ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 8, Issue, 11, pp.41300-41303, November, 2016

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

CASE STUDY

SEMILUNAR FLAP- ATRAUMATIC SUTURE-LESS TECHNIQUE FOR MANAGING GINGIVAL RECESSION-CASE SERIES

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ARTICLE INFO

Article History:
Received 18th August, 2016
Received in revised form
22nd September, 2016
Accepted 08th October, 2016
Published online 30th November, 2016

Key words:

Semilunar flap, Recession,
Root coverage, Predictability.

ABSTRACT

Gingival recession is a frequent periodontal pathology in our present day life, which is often associated with dentinal hypersensitivity and unpleasant looks. It is regarded as a major barrier for preserving the gingival health and is considered the most important and challenging tasks esthetic dentistry is facing today. Although, there are a variety of treatment options available for gingival recession ranging from the free gingival grafts to guided tissue regeneration, every technique has its own merits and demerits. It is the duty of the clinician to select the most suitable and atraumatic technique for managing gingival recession. Among all recession coverage surgical procedures, Semilunar flap is an ideal atraumatic treatment modality. It does not requires sutures and can be useful for managing even multiple recessions too. Hence, the aim of this paper is to highlight and potentiate the advantages and predictability of semilunar flap for managing gingival recession.

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Citation: Joshi Bharat and Gupta Kumar Rajesh, 2016. "Semilunar flap- Atraumatic suture-less technique for managing gingival recession Case series", *International Journal of Current Research*, 8, (11), 41300-41303.

INTRODUCTION

Periodontitis is a chronic disease which affects a large component of general population and is characterized by gingival recession, increased tooth mobility, furcation involvement and alveolar bone loss (Lindhe *et al.,* 2008). Majority of individuals, whether adult or young, male or female, rich or young, are suffering from gingival recession which is exposure of the root surface by an apical migration in the position of gingival (Newman *et al.,* 2006). Gingival anatomical factors, chronic trauma and tooth alignment are considered as the main conditions leading to the development of gingival recession (Khocht *et al.,* 1993; Camargo *et al.,* 2001). Therefore, treatment of gingival recession remains a formidable task in terms of achieving finer results regarding aesthetics and management of dentinal hypersensitivity. The proposed techniques for recession coverage include free gingival graft (FGG)/sub-epithelial connective tissue graft (SCTG), lateral pedicle flap, double papilla, coronal & semilunar coronally advanced flaps .The free gingival graft is always associated with painful post-operative palatal wound and unpleasant aesthetics (due to harvesting of graft from palatal mucosa) while lateral pedicle graft causes recession at the donor site (Miller, 1988; Sato, 2000).

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On the other hand, Coronally advanced flap is unstable (when used alone) on long-term analysis and sub-epithelial connective tissue (SCTG), is a technique sensitive procedure requiring a second site (donor) for harvesting of graft which is not always possible (Jankovic *et al.,* 2010; Paulo *et al.,* 2001). Hence, a need was felt to develop some simpler, long term beneficial and atraumatic techniques for achieving ideal recession coverage. In view of these requirements, a modification of coronally advanced flap called semilunar flap was devised by Tarnow (1986). This procedure is ideal for maxillary anterior teeth & premolars having 2-3mm of Miller's class I gingival recession (Tarnow, 1986). Moreover, it can be utilized where esthetics due to gingival recession cannot be controlled non-surgically (Haghighat, 2006). Hence, a case series comprising of two cases of semilunar flap have been presented which accomplished and achieved the dual goals of recession coverage and dentinal hypersensitivity elimination in Miller's class I gingival recessions. Also, patients were well satisfied with adequate esthetics and ideal gingival harmony.

Case 1: A 32 years old male came to the Department of Periodontology, Bhojia dental college & Hospital, Baddi, with a chief complaint of unpleasant looks in left upper front tooth region. On clinical examination, it was noticed that there was Miller's class I gingival recession with respect to left maxillary central incisor (tooth no.-21). Pre-operative measurement of recession width (RW), Recession Depth was done (RD) with University of Michigan "O" Probe (with William's markings at

1,2,3,5,7,8,9 & 10 mm) while width of keratinized tissue (KT) was recorded with reamer and rubber stopper as the protocol mentioned by Aroca *et al*. (2009) (Fig.-1). Recession depth (RD) was 1mm pre-operatively while recession width (RW) was calculated to be about 3 mm. Width of keratinized tissue came to be around 4 mm (Fig.-2). Full mouth scaling and root planing was done by hand and ultrasonic instruments, at least 4-5 weeks prior to the surgery and oral hygiene instructions were given and reinforced at each visit. After completion of phase I therapy, patients were scheduled for surgical phase.

Figure 1. Gingival recession on tooth no. 21

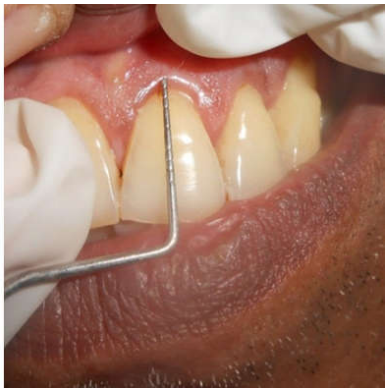

Figure 2. Pre-operative recession width and depth measured with Willliam's probe

Surgical procedure

The standard technique of Tarnow was followed.After proper investigations, the patient was given written and verbal information on the nature, risks and benefits of the surgical procedure and a signed, informed consent was obtained prior to the treatment. Phase I therapy was completed before the surgery. The surgical procedure was performed under local infiltration (2 % lidocaine, with adrenaline 1: 2,00,000). This procedure started with a semi-lunar incision following the curvature of the free gingival margin (Fig.3). The incision should end into the papilla on each end of the tooth, but not all the way to the tip of the papilla. Care was taken to left 2 mm on either side of the flap, since this is the main area from which the blood supply will come. Using a no. 15c blade, a splitthickness dissection was made from the initial incision line coronally. This was connected with an intra-sulcular incision which was made mid-facially.The mid-facial tissue was then coronally positioned to the CEJ, or to the height of the adjacent papilla in case of inter-proximal recession (Fig.4). The tissue was held in place with moist gauze against the tooth for 5 min. The area was packed with periodontal dressing (Coepack). The patient was placed on a soft diet for a period of 10 days and packing was changed after a week and further, placed for another 5 to 7 days for stability. The patient was told to apply minimal pressure during brushing and use a soft nylon bristle brush during then ext 2 to 3 weeks following pack removal. Recall was done after 3 and 6 months.

Figure 3. Semilunar and crevicular incision given

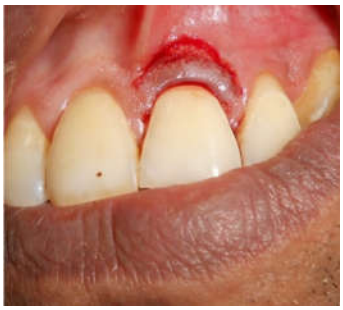

Figure 4. Flap coronally positioned

Case 2: Another patient, aged 29 years reported to the Department of Periodontology, Bhojia dental college & Hospital, Baddi with a chief complaint of dentinal sensitivity with respect to tooth no.23.i.e. left maxillary canine.On clinical examination, there was presence of Miller's class I gingival recession. Pre-operatively, Recession width (RW), Recessiondepth (RD) and Width of keratinized tissue (KT) were recorded. Recession depth (RD) was found to be 2 mm while Recession width (RW) was calculated to be about 4mm (Fig.- 5).

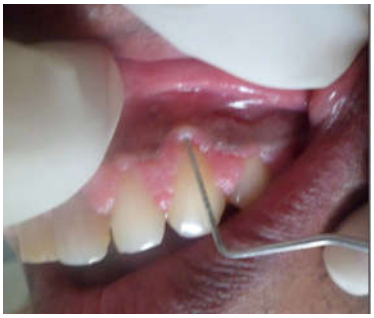

Figure 5. Pre-operative measurement of recession

Figure 6. Flap coronally positioned depth and width with Willliam's probe

Width of keratinized tissue (KT) came to be around 2 mm. The similar surgical procedure identical to first case was performed in this case also (Fig.-6).

Fig. 7. Post-operative recall after 10 days

Fig.8. Post-operative recall after 6 months

Fig. 9. Post-operative recall after 3 months

The patients were recalled after 10 days, 3 and 6 months and clinical parameters were recoded (Fig.-7,8,9). There was complete root coverage and healing was uneventful. Also, there were no post-operative complications.

RESULTS

The amount of root coverage was determined by calculation of recession depth /width reduction. It was calculated in percentage (%) (Zucchelli and De Sanctis, 2000): i.e.

$$\frac{\text{initial recession depth or width} - \text{final recession depth or width}}{\text{initial recession depth or width}} \times 100$$

Recession depth (RD) in 1st case reduced from 1mm pre-operatively to 0 mm post-operatively while Recession width (RW) decreased pre-operatively from 3 mm pre-operatively to 0 mm post-operatively demonstrating 100% root coverage. Width of keratinized tissue (KT) also increased from 3 mm from 4 mm post-operatively. Similarly in 2nd case, RD decreased from 2 mm pre-operatively to 0 mm post-operatively while RW decreased pre-operatively from 3 mm to 0 mm post-operatively. In this case also, there was 100 % root coverage. KT increased to 3 mm from 2 mm post-operatively.

DISCUSSION

Gingival recession is a condition which affects almost all the members of a society.The incidence of gingival recession has been reported to be more than 50% in the general population and is found to be more prevalent in men as compared to the women (Kassab and Cohen, 2003). The extent of gingival recession varies from 40 % in individuals of age group 16-25 years to 80 % in 36-86 year old adults (Gorman, 1967). Therefore, it is a serious problem and needs to be treated as early as possible. Recession treatment procedures comprise of pedicle soft tissue graft procedures (advanced or rotational), or free soft tissue graft procedures (epithelialized graft or sub-epithelial connective tissue graft) (Lindhe *et al.,* 2008). The rotational flap procedures involve the laterally sliding flap, double papilla flap and oblique rotated flap while the advanced flap procedures include the coronally advanced flap and semilunar coronally advanced flap. Besides these procedures, treatment modalities like guided tissue regeneration (GTR) and alloderm (along with Platelet-rich fibrin and Platelet-rich plasma as an adjunct) are also useful to obtain coverage of partially denuded root surface (Jankovic *et al.,* 2010; Paulo *et al.,* 2001). The choice of selecting appropriate surgical treatment of gingival recession depends mainly upon the Miller's classification (Newman *et al.,* 2006). While complete root coverage can be achieved in Class I and II defects, only partial coverage may be expected in Class III and Class IV recession defects. An ideal outcome of a root coverage procedure can be achieved only if the environment is plaque free and adequate periodontal support is present. Another important clinical entity which is always associated with the root coverage procedures is the amount of keratinized gingiva (Lindhe *et al*., 2008). Hence, the aim of every root coverage procedure is to achieve all these requisites besides restoring the gingival health.

As mentioned earlier,free gingival graft offers poor esthetics while lateral pedicle graft has shown to cause not only gingival recession at donor site but it is limited to narrow gingival recession defects (Camargo *et al.,* 2000; Grupe and Warren, 1956). Sub -epithelial connective tissue graft (SCTG) is a technically difficult procedure requiring donor site (with thickness of 3-4mm) and GTR procedure (in combination with Coronally advanced flap) results in exposure of membrane (Mealy *et al.,* 2004).; Tinti *et al.,* 1992). Platelet- rich plasma and Platelet–rich fibrin, the platelet concentrates are contraindicated in bleeding disorder patients and alloderm carries the risk of post-operative shrinkage (Harmon *et al.,* 2011; Haeri and Serio, 1999). The Coronally advanced flap alone causes shallowing of the vestibules thereby, affecting the esthetics (Haghighat, 2006). Semilunar flap is a modified form of coronally advanced flap. It offers various advantages like eliminating the need of sutures (as there is no tension) and no shortening of vestibule (which occurs in coronally advanced flap). Also, the papilla mesial and distal to the tooth being treated remain cosmetically unchanged which is a remarkable advantage (Haghighat, 2010). To improve the further predictability of this procedure, modifications in the original procedure were done by Haghighat (2006) and Amoian and

Shakoorpour (2013). The Haghighat's technique provides better control over flap repositioning than previously described semilunar coronally advanced flap (Tarnow, 1986) and reduces the likelihood of apical tissue retraction when attempting root coverage on two adjacent teeth. This is particularly of value for highly scalloped gingival margins where coronal manipulation and stability are difficult. Additionally, due to the incision design described above, potential scarring from vertical incisions is eliminated (Sumner, 1969). For the treatment of multiple teeth, Amoian and Shakoorpour (2013) introduced the combination of semilunar advanced flap & free gingival graft (Amoian and Shakoorpour, 2013). The procedure is useful in increasing the width of attached gingiva & providing support to the semilunar flap. But, 3 mm is the maximum root coverage that can be accomplished with this technique (Mealy *et al.,* 2004).

In the present two cases, there was complete root coverage along with increase in width of keratinized tissue. The reason could be attributed to the amount of recession and thick biotypes of the patients. Both the patients had recession depth of less than 3mm which is an ideal requisite for semilunar flap. Also, Thick biotype is advantageous in prevention of development of alveolar bone or tooth root fenestrations (Tarnow, 1986).It also eliminates the need for doing free gingival graft for progression of further recession. Absence of pockets or inflammation in the involved recession sites resulted in high success rate of the procedure while its application in maxillary arch helped in migration of the central area of the flap towards coronal direction since mandibular area have less mesio-distal dimension and therefore, coronal migration is difficult in them (Tarnow, 1986).However, absence of sutures is a relatively risky jobsince there are chances of decreased stability in the flap, post-operatively. But, in our cases, absence of sutures did not cause any harm in the stability of flap.

Conclusion

Clinicians opt to perform root coverage procedures with an aim of increasing gingival thickness and keratinized tissue, be sides recession coverage but patients appreciate these procedures in terms of improvement in esthetics and reduction in dentinal hypersensitivity. Semilunar flap is a non-traumatic, excellent and predictable root coverage modality for managing both single/ multiple recessions in a range of 2-3mm. However, it is limited to maxillary arch only and absence of sutures may hamper the stability in some cases. Hence, case selection is very much important for performing this procedure.It can be concluded from these case reports that semilunar flap is a predictable method for performing root coverage in Miller's class I gingival recession with recession depth of 1-2mm.

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