

Modified Coronally Positioned Flap with Sling and Tag Suturing – for Isolated Gingival Recession: A Study

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ABSTRACT

Background: Isolated gingival recession root coverage in an esthetic zone is an important factor. Color blending, well aligned contour, good surface texture, and root coverage are essential components of ideal root coverage procedures. Along with this, there should be less morbidity and discomfort to the patient. Modified coronally positioned flap with modified suturing should fulfill all the above criteria.

Materials and Methods: 8 patients with isolated gingival recession with more than 2 mm gingival recession and at least 1 mm of keratinized gingiva were selected. Gingival recession height, clinical attachment level, width of keratinized gingiva, and probing depth were recorded at base line, 3 months and 6 months and statistically evaluated. Further new method of assessment Root coverage esthetic score system (RES) was followed to evaluate not only root coverage and also in terms of esthetics.

Results: In all the 8 cases 100 % root coverage was obtained. Pre-operative gingival recession was 2.73 ± 0.28 mm with post-operative recession is 0.00. Gain in the clinical attachment level was 3.73 ± 0.28 mm and increase in the width of keratinized gingiva was 1.53 ± 0.9 mm. Probing depth remain unchanged. RES score for all the cases was 9/10, since MGJ shifted coronally.

Conclusion: Complete root coverage is possible with the simple modification of the coronally positioned flap with special suture technique “sling and tag suture”. Additional advantage of color match, good contour and less discomfort and morbidity makes this technique a suitable and recommended technique for the isolated gingival recession.

Keywords: Coronally positioned flap, sling and tag suture, root coverage, RES score system.

INTRODUCTION

Periodontics for long has been concerned with commonly occurring problems of gingival recession and root exposure. In addition to the esthetic concern of a patient, exposed root surfaces are frequently associated with the hypersensitivity and plaque retention. According to the American Academy of Periodontology 1996 position paper on mucogingival therapy, esthetic demands, reduction of root sensitivity and management of root caries or

cervical abrasions are the indications for root coverage, the usual treatment of soft tissue recessions.

Root coverage techniques can be broadly divided into three major groups. They are pedicle soft tissue grafts, which are further, divided into rotational flaps and advanced flaps. Advanced flaps are probably the simplest, yet successful procedure for managing gingival recession. Norberg (1926) first proposed coronally positioned flap procedure as an

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esthetic surgical procedure for root coverage. Optimum root coverage and good color blending of the treated area with respect to adjacent tissue and complete recovery of the original soft tissue morphology can be predictably accomplished by this procedure, furthermore the postoperative course is less troublesome for the patient as other surgical sites distant from the tooth with the recession defect are not involved.

There are several modifications proposed in the original technique of coronally positioned flap. Among them, the most recent modification was by Zuccheli G and De sanctis (2000)¹ who proposed split-full-split thickness flap of the coronally positioned flap for the multiple gingival recessions with high rate of success. De. sanctis and Zucchelli G (2007)² further extended the same technique for the treatment of isolated gingival recession. To obtain the complete root coverage, Lie- Hu- Hang (2007)³ proposed the Sling and Tag suturing with coronally positioned flap. This unique suturing technique offers the close adaptation of the flap to the underlying connective tissue and better stabilization of the coronally positioned flap.

With most of the root coverage procedures, only percentage of root coverage was assessed with less importance given to the esthetic outcome of these techniques (color blending, marginal tissue contour, soft tissue texture). To overcome this important objective of plastic periodontal procedure, a new method of assessing the esthetic outcome of these procedures, called Root coverage Esthetic score has been proposed.⁴ This new system has been shown to be a very useful tool to assess the esthetic outcome in addition to the percentage of root coverage.

The present study is undertaken to evaluate the predictability of the modified coronally positioned flap with sling and tag suturing in isolated gingival recession.

MATERIALS AND METHODS

Eight patients with isolated gingival recession sites of maxillary teeth, equal or more than 2 mm were selected from the outpatient department of Periodontics, Awadh Dental College & Hospital, and Jamshedpur.

Inclusion criteria

Normally aligned Maxillary teeth with isolated gingival recession equal to or more than 2 mm and which is having minimum of 1 mm of keratinized tissue. **Exclusion criteria**

1. Root caries and root surface restoration,
2. Smoking
3. Positive medical history individuals where periodontal surgery is contraindicated or it complicates the outcome of periodontal surgery were excluded.

Pre and post-surgical treatment records

Plaque index and bleeding upon probing were recorded. The following clinical measurements were taken on the day of surgery and again at 3 months and 6 months follow up visits of all treated teeth

Recession height, Width of keratinized gingiva, Probing pocket depth/ sulcus depth and Clinical attachment level were recorded.

Surgical procedure

The area to be operated was anaesthetized.

The design of the flap (split- full-split) consisted of the following incisions²

- ❖ Two horizontal beveled incisions (3 mm in length) mesial and distal to the recession defect located at a distance from the tip of papillae equal to the depth of the recession plus 1 mm.
- ❖ Two beveled oblique slightly divergent incisions at the end of the horizontal incisions extending in to the alveolar mucosa.

The resulting trapezoidal-shaped flap was elevated with a split–full–split approach in the coronal–apical direction.

Coronal split thickness flap - the surgical papillae comprised between the horizontal incisions and the probeable sulcular area apical to the root exposure were elevated split thickness. **Middle full thickness flap** -The soft tissue apical to the root exposure was elevated with full thickness inserting a small periosteal elevator in to the probeable sulcus and proceeding in the apical direction up to

exposing 3–4mm of bone apical to the dehiscence, this was done in order to include the periosteum in the thickness of that central portion of the flap covering the avascular root exposure. The releasing vertical incisions were elevated split thickness keeping the blade parallel to the bone plane thus leaving the periosteum to protect the underlying bone in the lateral areas of the flap. **Apical split thickness flap**-Apical to the bone exposure flap elevation continued split thickness.

Coronal advancement of the flap- In order to coronal advancement, all the muscle fiber insertions present in the flap was eliminated. This was done to keeping the blade parallel to the external mucosal surface. Coronal mobilization of the flap is considered “adequate” when the marginal portion of the flap was able to passively reach a level coronal to CEJ of the recession defect. The flap should be stable in its final coronal position even without sutures.

Deepitheliazation of remaining interdental papillae-The facial soft tissue of the anatomic interdental papillae coronal to the horizontal incisions was deepithelized to create a connective tissue bed. Following this, the flap was moved coronally and positioned 1 mm coronal to the CEJ covering the tip of the deepithelized papillae.

Root surface debridement- Only that portion of the root exposure with loss of clinical attachment (gingival recession + probeable gingival sulcus/pocket) was instrumented.

Suturing- suturing of the flap was started with two interrupted periosteal sutures performed at the apical extension of the vertical releasing incisions then it proceeded coronally with other interrupted sutures. Each of them directed from the flap to the adjacent buccal soft tissue in the apicocoronal direction. While suturing the interdental papilla, sling and tag suture proposed by Lei- Hu-Hang (2007)³ was followed. The sling suture permitted to stabilize the surgical papillae over the interdental connective tissue and Tag suture allowed for a precise adaptation of the flap margin over the underlying convexity of the crown.

After 14 days, sutures were removed. All patients were recalled for oral prophylaxis at 3 months and 6 months. All the clinical parameters were again

recorded and postoperative clinical photographs were taken. At the end of 6 months, Esthetic outcome of modified coronally positioned flap was evaluated using Root coverage esthetic score system (RES).

RESULTS

The eight areas of recession treated showed the following distribution. The treated teeth were 2 right maxillary canines, 3 left side maxillary canine and 3 right maxillary first premolars.

CLINICAL APPEARANCE OF THE FLAP

The following clinical observations were made during healing of modified coronally positioned flap.

At 14 days – After removal of Periodontal dressing, the flap was still edematous with a glossy, surface. Border of the margins was red in color. The area where the vertical incisions given could be demarcated from the surrounding tissue

At Ninety days – the healing of the flap had advanced and the flap blended harmoniously with the neighboring tissue. The flap appeared firm and well attached. The border of the gingival margin was well contoured. At 180 days- The changes observed were as same as it is seen during 90 days.

Clinical parameters

The mean gingival recession height preoperatively was 2.73 ± 0.29 mm which reduced to 0 mm on 90th day, and remained same at 180th day (100% root coverage) which was statistically significant (p value= 0.00) (Table 1). Clinical attachment level, preoperative (3.73 ± 0.28 mm) to 90th day, (0 mm) was noted, indicating a statistically significant gain in the clinical attachment level. Which remained stable even at 180th day, (p value= 0.00) (Table 2). On comparison of mean width of keratinized gingival, there was a mean increase of 1.53 ± 0.09 mm, indicating a statistically significant increase (Table 3).

Regarding the RES score- In all the cases, gingival marginal level was above the CEJ, suggesting complete root coverage (score 6). Marginal contour was scalloped and followed the CEJ (score 1). Thus soft tissue texture was same as with the adjacent

gingiva and well blended, which is scored as 1. In all the cases mucogingival junction was displaced coronally and which was not aligned with the adjacent teeth (Score 0). Since the flap was coronally positioned, the color of the gingiva remained same without any changes (score 1). Thus the total RES score of 9 /10 was given for all the cases.

DISCUSSION

According to the current concept, the success of plastic periodontal surgical procedures, not only depends on achieving complete root coverage but it should also fulfill the criteria of normal contour and complete match with the color of the adjacent gingiva. In the present study all the cases showed complete root coverage (100%). The results of the present study are in tandem with the clinical findings observed by Allen and Miller (1989)⁵ where they reported 98% of mean root coverage and 84% complete root coverage. These results were also comparable to the studies by De sanctis and Zucchelli M (2007).²

The better results obtained in the present study may be attributed to the split – full – split flap design, which has several advantages. Split thickness elevation at the level of the surgical papilla guarantees anchorage and blood supply in the interproximal areas mesial and distal to the root exposure. The full thickness portion by including the periosteum confers more thickness and thus better opportunity to achieve root coverage to that portion of the flap residing over the previously exposed avascular root surface. The more apical split thickness flap elevation facilitates the coronal displacement of the flap.²

Vertical incisions were given in this technique to displace the flap coronally. In Ideal plastic periodontal surgical procedures for root coverage, vertical incisions should be avoided, to have better blood supply and to avoid the scar-like appearance in the area of vertical incision post surgically. However in the present study no scar like appearance was noted in the surgical area where vertical incisions were given. Since surgical papillae, outlined by the horizontal 3 mm incision and by the vertical beveled incisions, were very wide and thus provided a longer area for anchoring the flap to the underlying vascular bed and more tissue to place

the coronal sling suture. Furthermore partial thickness of surgical papillae facilitated the nutritional exchange between flap and the underlying deepithelized anatomical papillae which improved the blending of surgically treated area with respect to adjacent soft tissue.²

One more reason for the better root coverage obtained with this technique is the manner in which the flap was coronally displaced.² Most of the earlier techniques of coronally displaced flap (Patur and Glickman,² Allen and Miller,⁵ Wennstrom and Zuchelli⁶) utilized coronal displacement of the flap through periosteal incisions, this resulted in some amount of tension on the flap. In the present modified technique, instead of periosteal incisions, coronal displacement was allowed through the eliminations of muscle insertions included in the thickness of the flap in the apical end.² This permitted to eliminate the tension on the flap and to displace passively the soft tissue flap coronal to CEJ without sutures because of the absence of the muscle pull thus achieving the better and stable root coverage post operatively. Further technique of suturing followed in this technique was unique, which further helped in the proper adaptation of the flap to the tooth.

There was a significant gain in the clinical attachment level. The results obtained in the present study is in accordance with the studies done by Desanctis M and Zuchelli G², Allen and Miller⁵ and several other authors.^{7,8} Further, probing pocket depth remained same pre and post-operatively. However to discover the type of attachment that is formed, it would require the removal of a successfully treated tooth. This type of information generated from human histology, was beyond the scope of the study. Historically the presence of an “adequate” zone of keratinized gingiva has been considered critical for the maintenance of gingival health. Pini Prato (2005)⁹ has stated that an increase in the width of keratinized gingiva is a desirable effect in decreasing the possibility of recurrence of the gingival recessions. In the present study there was significant increase in the width of keratinized gingiva. The results of the present study is in accordance with the Harris (2000)¹⁰ and De sanctis M and Zuchelli G (2007)². There are mainly two hypotheses that have been put forward to explain the increase in the width of keratinized gingiva

following plastic periodontal surgical procedures. The tendency of the mucogingivalline coronally displaced by means of surgery, to regain its original “genetically determined “ position (Ainamo et al 1992)¹¹ or the capability of connective tissue deriving from the periodontal ligament to participate in the healing process taking place at the dento-gingival interface(Karring et al 1971¹², Lundberg and Wennstorm 1988,¹³ Pasquinelli 1995¹⁴). Root coverage esthetic score system is the new evaluation system⁴ to assess the success of the root coverage procedures. In the present study, even though the color blending and soft tissue texture were expected to be good, since the same tissue was coronally placed, change in the contour, mucogingival junction position alteration and amount of root coverage may vary. In all the cases in the present study the mucogingival junction was not aligned properly in relation to the adjacent teeth. Since the possibility of change in the position of the mucogingival junction was expected to occur, long term evaluation may be needed, to know whether mucogingival junction would regain its original “genetically determined position”

CONCLUSION

The “modified coronally positioned flap” with sling and tag suture provides a highly satisfactory solution in the treatment of isolated gingival recession. However, the clinical study was followed up for only 6 months and change in the position of the gingival margin and mucogingival junction may occur over a period of time, follow up for longer period is necessary to evaluate the success of this technique.

Table 1: Comparison of Gingival Recession Height at Different Time Intervals.

TIME INTERVAL /days	MEAN +S.D (in mm)
0-day	2.73±0.28
90 th day	0.00
180 th day	0.00
Mean change -(0-90 th day) (0-180 th day)	2.73±0.28
p- value	0.000(sig)

Table 2: Comparison of Clinical Attachment Level At Different Time Intervals.

TIME INTERVAL /days	MEAN +S.D (in mm)
0-day	3.73±0.28

90 th day	0.00
180 th day	0.00
Mean change (0-90 th day) (0-180 th day)	3.73±0.28
p- value	0.000(sig)

Table 3: Comparison of Width of Keratinized Gingiva at Different Time Intervals.

TIME INTERVAL/days	MEAN +S.D (in mm)
0-day	2.20±0.13
90 th day	3.73±0.22
180 th day	3.73±0.22
Mean change (0-90 th day) (0-180 th day)	1.53±0.09
p- value	0.000(sig)

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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