

MODIFIED VERTICAL MATTRESS SUTURING TECHNIQUE FOR FLAP APPROXIMATION AFTER RAMPING – A MODIFIED RESECTIVE OSSEOUS SURGICAL PROCEDURE

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Case Report

ABSTRACT

Purpose of this study is to evaluate the efficacy of modified vertical mattress suturing technique for flap approximation after ramping – a modification of resective osseous surgical procedure. Eighteen patients requiring periodontal surgery for pocket therapy were included in the study. The preoperative gingival and periodontal conditions were evaluated and intraoral radiographs were taken to identify the osseous defect. Shallow Craters present in the interdental regions towards the palatal surface were treated by ramping. On completion of the procedure, flaps were approximated for the final suturing. Suturing is done by a modification of vertical mattress suturing method using 4-0 silk sutures. The surgical sites were evaluated at the conclusion of the surgery, during suture removal and one month post-operative. The outcomes were evaluated in terms of patient's comfort, surgical flap approximation, complications and post-operative recessions. Complete closure of wound and good flap approximation was achieved in all cases immediately after the surgery. Except for three patients with delayed wound healing at suture removal, all other patients displayed rapid healing without any discomfort. No noticeable defect was seen in the healing of the interdental papilla on the buccal aspect. Embrasure spaces on the buccal surface were completely filled by interdental papilla during the one month review period. In patients undergoing resective osseous surgery by ramping that result in two different planes for flap approximation, the modified vertical mattress suturing technique proves to be a reliable and an effective method of suturing.

Key words: Modified vertical mattress; craters; ramping; resective osseous surgery; flap approximation; planes of periodontal surgery.

INTRODUCTION

Resective osseous surgery is the most commonly practised periodontal surgery. This procedure of bone re-contouring is always done either during access flap therapy or as an integral part of flap surgery for pocket

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treatment. Many modifications of resective osseous surgery are practised for efficient and conservative treatment of the underlying osseous defect. Periodontal flap surgery involving Ramping (1), a modification of resective osseous surgery is the most frequently practiced surgical method for treating shallow III wall intra-bony defects that appears as craters. The immediate end points of any osseous surgery are not only the elimination of the intra-bony defect but also achieving minimal probing depth (≤ 3 mm) and proper gingival morphology (1). The gingival morphology and the minimal probing depths are achieved with the help of adequate approximation of the soft tissue flap using a proper and effective suturing procedure for the completion of the surgery. When the proper suture technique is used with the appropriate thread type and diameter, tension is placed on the wound margins so that primary intention healing occurs (2).

Accurate apposition of surgical flaps is significant for patient comfort, hemostasis, reduction of the wound size to be repaired, and prevention of unnecessary bone destruction (3). During all periodontal flap surgical procedure, the knowledge and skill of suturing along with selection of appropriate suture technique helps in the precise positioning of the muco-periosteal flaps thereby reducing the post-operative complications.

Various suturing methods are practised in the field of periodontal surgery. Most commonly used techniques of suturing are simple interrupted sutures, continuous suturing, and vertical or horizontal mattress techniques for adequate approximation of the elevated flap (4). Mattress technique is always used in the areas where tension-free closure cannot be accomplished (5).

Mattress suturing techniques generally are used to resist muscle pull, evert the wound edges (this keeps epithelium away from underlying structures), and to adapt the tissue flaps tightly to the underlying structures (e.g access flap surgery, bone graft, tissue graft, alveolar ridge corrections, regenerative membrane, or dental implant). Mattress sutures are also helpful in close approximation of flaps under tension as in the cases of suturing done in different planes.

Purpose of this present study is to evaluate the efficacy of modified vertical mattress suturing technique for flap approximation after ramping – a modification of resective osseous surgical procedures.

MATERIALS AND METHODS

Eighteen patients both male and female, non-smokers of age range 32–45 in good general health, diagnosed as Chronicperiodontitis (6) due to probing pocket depth (PPD) of 5mm on the interdental regions of palatal surface and who needed periodontal flap surgery were included in this study. All the patients considered in this study were explained clearly about the procedure and written consents were obtained. Full mouth oral prophylaxis was done a week ahead of the planned surgical procedures.

The pre & post-operative gingival and periodontal conditions were assessed and tabulated based on probing pocket depth (PPD), recession and clinical attachment level (CAL) recorded at 6 sites of all involved teeth along with oral hygiene status and Gingival index (GI). Intra-oral peri-apical and bitewing radiographs were taken to identify the periodontal osseous defect. All surgical procedures were done by the same operator. The surgical sites were anaesthetised and trans-gingival probing was done to confirm the radiographic appearance of the osseous defect (Figure 6).

Muco-periosteal flap was elevated and the steps in periodontal surgery were done before treating the osseous defect. Shallow Craters (III wall Intra-bony defects) were corrected following the modifications recommended in resective osseous surgery by Ramping method using the appropriate instruments and techniques (Figure 1–4). On completion of the surgical procedure, flaps were approximated for the final suturing and suturing were done (Figure 7).

Suturing Method: Suturing of the elevated muco-periosteal flap was done by a modification of vertical mattress suturing method using reverse cutting, 4–0 silk suture material. The bite for the suture on the buccal surface was taken 6–8 mm apical from the tip of inter-dental papilla (near the muco-ginigval junction) (Figure 5) and was passed on to the palatal surface. The suture was taken out from the inner surface of the flap on the palatal side. Instead of taking a vertical mattress bite on the palatal surface, regular interrupted style of winding was done (Figure 5). Then

the suture was passed through the inter-dental space to the buccal surface. On the buccal surface, the bite was taken from the inner surface of the flap and the knot was placed as in the vertical mattress suturing procedure. The modification that was done during suturing was that on the palatal surface, instead of taking a bite for vertical mattress, bite for interrupted sutures were placed.

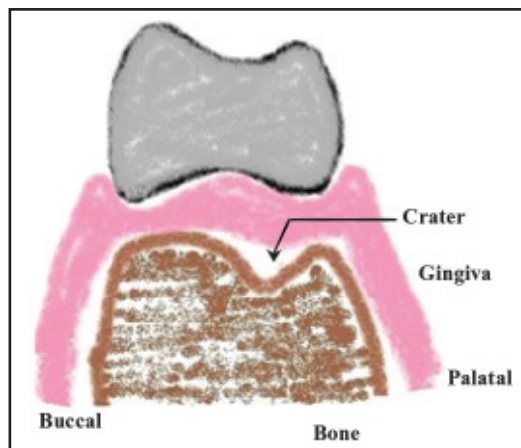


Figure 1. Crater seen in relation to the palatal.

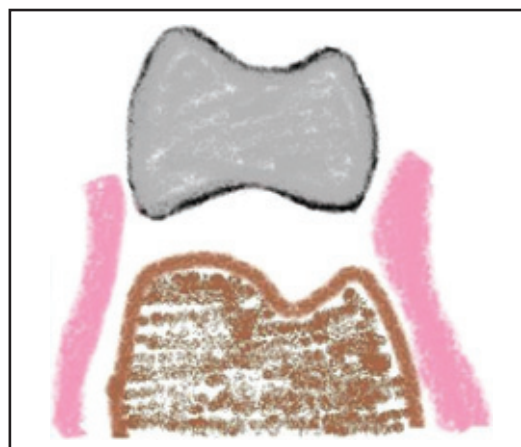


Figure 2. Muco-periosteal flap elevation surface interproximal region.

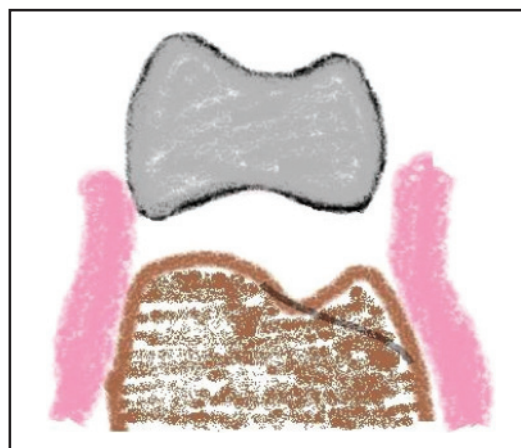


Figure 3. Ramping to be done along the 'black' lines.

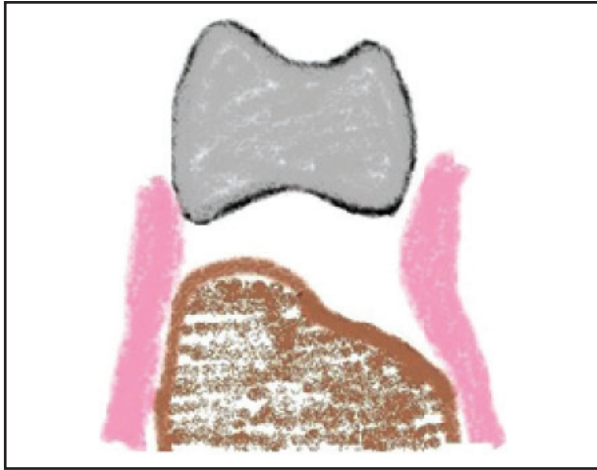


Figure 4. Ramping completed following the steps in resective osseous surgery.



Figure 6. Pre surgical – Buccal Surface.

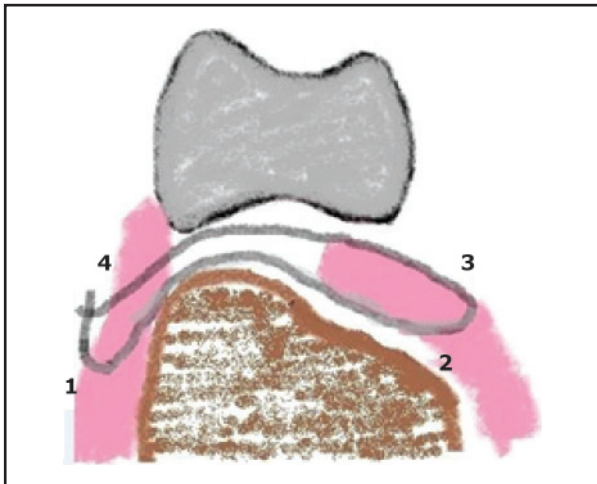


Figure 5. Modification of vertical mattress Buccal-vertical matteress and lingual is a simple interrupted method. The surgical areas were photographed and then evaluated immediately after the completion of the surgery, at the time of suture removal and one month post-operative (Figure 6–10). The suturing outcomes were evaluated in terms of patient's comfort, surgical flap approximation based on the exposure of interdental bone, complications if any, probing depth and post-operative recessions if any.

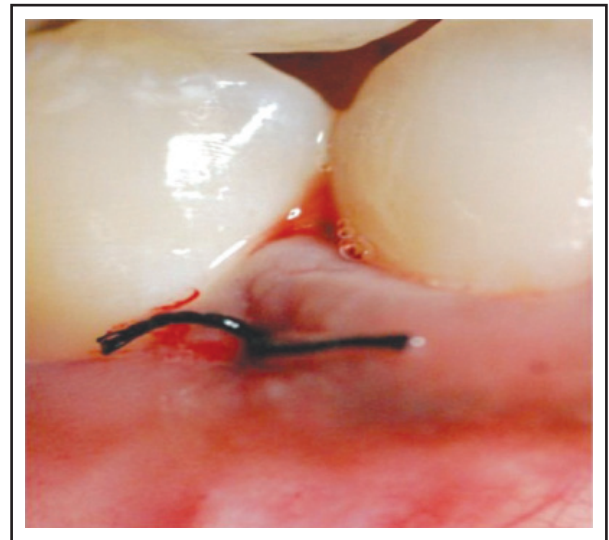


Figure 7. Post surgical – immediately after suture placement on the buccal surface.

The surgical areas were photographed and then evaluated immediately after the completion of the surgery, at the time of suture removal and one month post-operative (Figure 6–10). The suturing outcomes were evaluated in terms of patient's comfort, surgical flap approximation based on the exposure of interdental bone, complications if any, probing depth and post-operative recessions if any.

RESULTS

Complete closure of wound and adequate flap approximation was achieved in all cases immediately



Figure 8. Post – Operative photograph taken after a week before suture removal. Note the healing of interdental papilla in the buccal surface.

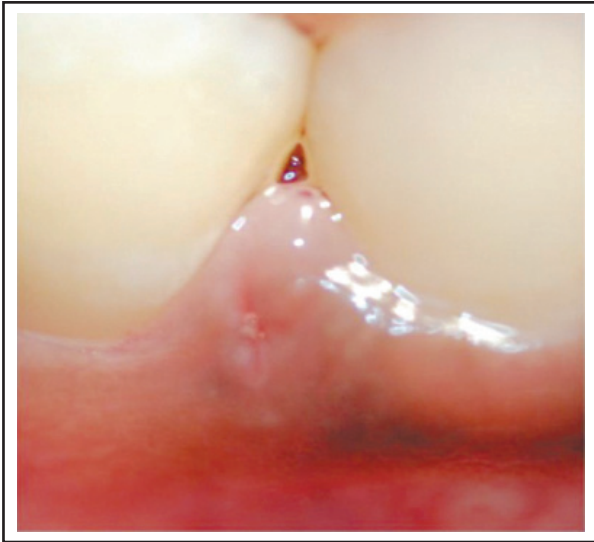


Figure 9. Post – Operative photograph taken after a week after suture removal on the buccal surface.



Figure 10. Post – Operative photograph taken after a week before suture removal showing the lingual surface.

after the surgery. Except for three patients with delayed wound healing at suture removal, all other patients displayed rapid healing without any discomfort. All the patients were comfortable with no or little post-operative discomfort. No noticeable defect was seen in the healing of the interdental papilla on the buccal aspect. Embrasure spaces on the buccal surface were completely filled by interdental papilla during the one month review period. The palatal interdental regions showed healing with probing depths remaining in the normal limits and minimal loss of contour of the interdental papilla after one month review. Mean probing depth which was 4.85 mm preoperatively has significantly reduced to 1.80 mm postoperatively after

one month post-operative appointment. Around six patients had noticeable amount of recession (1.08 mm) on the inter-dental regions of palatal surface at the time of one month postoperative review appointment.

DISCUSSION

Several aspects of the gingival response to osseous resective surgery, including changes in probing depth, clinical attachment levels and postsurgical gingival recession as well as the postoperative topography, have been reported in clinical trials and have been documented through various short-term studies (7-9). Resective osseous surgery always results in change in the contour of the gingiva and the position of the gingiva in the form of recession.

Bragger *et al.* in their study have calculated the amount of recession created after resective surgery for crown lengthening (7). The mean recession created was 1.3 mm immediately after suturing, 1.5 mm at six postoperative weeks and 1.4 mm at six months. In our study, the recession was not prominent immediately after the surgery and in one week postoperative review. This is because of the eversion of the interdental papilla due to vertical mattress suturing technique on the buccal surface.

In around six patients we noticed a change in the position of the gingiva in the form of recession. Recession was around 1.08 mm along the interproximal surfaces of molars on the palatal surface. Similar result was obtained by Camevale & Fuzzi (1995) in their study on interproximal recession following resective osseous surgery during crown lengthening procedure showed interproximal areas with a mean recession of 2.08 mm at 15 postoperative days and 1.67 mm at 30 days (9). The values of recession in our study are far less compared to the study done by them probably because of the procedure involved but the pattern of healing showed a better coronal migration of interproximal gingiva in our study.

Resective osseous surgery is a definitive procedure for pocket elimination. Becker *et al.* (1988) in their study on mean probing depth after resective osseous surgery, has said to have a mean probing depth of 2.10 mm after eight postoperative weeks in cases with 4–6 mm probing depth preoperatively (8). In our study, there was a similar marked decrease in the mean probing depth from 4.85 mm to 1.80 mm at the end of one month postoperative assessment.

Occurrences or recurrences of osseous craters following resective osseous surgery was documented by Becker *et al.* (1988). They have reported a 57% of crater formation and has attributed to the inadequate interproximal flap closure as the primary reason for osseous crater (8). In our study, due to modification in the vertical mattress suturing technique, we were

able to have a better proximal adaptation and quicker healing resulting in less probability of crater formation. Smith *et al.* (1980) proposed that closure of the embrasure space following surgery is also an important factor for coronal proliferation of the gingiva in the interdental region (10). In our study we were able to achieve a good closure of interdental space on the buccal aspect as a result we were able to see a better coronal movement of the interdental gingiva thereby resulting in a minimal recession on the palatal aspect.

This simple modification in the suturing procedure will help us during the resective osseous surgery with respect to good flap adaptation, an uneventful healing and better coronal migration of the gingival tissues in the interdental regions thereby resulting in a favourable aesthetics. This method is more advantageous in areas where we need to approximate the flaps from two different planes under tension. The benefits of this modification have to be evaluated in all other possible periodontal surgical procedures.

CONCLUSION

Successful resective osseous surgical procedure is done following certain guidelines on osseous re-contouring along with proper management and positioning of the periodontal flap. A simple modification of the vertical mattress suturing method has proved to be really a simple and effective modification that is done to achieve good flap approximation along with least complications, lesser recession and good gingival interproximal coronal migration after resective osseous surgery. Even though this method is simple to perform, it also has few drawbacks like restricted areas of usage and technique sensitive in periodontal regenerative procedures. The use of various suturing methods and its modifications have to be tried and applied in all relevant surgical techniques. We should develop an in-depth knowledge in the field of suturing since the art and precise skill of suturing is paramount to the success of all periodontal surgical procedures.

REFERENCES

1. Carnevale G, Kaldahl WB. Osseous resective surgery. *Periodontol.* 2000; 22: 59-87.
2. Silverstein LH. Essential principles of dental suturing for the implant surgeon. *Dent Implantol Update.* 2005; 16(1): 1-7.
3. Silverstein LH, Kurtzman G.M. A Review of Dental Suturing for Optimal Soft-Tissue Management. *Compendium* 2005; 26(3): 163-168.
4. Cohen ES. Sutures and suturing. In: *Atlas of Cosmetic Reconstructive Periodontal Surgery.* 2nd ed. Philadelphia: Lea & Febiger; 1994: 9-30.
5. Silverstein LH. *Principles of Dental Suturing: The Complete Guide to Surgical Closure.* Mahwah, NJ: Montage Media; 1999.
6. Armitage GC. Development of a classification system for periodontal diseases and conditions. *Ann Periodontol.* 1999; 4: 1-6.
7. Bragger U, Lauchenauer D, Lang NP. Surgical lengthening of the clinical crown. *J Clin Periodontol.* 1992; 19: 58-63.
8. Becker W, Becker BE, Ochsenein C, Kerry G, Caffesse R, Morrison EC, Prichard J. A longitudinal study comparing scaling, osseous surgery and modified Widman procedures. Results after one year. *J Periodontol.* 1988; 59: 351-365.
9. Carnevale G, Fuzzi M. Crown lengthening procedure, a wound healing study in humans. Personal communication in: 6th Meeting, International College of Prosthodontists, San Diego, 1995.
10. Smith D, Ammons W, van Belle G. A longitudinal study of periodontal status comparing osseous recontouring with flap curettage. I. Results after 6 months. *J Periodontol.* 1980; 51: 367-375.