

Evaluation of the effect of oxidized gelatin sponge on pain level in the donor area in free gingival graft operations

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Abstract

Aim: The purpose of the study is to evaluate the effect of Oxidized Gelatin Sponge (OGS) usage in the donor site on pain during the post-operation period through the VAS form administered to the patients.

Material and Methods: The study was carried out by using the VAS forms filled in on the 2nd and 7th days following the operation by the 34 patients who had undergone Free Gingival Graft (FGG) operation performed by the same periodontologist in the Faculty of Dentistry, Harran University, Turkey. The information on whether the wound that formed in the donor site was packed primarily and, if packed, what material was used was obtained from the periodontologist who treated the patients. As a result of these assessments, the patients whose donor sites were left to heal by secondary intention were categorized as the control group and those whose wounds were packed with OGS as the experimental group.

Results: When the VAS scores of the 22 patients, 14 of whom were female and 8 males, were examined, no statistically significant difference between females and males was determined ($p < 0.05$). While the 2nd and 7th day VAS value averages of the patients whose donor sites were left to heal by secondary intention were 5.71 ± 0.88 and 2.82 ± 0.62 respectively, these averages in the group whose donor sites were packed with OGS were determined to be 3.88 ± 0.95 and 1.67 ± 0.80 respectively. In addition, when the 2nd and 7th day VAS value averages of the two groups were compared, no statistically significant difference was found.

Conclusion: It was concluded that packing the donor site with OGS following the FGG operations does not have an impact on the intensity of post-operation pain felt by the patients.

Keywords: Oxidized gelatin sponge; free gingival graft; palatine pain

INTRODUCTION

Gingival Recession (GR) is a condition that is frequently encountered by clinicians and patients. It is defined as the displacement of the gingival soft tissue margin apical to cemento-enamel junction (1) (Figure 1). It is a frequently observed condition of the gingivitis and its prevalence has been reported to increase with aging (2). Generalized or localized, GR is regarded as one of the clinical properties of periodontal disease. It mostly leads to clinical problems such as sensitivity, root decays, cervical root abrasions, erosions, plaque accumulation and aesthetic concerns (3, 4). GR is usually caused by various etiological factors such as oral habits, teeth in malposition, high frenulum or muscle attachment, and iatrogenic factors associated

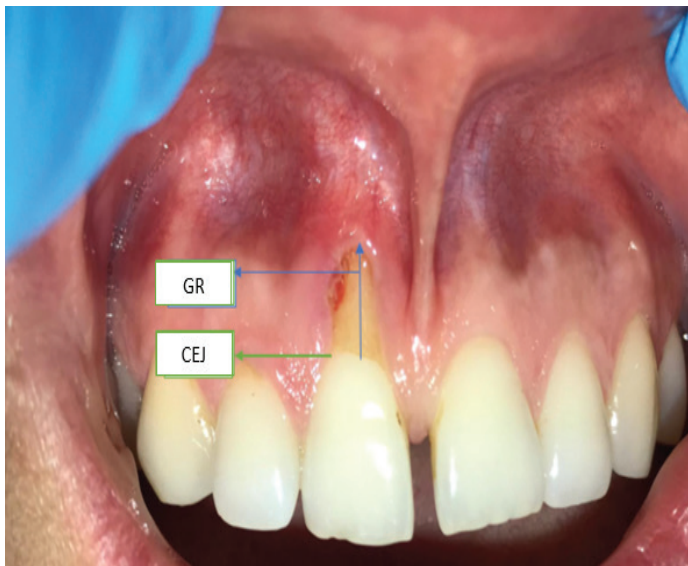
with various restorative and periodontal procedures (5, 6). In the treatment of GR, a variety of periodontal surgical methods such as rotational flaps, coronally positioned flap, free gingival graft (FGG), directed tissue regeneration, connective tissue graft or a combination of these are used (7). First described by Bjorn in 1963, FGG operation is a reliable and approved method as it increases the amount of connected gingivitis and hinders the advancement of GR. Besides, it has been shown in many long-term (more than 4 years) studies in the literature that the result of the treatment is maintained successfully (8). This technique is simply defined as the preparation of a recipient bed in the GR site and immobilizing the free gingival graft removed from the donor site onto the recipient bed

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through periosteal sutures. In this surgery, the FGG is usually removed from the chewing mucosa in the palatal region (Figure 2). Among the main disadvantages of the technique are the existence of two operation sites, inappropriate color match, rugose content of some parts of the graft, and insufficiency of the donor site (9).



Gr: Gingival Recession
CEJ: Cemento-enamel junction
Figure 1. Gingival Recession



Figure 2. Leaving the donor site to heal by secondary intention

Leaving the wounded area in the donor site where the graft is taken in FGG surgeries to heal by secondary intention leads to post-operative bleeding and pain complications, and thus the healing process tends to slow down (10) (Figure 3). It has been reported in several studies that the palatal area left to heal by secondary intention recovered in 2 to 4 weeks following the operation (11) (Figure 4).

Rossmann and Rees suggested packing this site with a hemostatic pad in order to prevent such post-operative complications in the donor site (12). There are numerous studies in the literature in which the site was packed with various materials to reduce the complications that might occur in the palatal donor site (12-16). Oxidized gelatin sponge (OGS) creates a matrix which augments coagulation by providing platelet aggregation and it is used as a clotting agent in some fields of dentistry. Today, employing the hemostatic property of this collagen is being increasingly widespread in mucogingival surgery. Many studies in the literature has demonstrated that in order to speed up the healing of the palatal area (donor site), this site is packed with OGS. (12, 18-20) (Figure 5).



Figure 3. Secondary bleeding that occurs in the donor site after the surgery

Visual Analog Scale (VAS) is commonly utilized in many clinical and epidemiological studies to evaluate the intensity and frequency of the patients' symptoms, primarily the pain (21). VAS is a reliable and valid measurement tool in the assessment of the severity of pain. On VAS, patients place a mark on a straight line of 10 cm thinking the lightest and the severest pain they have felt throughout their lives (22). In the study, a 100-mm horizontal VAS was employed (Figure 7). Patients were asked to fill in the scale on the 2nd and 7th day after the operation according to the post-operative pain they felt on their palate.

The purpose of the study is to evaluate the effect of OGS usage in the donor site in FGG operations on pain during post-operative period through the administration of VAS to the patients.



Figure 4. Appearance of the donor site on the 10th day after the surgery



Figure 6. Donor site packed with OGS



Figure 5. Packing the donor site with Oxidized Gelatin Sponge

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Name and Surname:..... Date.....

Mark the intensity of pain on the scale.



Figure 7. Visual Analog Scale form administered to the patients after the operation

MATERIAL and METHODS

The study was conducted on 34 patients who had Miller Class I and II gingival recession on only one of mandibular central incisor and were treated with FGG in the Periodontology Department of the Faculty of Dentistry, Harran University, Turkey. This retrospective study was performed using VAS forms of patients operated with FGG. VAS forms were selected among from marked on the 2nd and 7th days, and it was taken into consideration that the wound on the donor area was closed primary or secondary healing. The material type which was used (PRF is used in some patients) on the donor area for the

primary closure was learned from the physician who performed the operations. Therefore, patients who used any material other than OGS for primary closure of the donor area were excluded from the study. As a result of these assessments, the patients whose donor sites were left to heal by secondary intention were categorized as the control group and those whose wounds were packed with OGS as the experimental group a result of these assessments, the patients whose donor sites were left to heal by secondary intention were categorized as the control group and those whose wounds were packed with OGS as the experimental group.

The statistical analysis of the data obtained was performed with statistical analysis software (IBM SPSS Statistics 21). In order to determine the distribution of the data, Shapiro-Wilk test and to evaluate homogeneity Levene test were used. Independent t-test was applied to identify the intersex differences among the samples included in the study. Paired t-test was employed for assessing the intragroup difference between the average VAS values on the 2nd and 7th days, while the intergroup difference between the VAS values on the 2nd and 7th days was determined through One-way ANOVA test. In all the tests applied, $p < 0.05$ was considered as statistically significant.

RESULTS

When the VAS forms retrieved from the patients were examined, a total of 12 patients who smoked, did not use anti-inflammatory medicine on a regular basis, had some systemic illness, did not mark the form, and were treated with a different material from OGS in the donor site were excluded from the study. When the forms of the remaining 22 patients were examined, it was determined that the donor site in 12 patients was packed with OGS primarily (Figure 8), and that the donor sites of 10 patients were left to heal by secondary intention (Figure 9).

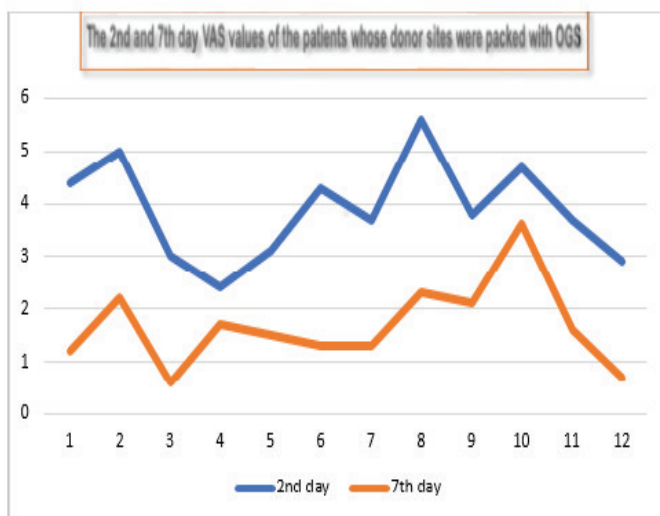


Figure 8. VAS values of the patients in the experimental group

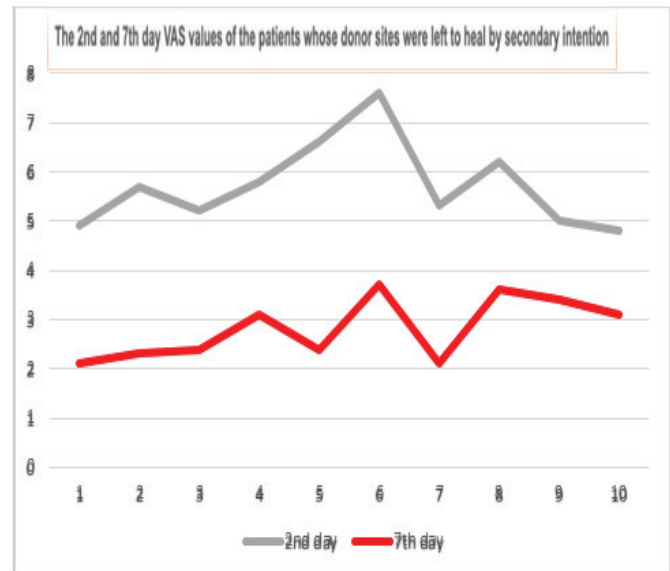


Figure 9. VAS values of the patients in the control group.

The ages of the total 22 patients, 14 of whom were female and 8 of whom were male, ranged between 22 and 34, and the mean age was determined to be $27,09 \pm 3,4$. The Independent t-test identified the average VAS values of the females in the control and experimental groups as 4.6 ± 1.2 and 3.4 ± 0.9 , respectively. On the other hand, the average VAS values of males in the control and experimental groups turned out to be 4.7 ± 1.4 and 3.3 ± 1.1 , respectively. In addition, no statistically significant difference between the 2nd and 7th day average VAS values of females and males in the control and experimental groups was found.

The average of the 2nd and 7th day VAS values of the group whose donor sites were left to heal by secondary intention was determined as 5.71 ± 0.88 and 2.82 ± 0.62 respectively, while the average of the 2nd and 7th day VAS values of the patient group whose donor sites were primarily packed with OGS was found to be 3.88 ± 0.95 and 1.67 ± 0.80 respectively. As a result of Paired t-test applied in order to identify any difference between the averages of VAS values observed on the 2nd and 7th days within the group (The group left to heal by secondary intention – the group packed primarily with OGS), the p value of the group left to heal by secondary intention was determined to be 0.00002, while the OGS group had a p value of 0.00001. Accordingly, it was concluded that there was a significant difference between the 2nd and 7th days in terms of VAS values in both groups, and it was reported that the pain regressed gradually after the operation. In the One-way ANOVA test which aimed to identify intergroup differences in VAS values, $p > 0.05$ value was obtained. In accordance with the result of this test, it was reported that packing the donor site with OGS primarily did not reduce the pain felt by the patients.

DISCUSSION

FGG surgery is a prevalent treatment method today which is employed in order to increase the amount of keratinized

gingivitis. As the palatal donor site is left to heal by secondary intention and the healing process takes a long time, various complications such as pain and bleeding occur in the patients (11,23). Besides, the healing process of the donor site left to heal by secondary intention requires longer time (24). With a view to minimizing such complications, researchers have used various materials such as stents (25), healing herbal essences (20), platelet-rich fibrin (PRF) [13], collagen from horses (26) and OGS (18) to close the donor site. On the other hand, there are also researchers who leave the donor site to heal by secondary intention without any intervention (11). Several studies have reported that packing the donor site with PRF in FGG operations reduced the post-operative complications significantly and that it accelerated the healing of the wound at a significant level (15,18,23,27). In a study where they compared the effect of OGS and PRF usage in the donor site on the healing process, Femminella et al. reported that the patients treated with PRF showed better recovery and that the patients experienced less pain (18). In our study, the clinical pictures taken showed better healing of the donor site, better color match and contour in the patients treated with OGS in the first week (Figure 6).

Since the FGG operations aim to close the exposed root surface, the size of this surface varies from patient to patient. Therefore, the size of the tissue taken from the donor site depends on the recipient site. This situation is thought to have a bearing on the level of the post-operative pain and a few studies have been carried out on this issue. In one of these studies, researchers placed the patients in 3 groups according to the size of the graft taken from the donor site, evaluated the pain they felt on VAS scale, and reported that there was no statistically significant difference in the VAS value of the 3 groups. As a result, the researchers concluded that the size of the donor site in FGG surgeries did not impact the level of post-operative pain felt (28). Based on this study, we carried out our study considering that the size of the graft taken from the donor site has no effect on VAS values.

Pain is a subjective complaint varying from person to person. Post-operative pain is an acute pain which starts with surgical trauma, subsides gradually and disappears with the recovery of the tissue. Pain is the most important factor affecting the life quality of the patient (29). In the assessment of pain, the most reliable indicator is the patient's expressing the pain (30). VAS is a valid and reliable method used in the assessment of the level of pain; however, measuring the intensity of pain in one dimension only is thought to be a disadvantage of the method (31). In the literature, there are many studies in which various materials were applied on the donor site in FGG operations and the effects of these materials on post-operative VAS values were evaluated (13,14,32,33). In a study they conducted in 2015, Keçeli et al. categorized the patients on whom they performed FGG operations into two groups as the control group and the experimental group, and while in the control group that they left the donor site to heal by

secondary intention, they used Ankaferd blood stopper in the donor site in the experimental group. As a result of the study, Keçeli et al. determined the average VAS values of the patients in the control group on the 2nd and 7th days as 4.87 ± 1.58 and 0.56 ± 1.03 respectively, while they reported the average VAS values of the patients in the experimental group on the 2nd and 7th days as 2.94 ± 1.47 and 0.00 ± 0.00 respectively (20). In a study they carried out, Femminella et al. identified the average VAS value in the first post-operative week of the patients whose donor sites were packed with OGS as 4.5 (33). In our study, on the other hand, it was determined that the average VAS values on the 2nd and 7th days of the patients whose donor sites were left to heal by secondary intention were 5.71 ± 0.88 and 2.82 ± 0.62 respectively, while those values in the patients whose donor sites were packed with OGS were 3.88 ± 0.95 and 1.67 ± 0.80 respectively. It has been reported in many studies that usage of PRF in the donor site alleviated the level of post-operative pain that occurred in the donor site, and that it proved more effective compared to other methods (13,15,18,33). When the literature was researched, although some studies were found in which OGS was used in the donor site in FGG operations in order to reduce the post-operative VAS values, no study was detected in which the VAS values of the situations where the donor site was left to heal by secondary intention were compared. With our study, we aimed to shed some light on this deficiency in the literature.

In the study, the VAS values of two groups of patients whose donor site were packed primarily with OGS and whose donor sites were left to heal by secondary intention were compared retrospectively. The VAS values of both groups on the 7th day after the operation were determined to be significantly less compared to the values on the 2nd day ($p = 0.00001$ and $p = 0.00002$). It was also determined in the study that the two methods, packing the donor site with OGS and leaving it to heal by secondary intention, did not yield a significant difference in the post-operative pain experienced by the patients ($p > 0.05$).

CONCLUSION

Considering the results of this retrospective study, the authors report that packing the donor site with OGS following FGG operations does not affect the intensity of post-operative pain felt by the patients. Besides, upon consideration of literature research, the authors state that usage of PRF in the donor site increases post-operative comfort of the patient and recommend that new studies be conducted on this issue.

Competing interests: The authors declare that they have no competing interest.

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Ethical approval: This study was approved by the Institutional Ethics Committee and conducted in compliance with the ethical principles according to the Declaration of Helsinki.

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REFERENCES

1. Cohen RE. The American Academy of Periodontology 1999 Annual Report 2005;70:1575.
2. Kassab MM, Cohen RE. The etiology and prevalence of gingival recession. *J Am Dent Assoc* 2003;134:220-5.
3. Khosya B, Cg D. Original Article Etiology and Severity of Different Grades of. *Natl J Med Res* 2014;4:189-92.
4. Chambrone LA, Chambrone L. Subepithelial Connective Tissue Grafts in the Treatment of Multiple Recession-Type Defects. *J Periodontol* 2006;77:909-16.
5. Susin C, Haas AN, Oppermann R V., et al. Gingival Recession: Epidemiology and Risk Indicators in a Representative Urban Brazilian Population. *J Periodontol* 2005;75:1377-86.
6. Tugnait A, Clerehugh V. Gingival recession - Its significance and management. *J Dent* 2001;29:381-94.
7. Goyal L, Gupta ND, Gupta N, et al. Free Gingival Graft as a Single Step Procedure for Treatment of Mandibular Miller Class I and II Recession Defects. *World J Plast Surg* 2019;8:12-7. 8.
8. Patil Veena A BN. Free Gingival Autograft : A Case Report. *Int J Dent Clin* 2010;2:42-6.
9. Popova C, Kotsilkov K, Doseva V. Mucogingival Surgery With Free Gingival Graft (Strip Technique) for Augmentation of the Attached Gingival Tissues : Report of Three Cases 2007;13
10. Hou L-T, Yan J-J, Liu C-M, et al. Treatment of the gingival recession -literature review of current progress. *Chin Dent J* 2005;24:71-8.
11. Del Pizzo M, Modica F, Bethaz N, et al. The connective tissue graft: A comparative clinical evaluation of wound healing at the palatal donor site - A preliminary study. *J Clin Periodontol* 2002;29:848-54.
12. Rossmann JA, Rees TD. A Comparative Evaluation of Hemostatic Agents in the Management of Soft Tissue Graft Donor Site Bleeding. *J Periodontol* 2005;70:1369-75.
13. Üner D, Izol B. Evaluation of the Effect of Platelet-Rich Fibrin on Palatal Donor Area Pain After Harvesting a Free Gingival Graft. *Int J Adv Res* 2018;6:292-6.
14. Mannava Y, Nayak SU, Kamath DG, et al. Platelet-rich fibrin as palatal bandage: A case report. *Indian J Public Heal Res Dev* 2018;9:65-8.
15. Bahammam MA. Effect of platelet-rich fibrin palatal bandage on pain scores and wound healing after free gingival graft: a randomized controlled clinical trial. *Clin Oral Investig* 2018;22:3179-88.
16. Kumar A, Gupta G. Palatal bandage. *J Indian Soc Periodontol* 2014;18:684.
17. Mannai C, Leake D, Pizzoferrato A, et al. Histologic evaluation of purified bovine tendon collagen sponge in tooth extraction sites in dogs. *Oral Surgery, Oral Med Oral Pathol* 1986;61:315-23.
18. Femminella B, Iaconi MC, Di Tullio M, et al. Clinical Comparison of Platelet-Rich Fibrin and a Gelatin Sponge in the Management of Palatal Wounds After Epithelialized Free Gingival Graft Harvest: A Randomized Clinical Trial. *J Periodontol* 2015;87:103-13.
19. Nct. Platelet Rich Fibrin in the Treatment of Palatal Wounds. <https://ClinicaltrialsGov/Show/Nct02438046> 2015.
20. Keceli HG, Aylikci BU, Koseoglu S, et al. Evaluation of palatal donor site haemostasis and wound healing after free gingival graft surgery. *J Clin Periodontol* 2015;42:582-9.
21. Miller MD, Ferris DG. Measurement of subjective phenomena in primary care research: the Visual Analogue Scale. *Fam Pract Res J* 1993;13:15-24.
22. Kurşun YZ, Yıldız F, Kaymaz Ö, ve ark. Ağrılı kanser hastalarının tedavisinde analjezik basamak tedavisinin yeri. *Ağrı* 2015;27:26-34.
23. Aravindaksha SP, Batra P, Sood V, et al. Use of Platelet-Rich Fibrin Membrane as a Palatal Bandage. *Clin Adv Periodontics* 2013.
24. Tomar N, Singh R, Jain G, et al. Enhancement of healing of donor hard palate site using platelet-rich fibrin. *J Curr Res Sci Med* 2017;2:132.
25. Wessel JR, Tatakis DN. Patient Outcomes Following Subepithelial Connective Tissue Graft and Free Gingival Graft Procedures. *J Periodontol* 2008;79:425-30.
26. Zucchelli G, Mele M, Stefanini M, et al. Patient morbidity and root coverage outcome after subepithelial connective tissue and de-epithelialized grafts: A comparative randomized-controlled clinical trial. *J Clin Periodontol* 2010;37:728-38.
27. Thomas B, Varghese J, Bhat G, et al. Platelet-rich fibrin as an adjunct to palatal wound healing after harvesting a free gingival graft: A case series. *J Indian Soc Periodontol* 2014;18:399.
28. Wyřebek B, Górski B, Górski R. Patient morbidity at the palatal donor site depending on gingival graft dimension. *Dent Med Probl* 2018;55:153-9.
29. Lellan K. Management of pain a practical approach for health care professionals. Nelson Thornes 2006.
30. Pasero C, McCaffery M. Pain Control: When Patients Can't Report Pain. *Am J Nurs* 2008;100:22.
31. Kursun YZ. Analgesic Step Ladder Treatment in Cancer Patients With Pain. *Ağrı - J Turkish Soc Algol* 2015;27:26-34.
32. Burkhardt R, Hämmerle CHF, Lang NP. Self-reported pain perception of patients after mucosal graft harvesting in the palatal area. *J Clin Periodontol* 2015;42:281-7.
33. Femminella B, Iaconi MC, Di Tullio M, et al. Clinical Comparison of Platelet-Rich Fibrin and a Gelatin Sponge in the Management of Palatal Wounds After Epithelialized Free Gingival Graft Harvest: A Randomized Clinical Trial. *J Periodontol* 2016;87:103-13.