair was observed in the boy. 2 cases are still being treated and up to now it is not possible to evaluate the results.

B) The whole treatment was administered to 9 subjects (5 men and 4 women, different chemotherapies for 4 different types of malignant tumours) who experienced a persistent Alopecia after at least 1 year after the suspension of the chemotherapy. A positive result was obtained in 7 subjects.

C) A child of 8 with congenital Ectodermal Dysplasia is currently being treated. Up to now, it is not possible to carry out an evaluation of the efficacy of the treatment.

SIDE EFFECTS.

No side effects have been reported so far, with the exception of:

10 cases of mild oedema (swelling) of the forehead following the lidocaine local anesthesia in women with AGA. However, the oedemas resolved spontaneously one day after the treatment.

2 cases of headache in women with AGA, which resolved one day after the treatment

15 cases of scalp tenderness following the intradermal injections, which resolved three days after the treatment

PAIN DURING THE TREATMENT

The treatment causes different types of pain, which are judged differently by the different patients. Obviously, blood sampling causes no significant pain, although some subjects may experience discomfort, stress or fear.

On the contrary, the several intradermal injections cause some discomfort, which most patients consider acceptable. However, 20% of subjects report a severe pain. The injections are administered with a 2.5 cc syringe and a tiny insulin needle.

We have therefore decided to administer a lidocaine local anesthesia without adrenalin to reduce the pain due to the several injections. Moreover, we have been using conscious sedation with nitrous oxide (commonly known as "laughing gas") for two months. No side effects have been reported, the subject is conscious during the whole treatment (ca. 5 minutes) but experiences no pain. The effect of sedation quickly resolves a few minutes after the treatment simply by mouth breathing normally.

THE TREATMENT OF PATIENTS FROM OTHER EUROPEAN COUNTRIES

To facilitate the treatment of patients from abroad, we have organized an evaluation service via e-mail: The patients wishing to undergo a PRP therapy submit us some pictures which we then analyse. After evaluating the patient's history of alopecia and overall health conditions, we request and analyse two digital macro pictures and we write an answer about the eligibility for receiving the treatment. Then, we plan a first examination late in the morning. The PRP treatment is usually administered to the patient in the early afternoon on the same day to let the patient go home as early as possible. So far we have treated subjects from Denmark, France, Great Britain, Ireland, Germany, Switzerland, Spain.

OUR SCIENTIFIC RESEARCH IN THE FUTURE. We are currently carrying on with our basis research work on Platelet Growth Factors and their synthesis equivalents (Mimicking Growth Factors) to further evaluate their effect on the hair cycle and the scalp immune system and their inflammatory action. We are also evaluating the possibility of associating PRP with some other substances in order to obtain some further mechanisms of action on hair conditions (cell therapies, adipose tissue stem cells, extracellular matrix cells). We are analyzing the different protocols to fix the best treatment interval times, the most suitable amount of plasma to be administered, the possible association with adjuvant topical therapies with growth factor equivalents.

CONCLUSIONS.

PRP has been known and used for years in dermatology, dentistry and sports medicine. The mechanisms of action of Growth Factors have been studied extensively and are now well established. It is therefore rationale to consider their use to treat several pathologies. As PRP has been now performed for years, this technique should not be considered experimental any more, although it can still undergo further improvement in the future. The safeness of this treatment is well established (after all, safeness is a characteristic of all regenerative medicine techniques).

In dermatology, PRP is extremely useful to treat skin ulcers, but it also widely used in aesthetic dermatology as an anti-ageing treatment and for the therapy of several skin conditions.

Thanks to the high number of cases treated and our experimental scientific approach, our expertise in the treatment of hair conditions is probably one of the most significant experiences in the world. Obviously, the expertise of Dr. Joseph Greco is also of note. On the basis of the relevant scientific findings and data, we think PRP is the only medical treatment resulting in a significant hair regrowth. All other medical treatments are seldom successful: An actual and significant regrowth can be hardly obtained. It seems only hair transplantation can lead to a significant hair regrowth and an increase in follicular density. However, this surgical approach is much more expensive and demanding for the patient, who also takes much longer to recover.