

Case Report

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Inverted Periosteal Technique – A Solution to Multiple Teeth Recession

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ABSTRACT

Background: The periosteum being a highly cellular connective tissue also has a good regenerative potential. This quality makes it a suitable for use as autogenous graft. Here, is technique, the inverted periosteal technique that utilizes this property of the periosteum and is used for root.

Method: Four patients with Miller Class I and II recessions ≥ 3 mm were treated utilizing the inverted periosteal technique.

Results: At the end of 6 months, satisfactory results were achieved.

Conclusion: The inverted periosteal technique can be used for the treatment of gingival recession defects in multiple teeth successfully.

KEYWORDS: Gingival recession; Inverted periosteal technique; Periosteum.

INTRODUCTION

Gingival recession causes an esthetic as well as discomfort due to dentinal hypersensitivity to the patient. For the treatment of these cases, a need for a graft for root coverage which has its own blood supply, regenerative potential and that which can be harvested adjacent to the recession defect in sufficient amounts without requiring any second surgical site is required.

One such autogenous graft material is the periosteum, which is highly cellular, rich in vascularity and has a high regenerative potential.^{1,2}

The alveolar bone is covered by periosteum and the endosteum. The periosteum consists of progenitor cells responsible for regenerating new cells which differentiate into osteoblasts aiding in the formation of new bone and soft tissue, which is made use of in this case series.^{3,4}

CASE REPORT

Four patients in the age group of 25-40 years reported to the outpatient department of periodontology who were randomly selected for this procedure. The four recruited patients had Millers Class I or II recession defects of ≥ 3 mm in upper/lower anterior teeth or premolars, there was no periapical involvement in the selected teeth, and all were systemically healthy with no contraindications for periodontal surgery.

The patients were explained about the procedure and a written informed consent was taken. The non-surgical phase included supragingival scaling and root planing, followed by oral hygiene instructions. The clinical parameters recorded were: length of recession, width of

recession and the thickness of attached gingiva. These recordings were taken at baseline and 6 months post operatively. (Table 1) (Figure 1)

case	Age	sex	Operated area	Pre-op measurements of recession (In mm)			Post-op results (In mm)		
				Length	Width	Thickness of attached gingiva	Length	Width	Thickness of attached gingiva
1.	36 yrs	F	13	3	3	2	0	0	2
			14	5	3	2	0	0	2
			15	2	3	1	0	0	2
2.	32 yrs	F	13	5	5	2	0	0	2
			14	5	5	1	0	0	2
			15	3	5	1	0	0	1
3.	27 yrs	F	31	5	5	1	1	1	2
			32	5	5	1	2	2	2
			41	5	5	1	1	2	2
4.	39 yrs	M	42	5	3	1	2	3	2
			31	3	5	2	2	2	2
			32	3	3	1	2	1	2
			41	3	3	1	2	1	2

Table 1: clinical parameters recession gingiva.



Figure 1: Preoperative measurements

The surgical procedure was carried out 3 weeks after the non-surgical phase. The patients were subjected to pre-procedural rinsing with chlorhexidine gluconate.

All the surgeries were performed under local anaesthesia using 2% lignocaine hydrochloride containing 1:1000000 epinephrines. Once the area was anaesthetized, with a number 15C blade, horizontal incisions were made perpendicular to the adjacent interdental papillae at the level of the CEJ preserving the gingival margin of the affected teeth along with sulcular incisions on the buccal/facial aspect of the involved teeth. At the line angles of the distal most and the mesial most teeth, vertical incisions extending beyond the mucogingival junction were given. A partial thickness flap was then elevated till an adequate

amount of periosteum was exposed (Figure 2).



Figure 2: Partial thickness flap reflected

A horizontal incision was then given at the apical extent of the periosteum where it was attached to the bone. A periosteal elevator was used to separate the periosteum from the underlying bone, and was reflected coronally to an extent where it was still attached to the bone (Figure 3).



Figure 3: Periosteum being reflected

The reflected periosteum was then inverted such that the cambium layer covers the denuded root (Figure 4).



Figure 4: Periosteum inverted and coronally positioned

Once it was in place, it was sutured and secured with a 5-0 silk suture. The reflected partial thickness flap was coronally advanced such that it covered the periosteum and was sutured using a sling suture. The vertical incisions were sutured using an interrupted suture (Figure 5). The operated site was protected by placement of a periodontal dressing (voco-pac). Post-operative instructions were given. All the patients were prescribed antibiotics and analgesics. (Amoxicillin-500 mg to be taken thrice daily for 5 days and lyser-D to be taken twice daily for 2 days).



Figure 5: Suturing

The patients were asked to report to the dental clinic after 15 days for the removal of the periodontal dressing and the sutures. The treated areas were irrigated with povidone iodine. The surgical area was healing uneventfully (Figure 6).



Figure 6: Post operative 1 month

Thereafter the patients were observed at regular intervals once in 15 days for 2 months and later at a month's interval for 6 months (Figure 7).

RESULTS

At the end of 6 months, complete root coverage was achieved on two of the patients with good color resemblance with the surrounding tissues. In the other two patients, about

3mm coverage was achieved. It was also noticed that the thickness of the attached gingiva was increased by about 1mm. It was observed that the root coverage and the thickness of the attached gingiva achieved with this technique remained stable.



Figure 7: Post operative 9 months

DISCUSSION

The ultimate goal of the clinician should be to improve patient care and satisfy their requirements. Root recession can cause discomfort to the patient with the presence of teeth hypersensitivity and root caries, esthetics could also be a cause of concern in some patients. One of the techniques for root coverage is the inverted periosteal technique.

The use of periosteum in medicine and dentistry is not new. The use of Periosteum as a barrier membrane for the treatment of periodontal defects has been reported by Lekovic et al. They observed similar gain in clinical attachment level which was comparable to the gain in clinical attachment levels with use of other barrier membranes.^{5,6}

The potential of using Periosteum for root coverage is because it is a highly vascular tissue and because of the presence of osteoprogenitor cells in the inner layer, which have been published in various research papers.^{7,8}

Wound healing after periodontal plastic surgery depends on clotting, revascularization and maintenance of blood supply. Also, a vascular graft is more likely to survive on an avascular root surface. The periosteum has a rich vascular plexus. A recent study showed that periosteal cells release vascular endothelial growth factor these qualities make periosteum a suitable graft over an avascular root surface.^{9,10}

Also, with this technique it was noticed that the thickness of attached gingiva increased.

Among all the root coverage procedures, subepithelial connective tissue having the highest predictability rate is

sidered to be the gold standard.¹¹ The main shortcoming of this technique is that it requires a second surgical site for the harvesting of the connective tissue.

The advantage of the inverted periosteal technique is the presence of periosteum adjacent to the defect and in sufficient quantity avoiding two surgical sites, resulting in less surgical trauma, postoperative complications and better patient satisfaction.

CONCLUSION

Gingival recession is one of the most common periodontal problems that can cause aesthetic problems to the patient. The need for developing newer techniques for root coverage is to increase predictability, reduce the number of surgical sites, and improve patient comfort together with the need to reconstruct the lost periodontal tissues. One such technique is the inverted periosteal technique as it can be harvested adjacent to the recession defect in sufficient amounts.

Without requiring any second surgical site, and has the potential to promote the regeneration of lost periodontal tissue. The long-term complications of this technique, e.g. the potential for resorption of root surface by the periosteum are yet to be assessed. Further studies are necessary to support its regular use.

REFERENCES

1. Bouchard P, Malet J, Borghetti A. Decision making in aesthetics: Root coverage revisited. *Periodontol.* 2000; 2001: 97-120. doi: [10.1034/j.1600-0757.2001.027001097.x](https://doi.org/10.1034/j.1600-0757.2001.027001097.x)
2. Struck JT. Methods and devices for the prevention and of gingival recession. *US20060068364.* 2006; 74-81.
3. Mahajan A, Karol S, Kashyap D, Kumar A, Mahajan P. Effective management of gingival recession defects using periosteal pedicle grafts. *E-Journal of Dentistry.* 2012; 2(3): 193 -199.
4. Provenza DV, Seibel W. Basic tissues. In: Provenza DV eds. *Oral histology inheritance and development.* 2nd ed. MD, USA: Lippincott Williams and Wilkins; 1986: 59-63.
5. Lekovic V, Kenny EB, Carranza FA, Martignoni M. Autogenous periosteal grafts as barriers for the treatment of Class II furcation involvements in lower molars. *J Periodontol.* 1991; 61: 775-780. doi: [10.1902/jop.1991.62.12.775](https://doi.org/10.1902/jop.1991.62.12.775)
6. Lekovic V, Klokkevold PR, Camargo PM, Kenney EB, Nedic M, Weinlaender M. Evaluation of periosteal membranes and coronally positioned flaps in the treatment of Class II furcation defects: A comparative clinical study in humans. *J Periodontol.* 1998; 69: 1050-1055. doi: [10.1902/jop.1998.69.9.1050](https://doi.org/10.1902/jop.1998.69.9.1050)
7. Sakata Y, Ueno T, Kagawa T, et al. Osteogenic potential of cultured human periosteum-derived cells: A pilot study of human cell transplantation into a rat calvarial defect model. *J Craniomaxillofac Surg.* 2006; 34: 461-465. doi: [10.1016/j.jcms.2006.07.861](https://doi.org/10.1016/j.jcms.2006.07.861)
8. Mizuno H, Hata KI, Kojima K, Bonassar LJ, Vacanti CA, Ueda M. A novel approach to regenerating periodontal tissue by grafting autologous cultured periosteum. *Tissue Engineering.* 2006; 12: 1227-1335. doi: [10.1089/ten.2006.12.1227](https://doi.org/10.1089/ten.2006.12.1227)
9. Hwang D, Wang HL. Flap thickness as a predictor of root coverage: A systematic review. *J Periodontol.* 2006; 77: 1625-1634. doi: [10.1902/jop.2006.060107](https://doi.org/10.1902/jop.2006.060107)
10. Bourke HE, Sandison A, Hughes SPF, Reichert ILH. Vascular endothelial growth factor (VEGF) in human periosteum normal expression and response to fracture. *J Bone Joint Surg Br.* 2003; 85-B(Suppl 1): 4.
11. Santarelli GAE, Ciancaglini R, Campanari F, Dinoi C, Ferraris S. Connective tissue grafting employing the tunnel technique: A case report of complete root coverage in the anterior maxilla. *Int J Periodontics Restorative Dent.* 2001; 21: 77-83.