

# WARMED 5<sup>th</sup> GENERATION PRP AS A DERMAL FILLER FOR FACIAL REJUVENATION

## ABSTRACT

Patients are increasingly seeking improvement in their facial esthetics to reverse the aging process that results in decrease in collagen leading to sagging skin, deeper creases and volume loss in the facial areas. The dentist may be the first healthcare provider that interacts with those patients who express unhappiness with facial aging during routine appointments or during treatment planning for dental treatment. Facial esthetic improvement can also enhance smile esthetics and improving the overall dental results esthetically. Usage of patient derived blood products as cosmetic fillers adds fibroblasts, stem cells and growth factors without the potential of allergic reactions reported with commercial products and at lower cost. This article will review a newer centrifugation process using the 5G protocol and how to create a plasma gel to be used to improve facial esthetics.

**Keywords:** Platelet Rich Plasma, PRP, facial esthetics, dermal filler. plasma gel, warmed PRP

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## INTRODUCTION

Individual perception determines ones perception of beauty and cultural aspects as well as pressure from the media and society, including their peer groups affect ones self perceived attractiveness. In recent years contemporary aesthetics has undergone a paradigm shift in terms of social trends and patient requests. Beauty standards today are based on individuals in their twenties irrespective of the patients actual age.<sup>1-3</sup> Today's standard of beauty includes; higher more prominent cheeks, softer, more oval facial shapes and fuller lips.<sup>4</sup> While those cosmetic results might be fashionable in younger patients, most older females will likely seek more subtle improvements in their appearance focusing on health, vitality, and well-being.

Aging plays a factor in facial aesthetics related to loss of volume of tissue collagen combined with a decrease in tissue elasticity. This leads to deepening of facial creases and an increase in sagging skin and. These results are patient dependent, presenting in some individuals as more rapid appearing aging. These changes lead patients a desire to "turn back the hands of time" improving their facial aesthetics. One of the first signs of aging is thinning of the skin, specifically around the eyes, especially the area of the lower eyes. The result is the presentation of darkening of the skin in comparison to the adjacent areas or "bags" under the eyes related to both a decrease in the skins elasticity and a loss of volume under the skin. Additionally, aging signs include; cheek sagging leading to deepening of the facial folds, thinner lips resulting from loss of elasticity of the

lips, forehead and frown lines between the eyebrows and creases at the corners of the eyes (crows feet). (Figure 1)

Improvement of facial aesthetics demand continues to increase both to correct what mother nature has provided and reverse the aging process. To meet these patient demands for facial rejuvenation and improvement to their facial aesthetics various commercial products have been in wide usage, these include hyaluronic acid (HA) fillers, such as Restylane and Juvederm as well as calcium hydroxyl apatite products (Radiesse) or collagen based products. Hyaluronic acid<sup>5,6</sup> and calcium hydroxyl apatite fillers<sup>7,8</sup> essentially are volume replacers designed to plump out the skin to replace lost collagen and eliminate the wrinkles by stretching the overlying skin. These products typically last 6 months before additional product needs to be placed to return to the volume that was initially achieved. There have been claims that these products stimulate collagen production, but the literature has scant references to support this contention.<sup>9</sup> Collagen based dermafill products have been widely used. Yet, are falling out of favor due to the shorter period they typically last once injected with service expectancy of 3-6 months before volume reduction requires additional material be injected.<sup>10</sup>

In recent years, utilization of autologous blood concentrates, such as platelet rich plasma (PRP), has expanded into use for facial aesthetic rejuvenation. As these products are derived from that individual patient blood, allergic reactions issues

that may be encountered with commercial dermafill products are eliminated. Additionally, product cost per patient is greatly diminished making this a treatment a more affordable option for patients. Since the injected material contains the patients own fibroblasts, collagen and growth factors they are able to stimulate localized changes replacing those cells lost related to aging. The result, longer lasting effects reversing the aging process.<sup>11-13</sup> PRP injections for facial aesthetic improvement has reported biostimulation related to the growth factors and fibroblasts contained in the prepared material.<sup>14-16</sup> Those reported effects are cumulative, with increasing biostimulation with subsequent injections. Those effects last approximately 12 months after the first placement before decreases in volume are noted that will require additional injections.

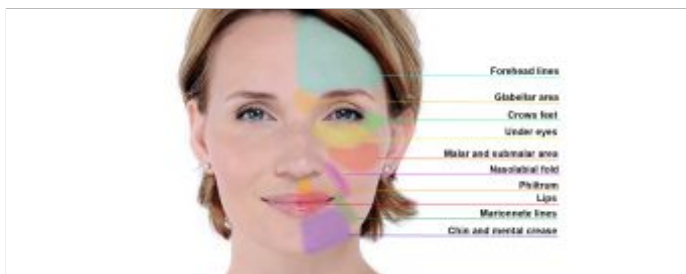


Fig 1: Facial areas that are treatable to with PRP to improve esthetics

**Fabrication of PRP gel for facial aesthetics (The 5G Protocol):**

Liquid PRP, has the factors desired for tissue biostimulation, in its fluid form, use for facial aesthetics is not ideal as it does not stay where injected dispersing laterally quickly. Conversion of the material into a thicker product in the form of an injectable gel allows better tissue bulking. retaining at the site after placement better than a liquid form.

Initiation of preparation of the platelet-rich-plasma begins with phlebotomy at the appointment that PRP will be utilized. The blood that is drawn is centrifuged to separate the hematological components. Centrifugation process using a single "spin" protocol that has been in wide use for all autologous blood concentrates, referred to as a 3<sup>rd</sup> generation protocol. To increase the benefits, the resulting products has been modified as a 5<sup>th</sup> generation (5G) protocol. The 5G protocol is a two "spin" protocol (centrifuged twice) resulting in an increase in platelets and growth factors present in the PRP which results in greater biostimulation at the placement site.

Blood is collected in six (6) 10 ml vacuum-loaded tubes with the addition of 10% sodium citrate as an anticoagulant (BD Vacutainer® yellow cap) (Becton, Dickinson and Company, Franklin Lakes, NJ). Those tubes are immediately centrifuged in a conventional centrifuge, rotated at a centrifugal force of 150 RCF (relative centrifugal force) for 15 minutes. (Figure 2) The result is, red blood cells end up in the lower portion of the tube and a yellow portion containing plasma and platelets with a thin layer of leukocytes present between the two layers.

The yellow portion in the tubes is withdrawn with a syringe and placed into dry tubes, with no additives present in the tubes. These tubes are then centrifuged for 10 minutes at 300 RCF

(2nd spin). (Figure 3) This results in the platelets accumulation at the bottom of the tube and plasma remaining above it in the tubes. Next, 50% of the yellow plasma is removed from the dry tubes with a syringe, this is the concentrated PRP plasma. (Figure 4) The stopper is replaced on the dry tubes and gently shaking the tubes resuspend the platelets in the remaining plasma. (Figure 5) This is then drawn from the tube via a syringe and the syringe is placed into a syringe warmer set at 75° C for 8 minutes (Figure 6) to obtain the fibrin albumin gel (also referred to as Plasma gel). (Figure 7)



Fig 2: 5<sup>th</sup> generation preparation of PRP gel, step 1, blood in the tube is centrifuged for 15 minutes at 150 gf to create separation of the layers with plasma at the top (yellow layer) and RBC at the bottom.



Fig 3: 5<sup>th</sup> Generation preparation of PRP gel, step 2, the yellow plasma layer is withdrawn in a syringe and placed in a new tube and centrifuged for 10 minutes at 300 gf.

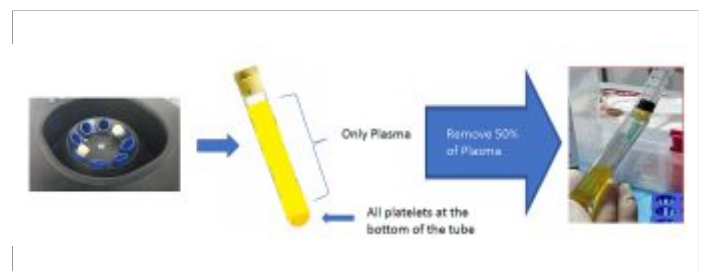


Fig 4: 5<sup>th</sup> Generation preparation of PRP gel, step 3, 50% of the plasma is withdrawn from the tube with a syringe.



Fig 5: 5<sup>th</sup> Generation preparation of PRP gel, step 4, what remained in the tube (plasma and platelets) is gently shaken to resuspend the platelets.



Fig 6: The syringe of withdrawn plasma is placed into the syringe warmer.



Fig 7: Syringes ready for preparation of the PRP Gel ready to use for facial placement (warmed plasma gel also referred to as fibrin albumin gel on left, PRP concentrated plasma on right)



Fig 9: When the Plasma gel and PRP concentrated have been completely mixed they will have a uniform appearance in the syringe and is ready for facial placement. This is a PRP Plasma Gel.

### PRP gel utilization

After removal from the syringe warmer, the Plasma gel is too thick to use as is and is mixed with concentrated PRP plasma to improve injectability. The ratio of warmed fibrin albumin gel to PRP concentrated plasma relates to which facial area will be treated. When greater volume desired, a higher ratio of fibrin albumin gel to PRP plasma is required and a 1:1 ratio is desired. Larger volume areas such as the chin, jaw line and submalar area require the use of a 1:1 ratio. Facial folds and deep wrinkles found at the nasal labial folds, mental crease, marionette lines, forehead and glabella require less volume, with a 1:2 ratio being recommended. Although a volume increase is being sought for the lips, a 1:2 ratio is used to treat that area. Shallow wrinkles and when smoothing the area is desired typically found with crows feet or under the eyes, a 1:3 ration is utilized.

A syringe connector (Becton, Dickinson and Company) is attached to the fibrin albumin gel syringe to achieve the desired ratio and the syringe of concentrated PRP plasma to which the volume has been adjusted to match the desired ratio is connected to the other end of the syringe connector. (Figure 8) The plunger on the fibrin albumin gel syringe is depressed to transfer gel into the PRP plasma syringe. The PRP plasma syringe contents are expressed back into the fibrin albumin gel syringe. The process is repeated, back and forth until the two materials are completely mixed to yield a uniform gel. (Figure 9) As neither syringe will hold the full volume of both syringes, several passes back and forth are needed to completely mix the two contents with the end result being PRP gel in both syringes. The resulting material is referred to as PRP gel.

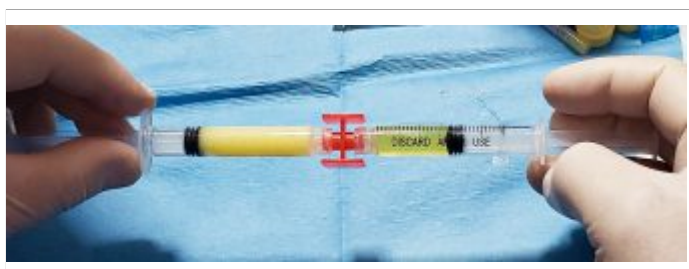


Fig 8: The material is sequentially pumped from one syringe to the other syringe to mix the two materials.

Each syringe has a needle placed on it and is ready to use for facial aesthetic treatment. The authors recommend labeling the syringes with the ratio, as multiple areas of the face will be treated at the appointment. This aids in the practitioner placing the correct ratio in each area during treatment with no syringe mix up.

### Aesthetic facial treatment with PRP gel:

Following creation of the PRP gel treatment will require proper anesthesia application to minimize patient discomfort and optimize desired outcome.<sup>17,18</sup> Local anesthetic (2% Lidocaine with 1:200,000 epi or an equivalent) can be applied in the areas being treated. This is recommended when treating the lips, philtrum, nasolabial folds, mental area, glabella or marionette lines as these are vascular areas which have significant neural innervation. Topical anesthetic alone may be used in less vascular such as when treating crows' feet, under the eyes or in combination with local anesthetic. An effective topical can be formulated by a pharmacy from a mixture of Benzocaine 20%, Lidocaine 8% and Tetracaine 4% (BLT) providing a powerful, fast-acting topical anesthetic that is effective 15 minutes after application.

### CASE REPORT

A female patient presented with a desire for facial aesthetics improvement, indicating she was unhappy about her thin lips, deep crease at the nasolabial folds and bags under her eyes. (Figure 10) Following examination, treatment recommended consisted of placement of PRP gel to widen the lips giving them a fuller appearance, make the philtrum more distinct,, fill in the nasolabial fold and eliminate the bags and dark areas under the eyes. Anesthetic was applied using topical anesthetic application followed by local anesthetic injections.

The PRP gel syringe needle was inserted into the philtrum on the right paralleling the philtrum with needle placement to just below the nostril. (Figure 11) As the syringe was slowly withdrawn PRP gel was expressed backfilling the area. This was repeated at the left philtrum making the area more distinct and prominent. Next, PRP gel was injected into the nasolabial fold on each side, filling the area at the crease to make that less distinct. (Figure 12).

Lip treatment was initiated requiring injections in several places to enhance that area. The upper and lower lips were treated by placement of PRP gel on the right side, left side and completed

with filler placed in the center area of the lip. Needle placement is midway between the vermilion boarder and portion of the upper lip that contacts the lower lips with the needle path directed at the corner of the mouth on the right side with initial tissue entry adjacent to the lateral incisor/canine. (Figure 13) The closer to the oral cavity the needle path is placed the greater the resulting lip enhancement will result rolling the lip exteriorly, making the visible lip wider. Once the tip of the needle is positioned at the corner of the mouth, as the needle is slowly withdrawn, PRP gel is expressed. This process is repeated on the left side of the upper lip to. Next, the needle enters the upper lip midway between the vermilion boarder and contact with the lower lip at the same point as was used for the corner of the mouth but directed towards the midline. (Figure 14) PRP gel is expressed as the needle is withdrawn and the process is repeated on the opposite side of the upper lip to complete enhancement of the upper lip. The process is repeated on the lower lip starting with the lateral aspects of the lip (Figure 15, 16) and completed with the center of the lip (Figure 17)

The dark areas under the eyes and bags, were addressed next with injection of PRP gel to gain volume under the eyes, thickening the tissue eliminating the darkness and drooping of the skin. Care should be taken to avoid contact with the infraorbital foramen and the nerve it contains. Additionally, with proximity to the eye, care should be taken with position of the tip of needle in relation to the eyeball. Immediate results present in a more youthful appearance with fuller lips and elimination of the nasolabial creases and dark eye bags. (Figure 18)



Fig 14: Additional PRP dermal filler is placed to plump the area of the lip below the philtrum



Fig 15: The process is repeated on the lower lip placing PRP dermal filler from the corner of the mouth to the canine area of the lip



Fig 16: The lips next receive PRP dermal filler at the center portion of the lower lip to enlarge it.



Fig 17: PRP dermal filler is placed into the are under the eyes to fill the area that due to collagen loss and decrease in skin elasticity had lead to eye bages



Fig 10: Patient presented with desire to eliminate the bags under her eyes and improve her lips and definition of the philtrum area

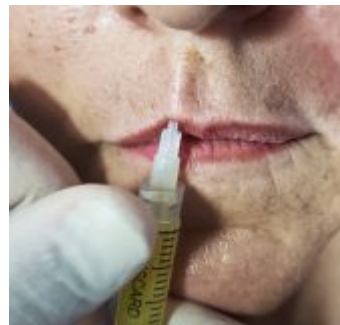


Fig 11: Warmed PRP filler is injected into the philtrum bilaterally to make it more defined

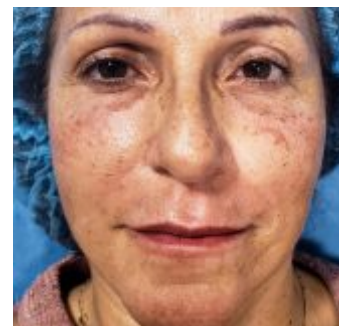


Fig 18: Patient immediately following PRP dermal filler placement, demonstrating fuller lips with more defined philtrum and eliminate of the eye bages



Fig 12: Warmed PRP filler is injected into the nasolabial fold to eliminate the deep crease

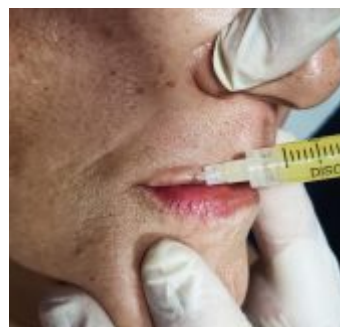


Fig 13: Lip enhancement of the upper lip begins with placement of PRP dermal filler at the lateral aspect of the lip from the corner of the mouth to the philtrum.

## CONCLUSION

Utilizing the 5G protocol, warmed PRP gel is a practical alternative to use of commercial dermafillers and may be used in place of Botox in some facial areas. Since, PRP gel is fabricated from the patients own blood, the potential for allergenic reactions that have been reported in some instances with commercial products is prevented. Concentrated growth factors, platelets and fibrin enhances rejuvenation of the tissue replacing those localized factors lost to aging. Additionally, treatment cost is reduced compared to use of commercially available dermafillers potentially making treatment affordable for a broader spectrum of patients.

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