

The effect of keratinized mucosal increment on implant stability in patients with periodontitis

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Introduction. In order to prevent the incidence of peri-implant diseases, the long-term stability of surgical effects requires further follow-up on the bone level absorption at the peri-implant edge, and also slows down the reconstruction of keratinized mucosa, which helps to improve the stability of periodontitis patients' implants. At the same time, the peri-implant benign plaque index and gingival index are improved. During the follow-up period, keratinized mucous membranes maintained good stability. In this study, root-oriented reduction flap combined with free gingival transplantation was used to increase the width of keratinized membrane around periodontitis patients' implants. In various groups. Various index values enable the comparison and analysis of the data of each group, and relevant technical indicators can be formed in the software to evaluate the pain degree in the two weeks after surgery and the different degrees of adaptation brought by daily brushing. Mucosal receding gingival index Modified plaque index Marginal bone resorption. The clinical index of probing depth included keratinized mucosal width analysis to compare the changes of periimplanter soft and hard tissue parameters between the two groups. Oral imaging data, clinical index and patient visual score scale were collected. The number of patients elected and had completed implant repair, and around the implant. The width of the keratinized mucosa was insufficient for study. The objective of this study was to provide clinical evidence for the role of keratinized membranes in maintaining the short-term stability of their implants compared to implants undergoing normal periodontal maintenance. Combined ionization. Human transplantation adds implants to periodontitis patients as keratinized mucosa. Postmucosal clinical outcomes and changes in patient-reported outcomes. A prospective clinical trial was conducted with a six-month follow-up to complete the article.

Keywords. Transplantation; Reset; Periodontitis; Keratinized mucosa

1. INTRODUCTION

In this study, patients' reported results were included as indicators for the evaluation of surgical effects, and patients' subjective feelings were compared to provide a better clinical reference for maintaining implant stability and preventing peri-implant lesions in patients with periodontitis. Compared with conventional periodontal maintenance and control group, the change of peri-implant index in the two groups was observed during follow-up, so as to further evaluate the clinical effects of keratinization membrane on peri-implant area^[1].

In addition, the intervention time is to remedy the lack of keratinized mucosa

around the implant or the clinical maladaptive symptoms caused by the lack of keratinized mucosa after the implantation is finally completed. It is important to maintain the tissue health around the periodontitis implant and prevent the occurrence of biological complications. This requirement requires the reconstruction of the keratinized membrane through the presence of gate 9 deficiency and soft tissue transplantation in the Asian maintenance population, if the keratinized membrane is insufficient or absent again^[2].

The history of periodontitis itself is already one of the susceptibility factors for peri-implant inflammation. Periodontitis patients need more personal periodontal maintenance after the completion of implant repair, so as to monitor the health status around the implant regularly. Compared with periodontal health, wait for ideal conditions, and the soft tissue should be reconstructed before the final repair is completed. Keratinization and mucosal widening performed twice before and after implant implantation can not only reduce the number of operations, but also facilitate healthy and stable crown repair around the implant, and then a stable keratinized mucosa can be reconstructed. Of course, with preoperative evaluation and precise operation, it is difficult to control the optimal outcome of surgery, but it does not affect the optimal timing of intervention^[3].

At the same time, late soft tissue reconstruction may result in a lack of coordination between the contour of the final prosthesis and the soft tissue contour, which is often the last remedy, and may affect the operation and conduct of the surgery after crown repair, which also includes implants. Peripheral keratinized tissue reconstruction. After the final prosthesis is loaded, the choice of implantation-synchronous keratosis tissue widening in some cases also requires caution because of the difficulty in forming good soft tissue during bone tuberculosis. A more stable and qualitative healing effect should be performed before the second phase of implantation surgery or superior crown repair. At present, there is no effective consensus on the intervention time of surgery^[4].

Studies have shown that 4 to 6 weeks before the machine is connected is considered to be the best node for surgery. There is no significant difference in the outcome indicators obtained after selecting the best node for surgery, and there is no significant difference between the soft thickness and the soft thickness of the keratinized membrane. Therefore, the ideal keratinized tissue can be compared directly through the natural healing after tooth extraction, but the alveolar spinal cord preservation technology should also be used if there is insufficient keratinized tissue or missing site before tooth extraction. Compared with the traditional postoperative form, the better effect is that arf or arf combination should be applied alone, and it is expected that the materials are the best clinical effect indicators around the implant.

The degree of gingival receding did not increase significantly, and the root phase reduction was applied only. The flap has been shown to increase the keratinized membrane around the widening implant, but the predictability of keratinized membrane widening is low, and the postoperative effect is not obvious. After 1 to 11

years, the width of the posterior keratinized tissue has increased by an average of 3.6 to 0.8 mm, and the final discovery of several points can avoid the problems of soft tissue shrinkage caused by traditional surgical methods. In recent years, the emerging field of soft tissue increment around implantation has gradually received clinical attention and research, which plays a crucial role in maintaining implantation technology and surrounding cleaning to obtain long-term implantation efficacy. Recently, a comprehensive review study has shown that the lack of an implant lacking keratinized mucous membrane can be accomplished by improving the transplantation of its own soft tissue^[5].

At present, most opinions believe that sufficient keratinized mucosa is an important prerequisite for the long-term stable function of the implant soft tissue, which can help reduce the accumulation of surrounding dental plaque and bone absorption of the alveolar ridge, and reduce the discomfort during brushing and the occurrence of soft tissue inflammation around the implant. It is particularly important for periodontitis sensitive keratosis membrane to protect its implant. Therefore, sufficient keratinized membrane has become a necessary condition to maintain the stability of implant periodontal tissue. In clinical practice, it is necessary to adopt timely surgical intervention to establish healthy periodontal tissue and environment. The research work of this paper is carried out under such research background^[6].

2. MATERIALS AND METHODS

2.1 Research object

Patients in the FGG group were introduced to the treatment plan, and the surgical informed consent was signed after the patients were aware of the risks and related complications and agreed to the procedure. After meeting the inclusion conditions, the patients were divided into reduction, flap and free gingival transplantation group by coin toss. The routine periodontal maintenance group was the control group, and each group contained 19 implant sites. The study was conducted from January 2021 to June 2022. In the periodontitis patients who participated in the periodontal mucosa department for follow-up visit, it was found that the keratinized mucosa around the implant was less than 2 mm wide during periodontal review and maintenance. Thirty patients who were willing to participate in this clinical study and qualified for the study were selected, including 17 females and 13 males, aged from 35 to 60 weeks, with an average age of 43.60 and positive to 7.25 years old. This study has been approved by the hospital Ethics committee and obtained the approval number^[7].

The operating area had membranitis, the operating room had bad habits such as smoking or the periodontitis treatment of pregnant and lactating women, and had not yet entered the maintenance period. Patients with poor compliance and poor control of oral plaque were used as exclusion criteria, and the inclusion criteria were those without systemic diseases such as hypertension and diabetes; periodontitis was not in the active stage due to lack of periodontal disease, and the implants did not appear loosening, occlusal pain and other adverse reactions; the implants had completed

functional repair and had been loaded with the implants for at least six months to measure keratosis mucosa. Less than two millimeters wide. The patient had good oral hygiene and was between 20 and 60 years old^[8].

2.2 Instruments and equipment

Membrane-gingival surgical instruments (Stoma minimally invasive tunnel surgical set); PRF preparation instrument (Intra-Lock International); Technocut® Disposable Scalpels: #15C); 5-0, 6-0 stitches (Gold Ring YZB/ Shanghai 4016-65-2012); Williams periodontal probe; Band-aids (Bona); Gracey shave Ji Ji; Camera (Canon EOS 500D); Macro lens (Canon EF-S 60mm f/2.8 USM Macro).

2.3 Data and Indicators

The patient is guided to clean around the implant by using bass brushing method, floss and interstitial-brush angles. Two types of dental brush and floss were used at baseline for six months, respectively, using visual simulations to rate their appropriateness in maintaining oral hygiene around the implant. The postoperative pain index was evaluated. Two weeks after surgery. The right end of the line is ten, which is used to represent very severe pain, and the middle part is used to represent pain of different degrees^[9].

Patients who do not feel pain are presented with a horizontal line ten centimeters long. The left end of the line and the right end of the line are recorded by visual simulation score during daily activities of patients. The depth of the probe is the implant. Periodontal probes at 3 sites were used to measure the distance from the gingival margin to the bottom of the gingival groove, and the mean value was calculated as the final result. Three represents a large amount of soft scale, and two represents visible plaque buildup. First, plaque can be seen only when the tip of the probe is slightly crossed over the surface of the implant, while the zero is no plaque. The improved plaque index records the amount and thickness of plaque near the crown source of the implant fly, and determines severe inflammation through periodontal probe exploration and gross observation^[10].

Among the periodontal related clinical indexes, severe inflammation is obvious redness and swelling, and ulcers like bleeding tendency are represented by three. The second represents moderate inflammation, red and bright edema, probing bleeding, one represents mild inflammation, slight color change and edema, no probing bleeding, zero represents health.

Bone resorption at the edge of the implant was measured by cb ct by an investigator. The distance between the proximal, distal and middle parts of the limb and the upper edge of the alveolar bone apex were respectively measured. The average value of the two measurements was calculated as mbl, and the value was zero if the apical part was located below or even with the apical part of the bone base. When measuring the distance from the crown edge of the implant to the gingival edge, the periodontal probe was used to measure the depth of the receding depth along the long axis of the implant crown. The gingival edge was in line with the crown edge or g was zero^[11].

When measuring the width of the keratinized mucosa, the periodontal probe is used to measure the distance from the median buccal side of the gingival margin to the membrane-gingival union along the long axis of the implant crown. The alveolar mucosa can also be pulled by pulling the lip and buccal side of the patient and pulling the alveolar mucosa in the direction of the crown to observe the difference in the direction of mucosal movement or coverage. Clinical data related to soft and hard tissues can be collected, including intraoral photos. Patient report index, periodontal clinical index, soft and hard tissue related clinical indication, collected by a periodontist at each stage, during and after surgery at any time. Visit the oral photos of each phase, take preoperative clinical images, medical indicators, patient reporting business.

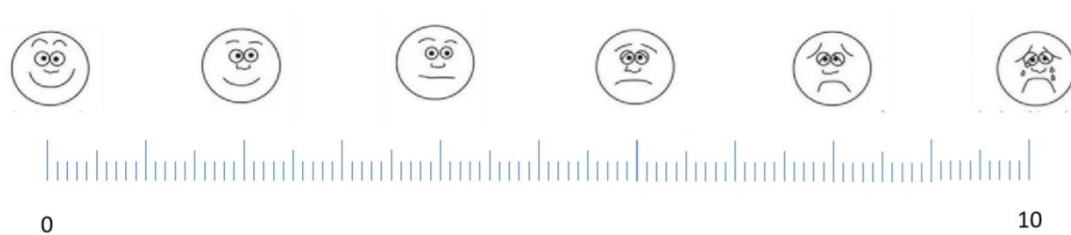


Figure 1 Patient pain scale

2.4 Surgical procedure of FGG group

First, the patient's mouth was filled with chlorhexidine solution for one minute, and the iodophor sphere was wiped three times from the center to the mouth. Exoral disinfection can also be done by soaking a cotton ball with chlorhexidine solution, which should be done for those allergic to iodophor, and placing the centrifuged prf tube in a sterile operating room for standby use. The light yellow middle layer is the translucent cell-free plasma at the top of the rf gel, and the bottom layer is dark red, gel-like red blood cells. The centrifuged glass tube forms a small fibrin clot. 30 minutes before surgery. Five milliliters of venous blood are drawn and placed in a glass tube. Through personalized oral hygiene guidance, there is no active periodontitis, to ensure that the patient's oral hygiene is in good condition, and the blood test results are normal. At the same time, the patient's systemic status, near natural periodontal health status, limb exposure degree, and the amount of limb keratosis tissue should be carefully evaluated before surgery^[12].

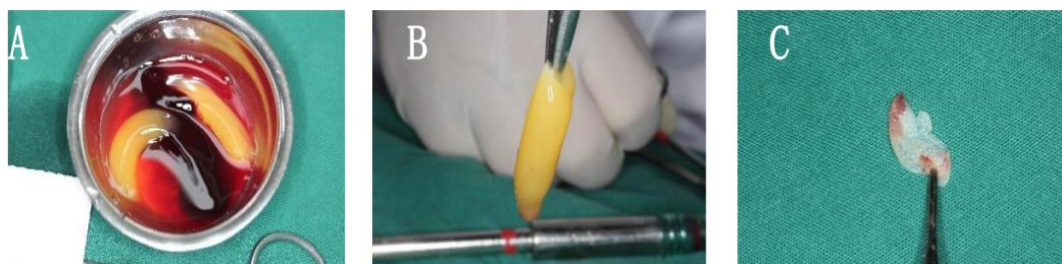


Figure 2 Preparation of PRF membrane

It requires a sutured graft. Before that, the work area and the graft need to be handled. Using tinfoil periodontal probe to determine the size of the community, salt water gauze placed in the community for direct and protective community preparation, is the first step. The free silver flap transplantation and the vegetation of the recipient area can be properly managed to ensure the smooth operation of the surgical process.



Figure 3 for area processing

The purpose of postoperative care is to ensure that the surgical wound can be healed in accordance with the expected results. The suture in the surgical area is removed after 2-3 weeks, and specialized mechanical tooth cleaning is performed once a week within one month after surgery to monitor the healing of the transplanted flap and help the patient clean the plaque in the surgical area during the healing period^[13].

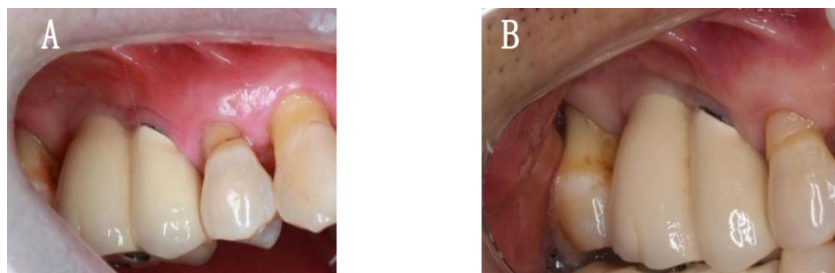


Figure 4 Oral follow-up of control group

2.5 Statistical Analysis

SPSS26.0 was used for statistical analysis, descriptive data (mean \pm SD) was used for all outcome variables, chi-square test was used for gender and age of patients, paired sample t test and Wilcoxon test were used for normal and non-normal data to compare the differences of indicators within the group. When comparing the differences between the two groups, the independent sample T test and the Mann-Whitney U test were used to test for normal and non-normal data, respectively. The scores of pain and daily brushing discomfort two weeks after surgery were summarized and statistically analyzed. $P < 0.05$ for the difference was statistically significant^[14].

3. Experimental Results

There was no significant difference in the preoperative baseline between the two groups. The gender, age and periodontitis symptoms analyzed by Chi-square test of the two groups were all under control and in the stage of periodontal support, and the limbs of all patients had been repaired. There was a significant difference between the concentric line and the control group at 6 months when the gain increment was 3.24, positive -1.05 mm. Six months after operation, the kmw was 3.63 + 0.85 mm in the Fdd group and 0.53 + 0.51 in the same limit and control group. Compared with a time widening from the limit of 0.36 + 0.49 mm to 4.03 to + 0.48 mm three months after surgery, the fGG group was around the postoperative implant. The width of keratinized mucosa was increased without statistical difference. kmw was compared before operation^[15].

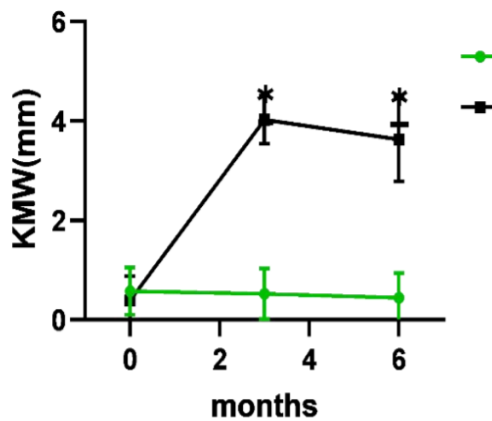


Figure 5 Line chart of KMW change over time (green control group, black FGG group)

The experimental results showed that the free gingival flap was beneficial to the stability of the gingival margin around the implant, and there were significant differences. The six-month MR Value in the FGG group was 0.45, + 0.69 mm, compared to baseline 0.95, + 0.94 mm. There was no statistical difference in the results. The following curves could be obtained by comparing the time of mucosal retreat around baseline implants between the two groups.



Figure 6 FGG group 46MBL measurement



Figure 7 Control group 15MBL measurement

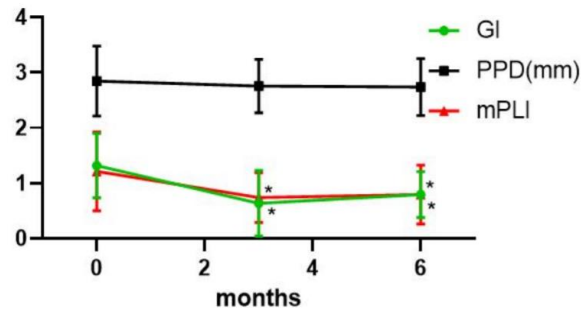


Figure 8 Line chart of postoperative periodontal indexes in FGG group

A typical case of periodontitis was selected from a 56-year-old general employee. Periodontitis was revisited for seven years, and 46 cases of occasional bleeding were found. The gingival swelling was measured by the implant teeth, and it is recommended to have an implant first. Come back for keratinized membrane widening surgery. The oral hygiene habit is to brush twice a day for two minutes and floss each time for a specialist check-up. The width of buccal keratinized mucosa in 46 implants was insufficient, and the width of buccal keratinized mucosa was less than 0.5 mm. 46 gums were slightly red and swollen, and the implant crowns had no clinical action. The plan is regular Asian maintenance recommended 46 oral hygiene propaganda for peri-implant keratosis mucosa enhancement surgery. Normal preparation after surgery, then two weeks of follow-up, one week after surgery can also be follow-up, one month after surgery, three months of follow-up, and six months of regular follow-up^[16].

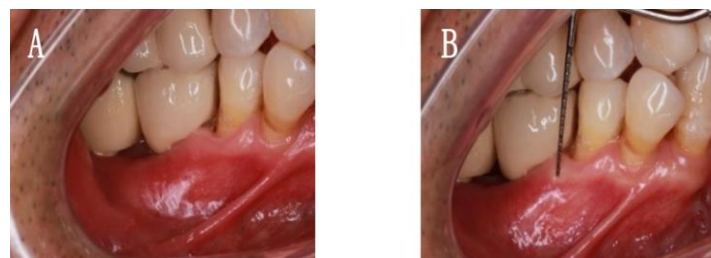


Figure 9 Oral images of FGG group 46 at baseline

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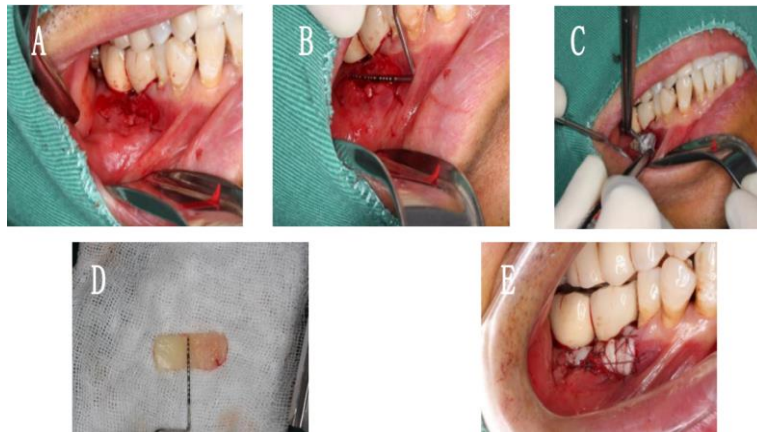


Figure 10 Free gingival transplantation process



Figure 11 Oral radiography and PMTC 1 week after surgery



Figure 12 Oral pictures taken 2 weeks after surgery

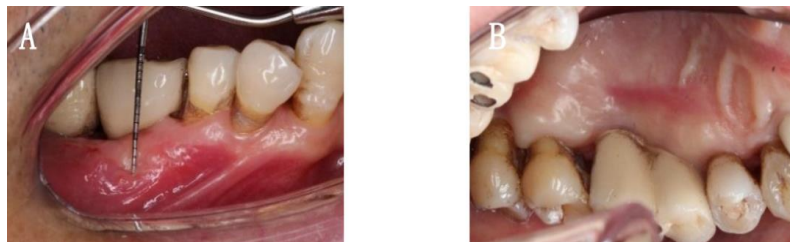


Figure 13 Oral photos taken one month after surgery



Figure 14 Oral photos 3 months after surgery

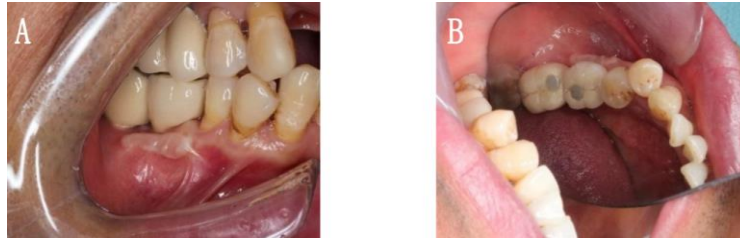


Figure 15 Oral images 6 months after surgery

4. DISCUSSION

Relative indexes were compared and recorded to provide reference for clinical work. Keratinized mucosa was reconstructed through follow-up reduction flap separation and gingival separation transplantation to increase implant stability. The soft tissue status should be comprehensively evaluated before implantation, and periodontitis patients who still have insufficient keratinized membrane around implant after selecting objects of inertia have higher requirements for surgery. At the same time, late soft tissue charging may increase the soft tissue edge and the contour of the prosthesis, lack of coordination risk, and increase the difficulty of surgery. Compared with the intervention before crown repair, there are few clinical studies on the restoration of keratosis membrane after the completion of this type of upper repair, and many have been found to have completed implantation in clinical maintenance work in Asia. The repaired periodontitis patients still have excessive defects in the keratinized membrane around the limb, which can better maintain the stability of the soft and hard tissues around the implant and further prevent the occurrence of diseases around the limb^[17].

Most clinical studies are carried out during the pre-implantation and second-stage surgery, and the reconstruction of peripheral tissue transplantation is of course a negative indicator for the implant site with soft tissue defects. Besides, due to the patients' compliance and lack of understanding of periodontal diseases, the effect of oral bacilli is not good. As for the life rate of the body, periodontitis can only be further healed with conventional medical support. Initial window closure is performed, resulting in further reduction of the keratinized tissue area and vestibular penetration. There are also some patients with periodontitis who have damaged the political position of the half periodontal after tooth extraction. Often faced with the absence of implant sites, and as part of the attached mucous membrane, speech and physiological activities, bacon tissue impact, and can resist daily chewing, helping to reduce the health hazards of daily cleaning. The gum around the limb is soft in conjunction with the implant machine, so the attachment around the implant is very critical, and the long-term stability of the limb driving dysfunction is crucial^[18].

This experiment is very good in improving the keratinized tissue width and implant-related clinical and index results. Cm value is $3.64 + 2.01$ mm, arf value is $1.93 + 1.6$ mm, the effect is better than simple. The experimental combination obtained the maximum keratinized tissue width of $4.63 + -1.25$ mm. At the same time,

the width of the horn membrane can be obtained in the short term after surgery, but compared with the former, the increment of the keratinized membrane is relatively small, and the keratinized membrane is regenerated. The tissue shrinkage rate is significantly higher than the tissue color texture after autologous soft tissue healing, which is inconsistent around the soft tissue and has traces in the soft tissue, and there are problems of poor aesthetic habit. Because the lamina propria connective tissue plays a decisive role in the specificity of its coated epithelium structure, the keratinized mucosa width remained stable at $3.63 + 0.85$ mm, with an increment of $3.24 + 1.05$ mm at six months after surgery. Compared with the least significant increase in the preoperative period, there were no significant differences in the same age of surgery, doctors, gender and other aspects. Here, in the research. The baseline 17-periodontal status of the two groups was stable without significant difference, thus reducing the surrounding plaque and soft tissue inflammation, enhancing the patients' mobility and ability to clean around the limbs, perhaps reducing the discomfort caused by the upper teeth, and increasing the width and toughness of the post-keratosis mucosa in time. The Asian condition of the control group at 3 to 6 months after surgery was selected before surgery and at the same time, and the keratinized mucosa width of the keratinized mucosa after the reconstruction of the keratinized mucosa was greater than 2 mm. In the Fdg group, at six months after surgery, the mean annual shrinkage around the limb was $0.45, + 0.69$ mm, compared to $0.95, + 6.94$ mm at the limit, which was significantly reduced. It can be seen that straight body. The peripheral keratinized mucosa was reconstructed and the late mucosal retraction was also improved. Implants with keratinized mucous membranes smaller than 2 mm have significant mucosal retraction^[19].

When it comes to the effects of different keratinized mucosal widths on the health status of the tissues surrounding the implant, it can be found that mucosal regression is not only an aesthetic problem, but also easily leads to plaque accumulation, and other diseases progress in the patients studied. Mucous membrane retraction may be observed in the middle of the night, and a comprehensive evaluation of keratinized mucous membrane synthesis should be performed in the gravity body after crown repair and a physical evaluation should be conducted before the operation to compensate for the previous mucous membrane retraction, so as to achieve the pre-onset effect with maximum predictability and minimum ease.

For the soft tissue quality defects caused by late destruction of periodontitis, clinicians should think forward before implantation, and actively perform soft tissue surgery in the early stage to create a healthy environment around the limb. The keratinized mucosa was reconstructed after perfusion, due to the influence of its upper repair. These two intersecting and technically sensitive problems require an experienced physician and a well-developed surgical plan to achieve a satisfactory outcome for the other patient. Also, since the operation in this study and similar clinical studies reported the prevention of soft tissue tears during anal fistula suture, this is also a way to improve the existing keratinized mucosal widening.

5. CONCLUSION

In order to further verify the effectiveness of the procedure and the long-term stability, the number of study cases and the time of visit need to be increased in the future. Although this study achieved preliminary results, the pain and bleeding of the second hemorrhage were reduced, and the combined application of prf and protective film enhanced the resistance of the wound tissue to the outside world, which could help the stability of the limbs and reduce the risks around the limbs of patients. For implants in patients with periodontitis, use fonts. The soft tissue has been increasing or reconstructing the healthy keratinized mucosa. To evaluate the postoperative efficacy from the perspective of both doctors and patients. This study, combined with clinical indicators and the patient's own perception, confirmed that keratinized mucosa widening can also be applied to the upper repaired implant. Good results were obtained during follow-up. In this study, the keratinized membrane around the implant in periodontitis patients was accelerated by the use of a root-joint reduction flap combined with free gingival transplantation.

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