Treatment of Gingival Fenestration with Connective Tissue Graft: A Case Report

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Abstract

Here, we report a case of gingival fenestration requiring periodontal plastic surgery. The patient was a 32-year-old man presenting with the chief complaint of esthetic impairment and gingival twitching due to gingival fenestration. Baseline examination revealed localized periodontal breakdown, including gingival fenestration in the lower right central incisor (#41). Periodontal examination revealed 3% of sites with a probing depth of ≥4 mm and 8.9% with bleeding on probing. Radiographic examination revealed vertical bone loss in #15 and 36, together with buccal fenestration in #41. Based on a clinical diagnosis of chronic periodontitis with gingival fenestration, initial periodontal therapy comprised plaque control and scaling and root planing. Following suppression of inflammation, occlusal adjustment was performed in the anterior teeth. As plastic surgery, combined use of an elevated flap and a connective tissue graft was applied at #41. Following reevaluation, the patient was placed on maintenance care. The patient’s periodontal condition has remained stable over a 6-month period.

Key words: Gingival fenestration — Esthetic dissatisfaction — Periodontal plastic surgery — Connective tissue graft — Oral health-related QoL

Introduction

Gingival fenestration is defined as the exposure of the tooth surface due to loss of the overlying bone and gingiva10. Its etiology remains unclear, however. Gingival fenestration can cause problems related to plaque control that eventually lead to root surface
caries, hypersensitivity, and compromised esthetics. Thus, gingival fenestration has the potential to adversely affect quality of life (QoL).

Although information on gingival fenestration is limited, techniques for its treatment have been reported. These include use of a connective tissue graft (CTG), various flap designs, guided tissue regeneration, and orthodontic treatment.

The purpose of the present report is to describe a case of localized chronic periodontitis with gingival fenestration requiring surgical treatment with a CTG. In addition to the results of periodontal examination, an assessment of oral health-related (OHR) QoL is also presented as a self-reported outcome.

**Case Presentation**

Written informed consent was obtained from the patient for inclusion in this case report.

1. **Baseline examination**

   In November 2016, a 32-year-old man was referred to the Clinic of Conservative Dentistry at Tokyo Dental College Suidobashi Hospital with the chief complaint of esthetic impairment and gingival twitching due to gingival fenestration that had left the root surface visible. The patient had first noticed a gingival wound, which was located close to the root apex, in May 2016. In July, he became aware of gingival fenestration, which was subsequently sutured by his local dentist. The result of this treatment was unsatisfactory, however, so he visited our hospital. The patient had no history of smoking or systemic symptoms. He had been treated for dental caries and had had wisdom teeth extracted, but had never been treated for periodontal disease.

   A visual examination revealed gingival fenestration, with the exposed root surface extending as far as the muco-gingival junction (Fig. 1). General plaque formation and gingival inflammation were present. Some spacing was observed between the teeth (Fig. 1). The guiding teeth were as follows: #14, 16, and 17, and 44, 46, 47 for right lateral movement; and #22–25 and 33–35 for left lateral movement. No premature contact was observed. Some occlusal interference during anterior guidance was detected, although the amount was small.

   The results of periodontal examination at baseline are shown in Fig. 2. Mean probing depth (PD) was 2.4 mm. Three percent of sites showed a PD of 4–6 mm. Bleeding on probing (BOP) was observed at 8.9% of sites.
No tooth mobility or furcation involvement was found. The level of plaque control as assessed according to the O’Leary Plaque Control Record (PCR) was 57%.

Radiographic examination using digital dental radiography (Fig. 3a) revealed interdental spaces in both the upper and lower jaw together with vertical bone loss in #15 and 36. Cone beam computed tomography (CBCT) (Fig. 3b, c) revealed buccal bone fenestration, but no periapical lesion, in #41.

In addition to a periodontal examination, OHRQoL was also assessed. The instrument used comprises 7 domains containing a total
of 22 subscale items. The respondent is asked to answer 22 of these items according to a 5-point response scale, which allows for answers ranging from “never” (score, 0) to “always” (score, 4). For the remaining 2 items, they are required to indicate how they perceive their oral and general health compared to others of the same age. The summation score from each of the 22 items produces total OHRQL scores ranging from 0 (representing the best impact possible) to 84 (representing the worst impact). The patient’s total pretreatment OHRQL score was 27 (Fig. 9a).

2. Diagnosis

The clinical diagnosis was localized chronic periodontitis with gingival fenestration.

Clinical Procedures and Outcomes

A treatment plan was presented to the patient and his consent to the proposed plan obtained. An outline of the treatment process is shown in Table 1.

1. Initial periodontal therapy

Initial periodontal therapy consisted mainly of securing patient motivation to undergo treatment, followed by tooth brushing instruction (the scrubbing method), and scaling and root planing. Occlusal adjustment was implemented in #41 due to some interference during anterior guidance. During initial periodontal therapy, the patient was also required to use an end-tufted toothbrush (EX onetuft S; Lion, Tokyo, Japan) to clean the interdental spaces.

At reevaluation, the patient’s PCR score showed an improvement, from 57 to 19%. No significant change in mean PD was observed (from 2.4 to 2.5 mm) (Figs. 2 and 4). However, sites with a PD of 4–6 mm disappeared, and the mean BOP showed a reduction, from 8.9 to 4.8%. The total OHRQL score at this stage was 17 (Fig. 9a).

2. Periodontal plastic surgery

Upon obtaining informed consent, combined use of an elevated flap and a CTG was applied for the gingival fenestration in #41 as periodontal plastic surgery (Fig. 5). Benzethonium chloride mouthwash (Neostelin Green 0.2% mouthwash solution, Nippon Shika Yakuhin, Shimonoseki, Japan), antibiotics, and anti-inflammatory analgesics were prescribed for 5 days postoperatively. The patient was also instructed to use a soft toothbrush when cleaning in the area treated for approximately 3 weeks postoperatively to

Table 1  Treatment process

| November 2016     | Initial periodontal therapy |
|-------------------|-----------------------------|
|                   | • Plaque control            |
|                   | • Quadrant scaling and root planing |
|                   | • Occlusal adjustment (#41) |
|                   | • The assessment of OHRQoL at baseline |
| January 2017      | (Reevaluation)              |
|                   | • The assessment of OHRQoL at post-IP |
|                   | • Periodontal plastic surgery following connective tissue graft (#41) |
| To present        | Maintenance care            |
|                   | (Reevaluation)              |
|                   | • Oral hygiene instruction  |
|                   | • Professional tooth cleaning |
|                   | • The assessment of OHRQoL at post-surgery (3M) and maintenance (6M) |
avoid mechanical trauma. The total postoperative OHRQL score was 4 (Fig. 9a).

3. Maintenance care

The course of postoperative healing was uneventful, and the patient is satisfied with the esthetic outcome (Fig. 6). At each recall visit, oral hygiene instruction and professional mechanical tooth cleaning have been implemented.

At the latest recall examination (at 6 months postoperatively), the periodontal condition was stable (Fig. 7). The mean PD and BOP was 2.1 mm and 4.8%, respectively. The PCR score was 13%. The bone level has remained stable (Fig. 8). The total OHRQL score showed a decrease to 3, indicating an improvement (Fig. 9a).
Discussion

Gingival fenestrations have rarely been reported in the dental literature, and their etiology is unclear. They are suspected to be caused by a number of factors, including periodontal disease, improper oral hygiene, frenal pull, bone dehiscence, improper restorations, tooth malposition, viral infections of the gingiva, and oral habits\(^{35}\). The gingival fenestration in the present case involved bone dehiscence. This was a factor we were unable to address at this point: only plastic surgery was performed, and no attempt was made to regenerate buccal bone. The patient refused orthodontic treatment. Therefore, the risk of recurrence of gingival fenestration remains. We believed, however, that we might be able...
to at least reduce the likelihood of such an outcome, as a CTG is thought to transform a thin gingival tissue into a thick one. Thick gingival tissue is not only more resistant to trauma than thin, but also reduces the likelihood of recurrence of the defect.\footnote{4}

Periapical lesions can also cause gingival fenestration. When tested, #41 was vital. Therefore, no root canal treatment was performed. However, the surgical area was close to the root apex. Therefore, the patient was informed of the possibility of the need for root canal treatment in the future.

Flap elevation with odontoplasty to treat gingival fenestration due to cervical enamel projections has been reported\footnote{2}. Recently, the utilization of a modified pouch and tunnel technique following application of a CTG, and of a coronally repositioned partial thickness graft have also been reported\footnote{10}. Furthermore, in treating mucosal fenestration, the combined use of an elevating flap and a CTG yielded good esthetic improvement\footnote{3}. Thus, combined use of an elevated flap and a CTG has been shown to yield good and predictable results in the treatment of gingival fenestration. This was the reason for this approach in the present report.

One necessary condition for complete recuperation of periodontal tissue is maintenance of adequate vascularization in the flaps and grafts\footnote{6}. Connection between the blood vessels of the graft and those originating in the periosteum and underlying bone occurs within the first 2 or 3 days\footnote{18}. If these conditions are not satisfied, tissue necrosis and scarred healing will occur, resulting in a reparative rather than a regenerative process\footnote{14}. Therefore, the flap design of the recipient site must be considered carefully. Releasing incisions interrupt superficial and intramural vascularization. These are necessary, however, for flap mobilization and for the placement and suturing of the connective tissue graft\footnote{18}. The blood supply originates in the base of the reflected flap, because most of the centripetal blood vessels are intercepted by incisions and sutures. In the present case, gingival fenestration extended as far as the mucogingival junction. Although marginal gingival recession was minimal, the coronal extension of the releasing incisions was kept to a minimum to facilitate access without involving the gingival margin or papilla according to a previously reported method for managing mucosal fenestration\footnote{17}. Therefore, in the present patient also, we believed we would be able to minimize postoperative deterioration in esthetics due to necrosis by keeping the releasing incisions to the minimum so as not to involve the gingival margin or papilla. However, it is necessary to carefully watch out

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\textbf{Fig. 8} Radiographic view at 6 months from start of maintenance care
for a potentially negative effect due to the placement of the horizontal incisions. At 6 months postoperatively, no negative influence was observed, and the marginal recession appeared to have improved, probably due to the patient having continued to practice proper tooth-brushing as instructed.

Patient perception of periodontal disease and its treatment have increasingly come to be recognized as an important measurement of outcome\textsuperscript{12}. And the importance of assessing the effect of periodontitis and its treatment on OHRQoL has been shown\textsuperscript{5,13}. Information on the effects of problems associated with periodontal soft tissue and their treatments on OHRQoL is still limited, however. In the present case, the patient’s OHRQoL showed an improvement as treatment progressed (Fig. 9). Total OHRQoL score and most of the subscale scores were observed to improve postoperatively. We believe that this improvement in social and psychological
function can be attributed to resolution of gingival fenestration, in particular.

So far, the patient’s periodontal condition has remained stable and will continue to be monitored.

Conflict of Interest

We report no conflict of interest with regard to this case report.

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