Case Report

Treatment of lingual gingival recession on mandibular lateral incisor using minimally invasive full-thickness tunneling technique and subepithelial palatal connective tissue graft

Eiti Agrawal, Rahul Chopra, Nikhil Sharma

Abstract:
Gingival recession on the lingual aspect of teeth may cause dentinal hypersensitivity problems in patients. Treatment of such recessions is not a regular procedure owing to its anatomical restraints, difficulty in isolation as well as lack of esthetic importance. The present case describes the use of connective tissue graft (CTG) in the treatment of isolated lingual recession on mandibular lateral incisor using minimally invasive tunneling technique. Six-month posttreatment follow-up showed a root coverage of 3.5 mm with enhanced width of keratinized tissue. This report encourages the application of CTG along with tunneling technique in the treatment of lingual recession to achieve root coverage as well as alleviate patient’s dentinal hypersensitivity issues.

Key words:
Connective tissue graft, dentinal hypersensitivity, lingual recession, root coverage

INTRODUCTION

Gingival recession (GR) is the exposure of the root surface due to the displacement of the gingival margin apical to the cementoenamel junction affecting any of the multiple surfaces of single or multiple teeth. Among all surfaces, GR on the lingual surface of the tooth can lead to severe hypersensitivity problems as it is associated with exposure of the root surface to the oral environment. There are many etiological and predisposing factors of GR such as the presence of plaque and calculus, tooth malposition, alveolar bone dehiscence, muscle pull, excessive or incorrect tooth brushing, periodontal disease, occlusal trauma, or trauma caused by orthodontic treatment among which the presence of a thin gingival biotype is considered to be one of the most relevant anatomical factors. The width of keratinized gingiva (WKG) on the lingual surface of the mandibular anterior teeth has a typical mean width of <3 mm, and the surfaces have <2 mm width which is the narrowest WKG leading to an increased likelihood of gingival inflammation and hypersensitivity. Recently, Hennequin-Hoenderdos et al. and others have reported about oral and perioral piercing as a significant etiological factor leading to gingival recession at the mandibular anterior teeth.

Due to specific anatomical characteristics, lingual recession on mandibular anterior teeth always possesses a challenge to the clinician as it is difficult to manage surgically. Although Tatakis et al. in 2015 American Academy of Periodontology periodontal regeneration consensus report have emphasized that root coverage on the lingual aspect of teeth is possible, evidence-based reports on its predictability are insufficient. The World Workshop in Periodontics in 1996 found that subepithelial grafts provided the highest mean root coverage which is 89.3% making it a “gold standard” for root coverage.

The present case highlights the improvement in the thickness of keratinized gingiva associated

How to cite this article: Agrawal E, Chopra R, Sharma N. Treatment of lingual gingival recession on mandibular lateral incisor using minimally invasive full-thickness tunneling technique and subepithelial palatal connective tissue graft. J Indian Soc Periodontol 2021;25:78-82.
with root coverage on the lingual surface of an isolated mandibular lateral incisor by full-thickness tunneled flap and subepithelial palatal connective tissue graft (CTG).

CASE REPORT

A 28-year-old male patient reported with the chief complaint of dentinal hypersensitivity on the lingual side of the mandibular right lateral incisor to cold liquids. Medical history was noncontributory, and there was no history of any type of habits. The periodontal evaluation revealed probing depths of 2 mm midlabially, distally, and mesially with mild plaque accumulation and minimal bleeding on probing. The patient presented with a narrow and deep GR of 5 mm midlingually with minimal attached gingiva and keratinized tissue width of 1 mm with respect to #42 [Figure 1]. No recession was seen on the labial aspect of the same tooth, and there was no tooth mobility. A midline diastema of 1 mm between central incisors was seen with mild labial inclination. Although it is not possible to classify lingual recession according to the popular Miller classification, the recession was similar to Miller’s Class II on the facial with no interproximal bone loss and recession extending up to the mucogingival junction. On radiographic examination, periapical radiographs revealed periodontal ligament space widening with mild to no horizontal bone loss interdentally [Figure 2]. After discussing the clinical findings, treatment options, and risks associated, the patient’s oral and written consent was obtained.

The treatment plan was divided into three phases: presurgical phase, which consisted of oral hygiene instructions, full-mouth debridement, and occlusal adjustment, followed by surgical phase which involved periodontal plastic surgery, and finally, maintenance phase, involving a strict supportive periodontal therapy.

Presurgical phase

A full-mouth debridement along with slight occlusal adjustment was performed on the labio-incisal surface. Necessary oral hygiene instructions were given, and after 3 weeks on re-evaluation, the surgical therapy was suggested.

Surgical phase

The patient was asked to rinse with a 0.2% chlorhexidine digluconate solution before surgery. Local anesthesia of 2% lidocaine with 1/100,000 epinephrine was administered following which the exposed root surface was debrided with curettes. Intrasulcular incisions were made on the lingual surface of #42 extending to adjacent teeth on either side without splitting the papilla. A full-thickness mucoperiosteal pouch and tunnel was created using Orban’s knife and ophthalmic crescent blade (CB01–2.5 mm, 20G) which extended beyond the mucogingival junction, and interdental papillae were elevated completely from the bone and also creating a tunnel laterally on the adjacent teeth. All the muscle fibers were separated and released to achieve a tension-free flap which could be easily mobilized coronally. The interdental papilla was gently undermined to get complete mobilization of flap, and special care of interdental papillary tissues was taken to avoid any perforation [Figure 5].

After recipient preparation, a subepithelial CTG (SCTG) of a thickness of 1.5–2 mm was harvested through Hurzler’s single incision technique from the palate.[7] The lance tip blades (SP15, 15°) and CB (CB01–2.5 mm, 20G) were also used in order to give precise incision and to avoid any secondary incision [Figure 4]. Any epithelium that was harvested with the graft was stripped away with a scalpel. The donor site was closed by interrupted sutures. The CTG was positioned in the tunnel covering the denuded recession area #42 [Figure 5]. The cross-mattress along with sling sutures using 4.0 sutures was given to stabilize the graft with respect to #42 [Figure 6].

Postoperative care

The patient was prescribed 500 mg of amoxicillin thrice a day and 500 mg of paracetamol analgesic for 5 days following the surgery. The patient was recalled for evaluation after surgery at every 3 days interval for 14 days. Sutures were removed after 14 days, and the patient was advised to continue with chemical plaque control along with regular professional oral hygiene care for the next 15 days. The patient was kept on recall visits for every 2-week interval for the next 3 months and after that every 1-month interval for the 6 months.

RESULTS

The follow-up was done at 1 month, 3 months, and 6 months [Figure 7]. Healing at donor and recipient site was uneventful with no postoperative complications. Satisfactory healing with some amount of soft-tissue shrinkage was seen 14 days after the surgery at the time of suture removal. At 6-month follow-up, root coverage of 3.5 mm was seen with 1.5 mm of residual recession [Figure 8]. However, the gingival margin was at the level of adjacent central incisor which can be attributed to the malpositioning in the region. The gingival tissue of the concerned tooth was having firm texture, and color was almost consistent with the adjacent tissue color along with the increased gingival thickness and the width of keratinized gingival tissue.

DISCUSSION

The recession on the lingual surface of mandibular anterior teeth is always discomforting for the patient and challenging for the clinician as these sites are not only prone to microbial plaque and calculus accumulation but also a more vulnerable site for root caries and hypersensitivity. Hence, the restoration of normal gingival contour along with its functional properties and reestablishment of the natural macro- and microscopic architecture is important in such cases. The treatment of recession on the lingual surface can be challenging due to presence of continuous tongue movement, thin lingual mucosa, various muscle attachments and a rich vascular plexus in the area, as any procedural error may lead to accumulation of blood in the floor of the oral cavity leading to the congestion, and airway obstruction. So focus is to use minimal invasive procedure in such areas after proper examination and planning.[8] Thus, it is prudent to use a minimally invasive technique for recession coverage in the mandibular lingual area.

The current case highlights the use of minimally invasive full-thickness tunneling technique along with CTG for successful root coverage of mandibular lateral incisor lingually.
In this surgical approach, a full-thickness tunnel was prepared beneath the interdental papilla adjacent to the recession, and apically, it reached up to the mucogingival junction along with the elevation of the interdental papilla to achieve good mobility. The CTG harvested was adapted over the denuded...
root surface with the major portion of this beneath the tunnel prepared, thus providing the bilaminar blood supply. The marginal tissue was advanced coronally so as to cover the CTG as much as possible. The CTG was stabilized using crisscross sutures which did not pass through the graft, to enhance its healing. This technique helped us to achieve a good amount of root coverage as well as enhanced gingival thickness in an anatomically difficult area.

There are very few cases available where successful root coverage on the lingual surface on mandibular anterior has been reported. Previously, Wilcko et al. reported a case series in which they demonstrated the successful use of envelope full-thickness flap + CTG + intramarrow penetrations for root coverage on the lingual surfaces of the mandibular anterior teeth.\(^{[79]}\) An increase in keratinized tissue height and thickness, as well as gain in clinical attachment level, was also seen. Zucchelli et al. also attempted root coverage on the lingual surface of the mandibular anterior teeth in which trapezoidal-type coronally advanced flap on the lingual side was raised and CTG was placed in order to achieve root coverage.\(^{[10]}\) Similarly, Parra et al. had achieved 75% of root coverage and an increase of 3.5 mm in keratinized tissue width where full-thickness flap on the lingual side with allograft and the nonresorbable membrane was used to treat a bony defect and recession on the lingual surface.\(^{[11]}\)

However, vertical releasing incisions were given to reflect the flap which is not preferable on the lingual side as raising the flap in such critical area can lead many postoperative complications such as swelling, perforation, or necrosis of the flap, and achieving the same level of success on the lingual side is questionable when compared to the buccal side. The procedure requires considerable precision and skill. Vijay et al. performed minimally invasive vestibular incision subperiosteal tunnel access technique + SCTG which is a single incision technique to treat multiple lingual recession defects.\(^{[12]}\) They reported an increase of 88.17%, root coverage, and sufficient gain in gingival thickness and WKG after 6 months. Recently, Abhyankar et al. modified and eliminated any vertical incision on the lingual surface and performed laterally closed tunnel technique on the lingual surface with SCTG on an isolated mandibular incisor root, and they achieved satisfactory results.\(^{[13]}\) This was similar to our procedure as we also achieved a good amount of coronal movement of the free gingival margin as this was a tension- and perforation-free tunnel that can be displaced coronally in which elevation of the interdental papilla was also performed to achieve greater mobility necessary for coronal displacement. In the majority of such procedures, CTG was done because of its best clinical outcomes for mean and complete root coverage procedures and gain in keratinized tissue for Miller’s Class 1 and 2 recession defects, which has been used in this case report also.\(^{[14]}\) However, in our case, we have used ophthalmic blades. The use of ophthalmic blades made this procedure easier to perform, and chances of flap perforation became less on the recipient and donor sites making this procedure as atraumatic as possible. Furthermore, the chances of damage to the greater palatine artery while harvesting CTG were minimized. Tavelli et al. conducted a systematic review and meta-analysis on tunneling technique, in which they concluded that this technique is a highly effective periodontal plastic procedure for treating single and multiple GRs.\(^{[15]}\) They have also recommended the use of a microsurgical approach and an interpositional graft material. The advantages of a microsurgical approach have also been described by Zuhr et al., as it not only minimizes the trauma but also ensures better blood supply and nutrition for the CTG which improves wound healing.\(^{[16]}\) In our study, the use of minimally invasive full-thickness tunneling technique along with ophthalmic blades helped us to provide better esthetic results along with low postoperative morbidity in this anatomically challenging area.

The present case is among one of the few reported cases on lingual recession where authors have achieved successful root coverage of recession in the lingual area. However, certain limitations cannot be ruled out such as short-term follow-up, some amount of residual recession, high operator’s skill, and use of CTG which requires a second surgical site. Hence, it will be prudent enough to suggest the use of interpositional materials as a substitute in future cases with long-term follow-up.
CONCLUSION

The minimally invasive full-thickness tunneling technique with subepithelial palatal CTG with microsurgical instruments can be used effectively for root coverage in cases of lingual recession. This report has also proved the effectiveness of autogenous CTG by improving the width of keratinized gingival tissue and biotype.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Wennström J. Mucogingival therapy, section 8, 1996 World Workshop in periodontics. Ann Periodontol 1996;1:671-701.
2. Cortellini P, Bissada NF. Mucogingival conditions in the natural dentition: Narrative review, case definitions, and diagnostic considerations. J Clin Periodontol 2018;45 Suppl 20:S190-8.
3. Agudio G, Nieri M, Rotundo R, Franceschi D, Cortellini P, Prato GP. Periodontal conditions of sites treated with gingival – Augmentation surgery compared to untreated contralateral homologous sites: A 10- to 27-year long-term study. J Periodontol 2009;80:1399-405.
4. Lang NP, Löe H. The relationship between the width of keratinized gingiva and gingival health. J Periodontol 1972;43:623-7.
5. Hennequin-Hoenderdos NL, Slot DE, van der Weijden GA. The prevalence of oral and peri-oral piercings in young adults: A systematic review. Int J Dent Hyg 2012;10:223-8.
6. Tatakas DN, Chambrone L, Allen EP, Langer B, McGuire MK, Richardson CR, et al. Periodontal soft tissue root coverage procedures: A consensus report from the AAP Regeneration Workshop. J Periodontol 2015;86:S52-5.
7. Hürzeler MB, Weng D. A single-incision technique to harvest subepithelial connective tissue grafts from the palate. Int J Periodontics Restorative Dent 1999;19:279-87.
8. Fujita S, Ide Y, Abe S. Variations of vascular distribution in the mandibular anterior lingual region: A high risk of vascular injury during implant surgery. Implant Dent 2012;21:259-64.
9. Wilcko MT, Wilcko WM, Murphy KG, Carroll WJ, Ferguson DJ, Miley DD, et al. Full-thickness flap/subepithelial connective tissue grafting with intramarrow penetrations: Three case reports of lingual root coverage. Int J Periodontics Restorative Dent 2005;25:561-9.
10. Zucchelli G, Bentivogli V, Ganz S, Bellone P, Mazzotti C. The connective tissue graft wall technique to improve root coverage and clinical attachment levels in lingual gingival defects. Int J Esthet Dent 2016;11:538-48.
11. Parra C, Jeong YN, Hawley CE. Guided tissue regeneration involving piercing-induced lingual recession: A case report. Int J Periodontics Restorative Dent 2016;36:869-75.
12. Vijay KM, Triveni MG, Kumar AB, Mehta DS. Minimally invasive treatment of mandibular anterior lingual defects by vestibular incision subperiosteal tunnel access technique and connective tissue graft: A case report. Clin Adv Periodontics 2017;7:195-200.
13. Abhyankar V, Wong D, Mascarénhas J. Treatment of a mandibular anterior lingual recession defect with minimally invasive laterally closed tunneling technique and sub-epithelial connective tissue graft. Int J Oral Maxillofac Surg 2018;2:017.
14. Chambrone L, Tatakas DN. Periodontal soft tissue root coverage procedures: A systematic review from the AAP Regeneration Workshop. J Periodontol 2015;86:S8-51.
15. Tavelli L, Barootchi S, Nguyen TV, Tattan M, Ravidà A, Wang HL. Efficacy of tunnel technique in the treatment of localized and multiple gingival recessions: A systematic review and meta-analysis. J Periodontol 2018;89:1075-90.
16. Zuhr O, Fickl S, Wachtel H, Bolz W, Hürzeler MB. Covering of gingival recessions with a modified microsurgical tunnel technique: Case report. Int J Periodontics Restorative Dent 2007;27:457-63.