

THE USE OF MICRONEEDLING AND INJECTABLE PRF FOR GINGIVAL AUGMENTATION – a case report

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ABSTRACT

A 28 year old female patient with thin periodontal phenotype was advised surgical periodontal plastic surgery for which she did not agree. She was then suggested a non surgical approach which she was willing to undergo. Microneedling was performed in the mandibular anterior attached gingiva region using lancet microneedles followed by injection of injectable PRF in the same region.

The one month follow up of the patient showed significant increase in the thickness of the attached gingiva and thus this was considered to be a good alternative to surgical approach. This case report was done to gain knowledge about microneedling and its future use in dentistry.

INTRODUCTION

Gingival phenotype refers to gingival thickness (GT) and keratinized tissue width (KTW). While gingival recession is usually observed in the presence of trauma and inflammation in individuals with thin phenotypes, pocket formation has been reported in individuals with thick phenotypes. The periodontal phenotype also affects the mucogingival surgical technique to be selected for coverage of the root surface. The body uses blood as the

most important autogenous source for the healing of soft and hard tissues¹. Platelet-rich fibrin (PRF), has been developed by centrifugation of blood obtained in glass tubes without anticoagulants and activators². I-PRF prepared according to low-speed centrifugation concept can provide a significant advantage for the regeneration process, as it is rich in platelets, leukocytes and growth factors. It has been reported that i-PRF may contribute to wound-healing processes with increased vascularization³.

Microneedling (MN) is also known as “percutaneous collagen induction therapy”. Microinjuries created by MN result in minimal superficial bleedings and create a wound-healing cascade from which various growth factors, such as platelet-derived growth factors, transforming growth factors, connective tissue growth factor and fibroblast growth factors are released. Growth factors are released immediately after injury, inducing the proliferation of new cells, and fibroblasts are transformed into collagen and elastin fibers from day 5 up to week 8⁴.

In light of these factors, due to the positive effects of MN and i-PRF on the biological potential, neoangiogenesis, neocollagenesis and wound-healing, this case was chosen to perform this non-surgical therapy to increase the thickness of the attached gingiva.

CASE REPORT

A 28-year-old female patient reported to the out patient department of DY PATIL SCHOOL OF DENTISTRY with a chief complaint of hyperpigmented gums and wanted them treated. The patient was referred to the Department Of Periodontology for a Depigmentation procedure. Patient was examined and a detailed case history was recorded in the Department Of Periodontology and it was found that she had no medical history of any sort, had no drug/other known allergies and did not have any deleterious habit. She gave history of orthodontic treatment with both upper and lower arch which ended 1 month back and it was on going since 15 months prior to that.

On examination of the attached gingiva in the mandibular anterior region was found to be of a thin periodontal phenotype, the thickness of the mandibular anterior attached gingiva when checked using a 15K file and measured using a digital vernier calliper was found to be 0.73 mm in the region of 31,32,33 and 0.85 mm in the region of 41,42,43.

A minimum thickness of 1.5mm is required for a depigmentation procedure to be carried out and thus the patient was advised to undergo a Free Gingival Graft to increase the thickness of the attached gingiva. The patient was strictly against getting any surgical treatment done and

hence was informed about an alternative non-surgical procedure to increase the periodontal phenotype.

Patient was informed about the merits and demerits of the Microneedling and iPRF treatment modality and she was convinced with that treatment alternative.

An informed consent was obtained from the patient and she was made to sign a form where details of the entire procedure were mentioned. The same was also explained to her before the procedure verbally.

10 cc 23 gauge syringe were used to draw blood from the patient and was filled in red colour coded vacuum tubes for the preparation of iPRF. These tubes were put into the centrifugation unit and were centrifugated at 700rpm for 3 minutes. This protocol for centrifugation gives us a pale straw colour fluid at the top of the tube which is used as Injectable Platelet Rich Fibrin. Once the iPRF is ready we give topical anaesthesia. Once the area is anaesthetised microneedling is performed using lancet needles. Microneedling is performed at a distance of 1.5mm apical to the gingival margin. The entire attached gingiva in the mandibular anterior region is thus microneedled and is cleaned with cotton to get rid of tiny bleeding points. Once the microneedling is done, iPRF is taken into 1cc insulin syringes and is then injected into the microneedled region. Any extra leaked iPRF is cleaned with a gauze.

Post operative instructions were given to the patient and Tab.Diclofenac 50mg was prescribed. The patient was recalled after 1 month of the procedure for a follow up to evaluate the gain in gingival thickness.

1 month follow up of the patient showed complete gingival healing and the patient was asked if she had any discomfort. The gingival thickness when checked using a 15K file and measured on a digital vernier calliper was found to be 1.74mm in the region of 31,32,33 and 1.77mm in the region of 41,42,43.

DISCUSSION

The result of this present case shows that at the end of 1 month there was a significant increase in the gingival thickness of the attached gingiva. The role of iPRF in gingival augmentation is well established and proven to be a successful treatment alternative to classical surgical techniques. The development of platelet-rich fibrin (PRF) as a second generation of platelet concentrate, which is rich in various growth factors and capable of releasing them continuously and slowly, offers a solution for appropriate growth factor delivery. Moreover, PRF is produced without the use of anticoagulants or coagulation factors and, due to reduced centrifugation G-force, it induces an increase in leukocyte numbers and growth factor concentrations. These products both share the same principle of preparation

through activation of the intrinsic coagulation cascade⁵. PRF products have complete immune biocompatibility and induce rapid angiogenesis of tissues, leading to faster wound healing. Initially, PRF was designated as leukocyte- and PRF (L-PRF). The preparation protocol was later modified to produce injectable PRF (iPRF)⁶. iPRF is a recently developed leukocyte-enriched platelet concentrate, which could better assist tissue regeneration and wound healing phenomena⁷.

Increased collagen and elastin fiber production have been reported after MN procedures with a 40% thicker stratum spinosum layer at 6 month post-treatment⁸ (Aust, Fernandes, Kolokythas, Kaplan, & Vogt, 2008). In a study evaluating the additional contribution of a MN procedure to the use of topical vitamin A and vitamin C, a 22% increase in the epidermal thickness after the use of only topical A and vitamin C and a 140% increase in the epidermal thickness after the use of MN and topical A and C vitamin were reported at 8 weeks after the procedure when compared with the baseline. Fabbrociniet al⁹ administered two sessions of MN for wrinkles of the cervical region. It was reported that tissue thickness increased approximately 0.45 mm in 8th month after the treatment. GT results in this study were similar to the dermatology literature, which indicate an increase in tissue thickness.

CONCLUSION

The increase in the gingival thickness in this case shows that Microneedling with injection of iPRF can be used as a non-surgical approach for gingival augmentation. This can be a viable alternative for patients who are apprehensive about undergoing extensive surgery, patients with systemic conditions which contraindicate the periodontal plastic surgeries and it also eliminates the need of invasive palatal tissue surgery.

In the age of growth factors and stem cells being used for regeneration such a treatment modality could prove to be a step into the future of minimally invasive procedures for gingival augmentation.

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Image 1- Lancet Microneedle used for Microneedling



Image 2- 1 cc Insulin Syringe used to inject iPRF



Image 3- Plastic tubes used for preparing iPRF



Image 4- Microneedling with inection of iPRF in 4th quadrant



Image 5-Microneedling with inection of iPRF in 3rd quadrant



Image 6- Follow up after 1 month