

## Research Article

# Nanofat Grafting Compared to Hyaluronic Acid and PRP Treatment of the Lower Lid and Tear Trough: Clinical Outcome

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**Abstract**

The purpose of this work is to compare the rejuvenation techniques employed in the treatment of aging effects on the lower lid and the tear trough. In our case we've considered the use of NanoFat grafting and the Hyaluronic Acid combined with Platelet Rich Plasma (PRP). We conducted our study within three months over 40 patients between 40 and 65 years that were casually treated with the first or the second method, in this way 20 people composed the first group (NF) and the remaining 20 became part of the second group (PRP). All these procedures can be performed with ease in an outpatient clinic. We let the patients judge the short term results and there are no significant differences between the two groups. We haven't found disparities in effects and side effects while we've seen dissimilarity in the execution time, especially the part dedicated to prepare the material to inject. The use of Regen kit made it faster. In our intention is the enlargement of the two groups and, depending on the patients' compliance, a six and then a twelve months follow up. Long time effects of each group have got to be studied to determine, for example, which one lasts longer or if any related side effect will come out.

**ABBREVIATIONS**

PRP: Platelet Rich Plasma

**INTRODUCTION**

The tear trough and lower lid deformity can be corrected in people having a tired look caused by the presence of lipoatrophy and volume loss of lower lid due to the aging process or a lower eyelid surgery where too much fat has been taken off.

The goal of fat grafting is to treat volume losses. Fat can be injected with relatively large blunt cannulas ( $\pm 2$  mm diameter). When injection needleless cannulas as small as 0.7 mm in diameter are used, lipofilling is also called microfat grafting [1-6].

Recently, a new technique called Nanofat has been introduced by Tonnard et al. Fat was harvested after infiltration with a modified Klein solution then it's mechanically emulsified and filtered until a liquid suspension is obtained. The nanofat is then injected with fine sharp needles (27gauge) [6].

The PRP consist in the concentration of self-human platelets and their Growth Factors (GF) in a little plasma volume, this content is the reason why PRP took field in the regenerative medicine; [7,8] and we combined it with both NanoFat and Hyaluronic Acid (HA). It has been studied in the last years the effect of PRP in fat grafting and it seems that enhances the fat grafted survival and its maintenance [9,10].

To obtain PRP-HA we used the new Regen Lab kit that makes the procedure from the blood collection to the injection easier. We decided to compare PRP combined with Hyaluronic Acid to the alternative use of PRP combined with nanofat graft to solve the blemish.

**MATERIALS AND METHODS**

Our experience goes between November of 2013 and September of 2014, we performed, in our centers, nanofat grafting in 112 cases. We decided to consider only the 20 cases from April until June 2014 of whom it has been possible to

conduct a three month follow up visit and it was called NF group. In the same months another group, called HA group, treated with Hyaluronic Acid associated with PRP, was created in order to be compared. The patients enrolled in both groups were between 40 and 65 years. We obviously discarded all patients with contraindications like hypersensitivity to any component of the drugs used, anatomical malformations of lacrimal ducts, severe skin atrophy or laxity, anatomical alterations due to trauma or surgery, previous treatment with liquid silicone or other permanent fillers.

For what regards Hyaluronic acid combined with PRP: The procedure usually takes 45 minutes; most of the time is employed to obtain the platelet enriched plasma (PRP).

The Cellular Matrix® (RegenLab, Switzerland) contains 2ml of natural non-cross-linked HA at a concentration of 20 mg/ml added to a gel that permits the separation of cells; with this device it's possible to prepare 4ml of PRP-HA combination starting with collecting just 4 ml of blood of the patient to treat (Figure 1). In this way we obtain at the same time platelets scattered in HA and higher viscosity and protract the time of residence and so the releasing time of the growth factors (Figure 2).

For what regards the Nanofat we collect blood sample with the PRPR egenkit® (RegenLab, Switzerland) into tubes. Five minutes centrifugation at 1500G speed separates PRP from erythrocytes by means of a gel. PRP is now ready to be transferred into a syringe (Figure 3). The harvesting procedure starts with the identification of the fat extraction zone and its delimitation with a dermatographic marker. The second step is the zone infiltration with a modified Klein solution (lidocaine 800 mg/l, sodium dicarbonate 20 mEq/l, adrenaline 1mg/l, physiological

solution). This allows harvesting fat with a multi- port 1, 5-mm cannula with sharp side holes of 1 mm in diameter (Tulip Medical Products, San Diego, Calif.). After saline rinsing and filtering, the lipoaspirate is mechanically emulsified. Emulsification of the fat is achieved with Tonnard's [6] technique by 30 passes shifting between two 10-cc syringes connected each other by a female-to-female Luer-Lock connector (Figure 4). At the end of the fragmentation process, the fat becomes liquid and acquires a whitish appearance. At this point a mixture with 20% PRP can be done (Figure 5).

Finally lower lid and/or tear trough (Figure 6 and 7) intra-dermal injection was performed with a 30-gauge needle or with a 27-gauge 4cm long blunt cannula. The endpoint of injection was the appearance of skinyellowish discoloration.

We let the patients' judge the short term results with a simple scale with whom they could choose between: very good, good, bad, very bad.

## RESULTS AND DISCUSSION

The clinical results usually appeared immediately after the injection, improved over time and were maximal from 2 to 3 months postoperatively. Both groups gave us their impression using an anonymous form with the following results: very good (5 in NF and 4 in HA group), good (12 in NF and 13 in HA group), bad (2 in NF and 1 in HA group) very bad (1 in NF and 2 in HA group) so that we can say that there are no significant differences between the two groups.

We've seen dissimilarity in the execution time, especially in the time dedicated to prepare the material to inject. The use of Cellular Matrix®kit made it faster 15-15 minutes (HA group)



**Figure 1** The Cellular Matrix kit.

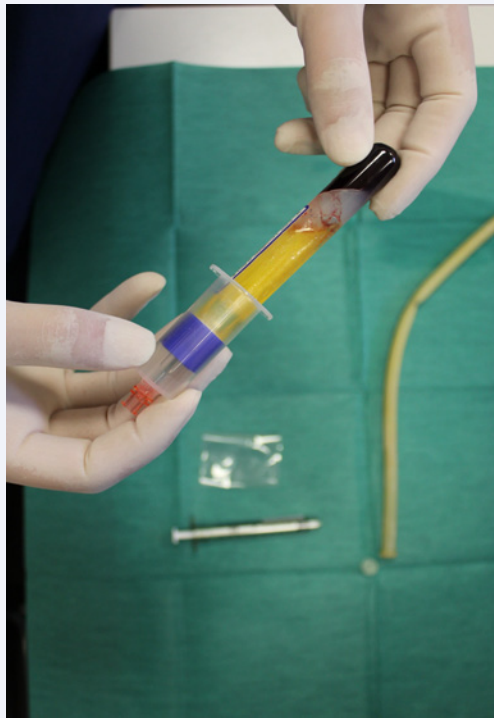


Figure 2 PRP with HA.

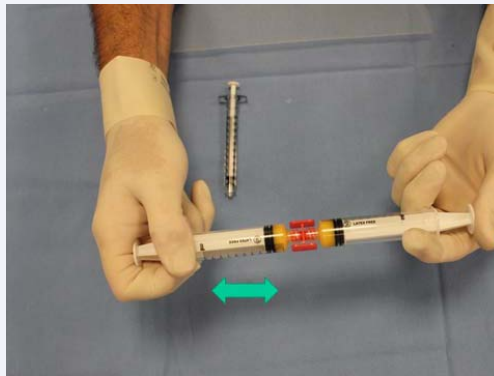


Figure 3 Extracting PRP.

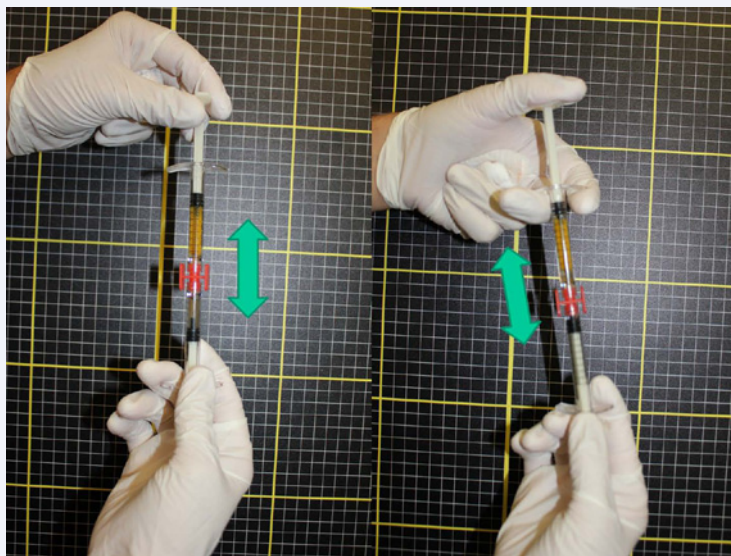
while time needed for infiltration, harvest and emulsification ranged 30-45 minutes (NF group). To quicken the procedure, PRP in NF group was centrifuged during the fat harvesting and we also ideated a procedure without filtration. In fact, after the emulsification process, Tonnard filters the fatty liquid over a sterile nylon cloth and collects the effluent in a sterile recipient [6]. Because of regulatory problems, it was impossible to use a non-medical nylon cloth in our clinic. The use of a smaller

1,5mm cannula for fat harvesting allows obtaining a connective free fat. In this way we don't need to filter tissue remnants that would block the fine needles. The injection time with a needless cannula was the same in both groups. There were no significant complications in our patients. No fat cysts, infections, foreign body reactions, permanent discolorations, or other side effects were observed right after the treatment and also at the three months follow up visit.

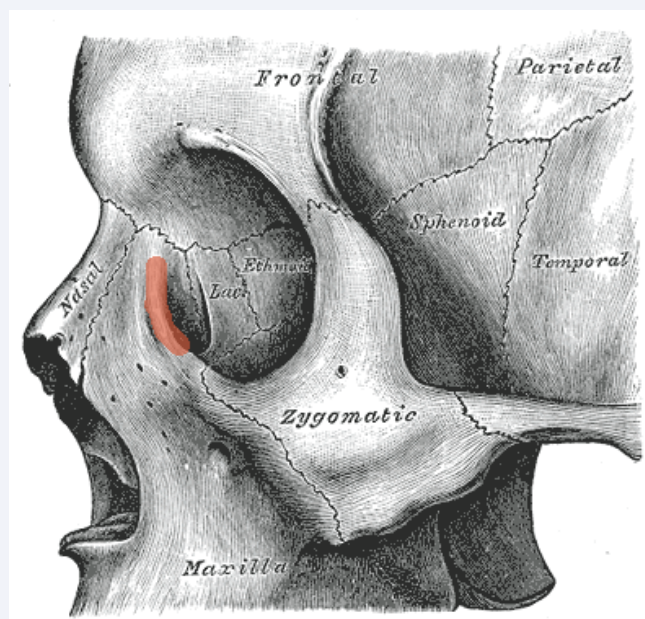




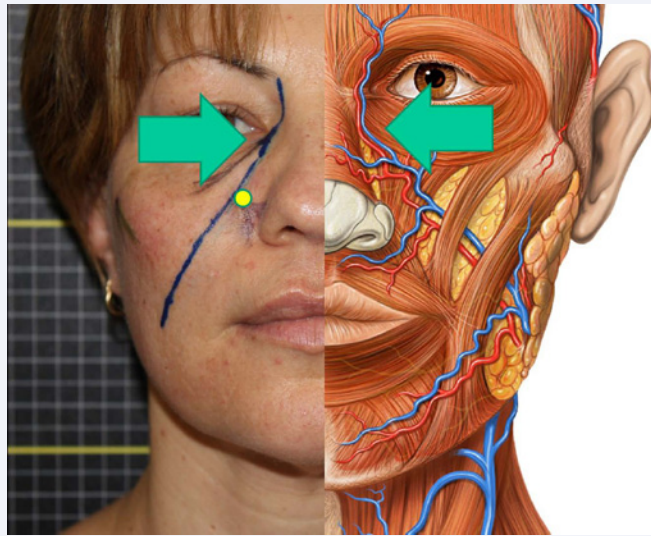
**Figure 4** Fat shifting between two syringes.



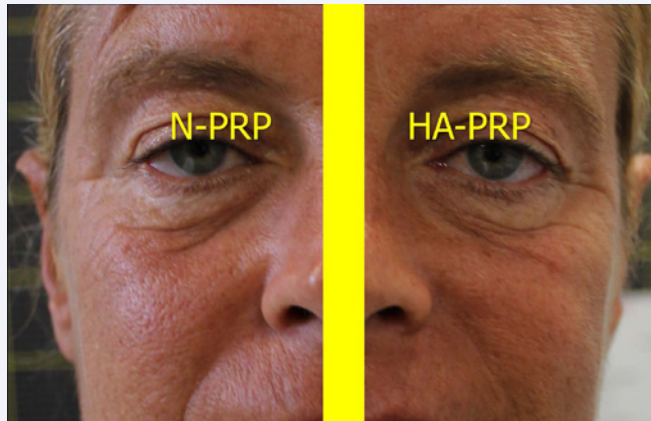
**Figure 5** Creating PRP and Nanofat mixture.



**Figure 6** Lacrimal Sulcus.



**Figure 7** Lacrimal Sulcus.



**Figure 8** Two sides to be treated differently.



**Figure 9** Right Side Materials.

## CONCLUSION

Fat transposition techniques, autologous fat grafting, nanograft and hyaluronic acid fillers are reliable choices for tear trough correction of the lower eyelid. Furthermore we can affirm that it's still easier and faster the treatment with HA and PRP compared to the Nanofat Grafting added to PRP. On the other hand autologous fat is biocompatible, naturally integrates into the host tissues without producing an inflammatory reaction. In our intention is the enlargement of the two groups in order to obtain statistic significance and, depending on the patients' compliance, a six and then twelve months follow up. Long time effects of each group have got to be studied to determine, for example, which one lasts longer or if any related side effect will come out.

## CASE REPORT

A 61-year-old woman consulted for lower lid rejuvenation.

She agreed to undergo a spermental purpose technique combining PRP with nanofat for the correction of the right side, and PRP with hyaluronic acid on the left side (Figure 8). The donor site was the hip. The nanofat has been then combined with PRP in 4:5 proportions (Figure 9). The mixture has been used for the correction only on the right side, using 1 cc luer lock syringe with a 27 G needlless cannula (Figure 10-14).

On the left side, wrinkles has been corrected by means of 6 cc of PRP and hyaluronic acid mixture provided by the cellular matrix kit (Regen Lab) using 1 cc luer lock syringe with a 17 G needlless cannula (Figure 15).

Both techniques provided good correction on the short term (Figure 16-18). After three months the correction obtained by nanofat grafting showed to be more stable.

As reported in the rest of the article, obtaining the HA and



Figure 10 Cannula introduction point.



Figure 11 Cannula insertion.



Figure 12 NanoFat injection.

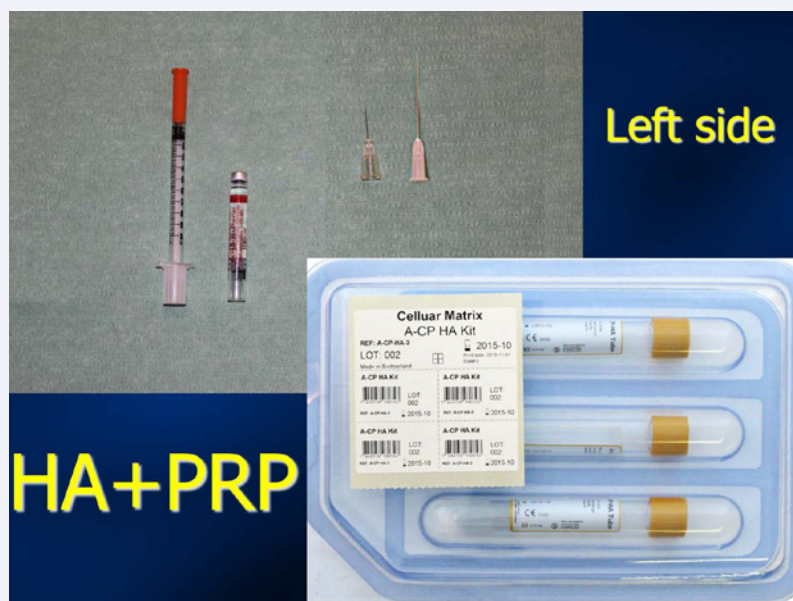




**Figure 13** Nanofat injection.



**Figure 14** After injection massage.



**Figure 15** Left Side Materials.



Figure 16 NF side.



Figure 17 HA side.



Figure 18 Front side.



Figure 19 A: Before treatment / B: Right After treatment.





**Figure 20** A: Before treatment / B: Right after treatment.

PRP mixture revealed to be a faster procedure.

We repeated the same procedures with a 63 and a 58 years old women and still we had good short term results with both procedures (Figure 19 and 20).

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All authors contributed equally.

## Conflict of Interest

The authors have no financial interest to declare in relation to the content of this article. No external funding was received.

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