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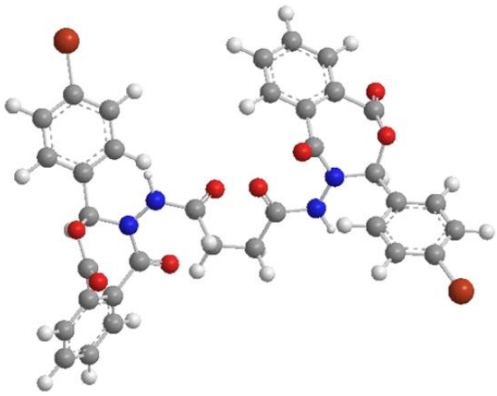

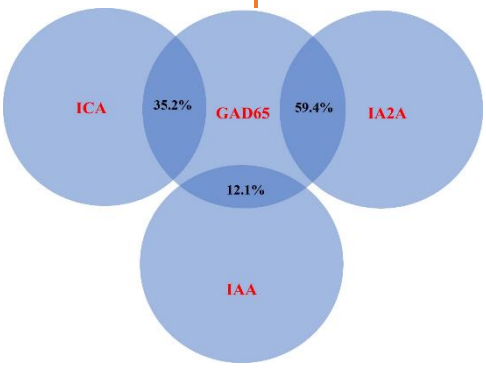

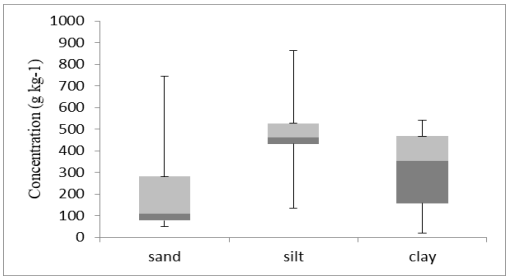

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Effectiveness of the periodontal dressing upon periodontal parameters during treatment of gingival recession by free gingival graft

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Abstract

Background: Various grafting procedures have been used to convert a thin periodontal phenotype to a thick phenotype, including free gingival graft. **Objective:** To evaluate the effectiveness of the periodontal dressing upon periodontal parameters such as Pocket depth, width of keratinized gingiva and recession depth during treatment of the Miller class I, II or III gingival recession of the lower anterior teeth. **Materials and Methods:** 34 lower anterior teeth with Miller class I, II or III gingival recession were selected and randomly grouped into two groups. The first group included 19 teeth and was treated with a single-step free gingival graft procedure with the application of the periodontal dressing. The second group had 15 teeth and was treated with a single-step free gingival graft (FGG) procedure without applying the periodontal dressing. Clinical parameters such as probing depth, the width of keratinized gingiva and recession depth were recorded before surgery (B0), two weeks (B1) and three months (B2) after surgery. **Results:** No significant differences (P>0.05) in PD were observed in both groups at different time intervals and between both groups at two weeks and three months after surgery. However, a significant reduction (P<0.05) in RD in both groups at two weeks and three months after the surgery was seen. Also, both groups saw a significant decrease (P<0.05) at two weeks and three months after surgery. WKG was significantly (P<0.05) increased at two weeks and three months after the surgery in both groups. The difference in the increase was highly significant (P<0.001) between both groups at 2-weeks and 3-months after the surgery. **Conclusions:** The group that used periodontal dressing at 2-weeks and 3-months after surgery reported greater improvements in root coverage and increased width of keratinized gingiva compared to those who did not use periodontal dressing.

Introduction

Gingival recession refers to the exposure of the tooth's surface by an apical shift of the gingiva. Numerous factors play roles in the development of gingival recession, like periodontal disease and mechanical trauma, which are considered the primary factors in the pathogenesis of gingival recession [1]. It usually creates an esthetic problem, mainly when such a problem affects the anterior teeth and causes anxiety about tooth loss due to the progression of the destruction. It may also be associated with dentine hypersensitivity, root caries, abrasion and cervical wear, erosion because of exposure of the root surface to the oral environment and increased accumulation of dental plaque [2]. To manage unfavorable mucogingival conditions, gingival recession is often encountered in the anterior area of the mandible (marginal frenum attachment, high muscle pull, and a shallow vestibule) [3].

Free gingival graft (FGG) is a highly predictable method to increase the width of keratinized gingiva (WKG) [3]. The procedure of FGG includes harvesting FGG from the palate, leaving an open wound that heals by secondary intention [4]. Dr A.W Ward introduced periodontal dressings in 1923 and suggested using periodontal bandages following periodontal surgery [5]. They are now widely used for various purposes by periodontists, although some controversy exists regarding the necessity of their application following periodontal surgery [5].

Sometimes, periodontal dressing protects the wound from mechanical trauma and stabilizes the surgical site during healing. It reduces the risk of wound infection by decreasing plaque accumulation, reducing postoperative bleeding and granulation tissue formation and improving tissue healing [6]. Other advantages of periodontal dressing include patient comfort during tissue healing after surgery, good adaptation to underlying gingival and bone tissue, decreasing tooth hypersensitivity in the first hours after surgery, protecting the clot from the forces applied during speaking or chewing and preventing gingival detachment from the root surface [7].

COE-PAK (non-eugenol) periodontal dressing is provided in two tubes, one containing zinc oxide, gum, oil, and lorothidol. The other contains liquid coconut fatty acids thickened with colophony resin and chlorophyll. Metallic oxide reaction with fatty acids is the basis for COE-PAK (non-eugenol) periodontal dressing [8]. Two synthetic pyrimidine compounds (MS-430 and MS-818) have been added to the COE-PAK ingredients to accelerate angiogenesis [5].

Presently, there is scarce data on using periodontal dressing in the stability of the FGG to treat the gingival recession in Iraq. Thus, this study was designed to assess the effectiveness of the periodontal dressing on the strength of the FGG over the denuded root during treatment of the gingival recession of the lower anterior teeth.

Materials and Methods

Study design and setting

This randomized clinical trial (RCT) study has been conducted on 34 lower anterior teeth with Miller class I, II or III gingival recession at Periodontics Department, College of Dentistry, University of Duhok and private dental clinic, from September 01, 2021 to April 15, 2023.

Inclusion criteria

Medically fit cases that were free from signs of aggressive periodontitis were enrolled.

Exclusion criteria

Patients on medication, particularly antibiotics, corticosteroids and hormones in the past two months and smokers, were excluded from the study.

Study protocol

Patients, 25 - 45 years of age, were grouped randomly into two groups. The first group involved 19 teeth treated with single step FGG procedure with the application of the COE-PAK (non-eugenol) periodontal dressing. Briefly, a surgical blade (15c) was used to prepare partial thickness flap (recipient site) which extend 3 mm mesial, distal and apical to the recession. A uniform FGG with 1.0 mm of epithelium and connective tissue was harvested from the palate (donor site) of first and second bicuspid teeth using the edge of the blade tip as a guide. Then, polyglycolic acid (PGA) was used with reverse-cut 3/8 circle needle to suture the graft through the periosteum of the recipient site and stabilized directly on the root surface. At the same time, non-eugenol Coe-Pak periodontal dressing was prepared by mixing equal lengths of the base and accelerator paste on paper pad to obtain a paste with uniform color, then was placed and adapted over the operated area. The periodontal pack and the suture were removed after 2weeks [15].

On the other hand, the second group involved 15 teeth that were treated with single step FGG procedure but without applying the periodontal dressing. Then, clinical parameters such as probing depth (PD), width of

keratinized gingiva (WKG) and recession depth (RD) were recorded at baseline (B0) (before surgery), two weeks (B1) and three months (B2) after surgery for both studied groups.

Ethical considerations

The Scientific and Ethical Committees of the College of Dentistry, University of Duhok, Iraq, revised and approved the study protocol. All procedures were conducted following the declarations of Helsinki. Written informed consent was obtained from all patients, and they felt free to leave the study any time they desired without giving reasons.

Statistical analysis

The data were analyzed using Statistical Package for Social Science (SPSS, IBM, Chicago, USA, version 26). Paired-samples T-tests were employed for within-group comparisons between different time intervals. Conversely, independent-samples T-tests were used for between-group comparisons at two weeks and three months after surgery time point.

Results

FGG group with the application of the periodontal dressing

Regarding different periodontal parameters at different time intervals, PD was 1.79±0.52 at baseline (B0) and reduced after 2 weeks (B1) (1.67±0.52) and 3 months (B2) (1.63±0.52) of surgery. Similarly, RD was 6.03±1.53 at baseline (B0) and reduced after 2 weeks (B1) (2.1±1.11) and 3 months (B2) (1.86±1.13) of surgery, while the WKG was 0.57±0.46 at baseline (B0) and increased after 2 weeks (B1) (5.85±1.36) and 3 months (B2) (6.52±1.34) of surgery (Table 1 and Figure 1).

Table 1: Periodontal parameters at different time intervals for the FGG group with the application of the periodontal dressing.

Parameter	Time Interval (Mean±SD)		
	Baseline (B0)	**Two weeks (B1)**	**Three months (B2)**
PD	1.79±0.52	1.67±0.52	1.63±0.52
RD	6.03±1.53	2.1±1.11	1.86±1.13
WKG	0.57±0.56	5.85±1.36	6.52±1.34

FFG: Free gingival graft; PD: Pocket depth; RD: Recession depth; WKG: Width of the keratinized gingiva

Regarding intra-groups comparison between different time intervals, PD showed significant differences ($P<0.05$) at base line-2 weeks and base line-3 months' intervals. On contrast, no significant differences ($P>0.05$) at 2-weeks and 3-months' interval was observed. The RD and WKG showed highly significant differences ($P<0.001$) between different intervals (Table 2).

Table 2: Intra-group comparison between different time intervals of the FGG group with the application of the periodontal dressing.

Parameter	Time Interval (p-value)		
	Baseline - 2 weeks (B0-B1)	**Baseline - 3 months (B0-B2)**	**Two weeks - 3 months (B1-B2)**
PPD	0.007*	0.02*	1.63
RD	0.001**	0.001**	0.001**
WKG	0.001**	0.001**	0.001**

*: Significant difference; **: Highly significant difference using Paired-samples T-test; FFG: Free gingival graft; PD: Pocket depth; RD: Recession depth; WKG: Width of the keratinized gingiva

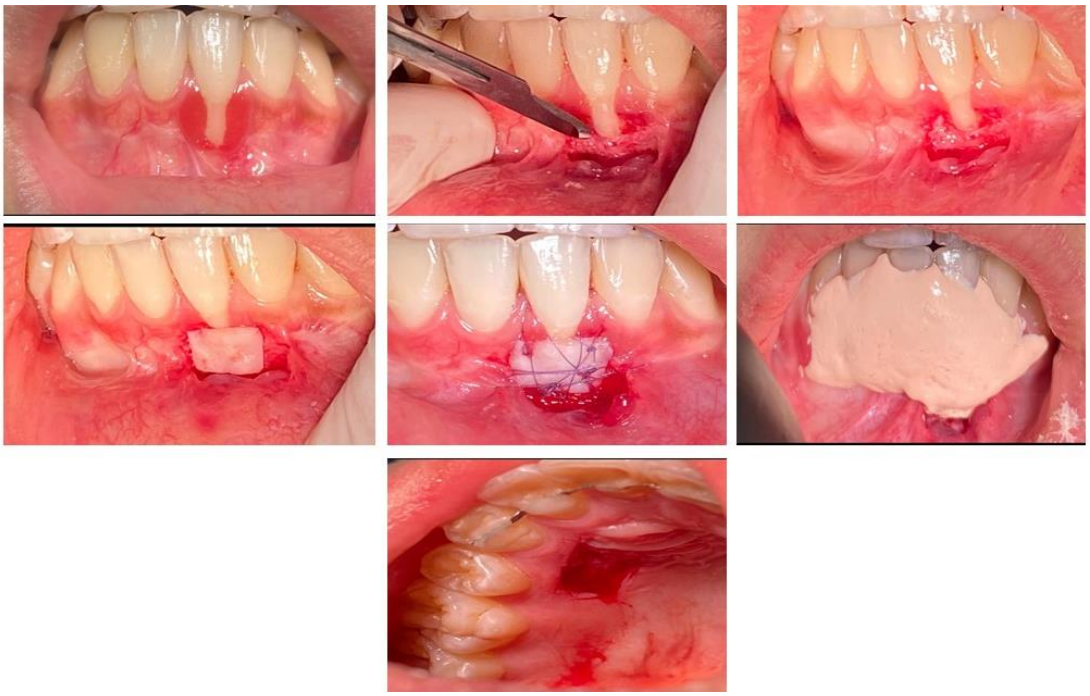

Figure 1A: Baseline subgroup of FGG group with the application of the periodontal dressing.

Figure 1B: FGG group with application of the periodontal dressing two weeks after surgery (upper) and three months after surgery (lower).

FGG group without application of the periodontal dressing

Regarding periodontal parameters at different time intervals, PD was 1.85±0.47 at baseline, reduced after two weeks (1.81±0.46) and three months (1.72±0.45) of surgery. Simultaneously, RD was 5.12±1.47 at baseline, then reduced after two weeks (3.21±0.63) and three months (2.91±0.6) of surgery. However, WKG was 1.2±0.44 at baseline, then increased after two weeks (2.9±0.99) and three months (3.1±1.14) of surgery (Table 3).

Table 3: Periodontal parameters at different time intervals for the FGG group without application of the periodontal dressing.

Parameter	Time interval (Mean±SD)		
	Baseline (B0)	**Two weeks (B1)**	**Three months (B2)**
PPD	1.85±0.47	1.81±0.46	1.72±0.45
RD	5.12±1.47	3.21±0.63	2.91±0.6
WKG	1.2±0.44	2.9±0.99	3.1±1.14

FFG: Free gingival graft; PD: Pocket depth; RD: Recession depth; WKG: Width of the keratinized gingiva

Regarding intra-groups comparison between different time intervals, PD showed no significant difference (P=0.189) at base line-2 weeks' time interval. In contrast, it showed significant differences (P=0.020 and P=0.015) at bottom line-3 months and 2 weeks to 3 months' time intervals, respectively. Moreover, RD showed substantial differences (P=0.000) at both base line to 2 weeks and base line to 3 months' time intervals with a considerable difference (P=0.026) at 2 weeks to 3 months' time intervals. Also, WKG showed highly significant differences (P=0.000/P=0.001) between all-time intervals (Table 4 & Figure 2).

Table 4: Intra-group comparison between different time intervals of the FGG group without application of the periodontal dressing.

Parameter	Time Interval (p-value)		
	Baseline - 2 weeks (B0-B1)	**Baseline - 2 weeks (B0-B2)**	**Two weeks -3 months (B1-B2)**
PPD	0.189	0.020*	0.015*
RD	0.000**	0.000**	0.026*
WKG	0.000**	0.000**	0.001**

*: Significant difference; **: Highly significant difference using Paired-samples T-test; FFG: Free gingival graft; PD: Pocket depth; RD: Recession depth; WKG: Width of the keratinized gingiva

Figure 2: FGG without application of the periodontal dressing. Baseline subgroup (upper), Two weeks after surgery (lower left) and three months after surgery (lower right).

Regarding the inter-group comparison between different time intervals, PD two weeks after surgery showed no significant difference (P=0.428) between both treated groups, while RD showed a considerable difference (P=0.002). Furthermore, WKG showed a highly significant difference (P=0.000) between both groups. At three months after surgery, PD showed no significant difference (P=0.578) between both groups, and RD showed a considerable difference (P=0.003) between both groups, while WKG showed a highly significant

difference (P=0.000) between both groups (Table 5). Thus, statistical differences between both groups for RD and WKG at two weeks and three months after surgery favoured the FGG group with the application of the periodontal dressing.

Table 5: Inter-group comparisons for the periodontal parameters at two weeks and three months after surgery.

Parameter	Treated Group	p-value	
		Two weeks	Three months
PDD	With periodontal dressing	0.428	0.578
	Without periodontal dressing		
RD	With periodontal dressing	0.002*	0.003*
	Without periodontal dressing		
WKG	With periodontal dressing	0.000**	0.000**
	Without periodontal dressing		

*: Significant difference; **: Highly significant difference using Paired-samples T-test; FFG: Free gingival graft; PD: Pocket depth; RD: Recession depth; WKG: Width of the keratinized gingiva

Discussion

Graft surviving over denuded root surface would offer some advantages such as preventing root caries, managing tooth sensitivity, and esthetic purposes, but suboptimal, long-term soft tissue stability over the root surfaces and creeping of the marginal smooth tissue cells coronally, according to the recession class, to fully or partially cover residual exposed roots surfaces. Numerous studies have reported that creeping attachment occurs from the fourth week till a year after the surgery [9].

Non-eugenol dressings are currently the most widely used periodontal dressings. Commercially available non-eugenol dressings include COE-PAK, Cross Pack, Peripac, Septopack, PerioCare, Perio Putty and Periogenix [7]. Thus, it was planned to use COE-PAK as periodontal dressings for preventing FGG necrosis in this study.

The primary clinical traits determining periodontal phenotype are gingival thickness, keratinized tissue width and bone morphotype. Collectively, these features are essential in the maintenance of periodontal health. In the current study, no significant differences in PD were observed in treated groups at different time intervals and between groups at two weeks and three months after surgery. While a significant reduction in RD in treated groups at two weeks and three months after the surgery was observed. Also, a significant reduction between both groups at two weeks and three months after surgery was detected. WKG was significantly increased at two weeks and three months after the surgery in treated groups. Still, the difference in the increase was highly significant between both groups at two weeks and three months after the surgery.

Thus, it was evident from this study that the creeping attachment depends on the abundance of the created keratinized gingiva, so the higher the keratinized tissue formed, the faster, and the higher amount of the creeping extension would be observed over time. Another study mentioned that collagen-based dressing offered significantly more advantages than traditional non-eugenol sauces [10]. While Kadkhodazadeh et al. 2017 stated that Reso-Pac periodontal dressing had less cytotoxicity than COE-PAK [11]. However, another study mentioned that CollaCote showed better and faster healing with significantly less pain experience than COE-PAK [12]. Moreover, the effect of curcumin gel and non-eugenol periodontal dressing (COE-PAK) after periodontal flap surgery was evaluated for wound healing and postoperative pain. It was reported that curcumin was marginally better than periodontal dressing in exhibiting anti inflammatory effects and was very influential in reducing postoperative pain [13]. In another study, it was observed that the pain was lower in the Diplen LX membrane group than in the COE-PAK group; thus, most patients preferred the use of the Diplen LX membrane [14].

The success of the FGG, despite using periodontal dressing, depends on the size of the graft that extends at least 3.0 mm medially, distally and apically from the borders of the denuded root, as well as on the root protrusion that could compromise blood vascularization into the graft and impede fit adaptation of the graft with the root surface [15].

Conclusions

At two weeks and three months' post-surgery, the FGG group with the application of non-eugenol periodontal dressing observed greater improvements in term of root coverage and increased WKG compared to the FGG group without the application of periodontal dressing.

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Conflict of interest

The authors confirm that they are not affiliated with or involved in any organization or entity with financial interests.

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