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Comparative Evaluation of the Subjective Results from the Treatment of Gingival Recessions with Connective Tissue Graft and Platelet Rich Fibrin Membrane

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Abstract
Purpose: *The purpose of this study is a comparative subjective evaluation of the postoperative pain, teeth sensitivity and aesthetic results for the patients treated with coronally advanced flap (CAF) in combination with connective tissue graft and platelet rich fibrin membrane (PRF m).*
Material and Methods: *30 patients with a total of 118 symmetrical recessions of Miller's Class I and Class II on different spots of the jaws were treated surgically using two distinct methods. The recessions on one side of the jaw were treated with CAF combined with PRF m (test group), while the other side was treated with CAF combined with connective tissue graft (control group). For the evaluation of the studied subjective parameters we used the standard visual analog scale.*
Results: *The average values for the pain after the surgery were 4.53±1.5cm for the control group and 1.5±0.63cm for the test group. The sensitivity results for the control group show a decrease from 7.1±1.54cm to 1.43±0.68cm, and 7.3±1.58 down to 1.77±0.86cm for the test group. On the sixth month was performed an evaluation of the aesthetic results which was 9.03±1.0cm for the control group and 8.37±1.19cm for the test group.*
Conclusion: *The control group showed better results with a statistically significant difference in comparison to the ones for the test group for the aesthetic results and the decrease in the teeth's sensitivity. The results for the values of the pain after the surgery were lower with a statistically significant difference for the test group compared to the control group.*
Keywords: *gingival recession, platelet-rich fibrin, connective tissue graft, coronally advanced flap*

I. Introduction

The most common reason for which the patients look for treatment of gingival recessions is the impaired aesthetics and the hypersensitivity of the affected teeth. However, most studies seldom take into account the subjective evaluation given by the patients for aesthetic results, postoperative discomfort and the sensitivity of the teeth after the surgery. The existing surgical methods for the treatment of gingival recessions mostly demonstrate good results and predictability. Most authors make use of different modifications of coronally advanced flap (CAF) in combination with connective tissue graft (CTG) and consider it the "golden standard". [1] However, these techniques create two postoperative wounds and this is considered to be related with the increased risk of direct and postoperative complications with marked postoperative discomfort. [2] Single publications for the treatment of gingival recessions using platelet rich fibrin (PRF) with very promising results appeared in the past few years. [3-8] PRF is defined as an autogenous, containing increased concentration of leukocytes and platelets, solid biomaterial. It releases growth factors slowly for at least 7-28 days. [9-11] The PRF is made out of the blood of the patient in clinical conditions and it contains no other chemical or biological supplements. PRF is used to stimulate the bone and soft tissue regeneration in the oral and maxillo-facial surgery, dental implantology and periodontal surgery. [12, 13] It is also used for the healing of extraction wounds [14], covering of mucous lesions [15], treatment of intraosteal defects [16], radicular cysts [17], influence of the bone in biphosphate osteonecrosis [18] and more.
Comparative evaluation of the subjective results from the treatment of gingival recessions with connective tissue... ,

II. Purpose

The purpose of the study is a subjective evaluation of the level of postoperative pain, teeth sensitivity and aesthetic results for the patients treated with coronally advanced flap in combination with connective tissue graft (CAF+CTG) and coronally advanced flap in combination with platelet rich fibrin membrane (CAF+PRF m).

III. Material and Metods

The clinical study was conducted in the Department of Oral Surgery, Faculty of Dental Medicine, Medical University – Plovdiv. The period was from January 2013 to November 2015. There were 30 patients (23 women and 7 men) at the age of 23 to 70 years (average age of 37.93 years) with a total of 118 symmetrical gingival recessions of Miller's Class I and Class II on different spots of the jaws. On one side of the jaw was carried out a covering of 59 gingival recessions with CAF in combination with PRF m (test group) – Fig. 1 – while on the opposite side 59 recessions were covered with CAF in combination with CTG (control group) – Fig. 2. The treatment method was chosen at random on the day of the surgery. The results were monitored for six months after.

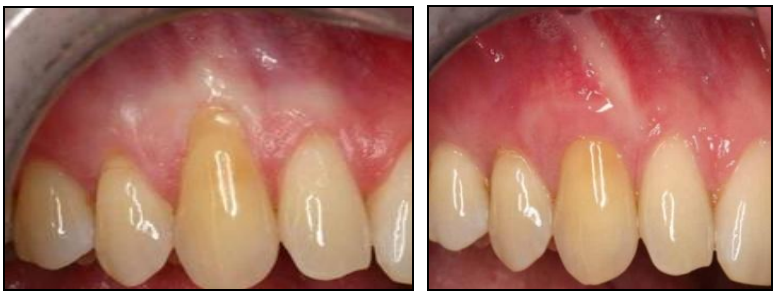

Fig. 1. Before and after treatment with CAF+CTG

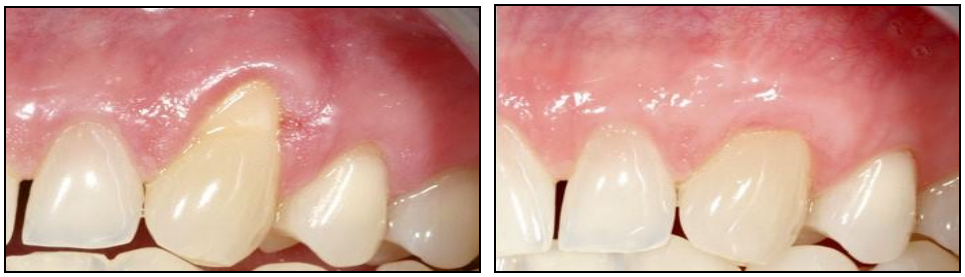

Fig. 2. Before and after treatment with CAF+PRF

3.1 Inclusive criteria

Recessions of Miller's Class I and Class II; age of 18 or above; patients with no contraindications for surgical intervention and good oral hygiene (plaque index < 20%).

3.2 Exclusive criteria

Severe systematic diseases or immunodeficiency; intake of anticoagulants and antiaggregants; pregnant with contraindications for surgical interventions; allergies to medicaments used during the treatment; bad oral hygiene (plaque index > 20%); patients with removable or fixed dentures; patients smoking more than 10 cigarettes a day or taking drugs.

3.3 Surgical treatment

After the application of suitable local anesthesia a horizontal incision of the mucosa is made with a scalpel, beginning from the middle of the gingival papilla, medially of the affected by the recession tooth, a little above the cemento-enamel junction (CEJ).

The incision goes sulcularly along the marginal edge of the affected by the recessions teeth and ends in the middle of the papilla, distally of the affected tooth a little above the CEJ. The vertical incisions begin from the ends of the horizontal ones, slightly diverging apically, reaching the mucogingival junction (MGJ). The formed mucoperiosteal flap is carefully detached with a small periosteal elevator and the periosteum is cut at its length at the base of the flap. The gingival papillae are de-epithelized coronally above the horizontal incisions. The exposed root surfaces are carefully cleaned and polished with hand and machine instruments. The root surface is then conditioned with prepared ex tempore solution of tetracycline with a concentration of 125mg/ml for 3 mintues. At this stage for the test group is then put the PRF m, and for the control group – CTG. CTG and PRF m are stitched a little above the CEJ with absorbable thread 0000. After being stitched they are covered by mucoperiosteal flap which is also stitched with absorbable thread 0000. The threads are removed 12-14 days after the surgery.

3.4 Preparation of the PRF membrane

We prepare the PRF m just before the surgery after drying out the PRF clot, created by centrifugation of blood from the patient by the method of Choukroun et al. [19, 20] Depending on the case 2 to 4 tubes of blood are taken from each patient. The blood is then centrifugated at 1500 rpm for 8 minutes (PF DUO-Processor PRF – France). The PRF m is prepared from two PRF clots which are put on top of one another in a way that the parts bordering with the red zone are the opposite ends. The prepared PRF membrane is bent in two and then dried for 1-2 minutes in A-PRF Box® [12] – fig. 3.

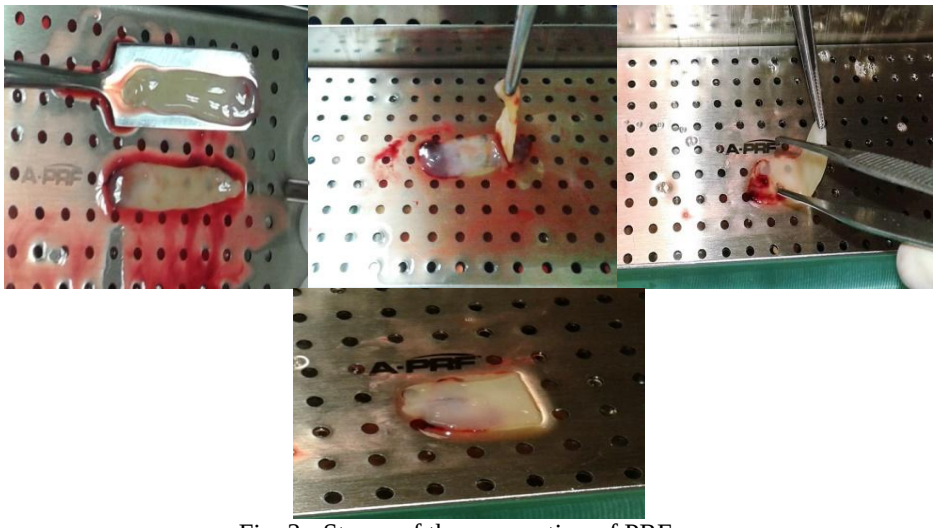

Fig. 3 - Stages of the preparation of PRFm.

3.5 Method for the taking for the connective tissue graft

If possible we always apply the single incision technique described by Hürzeler and Weng [21] in order to take the CTG from the palatum of the patient – Class I in the classification of Liu. [22]

3.6 Subjective measurements

For the evaluation of the studied subjective parameters we used the standard visual analog scale – VAS. The results from the subjective evaluation of the patients were registered at the checkup visits. The patients were given a previously formulated question related to the value of a given subjective parameter. With a pen or pencil the patient puts a mark on the scale (VAS) based on his estimation. The marked by the patient result is then measured with a millimetric ruler (the VAS line's length is exactly 10 cm). The centimeter values are then rounded to integer values from 0 to 10. A value of 0 is for no complaint while a value of 10 is for the maximal grade of complaint. The following subjective parameters were studied:

- Evaluation of the pain on the first day after the surgery – VAS-P (Visual Analog Scale of Pain).
- Evaluation of the sensitivity to thermal and mechanical irritants – VAS-S (Visual Analog Scale of Sensitivity). This is done by an aimed air stream for 1-2 seconds at the area of the recession by the three way syringe of the dental unit. The results were measured prior to the surgery (VAS-S0) and on the sixth month after (VAS-S6).
- The subjective evaluation for the aesthetic results – VAS-E (Visual Analog Scale of Esthetic Outcomes). The results is measured on the checkup visit on the sixth month after the surgery.

3.7 Statistical methods

For the processing and objectifying of the subjective VAS values we used Student's t-test for paired samples and Fischer's test for normal distribution in the studied population.

3.8 Postoperative care

Postoperatively all patients were assigned therapy with NSAIDs for 3 days and mouth rinsing with 0,12% solution of chlorhexidine one minute three times a day for 14 days. The application of cold compresses in the surgery area and mushy-liquid diet for the first seven days were recommended. Checkup examination was done on the first day after the surgery, and the threads were removed on the 14th day after. Patients were given instructions about the technique of personal hygiene and to avoid brushing the treated teeth for the next 14 days.

IV. Results

The average values of the subjective results for the postoperative pain, tooth sensitivity and aesthetic outcome are listed in Table 1. The average values of mean percent of root coverage (RC %) for the control group are 90.29%±9.05% and 80.48%±10.19% for the test group. All other clinical values have been published in our previous study. [23]

Tabl 1. Subjective results

Measured parameters	**VAS-P mean±SD**	**VAS-S_0 mean±SD**	**VAS-S_6 mean±SD**	**VAS-E mean±SD**
Control group (CAF+CTG)	4.53±1.50	7.10±1.54	1.43±0.68	9.03±1.0
Test group (CAF+PRFm)	1.50±0.63	7.30±1.58	1.77±0.86	8.37±1.19
P value	0.00*	0.06	0.00*	0.00*

Key of table 1. -*-statistical significance - P value < 0.05

V. Discussion

The grade to which the subjective complaints of the patients have been affected after the treatment of gingival recessions is essential for the correct evaluation of the achieved healing result. The sensation of postoperative discomfort (pain) of the patients is subjective but to a large degree it depends on the surgical technique and the skills of the surgeon. In this study we used the visual analog scale (VAS) in order to objectify the subjective values. Thus the subjective results were processed statistically which allows a better interpretation. On the 24th hour after the treatment for the patients treated with CAF + PRF m, lower were given for the postoperative pain. Comparing the results of the two groups demonstrated a statistically significant difference (P value < 0.05) for the test group (CAF + PRF m) – Table 1. The greater discomfort for the patients in the control group (CAF + CTG) was deemed to be due to the donor operative wound (palate wound) and the greater discomfort in the area of the treated gingival recessions. The resulting values of postoperative pain confirm the opinion of most authors about the greater discomfort of the patients treated with surgical techniques using CTG. [5, 24-26] The lowered postoperative discomfort in the test group can be due to the biological qualities of the PRF. Platelet concentrates, and the PRF in particular, are stitched quick and well to the exposed root surfaces, the bone and the periosteum. [27] This way they aid in the stabilization of the tissues around the treated gingival recession and reduce the micromovement of the tissues in the surgical wound. [4, 28, 29] The PRF membrane contains a high concentration of growth facotrs which aid in the healing process (neoangiogenesis) of the soft tissues while the leukocytes in the PRF m can improve the defensive mechanisms locally about the wound. [4, 9, 28-31] When comparing the preoperative results for the sensitivity of the teeth for both groups no statistical significance is shown. The average values for the sensitivity on the sixth month after the surgery demonstrate a great decrease for both groups – Table 1.

The decrease is statistically significant for both groups when compared to the preoperative values – P value < 0.05. The average values for the tooth sensitivity at the end of the monitoring period were slightly better for the control group (CAF + CTG). Compared to the test group (CAF + PRF m) the results show no statistically significant difference - P value ≥ 0.05 – Table 1. The better result for the control group we consider to be due to the fact that the control group has a higher mean percent of root covering (90.29%±9.05%). For the test group the results for this parameter was lower – 80.48%±10.19%. We found no data for the measurement of the average values of teeth's sensitivity to thermal and mechanical irritants in the treatment of gingival recessions with the usage of PRF m. This does not allow for a better evaluation of the results for the test group. The results for the teeth's sensitivity to thermal and mechanical irritants for the control group coincides with the results from the retrospective study published by Pini-Prato G et al. [26] The average values on the sixth month after the surgery for the aesthetic outcome demonstrate great results for both groups – Table 1. The aesthetic result was slightly better for the control group (CAF + CTG) in comparison to the one of the test group (CAF + PRF m) but with no statistically significant difference (P value ≥ 0.05) – Table 1. The better aesthetic result for the group treated with CTG coincides with the results from other studies. [26, 32-35] What makes an impression are the lower mean percent of root coverage in our study for the test group – 80.48%±10.19% - and the high aesthetic values given by the patients in this group. We consider this to be due to the quick healing of the soft tissues with no complications when using the PRF m. According to Aroca S et al. [36] the mean percent of root coverage is not directly proportional to the satisfaction of the aesthetics. In their study only 52.3% of the patients in the control group (CAF + CTG) and 19% in the test group (CAF + PRF m) show a 100% covering 6 months after the treatment. However, this result, according to the authors, does not analogically reflect the subjective values given by the patients. The satisfaction of the patients by the aesthetic results after the surgical treatment is 38% for the test group (CAF + PRF m) and 71.4% for the control group (CAF + CTG). Our results coincide with the resulting values of the Healing Index used in another study [29], conducted in order to get a

comparative evaluation of the healing period after the treatment of gingival recessions with two distinct methods. For the first method the researchers treat gingival recessions with CAF + PRF m, and for the second method they treat the recessions with CAF + CTG. The authors of this comparative study conclude that the good clinical results, the absence of second operative wound, the faster healing of the tissues and the significantly lower postoperative discomfort of the patients are the main advantages of the PRF membrane in the treatment of gingival recessions.

VI. Conclusion

Both methods used in the treatment of gingival recessions show a good reduction for the sensitivity of the teeth to thermal and mechanical irritants. Patients made a good evaluation of the achieved aesthetic results with slightly better values for the patients treated with CAF + CTG. The measurement of postoperative pain in our study showed lower levels of pain for the group treated with CAF + PRF m.

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