Treatment of Gingival Recession by a Novel Pinhole Technique- A Report of Two Cases

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Abstract

Background: The concept of minimal invasive technique has gained importance in the recent years and is replacing the open surgical procedures in the field of periodontology too. The treatment of gingival recession has always been technique sensitive with its associated morbidity and discomfort because of the invasive nature. This article presents a report of two cases treated with a minimally invasive Pinhole Surgical Technique, which is a modern marvel, gradually taking over the open surgical procedures, resulting in a near overall root coverage, especially in multiple recession defects.

Keywords: Pinhole technique; PRF; Recession; Root coverage;

Introduction

The esthetic and functional concern over teeth involved with gingival recession is on the rise among the general population. With the demand for precision treatment for multiple recession defects, the challenge posed to clinician is high because of the extensivity of avascular root surface area. Also, thin biotype, decreased Keratinized Tissue Width (KTW), root prominence and root proximity make the choice of surgical treatment difficult [1].

Arrays of techniques are advocated for treatment of recession, many of these are better suited for treatment of isolated defects. Although considered the current gold standard, the CTG as well as some other current technique presents with a number of disadvantages, including the need for harvesting at a distant donor site, limited tissue availability, scar formation at the recipient site and an increased potential for post harvesting morbidity [2].

Furthermore muscle pull during healing frequently leads to insufficient root coverage or relapse of the recession. Tunnel technique for multiple recessions is also challenging in nature because of the need to obtain access through a small sulcular access point and the increased risk of traumatizing and perforating the sulcular tissues, yielding possible unfavorable healing outcomes.

As a consequence of these limitations, the Vestibular Incision Subperiosteal Tunnel Access (VISTA) approach was developed to avoid some of the potential complications of intrasulcular tunneling techniques especially for maxillary anteriors [3,4].

In light of the evolving techniques, based on the principles of minimally invasive procedure, is the pin hole technique invented by John Chao, which is a scalpel free suture free procedure for correcting recessions [5]. This article reports two cases with gingival recession that was treated with pin hole technique and specially designed gingival elevator to minimally access the defect site.

Methods

Report of Two Cases

Case 1

In the first case, a 26 year old systemically healthy female patient visited the Department of Periodontology, with the chief complaint of sensitivity in her upper front tooth region since 2 months. The patient's general health was non-contributory and intraoral examination of the patient revealed multiple recession defects in relation to 13-23. Miller's class I gingival recession was recorded in relation to maxillary right canine and lateral incisor; and left central incisor (4mm), Class II in maxillary lateral incisor and canine (4-5 mm). (Figure 1)

Figure 1: Preoperative photo showing multiple recession defects

The parameters measured included Gingival Recession (GR) measured mid labially as the distance from Cementoenamel Junction (CEJ) to gingival margin, mean root coverage obtained post operatively, amount of analgesics consumed and Verbal Analogue Score (VAS) for sensitivity and patient discomfort. All the parameters were assessed at baseline, 7days, 1, 3 and 6 months postoperatively.

The surgical procedure was explained to the patient and the informed consent was obtained. After thorough scaling and root planning and proper oral hygiene instructions in phase I therapy, the patient was recalled after a week for the surgical procedure. On the elected day, following routine presurgical protocols and after establishing profound local anesthesia, the composite restoration in the recession site was removed with the help of a tapered fissure diamond bur and the root surface was thoroughly planed. Following this, a pinhole incision was made in the alveolar mucosa just apical to the recession defect using Orban's knife (Figure 2). With the help of specially designed ABS gingival elevators (Figure 3), access was gained through the pin hole created, and subperiosteal blunt dissection was done apicocoronally and laterally till the interdental papilla (Figure 4). All the muscular and fibrous adhesions were released from within till the flap was freely movable without any tension and was able to advance coronally. Crevicular incisions if need were given with the same gingival elevator sparing the interdental papillae. Passive coronal advancement in situations of indication was maintained by passing a suture at the gingival margin and securing it onto the tooth with the help of composite (Figure 5).

Figure 2: Access incision made with Orban's knife

Figure 3: ABS™ gingival elevator

Figure 4: Blunt dissection carried out through pin hole with the help of gingival elevators

Figure 5: Passive advancement maintained with the help of sutures

PRF Preparation

10 ml of whole venous blood was collected from the patient and centrifuged at a speed of 3200 rpm for 12 minutes. Following this, the blood settled in 3 layers. Only the middle fraction containing Platelet Rich Fibrin (PRF) was collected and was compressed gently between gauze to make a PRF membrane.

This PRF membrane was introduced through the pinhole and packed properly until the advancement was stabilized and a sufficient fullness in the papillary tissues for self-holding the mucogingival tissue complex was created. (Figure 6) The surgical site was then covered with periodontal dressing.

Figure 6: Placement of PRF through the pin hole access

Postoperative care

Patients were advised to take analgesics until no discomfort was observed and asked to rinse with 0.2% chlorhexidine digluconate mouthrinse for 3 weeks. Post operative evaluation was done after 7 days, 1, 3 and 6 months. Figure 7 shows the post operative view at 6 months.

Figure 7: 6 months post operative view

Case 2

In the second case, 38-year old systemically healthy male patient complained of sensitivity in his lower front tooth region since 6 months. The patient's general health was assessed and found to be non contributory but he was a known smoker since 10 years without any abusive habits. Patient's oral hygiene was fair and intraoral examination revealed multiple recession defects in relation to 33-43. Miller's class II gingival recession in relation to mandibular right lateral incisor (5mm) and mandibular left canine (7mm); class I recession wrt mandibular left central and lateral incisor and right canine (3-4mm) was recorded (Figure 8) with no associated mobility.

The parameters were assessed in the same manner as mentioned in Case 1. After obtaining the informed consent, the surgery was performed as mentioned under Case 1 (Figure 9). Since there was passive adaptation of the gingival margin to the CEJ without any tension, sutures was avoided in this situation. Postoperatively, patient was advised to take analgesics and rinse is mouth with 0.2% chlorhexidine digluconate mouthrinse for 3 weeks. Post operative evaluation was done after 7 days, 1, 3 and 6 months. Figure 10 shows the post operative view at 6 months.

Figure 8: Preoperative photo showing multiple recession defects

Figure 9: Placement of PRF through the pin hole access

Figure 10: 6 months post operative view

Discussions

The concept of Minimally Invasive Surgery (MIS) is embracing all aspect of surgical techniques aiming to produce minimal wounds, minimal flap reflection, and gentle handling of the soft and hard tissues. MIS avoids the use of open invasive surgery in favour of closed or local surgery [5].

A new minimally invasive treatment of multiple gingival recession defects in maxillary anterior region was achieved by Zadeh, [4] as a case series by vestibular incision subperiosteal tunnel access technique. The result showed good outcome in esthetic zones.

Following the similar principle, is the Chao's Pinhole Surgical Technique (PST) which is a minimally invasive option for treating multiple gum recession. Unlike traditional grafting techniques, PST is incision and suture free.

In the original technique described by Chao, a scalpel is used to make a minimal small incision of 2-3mm in the alveolar mucosa near the base of the vestibule apical to the recipient site. Specially designed instruments were inserted through the entry incision to elevate a full thickness flap, which was guided by the shape and size of the instrument. The flap was extended coronally and horizontally to allow for elevation of two papilla. The inclusion of four papilla is the unique feature of PST [6].

In our case, we used an Orban's knife instead of a scalpel to create the access hole in the vestibular area. With the help of a specially designed gingival elevators, suprapariosteal closed blunt dissection was done until passive mobilization of the entire gingival tissue was achieved.

The effectiveness of a procedure is measured by Mean Root Coverage (MRC) which is the actual amount of root coverage achieved in individual sites. The MRC expressed as percentage, was calculated using the formula; $\text{baseline GR} - \text{postoperative GR} / \text{baseline GR} \times 100$ [7]. The MRC achieved in our cases, 6 months post operatively, averaged between 93-95% with a complete coverage only in 3 teeth out of the 10 teeth treated.

A similar result was observed in a retrospective study of 18 months, where out of 121 sites of multiple recession defects (Miller's Class I, II and III) treated, there was complete root coverage in 69.4% of the sites and 90% coverage was obtained in 77.7% of the sites. When only Class I and II were compared complete root coverage was observed in 90.6% of the sites. This revealed that PST is a very effective surgical technique to treat Miller's Class I, II and III type of multiple recession defects [6].

Also, there was a gain in keratinised tissue in the recessed area with a mean of 1.2mm which is similar to that obtained by Chao et al, where they observed a mean increase by 1.3mm and this was attributed to the adjunctive use of collagen membrane along with pin hole technique [6].

Patient satisfaction was good on the esthetic point of view with no difference in the color change. The increase in keratinised width and esthetic appearance could be attributed to the adjunctive use of PRF in our case. The growth factors present in PRF have shown to promote fibroblast proliferation and accelerate tissue vascularisation.

The efficacy of PRF in healing of multiple recession defects was demonstrated in a recent 12-month study where vista technique was used, they found coverage of 96% during the early healing phase [1].

In one of our case, due to the amount of recession (Class II), the gingival tissue was displaced coronally till the CEJ and stabilized with the help of sutures and secured to the enamel with composite. PRF was placed in this case also, and it enhanced the healing as well covered the root surface significantly (MRC 93%). Also, in the second case, since the design of the instrument made it difficult to access the maxillary left canine site which had a prominent root surface area, it was treated separately with a different access.

Another parameter assessed was the root sensitivity on VAS scale with the help of air test. 10 days, 1, 3 and 6months postoperative evaluation reported no sensitivity with a VAS score of 0 on a scale of 0-10 by both the patients.

There was no postoperative complication reported. Patient took analgesics only for two days and this is in accordance with report by Reddy, [7]; were mean number of analgesics taken by the patient was found to be 1.7 ± 2.6 .

In PST, there is no actual flap raised and the integrity of the tissue is still maintained with its periosteum without any changes in vascularity. This explains the faster rate of healing without any complication in PST [8]. Also the addition of PRF induces rapid

release of collagen 1 and sustained release and protection against proteolytic degradation of endogenous fibrogenic factors that are important for wound healing [9]. In an invitro study by Lundquist, et al. PRF induced the mitogenic and migratory effect on cultured human dermal fibroblast and they further showed that fibrocyte (a cell type important for acute wound healing) could be grown from within PRF patches; further favouring wound healing and soft tissue regeneration [10].

Based on these findings, there is an additional biologic, esthetic, and time advantage with no scar formation, and reduced time taken with PST [8]. The benefits [6] maybe summarised as:

- Less discomfort for the patient after treatment,
- Faster recovery for the patient than traditional grafting.
- No need for scalpels or invasive surgical tools.
- No need to take donor tissue from the patient's palate.
- Excellent, natural-looking, long-lasting results

For the fearful patient, this procedure could make a possible difference between tooth loss and continuing discomfort or tooth retention.

The limitation of PST is it requires specialized instruments. Presence of bone and papilla height between the teeth might be technique sensitive.

Conclusion

Thus, it can be concluded that this could be a promising technique to treat Miller's Class I - III recession. It's minimally invasive nature, time and cost-effectiveness may prove to be a better alternative than the other techniques. The adjunctive use of PRF plays vital role in early wound-healing, development, and maturation of a normal vasculature. Also, it is cost effective and eliminates any chances of immune reaction. Long term research with large number of patients may provide further evidence on the effectiveness of this novel technique.

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