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INCREASE IN WIDTH OF ATTACHED GINGIVA AND VESTIBULAR EXTENSION BY FREE GINGIVAL GRAFT: A CASE REPORT WITH SIX MONTHS FOLLOW-UP

Dental Science

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ABSTRACT

Presence of adequate amount of attached gingiva and vestibular depth has been considered as keystone for maintenance of periodontal health. An array of surgical procedures has been advocated to increase the vestibular depth and zone of attached gingiva. Free gingival graft (FGG) is a versatile treatment modality to achieve both. Present case with inadequate width of attached gingiva (as assessed by positive tension test) and shallow vestibular depth (inadequate space for placement of the head of an adult tooth-brush) was treated with FGG obtained from the palate. Case was followed up for increase in width of attached gingiva and vestibular depth at 15 days, one month and six months. Significant increase in measurement of both was observed by UNC-15 probe. An excellent maintenance of oral hygiene was also observed clinically at follow-up visits.

KEYWORDS

Vestibuloplasty, Free gingival graft, Attached gingiva

INTRODUCTION

Periodontal therapy not only aims at correction of biological and functional problems that affect the periodontium but also focuses on improving esthetic appearance due to recent advances in periodontal therapy.[1] The vestibular depth is measured from the gingival margin of the tooth to the bottom of the vestibule. A shallow vestibule compromises the maintenance of proper oral hygiene, thus facilitating plaque accumulation and initiation of gingival inflammation. If the inadequate vestibular depth is accompanied with lack of attached gingiva, it further facilitates subgingival plaque accumulation, increasing deflection of the marginal tissues, favouring attachment loss and soft tissue recession; ultimately impeding proper oral hygiene.[1]

According to Friedman[2], periodontal plastic surgical procedures correct the relationship between the gingiva and alveolar mucous membrane, which are designed to preserve gingival health, remove aberrant frenulum and/or muscle attachments, and increase the depth of the vestibule. Vestibuloplasty is a surgical procedure whereby shallow oral vestibule is deepened by changing soft tissue attachments. Techniques for increasing the zone of attached gingiva and deepening the vestibular depth have evolved through years. The technique to deepen the vestibule in edentulous patient was primarily introduced in 1924 by Kazanjian.[3] Later, Godwin modified Kazanjian's technique by vestibular deepening through sub-periosteal stripping instead of supra-periosteal dissection.[4] Fox, in 1953, devised the "Push-back" operation for eliminating pockets and creating a new and wider zone of attached gingiva.[5] Clark in 1953 used mucosa pedicled from the lip for vestibular deepening.[6] Schluger, in 1956, recognized the need for deepening the vestibule in addition to creating an adequate zone of attached gingiva and introduced "Pouch" operation for the same.[7] Goldman in the same year, introduced "Gingival Extension Operation" for deepening the vestibular trough.[7]

Bohannan in 1962 stated procedure constituting complete denudation, periosteum retention and vestibular extension.[8] Edlan and Mejchar in 1963 have given "Edlan's vestibuloplasty" or “Transpositional flap vestibuloplasty”.[9] Marggraf[10] in 1985 introduced “Bridge flap” which was further modified by Romanos[11]; used to correct mucogingival problems where there is gingival recession, aberrant frenal attachment, shallow vestibule and inadequate width of attached gingiva. Bjorn in 1963 described free gingival graft (FGG) and its clinical application to correct mucogingival problems.[12] FGG has high degree of predictability of success and relative ease of manipulation and is now the most commonly used procedure for gingival augmentation.

Aim of this vestibular extension procedure by utilizing FGG (through classic technique of FGG[13] retrieval) was to increase the depth of vestibule and width of attached gingiva for maintenance of periodontal health.

Case report

A 24 years old systemically healthy male patient reported with the complaint of difficulty in brushing and poor oral hygiene in lower anterior region of jaw. On intraoral examination, shallow vestibule (inadequate space for placement of the head of an adult tooth brush) along with inadequate width of attached gingiva (positive tension test with movement of marginal gingiva) was found. Primarily, to prevent the occurrence of gingival recession and to increase the width of attached gingiva, vestibular deepening procedure was planned with FGG. The patient was informed about the procedure and informed consent was obtained. Before surgery, oral hygiene instructions were given, scaling and root planing were performed and impressions were made for preparation of palatal stent. Two weeks after phase I therapy, the patient was prepared for surgical procedure.

Pre-operative vestibular depth was measured with UNC-15 probe on lower right central incisor from gingival margin at the junction of mesial 1/3rd and distal 2/3rd [Figure 1]. At the time of surgery; for recipient site preparation; local anesthesia was administered and horizontal incision was given along the mucogingival junction using no.15 blade and supra-periosteal dissection was made [Figure 2]; exposing the underlying connective tissue [Figure 3]. Template was prepared for the required amount of FGG [Figure 4] and appropriate thickness (1 mm) of the graft was harvested from the palate extending from the distal aspect of maxillary canine to the mesial aspect of maxillary first molar horizontally approximately 15 mm in length; vertically extending 2-3 mm apical to gingival margin of maxillary premolars for around 8mm [Figure 5 and Figure 6]. FGG was contoured, adapted, and sutured by lateral interrupted loop sutures on to the recipient bed with 4-0 mersilk suture [Figure 7]. Pressure was exerted against the graft for 2 minutes in order to eliminate the dead space between the graft and the recipient bed; following which Ochsenbein sling sutures were placed. Donor site was covered by tin foil and periodontal dressing over which acrylic stent was placed.

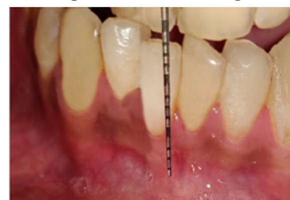

Figure 1 - Pre-operative vestibular depth - 5 mm

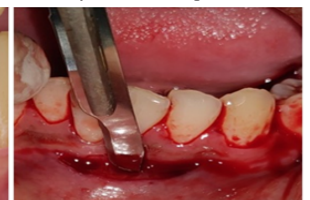

Figure 2 - Supra-periosteal releasing incision in vestibule

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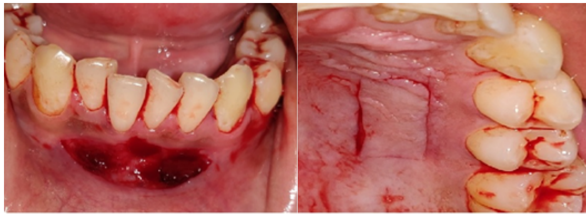

Figure 3 - Exposure of connective tissue

Figure 4 - Donor site preparation

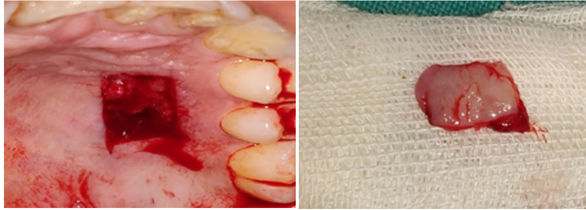

Figure 5 - Donor site after graft retrieval

Figure 6 - Harvested free gingival graft

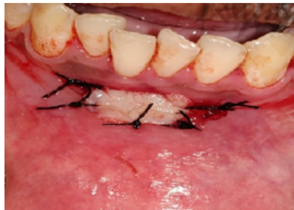

Figure 7 - Graft sutured at recipient site

Post surgical instructions included: Use of ice pack, soft non spicy food (to be chewed on non-operated side) for 10 days, appropriate oral hygiene maintenance encompassing tooth-brushing with soft toothbrush twice daily (except near the surgical sites), no spitting and rinsing with (0.2%) chlorhexidine antiseptic mouthwash twice daily from next day of surgery for 1 week. Antibiotic coverage consisting of Amoxicillin + Clavulanic acid 625 mg and analgesics containing a combination of Aceclofenac 100 mg and Paracetamol 500 mg twice a day were prescribed for five days post-operatively. Patient was followed up by regular visits. Sutures were removed 14 days post-operatively. Healing proceeded uneventfully with primary wound closure. Increase in vestibular depth and width of attached gingiva was observed, which was documented by the difference in measurement of vestibular depth as taken from a fixed reference point. No postoperative complications were evident both at donor and recipient sites. 15 days, one month and six months postoperative results showed esthetically and functionally stable vestibular depth as well as adequate width of attached gingiva [Figure 8-10].

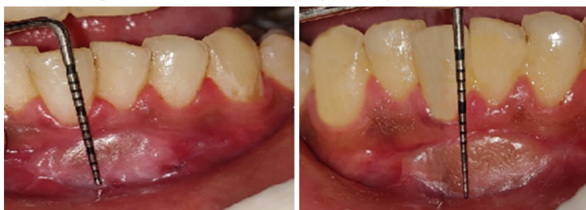

Figure 8 - Vestibular depth after 15 days of surgery -7 mm

Figure 9 – One month post-operative vestibular depth -8 mm

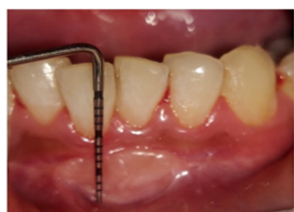

Figure 10 – Six month post-operative vestibular depth – 9 mm

DISCUSSION

Adequate width of attached gingiva around the tooth with firm attachment to the underlying periosteum and bone is important for maintaining gingival health, preventing attachment loss and soft tissue recession. Narrow zone of gingiva is insufficient to protect the periodontium from injury caused by frictional forces of mastication and to dissipate the pull on gingival margin by muscles of alveolar mucosa.[14] Moreover, movability of the marginal tissues and less tissue resistance for apical spread of plaque results in attachment loss and soft tissue recession.[14] Lang and Loe[15] in 1972 stated that there must be at least 2 mm of keratinized gingiva, of which 1 mm must be attached. Shallow vestibule and inadequate width of attached gingiva; which cause esthetic and functional problems are very common in lower front region of the jaw. Wennstrom and Pinipratto[14] stated that shallow vestibule along with inadequate width of attached gingiva might favour the food accumulation and difficulty to maintain the proper oral hygiene. Thus, the presence of adequate amount of attached gingival zone is required for the maintenance of periodontal health.[16]

Vestibuloplasty is a surgical procedure which can be employed by the use autogenous soft tissue graft or alloderm.[17] FGG is one of the most commonly used material for gingival augmentation. However, other grafting materials of allogenic or alloplastic origin may also be used. But the increase in width of attached gingiva and depth of vestibule tissue with these materials is not as predictable as with the use autogenous graft or FGG.[18]

Healing of FGG takes around three weeks. Events in healing encompass: graft survival by diffusion of nutrients followed by neo-vascularization; where new blood vessels proliferate from the surrounding areas and establish a plexus with vessels present in the graft. Finally, maturation and functional integration results in complete renewal of the epithelium.[19] With FGG, vascular part of gingiva provides superior tissue integration with the recipient bed along with a more esthetic coverage and favourable tissue blend.[20] This was in accordance with the presented case in which vestibular extension along with significant increase in the width of attached gingiva (as evident with the pre and post-operative photographs with UNC 15 probe) was observed. The esthetic results were also satisfactory with uneventful healing both at donor and recipient sites.

Similar results were observed in the study carried out by Singal et al[21]; where FGG was used to increase the width of attached gingiva. The authors concluded that it is a viable and effective treatment modality.

However, there are various limitations for using FGG such as colour mismatch, malalignment of muco-gingival junction and tirepatch appearance; but it definitely prevents plaque accumulation and gingival recession by increasing the depth of vestibule and widening the zone of attached gingiva.[22]

CONCLUSION

Uneventful healing and appreciable improvement in oral hygiene with this technique of vestibuloplasty revealed that it is a viable and effective modality for vestibular extension and increasing the width of attached gingiva; further preventing gingival recession with long term sustainable results.

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