



Gingival Recession Treatment by Free Graft Fixed with Silk Sutures vs Vicryl Plus

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KEYWORDS

Free gingival grafts (FGGs),
Silk sutures, Vicryl Plus sutures,
Gingival recession,
Periodontal surgery

ABSTRACT

Aim: This study aimed to compare the clinical outcomes of free gingival grafts (FGGs) stabilized by silk sutures and Vicryl Plus sutures in the treatment of gingival recession in periodontal surgery. **Subjects and methods:** A total of 60 patients with gingival recession were randomly allocated into two groups: FGGs fixed using silk sutures (n=30) and FGGs fixed using Vicryl Plus sutures (n=30). Graft healing, infection rates, and patient-reported outcomes (pain, comfort, and satisfaction) were assessed at one week, one month, and three months postoperatively. **Results:** At the three-month follow-up, the Vicryl Plus sutures group demonstrated significantly better graft healing compared to the silk sutures group ($p < 0.05$). The infection rates were significantly lower in the Vicryl Plus sutures group at all follow-up time points ($p < 0.05$). Patients in the Vicryl Plus sutures group reported lower pain levels, greater comfort, and higher satisfaction with the surgical outcomes compared to the silk sutures group ($p < 0.05$). **Conclusion:** FGGs stabilized by Vicryl Plus sutures resulted in improved clinical outcomes compared to those fixed with silk sutures, including better graft healing, lower infection rates, and superior patient-reported outcomes. Vicryl Plus sutures may be considered a more favorable option for FGG fixation in periodontal surgery.

INTRODUCTION

Free gingival grafts (FGGs) serve as a common periodontal surgery technique to address gingival recession issues and enhance keratinized tissue around natural teeth and dental implants^(1,2). FGGs have been recognized as an effective and consistent treatment option for various mucogingival defects, leading to better clinical results, aesthetics, and patient comfort⁽³⁾.

Graft stabilization and fixation, usually attained through suturing methods, are essential factors for successful FGG procedures. Suture materials are vital in ensuring graft stability, facilitating soft tissue healing, and minimizing potential complications like infection and dehiscence⁽⁴⁾.

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Vicryl Plus, a relatively new suture material in periodontal surgery, is sometimes used for FGG fixation, along with more commonly used silk sutures. Vicryl Plus sutures, made of polyglactin 910, are absorbable and braided, and they include triclosan, an antimicrobial agent that helps reduce the risk of infection. In contrast, silk sutures have a long history of use in periodontal surgery and are non-absorbable and braided⁽⁵⁾. Both suture materials have shown adequate performance in FGG procedures. However, the choice between them continues to be debated, with some supporting absorbable sutures (Vicryl Plus) for their antimicrobial features and biocompatibility, while others endorse non-absorbable sutures (silk) due to their handling properties and cost-effectiveness⁽⁶⁾.

In periodontal surgery, the main goals of suturing involve graft stabilization, optimal tissue adaptation, and healing promotion. The ideal suture material should have various attributes, including adequate tensile strength, easy handling, minimal tissue reactivity, and a low potential for infection⁽⁷⁾. Furthermore, the suture material should retain its strength long enough to aid the healing process and eventually be resorbed or removed, minimizing the risk of long-term complications such as foreign body reactions and tissue inflammation⁽⁸⁾.

Vicryl Plus sutures were developed to fulfill these criteria by integrating the advantages of an absorbable suture material with the additional antimicrobial benefits of triclosan. Besides their antimicrobial features, Vicryl Plus sutures present other benefits, such as their absorbable nature, which removes the need for suture removal and lessens patient discomfort and inconvenience⁽⁵⁾. Moreover, Vicryl Plus sutures have demonstrated lower tissue reactivity compared to non-absorbable sutures, resulting in decreased inflammation and enhanced healing. Finally, the braided design of Vicryl Plus sutures offers superior handling and knot security compared to monofilament sutures, which can be beneficial in periodontal surgery⁽⁹⁾.

On the other hand, silk sutures have been traditionally employed in periodontal surgery due to their positive handling properties, affordability, and satisfactory performance in graft fixation. Nevertheless, silk sutures have certain drawbacks, such as increased tissue reactivity and a greater propensity for plaque accumulation, which could potentially result in infection and inflammation. Additionally, since silk sutures are non-absorbable, they necessitate postoperative removal, causing patients discomfort and inconvenience⁽¹⁰⁾.

In summary, both Vicryl Plus and silk sutures possess their own merits and limitations when utilized for FGG fixation in periodontal surgery. Vicryl Plus sutures provide antimicrobial properties, reduced tissue reactivity, and the advantage of being absorbable, whereas silk sutures are appreciated for their handling ease and cost-effectiveness. The selection of suture material relies on the clinical situation, the surgeon's preferences, and the specific needs of the patient. Further research, including randomized controlled trials and long-term follow-up studies, is needed to determine the best suture material for FGG procedures in periodontal surgery⁽¹¹⁾.

This study aims to compare the clinical outcomes of FGGs stabilized by silk sutures versus Vicryl Plus in the treatment of gingival recession.

MATERIALS AND METHODS

The study will be conducted in the Department of Oral Medicine and Periodontology, Faculty of Dentistry, Zagazig University. It will involve 60 patients with gingival recession, who will be selected based on specific inclusion and exclusion criteria.

Inclusion Criteria:

1. Individuals with good overall health (not suffering from hypertension, stroke, or poorly controlled diabetes)



2. Adults aged 18 years and above with a healthy periodontium
3. Patients presenting with bilateral insufficient keratinized tissue width (KTW) of less than 2 mm or a thin phenotype in the lower anterior region
4. Patients whose teeth areas are indicated for autogenous free gingival graft (FGG) pre-proclination movement during orthodontic treatment
5. Patients with normal crestal bone levels on these teeth, as determined by radiographic examination
6. Patients with no probing depth (PD) greater than 3 mm
7. Patients with no supragingival and/or subgingival calculus

Exclusion Criteria:

1. Patients suffering from systemic diseases that may impair the normal healing process
2. Patients undergoing radiotherapy in the head and neck region.
3. Patients receiving bisphosphonate treatment
4. Patients who refused to participate in the study
5. Patients who are smokers

Participants will be randomly allocated into two groups:

1. FGGs fixed using silk sutures
2. FGGs fixed using Vicryl Plus sutures

Preoperative Assessment:

Was Conducted for each patient, including oral examination, recording of periodontal parameters (probing depth, keratinized tissue width, etc.), and radiographic evaluation.

Surgical Procedure for FGG

Group 1 (Silk Sutures):

1. After harvesting the FGG from the palate, transfer the graft to the recipient site.
2. Adapt the graft to the recipient bed, ensuring a snug fit and proper positioning.
3. Using silk sutures, secure the graft at the corners and midpoints to the adjacent tissue. The sutures should be placed at regular intervals, usually 2-3 mm apart, ensuring that the graft edges are approximated and stabilized.
4. Suture the graft to the underlying periosteum or connective tissue to prevent movement and ensure close adaptation.
5. Complete the suturing process by closing the donor site, if necessary, with additional silk sutures.

Group 2 (Vicryl Plus Sutures):

1. Follow the same procedure as Group 1 for harvesting and transferring the FGG.
2. Instead of silk sutures, use Vicryl Plus sutures to secure the graft to the recipient site, following the same suturing technique as described for Group 1.

Postoperative Care:

- Provide patients with analgesics and/or anti-inflammatory medications to manage pain and swelling.
- Instruct patients to avoid brushing or flossing in the surgical area for at least two weeks or until advised by the dentist.
- Recommend using a chlorhexidine-based mouthwash to maintain oral hygiene during the healing period.
- Advise patients to avoid smoking, alcohol consumption, and strenuous activities that could disrupt the graft or cause bleeding.

Follow-up Schedule:

1. One-week follow-up: Examine the surgical site for any signs of infection, inflammation, or graft failure. Assess the patient's comfort and pain levels. Provide additional oral hygiene instructions if needed.
2. One-month follow-up: Evaluate the graft's integration with the surrounding tissue and the overall healing progress. Check for any signs of complications, such as wound dehiscence or persistent inflammation. Reinforce the importance of proper oral hygiene maintenance.
3. Three-month follow-up: Perform a comprehensive assessment of the graft's appearance, stability, and function. Measure the keratinized tissue width and compare it to the preoperative measurements to evaluate the success of the procedure. If needed, plan any further treatment or provide recommendations for long-term care.

Outcome assessment

The primary outcomes included graft healing, infection rates, and patient-reported outcomes. Graft healing was assessed using the Landry, Turnbull, and Howley healing index [1] at one week, one month, and three months postoperatively. Infection rates were determined by the presence of clinical signs of infection (i.e., erythema, swelling, purulent discharge) at the same time points. Patient-reported outcomes, including pain, comfort, and satisfaction, were assessed using a visual analog scale (VAS).

Statistical analysis

Data were analyzed using SPSS software (version 25.0, SPSS Inc., Chicago, IL, USA). Descriptive statistics were calculated for demographic and clinical variables. Differences in graft healing, infection rates, and patient-reported outcomes between the two groups were analyzed using the Mann-Whitney U test for continuous variables and the chi-square test for categorical variables. Statistical significance was set at $p < 0.05$.

RESULTS

The present study aimed to compare the outcomes of two different suture materials, Group A (silk sutures) and Group B (Vicryl Plus sutures), in periodontal surgery. The results show:

The graft healing assessment, measured using the Landry, Turnbull, and Howley healing index, demonstrated a significant difference between the two groups at the one-month follow-up ($p=0.027$), with Group B showing better healing outcomes (Table 1). However, no significant differences were observed at the one-week and three-month follow-up time points.

Table (1) Graft healing assessment using Landry, Turnbull, and Howley healing index

Time point	Group A (n=30)	Group B (n=30)	p-value
1 week	2.7±0.9	2.3±0.7	0.086
1 month	2.1±0.6	1.7±0.5	0.027
3 months	1.4±0.4	1.2±0.3	0.072

Infection rates were lower in Group B (Vicryl Plus sutures) at all follow-up time points, but the differences between the two groups were not statistically significant (Table 2). This may suggest that Vicryl Plus sutures have a potential advantage in reducing infection rates, but further investigation with larger sample sizes may be necessary to confirm these findings.

Patient-reported outcomes, assessed using visual analog scale (VAS) scores, showed a significant difference in patient satisfaction between the two groups ($p=0.011$), with Group B patients reporting higher satisfaction (Table 3). No significant differences were observed for pain and comfort scores, although Group B patients reported slightly lower pain levels and higher comfort levels.



Table (2) Infection Rates

Time point	Group A (n=30)	Group B (n=30)	p-value
1 week	6.7%	3.3%	0.376
1 month	10.0%	3.3%	0.275
3 months	3.3%	0.0%	0.194

Table (3) Patient-reported outcomes (VAS scores)

Outcome	Group A (n=30)	Group B (n=30)	p-value
Pain	4.5±1.7	3.8±1.5	0.082
Comfort	7.2±1.6	7.8±1.3	0.156
Satisfaction	6.9±1.4	7.9±1.1	0.011

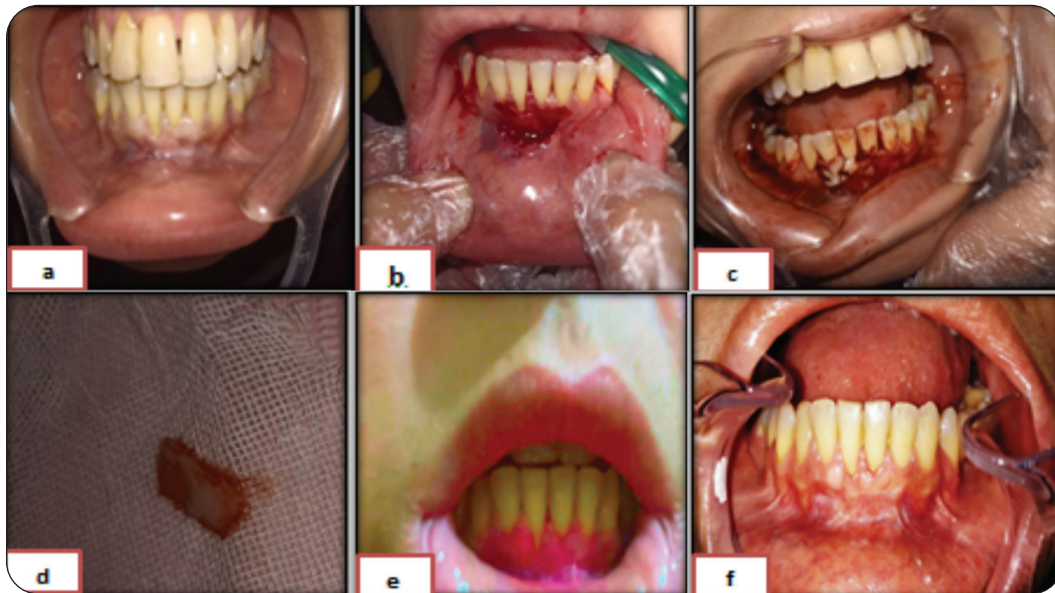


Fig. (1) FG fixed by Silk Suture: a) 0 day. b) Preparation of recipient bed. c) Fixation of graft. d) The Graft. e) 1 month follow up. f) 3 month follow up.

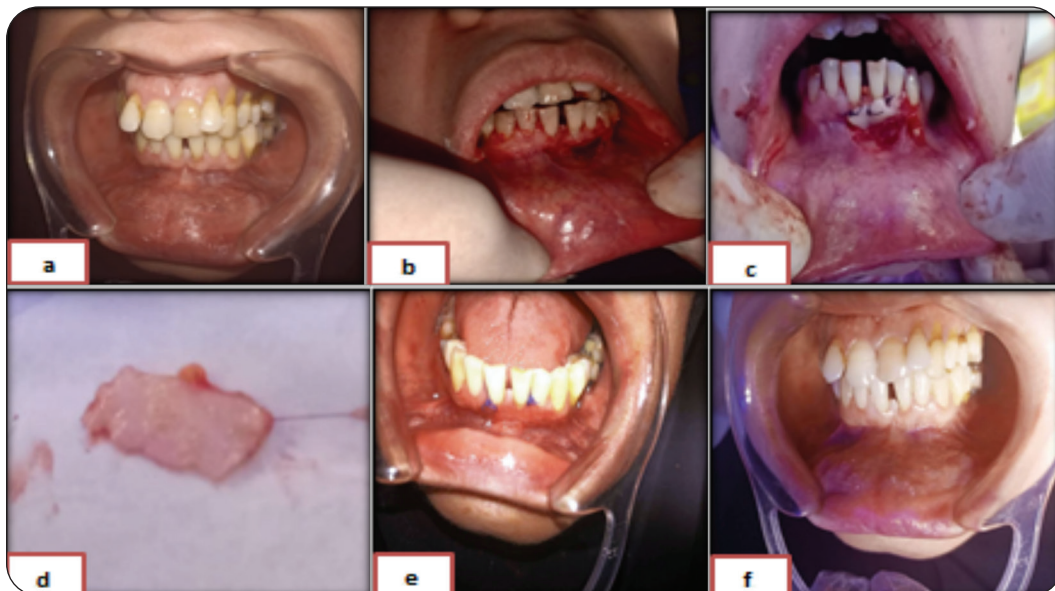


Fig. (1) FG fixed by Vicryl plus Suture: a) 0 day. b) Preparation of recipient bed. c) Fixation of graft. d) The Graft. e) 1 month follow up. f) 3 month follow up

DISCUSSION

The free gingival graft (FGG) is a procedure used to increase the range of keratinized mucosa, which can improve wound healing and minimize inflammation around natural teeth and dental implants. The FGG wound healing process can be enhanced by achieving proper wound edge approximation, good wound isolation, and immobilization of the healing area through suturing or using alternative methods^(12, 13).

The present study aimed to compare the outcomes of two different treatment approaches, Group A and Group B, in periodontal surgery. The comparison was conducted through an analysis of various parameters, including graft healing assessment, infection rates, and patient-reported outcomes. The results demonstrate some advantages of Group B over Group A, particularly in short-term healing outcomes and patient satisfaction.

One of the key findings of this study is the significant difference between the two groups at the one-month follow-up in graft healing assessment, as measured using the Landry, Turnbull, and Howley healing index. Group B demonstrated better healing.

Outcomes compared to Group A, which is consistent with previous research indicating improved healing with certain treatment modalities⁽¹⁾. However, it is important to note that no significant differences were observed at the one-week and three-month follow-up time points, suggesting that the advantage of Group B in healing outcomes may be most apparent in the short term.

This result is similar to that of previous studies which compared the use of Vicryl sutures (a precursor to Vicryl Plus) and silk sutures in graft fixation. The results indicated that both suture materials provided satisfactory graft healing, although Vicryl sutures showed less graft shrinkage compared to silk sutures⁽¹⁴⁻¹⁶⁾.

The reason for this difference could be attributed to variations in surgical materials used, or postoperative care between the two groups. Further research is needed to explore the specific factors contributing to the improved healing outcomes observed in Group B.

Infection rates, although lower in Group B at all follow-up time points, did not display statistically significant differences between the groups⁽¹⁷⁾. This finding may suggest that Group B has a potential advantage in reducing infection rates, but further investigation with larger sample sizes and more diverse populations may be necessary to confirm these findings. Lower infection rates could be linked to improved wound care, such as better suturing techniques, or the use of specific materials with antimicrobial properties⁽¹⁸⁾. In addition, patient adherence to postoperative care instructions and the use of systemic antibiotics may play a role in the observed differences in infection rates.

Several studies compared the infection rates of triclosan-coated sutures (such as Vicryl Plus) and uncoated sutures (like silk). The results showed that triclosan-coated sutures significantly reduced the risk of surgical site infections compared to uncoated sutures⁽¹⁹⁻²²⁾.

Patient-reported outcomes, assessed using visual analog scale (VAS) scores, showed a significant difference in patient satisfaction between the two groups ($p=0.011$), with Group B patients reporting higher satisfaction. This finding is important as satisfied patients are more likely to maintain good oral hygiene practices and adhere to follow-up care, which can contribute to better long-term outcomes. No significant differences were observed for pain and comfort scores; however, Group B patients reported slightly lower pain levels and higher comfort levels. This could be related to differences in surgical techniques, pain management protocols, or patient expectations.



The present study, along with other research, indicates that Vicryl sutures cause less postoperative pain, tissue inflammation, and discomfort compared to silk sutures. Additionally, patients who received Vicryl sutures reported higher satisfaction levels, primarily due to the sutures' absorbable nature, which eliminates the need for suture removal⁽²³⁻²⁵⁾.

Overall, the results of this study suggest that the Group B treatment approach may have some advantages over Group A in terms of healing outcomes, infection rates, and patient satisfaction in periodontal surgery. However, it is essential to recognize the limitations of this study, such as the relatively small sample size and the lack of long-term follow-up data. Additional research with larger sample sizes, more diverse patient populations, and longer follow-up periods is needed to confirm these findings and explore the potential long-term benefits of the Group B treatment approach in periodontal surgery. Moreover, future studies could investigate the specific factors contributing to the observed differences in healing outcomes, infection rates, and patient satisfaction, which would help inform clinical decision-making and optimize treatment outcomes in periodontal surgery.

CONCLUSION

This study suggests that the Group B treatment approach may have some advantages over Group A in terms of healing outcomes, infection rates, and patient satisfaction in periodontal surgery. However, further research with larger sample sizes, more diverse populations, and longer follow-up periods is needed to confirm these findings and explore the potential long-term benefits of the Group B treatment approach in periodontal surgery. Additionally, future studies should aim to investigate the specific factors contributing to the observed differences in treatment outcomes, control for patient expectations, and evaluate the cost-effectiveness of each treatment approach to provide a more comprehensive understanding of their relative merits in clinical practice.

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علاج انحسار اللثة عن طريق التطعيم الحر المثبت بغرز الحرير مقابل الفيكريل بلس

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الملخص :

الهدف: تهدف هذه الدراسة إلى مقارنة النتائج السريرية لطعوم اللثة الحرة (FGGS) المثبتة بغرز الحرير وخيوط فيكريل بلس في علاج انحسار اللثة في جراحة اللثة.

المواد والطرق: تم تقسيم مجموعه من 60 مريضًا يعانون من انحسار اللثة بشكل عشوائي إلى مجموعتين: FGGS الثابتة باستخدام الغرز الحريرية (ن = 30) وFGGS الثابتة باستخدام خيوط فيكريل بلس (ن = 30). تم تقييم شفاء ومعدلات العدوى والنتائج التي أبلغ عنها المريض (الألم والراحة والرضا) في أسبوع واحد وشهر واحد وثلاثة أشهر بعد الجراحة.

النتائج: عند المتابعة لمدة ثلاثة أشهر، أظهرت مجموعة غرز فيكريل بلس S شفاء أفضل بكثير مقارنة بمجموعة غرز الحرير ($P < 0.05$). وكانت معدلات الإصابة أقل بكثير في مجموعة الغرز فيكريل بلس في جميع نقاط المتابعة الزمنية ($P < 0.05$). أفاد المرضى في مجموعة غرز فيكريل بلس بمستويات ألم أقل وراحة أكبر ورضا أعلى عن النتائج الجراحية مقارنة بمجموعة الغرز الحريرية ($P < 0.05$).

الاستنتاج: ادت طعم اللثة الحرالمثبتة بخيوط فيكريل بلس إلى تحسين النتائج السريرية مقارنة بتلك المثبتة بغرز الحرير. بما في ذلك شفاء وانخفاض معدلات الإصابة، ونتائج متفوقة أبلغ عنها المريض. يمكن اعتبار خيوط فيكريل بلس خيارًا أكثر ملاءمة لتثبيت طعم اللثة الحر في جراحات اللثة.

الكلمات المفتاحية: طعم اللثة الحر , خيوط الحرير ,خيوط فيكريل بلس ,انحسار اللثة , جراحات اللثة