Case Report

Pinhole Surgical Technique – A Novel Minimally Invasive Approach for Treatment of Multiple Gingival Recession Defects: A Case Series

Abstract

Gingival recessions are one of the most prevalent periodontal diseases. Hypersensitivity and esthetics are the major concerns associated with recession defects. There are various treatment modalities for its management, but recently, minimally invasive techniques have gained much importance because of lower patient morbidity and comparable results when compared to conventional techniques. This case series represents a 6-month follow-up of a recently introduced pinhole surgical technique where the percentage of root coverage was found to be statistically significant.

Keywords: *Gingival recession, minimally invasive, pinhole*

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Introduction

Gingival recession is defined as the migration of marginal tissue apical to cementoenamel junction.[1] The etiological factors include periodontitis, faulty toothbrushing, malpositioning, buccal prominence, gingival biotype, and carious and noncarious cervical lesions.[2] Patients presenting gingival recession usually complain of hypersensitivity or unaesthetic appearance.

Various periodontal plastic surgeries are advocated for the treatment of gingival recession including free gingival grafts, laterally repositioned flap, and coronally advanced flap (CAF) with their various modifications.[3] Since the last decades, patients' esthetic expectations and perception of the use of least traumatic surgeries have led to the development of minimally invasive techniques which not only obtain root coverage but also have a color match and tissue blending with adjacent tissues of the defect site.[4] Currently, the technique which is considered a gold standard for the correction of root coverage is subepithelial connective tissue graft along with CAF. However, this technique is associated with creation of a second surgical site increasing the patients' morbidity and inclusion of vertical releasing incisions, which results in scar formation, thus compromising the esthetics.[5]

To avoid these disadvantages, the vestibular incision subperiosteal tunnel access approach was developed.[6] Following the similar concept, a novel minimally invasive technique was introduced by Chao in 2012, pinhole surgical technique (PST).[7] This technique provides a conservative approach to treat the recession defects. This case series report cases of gingival recession which were treated with a transmucosal periosteal elevator. The rationale behind using this novel surgical technique is that it is minimally invasive approach, scalpel usage is restricted to pinholes with no damage to intrasulcular tissues, does not require any sutures, minimal postoperative complications such as bleeding, pain, and better healing due to minimal manipulation of soft tissue.

Materials and Methods

Ten patients with Miller's Class I or II recession defects (n = 20 sites) in the esthetic zone were selected from the outpatient department of the department of periodontology [Figure 1]. All the patients complained of either receding gums or elongation of teeth which appeared unaesthetic to them. Clinical parameters observed were as follows: probing depth, recession depth (RD), recession width (RW), clinical attachment level (CAL), and width of keratinized tissue (WKT).

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Patients were explained about the surgical procedure, and informed consent was obtained. Scaling and root planing was done 3 weeks preoperatively, and a patient was instructed to maintain oral hygiene.

For all the cases, PST was used along with the placement of titanium-prepared platelet-rich fibrin (T-PRF) membrane. Tunali *et al*.[8] gave the protocol for the preparation of T-PRF. Ten milliliters of blood was withdrawn from the antecubital vein and centrifuged at 3500 rpm for 15 min in a titanium test tube, and the T-PRF then formed was separated and compressed in a PRF box to obtain a membrane.

Following local anesthesia, a horizontal incision of around 2–3 mm was made in the base of the vestibule just apical to the recession site in case of a single recession defect. In case of multiple recession sites, the horizontal incision was made in the base of the vestibule in the inter-radicular area of two adjacent defect sites [Figure 2a]. A sulcular incision was given keeping the tip of the interdental papilla intact at both mesial and distal sites. A tunneling instrument (transmucosal periosteal elevator) was inserted through the pinhole and used for blunt dissection [Figure 2b]. The flap was then extended coronally and horizontally to allow for elevation of two adjacent papillae on each side of denuded root(s). The interproximal extension of flap allowed the coronal advancement of the mucogingival complex beyond the cementoenamel junction at the defect site. For stabilization, a T-PRF membrane was placed through the pinhole beneath the tunnel [Figure 2c]. Digital pressure was applied for 5 min to stabilize the advanced flap, followed by periodontal dressing. Amoxicillin 500 mg three times a day and a painkiller SOS was advised for three days postoperatively. A patient was refrained from brushing at the surgical site for 4 weeks and was advised 0.2% chlorhexidine mouthwash twice daily for 15 days. The dressing was removed on the 10th day of surgery, and all the clinical parameters were taken at 3-month and 6-month follow-up [Figure 3]. A patient was asked to rate the Visual Analog Scale (VAS) on a scale of 1–10 according to the pain he/she experienced during and after the surgery, 0 being least and 10 being the worst pain.

Statistical analysis

The data were entered on a Microsoft Excel spreadsheet and imported into the Statistical Package for the Social Sciences version 22 (USA) for statistical analysis. The results are present in the form of mean and standard deviation. The student paired *t*-test was used to find significant difference within the group at 3 months and 6 months. $P < 0.05$ was considered statistically significant.

Figure 1: Preoperative view

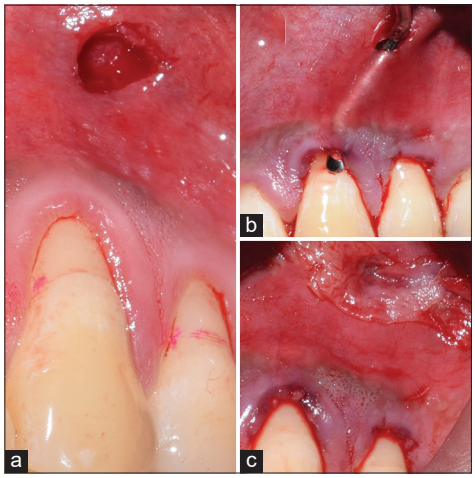

Figure 2: (a) Pinhole made beyond the mucogingival junction, (b) creation of tunnel from pinhole to the gingival sulcus, (c) placement of titanium-prepared platelet-rich fibrin through the pinhole

Figure 3: Six months postoperative view

Results

All the parameters observed at baseline were again evaluated at 3-month and 6-month recall visits. Table 1 shows the description on the mean values of pocket probing depth, RD, RW, WKT, and CAL at baseline, 3-month, and 6-month follow-up period. At baseline,

the mean value of RD was 2.65 ± 0.67, which showed a progressive and statistically significant reduction from baseline (2.65 ± 0.67) to 3 months (0.1 ± 0.32) and 6 months (0.35 ± 0.47). Similarly, when a comparison was done for RW from baseline to 3 and 6 months, it was also found to be significantly reduced. The 6-month mean value for the keratinized tissue width depicted a significant increase. The percentage of root coverage was calculated as follows: (baseline RD − RD at 3/6 months)/baseline RD and the result multiplied by 100. The mean values at 3 months (98%) and 6 months (87%) were found to be statistically significant, but there was a decrease found in root coverage from 3 months to 6 months [Table 2]. Among the ten cases, nine cases represented complete root coverage (CRC) at 3-month follow-up which was reduced to six cases at 6-month recall period. The mean value for the VAS reading was 3.4 ± 0.84, depicting better patient acceptance and low morbidity.

Discussion

The predictability of a root coverage technique is the most critical factor which is measured in terms of the frequency of CRC, i.e., the percentage of the treated defect in which the soft-tissue margin has been repositioned at the level of, or coronal to, the cementoenamel junction, or near CRC (≥90%).[9] It determines the success of a procedure. CAF with subepithelial connective tissue graft is accepted as the gold standard procedure for coverage of gingival recession defects and has shown greater predictability for obtaining CRC.[10] However, to avoid the second surgical site, the placement of platelet-rich fibrin has been used along with CAF giving almost equal results as demonstrated in various clinical trials.

The novel minimally invasive technique, PST, used in this case series overcomes the limitations of CAF, i.e., vertical releasing incisions and elevation of full-thickness flap that compromise the blood supply to the flap, scar formation, and shortening of vestibule.

In the initial study performed by Chao,[7] the mean root coverage obtained was 88.4% following the PST. In accordance with this study, the mean root coverage obtained was 87% at 6-month follow-up. The reduction in RD and RW was also found to be statistically significant when compared to baseline values.

In the present cases, WKT significantly increased from baseline to 6 months showing a similar pattern with previous studies conducted by Reddy[11] and Zucchelli and De Sanctis.[12] The results of this case series are also in accordance with the study conducted by Reddy[11] where the author has obtained a mean root coverage of 96.7% with a statistically significant difference regarding RD and RW during a 6-month postoperative follow-up.

The use of T-PRF along with minimum manipulation of tissue may also have added to the significant increase in the WKT and stability of the results. Uzun *et al*., in 2018, compared the use of T-PRF with that of connective tissue graft along with tunnel technique in the treatment of multiple gingival recession defects and found the comparable results for both techniques (93.29% and 93.22%, respectively), concluding that T-PRF can serve as an alternative to CTG.[13]

The ultimate goal of any surgical technique is patient satisfaction which was found to be high in the present case series (VAS value: 3.4 ± 0.84). The intraoperative discomfort was low, and postoperative bleeding, swelling, and pain were mild and for short duration. The esthetic acceptance in terms of color match and tissue blending was also good. The higher success rate of this novel surgical technique might also be attributed to minimal invasiveness and no use of sutures. Moreover, instant esthetic results can be obtained which are obvious to patients. This technique also has an additional benefit of not hampering vascular supply (no vertical releasing incisions involved), no scar formation, and lesser surgical time.[14] The limitations of the present technique might be utilization of specialized instrument, technique sensitivity and experience is required to improve the handling of soft tissues.

Table 1: Descriptive table

Clinical parameters	Mean±SD		
	Baseline	3 months	6 months
PPD	1.4±0.52	1.1±0.32	1.1±0.32
RD	2.65±0.67	0.1±0.32	0.35±0.47
RW	3.6±0.52	0.2±0.63	0.8±1.03
CAL	4.05±0.96	1.2±0.42	1.45±0.5
WKT	2.4±0.52	3.1±0.74	3.1±0.74
Percentage of root coverage		0.98±0.08	0.87±0.18

PPD: Pocket probing depth; RD: Recession depth; RW: Recession width; CAL: Clinical attachment level; WKT: Width of keratinized tissue; SD: Standard deviation

Table 2: Comparison of mean values of observed clinical parameters from baseline to 3 months and 6 months

Parameters	Baseline	3 months	6 months
PPD	1.4±0.52	1.1±0.32	1.1±0.32
P		0.081	0.081
RD	2.65±0.67	0.1±0.32	0.35±0.47
P		<0.001*	<0.001*
RW	3.6±0.52	0.2±0.63	0.8±1.03
P		<0.001*	<0.001*
CAL	4.05±0.96	1.2±0.42	1.45±0.5
P		<0.001*	<0.001*
WKT	2.4±0.52	3.1±0.74	3.1±0.74
P		<0.001*	<0.001*
Percentage of root coverage		0.98±0.08	0.87±0.18
P		<0.001*	<0.001*

*Statistically significant. PPD: Pocket probing depth; RD: Recession depth; RW: Recession width; CAL: Clinical attachment level; WKT: Width of keratinized tissue

Conclusion

Within the limitations of this case series, PST can be considered as one of the minimally invasive surgical techniques to obtain promising results in the treatment of Miller's Class I and II recession defects.

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Conflicts of interest

There are no conflicts of interest.

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