

Interdental Papilla Reconstruction Combining Periodontal and Orthodontic Therapy in Adult Periodontal Patients: A Case Report

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ABSTRACT

Migration of maxillary anterior teeth because of the loss of periodontal support can alter the appearance of the esthetic zone. The loss of contacts between adjacent teeth results in the recession of interdental papillae. To restore sustainable periodontal health and the normal, esthetic appearance of a healthy 37-year-old woman with generalized advanced chronic periodontitis in the maxillary arch, a combined periodontal and orthodontic technique was used. This approach resulted in stable periodontium and an esthetically pleasing appearance of the maxillary anterior area.

For citation purposes, the electronic version is the definitive version of this article: www.cda-adc.ca/jcda/vol-74/issue-6/531.html

Pathologic migration of maxillary anterior teeth because of a loss of periodontal support is very common.¹ This migration can result in the extrusion of teeth,²⁻⁴ loss of contact points, missing papillae and poor appearance of the esthetic zone.⁵⁻⁷ In the absence of contacts between the adjacent teeth, papillae recede. It has been proposed that the distance from the contact point to the alveolar crest is at least partially indicative of the presence of interdental papillae.⁸

Several periodontal surgical techniques have been proposed to recreate the missing papillae^{5,7,9-17}; however, predictable results have not yet been achieved.¹⁸ In cases of loss of periodontal support and shifting teeth, a multidisciplinary treatment approach with esthetic periodontal surgery is required to eliminate periodontal inflammation without loss of soft tissue.^{4,5,7,18,19} This surgery should be followed

immediately by orthodontic treatment to reduce the infrabony defects caused by the intrusion and lateral movement of teeth into the defect.^{1-3,20-23} These clinical techniques may also help to re-establish the contact points, reduce the distance between the contact point and the alveolar crest and re-form the interdental papillae.^{5-8,18,22,24-26}

This paper is the initial report of an interdisciplinary investigation into the outcome of treatment designed to enhance the prognosis of periodontally involved teeth and to improve the appearance of the esthetic zone.

Case Report

A healthy 37-year-old woman who was a smoker sought treatment of her shifting maxillary teeth and closure of diastemas (**Fig. 1**). A diagnosis of generalized advanced



Figure 1: Initial intraoral photographs showing generalized spacing and absence of papillae in the upper anterior segment.



Figure 2: Initial radiographs revealed the presence of bony defects between the central incisors and the lateral incisors and canines.

chronic periodontitis in the maxillary arch was made. Undergoing smoking cessation counselling helped the patient quit smoking; she has been tobacco-free since the surgical treatment.

After the initial sanative phase, osseous surgery for pocket reduction was completed in sextant 1 and sextant 3. To avoid maxillary anterior soft-tissue loss, papilla preservation flap surgery was done.^{12,13} This procedure allowed access to the infrabony defects (**Fig. 2**) for debridement without loss of papillae. No adjunct guided tissue regeneration was attempted.

The patient was followed 6 weeks for postoperative care and was referred to an orthodontist for further orthodontic management of the diastemas and missing papillae. The patient was seen every 3 months for periodontal maintenance during her orthodontic treatment. Periodontal pocket depths and clinical attachment levels before and after periodontal treatment, and after orthodontic treatment are shown in **Table 1**.

Although some proinclination of the incisors was present, the relatively shallow overjet and overbite made room for the intrusion and retrusion of the incisor segment very limited.

Upper brackets on the incisors and canines, as well as direct bonding tubes on the first molars, were bonded, starting with a nickel-titanium 0.016 archwire for initial alignment, followed by nickel-titanium 0.018, nickel-titanium 0.018 × 0.025 and stainless steel 0.018 × 0.025 archwires. Closing the space by moving the central and lateral incisors into the bony defects was started with an elastomeric power chain.

Because of the reduction in the overjet, lower brackets that mirrored the upper ones were bonded to anchor the closure of the space by means of the mesialization of the upper posterior segments with Class III elastics. Some intrusion of the upper incisors was intended, but it was limited because of the shallow overbite. During the orthodontic procedures, oral hygiene maintenance was done every 3 months.

After the space was closed, the esthetic appearance of the papillae was significantly improved, resulting in a normal appearance of the whole anterior segment (**Fig. 3**). Periapical radiographs showed improvement at the level of the bone crest between the central incisors and between the lateral incisors and canines (**Fig. 4**). Resin-bonded fixed retention was established after the appliances were debonded.



Figure 3: Post-treatment photographs showing proper proximal contacts and improved appearance of the papillae.

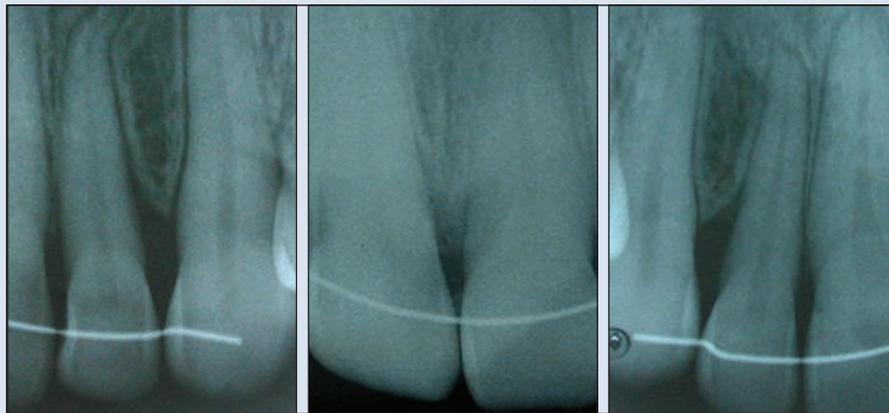


Figure 4: Post-treatment radiographs showing a significant reduction of the bony defects after space closure.

Table 1 Clinical measurements (mm) of lateral incisors before treatment, after periodontal treatment and after orthodontic treatment

Incisors	Probing pocket depth (mm)			Clinical attachment level (mm)		
	Before treatment	After periodontal treatment	After orthodontic treatment	Before treatment	After periodontal treatment	After orthodontic treatment
Right lateral incisor						
Mesiobuccal	3	3	2	3	3	2
Buccal	2	2	2	2	2	2
Distobuccal	7	4	2	7	4	2
Distolingual	7	4	3	4	3	3
Lingual	5	2	2	5	2	2
Mesiolingual	3	2	2	3	2	2
Left lateral incisor						
Mesiobuccal	3	2	2	3	2	2
Buccal	2	2	2	2	2	2
Distobuccal	4	4	2	4	4	2
Distolingual	6	2	2	6	2	2
Lingual	2	2	2	2	2	2
Mesiolingual	3	2	2	3	2	2

Discussion

Periodontic plastic surgical procedures have tremendously improved with the use of microscopes and microsurgical instruments. Although many investigations^{9–11,14,16,17,26,27} have proposed procedures for reconstructing the papillae, predictable results have not yet been achieved because of a variety of factors.¹⁸ Infrabony defects can be treated by extrusion²⁰ and intrusion^{5,7,19} of teeth, bodily movement of the teeth into the bony defects^{21,22} and guided tissue regeneration.⁷ For our patient, we used a modified papilla preservation technique, followed by orthodontic mesialization of the posterior segments and minor intrusion of the maxillary anterior segment. Our patient's occlusal conditions limited the amount of intrusion feasible and may have had an impact on the final results.

With this combined periodontal and orthodontic treatment, stable periodontal health was achieved. Pocket depth was reduced and the level of clinical attachment improved. Results of a radiographic survey showed that the infrabony defects were at least partially healed and the height of the alveolar crest around the lateral incisors increased. These results were obtained without the addition of any regenerative materials. With the re-establishment of contact points between the central and lateral incisors and the lateral incisors and canines, the interdental papillae returned to their proper contours and almost filled the interdental spaces. These clinical improvements created an esthetic appearance free from receded papillae and diastemas. For our patient, the reduction in pocket depth, gain in clinical attachment level and reduction in mobility were consistent with the elimination of inflammation and improved home care.²⁸

Radiographic reduction of our patient's infrabony defects, especially around the lateral incisors, was consistent with results obtained with the intrusion^{5,7,19,21} and lateral movement^{1–3,20–23} of teeth. Although interpreting nonstandardized radiographs has limitations, our patient's combined radiographic improvement in bone level, reduction in pocket depth, gain in the clinical attachment level and absence of gingival recession indicate definitive improvement in her periodontal status. Our patient has now maintained this stable stage for 3 years.

The re-establishment of contact points through mesial movement and intrusion also allowed proper reformation of interdental papillae. This is consistent with the concept that the distance between the contact point and the alveolar crest is at least partially indicative of the presence of interdental papillae.⁸ The intrusion of teeth also allows the wider mesiodistal dimension of the crowns to close the embrasure space.

In conclusion, within the limitations of this investigation, combined periodontal and orthodontic therapy that involved mesial movement of teeth to the point of

minor intrusion achieved a healthy stable periodontium and significantly improved the appearance of the esthetic zone. ✦

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Acknowledgments: We would like to thank Meghan Perinpanayagam for her assistance in the preparation of this manuscript.

The authors have no declared financial interests.

This article has been peer reviewed.

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