Pouch and tunnel technique: Minimally invasive periodontal plastic surgery for root coverage

Sangeeta Singh

ABSTRACT

Introduction: The indications for root coverage surgery are very well defined today eliminating unnecessary repeated surgeries due to failures resulting from improper case selection. The results of tunnel technique and its modifications combined with the use of connective tissue grafting have been quite predictable.

Case Series: This case series comprises three cases of multiple adjacent recessions which were treated using pouch and tunnel technique with connective tissue grafting from palate using Liu's Class 1a incision. This technique resulted in excellent root coverage and complete healing of the donor site. The cases have been followed postoperatively varying from 9 to 18 months.

Conclusion: The pouch and tunnel procedure is ideal for treatment of multiple adjacent recessions in a single surgical procedure demonstrating early healing and highly predictable root coverage results.

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Introduction: The indications for root coverage surgery are very well defined today eliminating unnecessary repeated surgeries due to failures resulting from improper case selection. The results of tunnel technique and its modifications combined with the use of connective tissue grafting have been quite predictable. **Case Series:** This case series comprises three cases of multiple adjacent recessions which were treated using pouch and tunnel technique with connective tissue grafting from palate using Liu's Class 1a incision. This technique resulted in excellent root coverage and complete healing of the donor site. The cases have been followed postoperatively varying from 9 to 18 months. **Conclusion:** The pouch and tunnel procedure is ideal for treatment of multiple adjacent recessions in a single surgical procedure demonstrating early healing and highly predictable root coverage results.

Keywords: Marginal tissue recession, Minimally invasive technique, Periodontal plastic surgery, Pouch and tunnel procedure, Root coverage surgery

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INTRODUCTION

Marginal tissue recession as a clinical entity has been documented quite elaborately in literature [1, 2]. The indications for surgical intervention are quite well defined and it is essential to carry out root coverage surgery whenever concerns such as aesthetics, sensitivity, susceptibility to root caries pulpal symptoms due to root exposure, food lodgment and plaque accumulation exists [3]. Surgical techniques for root coverage have been invented and modified over the last few decades with encouraging results and most of the procedures followed today result in 80–90% root coverage. Currently, accepted procedures for root coverage include coronally advanced flap, sub-epithelial connective tissue graft, guided tissue regeneration and acellular dermal matrix. The tunnel technique followed in this case report is the one described by Langer et al. where multiple adjacent recessions can be covered in a single surgery using connective tissue graft from the palate.

CASE SERIES

The three cases selected for root coverage using the pouch and tunnel technique had multiple adjacent recessions. The most important criterion for selecting this procedure was sufficient thickness of the marginal and papillary gingival at the recipient site so as to facilitate complete undermining for creating the pouch and tunnel without detaching the papillary tip.

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Case 1: A 36-year-old female reported with the chief complaint of sensitivity in lower right posterior teeth. On examination there was Millers Class III recession in relation to 44 and 45 (Figure 1). The width of attached gingiva was found to be inadequate since the tension test was positive. After phase I therapy, a pouch and tunnel technique utilizing a connective tissue graft was planned for root coverage. A sulcular incision was made through each recession area and the tissues gradually undermined including the base of the interdental papilla without the tip and the undermining extended up to the mucogingival junction so as to relax the flap sufficiently to allow placement of the connective tissue graft. Thus gradually a pouch and tunnel was prepared connecting the recipient sites for placement of the graft (Figure 2). The connective tissue graft was harvested from the palate using Liu's Class 1a incision (Figure 3). This graft was then placed using a technique described by Zabaluigi et al. where two resorbable sutures of different colors were placed, one on either side of the graft. Using these sutures, the graft was gradually manipulated into the pouch and through the tunnel to cover the adjacent recipient sites. Once the graft was completely inside the tunnel, it was positioned coronal to the cemento-enamel junction. The ends were sutured with a simple square knot (Figure 4). A periodontal pack was placed both at the recipient site as well as the donor site using an acrylic stent for the palatal placement.

Case 2: A 31-year-old male presented with the chief complaint of sensitivity in the lower teeth and was

Figure 1: Millers Class III recession in relation to 44 and 45 (Case 1).

Figure 2: Pouch and tunnel preparation (Case 1).

Figure 3: The connective tissue graft was harvested from the palate using Liu's Class 1a incision.

Figure 4: The graft placed into the tunnel and sutured.

clinically diagnosed as a case of Millers Class II recession in relation to 33 and 34 (Figure 5). The same surgical technique, as in Case 1, was used to place the connective tissue graft in the pouch created in relation to 33 and 34.

Case 3: A 35-year-old female patient presented and her main concern was the gums 'going down' in relation to the lower teeth on the left side. She was diagnosed as a case of Millers Class II recession in relation to 34 and 35 (Figure 6). This case too was treated using the pouch and tunnel technique with placement of CTG procured from the palate. The donor site appeared normal in color and healthy after four weeks and the recipient site was healthy with excellent color match with adjacent tissues in all four cases. These results were stable and maintained at the time of review, 12 months in Case 1 (Figure 7), 18 months in Case 2 (Figure 8), six months in Case 3 (Figure 9). The mean root coverage achieved in these cases was an average 90% which is close to the mean root coverage of 91.6% in the Zabaluigi study.

DISCUSSION

The concerns of hypersensitivity, root caries, fear of tooth loss and an increasing interest in aesthetics have led to development and modifications of surgical procedures that not only enhance the width of attached gingival but also achieve maximum root coverage addressing these concerns. The subepithelial connective tissue graft technique gives the dual advantage of excellent healing of the donor site as well as excellent color match of tissues

[4]. The tunnel technique was developed as a modification of the envelope technique to manage multiple adjacent recessions using a single surgical procedure and this technique has resulted in consistently favorable results [5].

The pouch and tunnel technique of connective tissue grafting, if performed correctly, is the most predictable periodontal plastic surgery procedure. It is a very sensitive procedure and requires use of operating microscope, microsurgical instruments, delicate handling of the tissues and ample patience while undermining the interdental papilla. The common complications that can occur are detachment of the interdental papilla, thinning of the flap, too thick connective tissue graft harvested which can lead to ischemic necrosis of the inter dental papilla or too thin connective tissue graft harvested

Figure 8: Postoperative image after 18 months (Case 2).

Figure 9: Postoperative image after six months (Case 3).

Figure 5: Millers Class II recession in relation to 33 and 34.

Figure 6: Millers Class II recession on 34 and 35.

Figure 7: Postoperative image after 12 months (Case 1).

which can lead to insufficient coverage of the recession defect [6].

The use of tunnel procedure preserves the interdental papilla and this facilitates an early and accelerated initial wound healing. The tunneling also applies less traction and preserves the gingival height [7]. The elimination of vertical incision which is used in subepithelial connective tissue grafting, ensures complete coverage of the connective tissue graft by the flap thus aids in faster healing as well as excellent color matching. The pouch and tunnel procedure may be of advantage in multiple

adjacent recessions as compared to coronally repositioned flap as there is minimum trauma to the recipient site and there is predictable root coverage [8].

CONCLUSION

The pouch and tunnel technique combines the advantages of subepithelial connective tissue grafting as well as the envelope technique thus making it an ideal choice for treatment of multiple adjacent recessions in a single surgical procedure demonstrating early healing and highly predictable root coverage results.

Author Contributions

Sangeeta Singh – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor

The corresponding author is the guarantor of submission.

Conflict of Interest

Authors declare no conflict of interest.

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