

CASE REPORT

Treatment of an Isolated Vertical Infrabony Defect with Orthodontic Intrusion

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Orthodontic treatment of patients with advanced periodontal disease requires a multidisciplinary approach. Orthodontic forces acting on teeth in the presence of ongoing periodontal inflammation can produce rapid periodontal breakdown.¹⁻³ Several authors have shown, however, that with proper periodontal treatment and regular maintenance, teeth with reduced periodontal support may be treated orthodontically at no increased risk.^{4,5} Orthodontic correction of the archform and periodontal architecture may facilitate good

oral hygiene and promote the formation of a new attachment.^{6,7}

Diagnosis and Treatment Plan

A 47-year-old female with periodontal disease presented with the complaint of spacing between the anterior teeth due to tooth mobility. She had Class I molar and canine relationships, but the anterior teeth in both arches were slightly proclined, and the maxillary central incisors were extruded and rotated (Fig. 1). Periodontal examination revealed

widespread periodontal disease and an infrabony pocket on the mesial side of the maxillary left central incisor, with a periodontal probing depth of 10mm (Table 1).

The treatment plan involved nonsurgical periodontal treatment followed by orthodontic treatment. Orthodontic goals were to reduce the anterior spaces, intrude the maxillary left central incisor, and reduce the infrabony defect to improve the prospect for periodontal regenerative surgery.^{8,9} The patient was counseled on the importance of oral hygiene in avoiding further periodontal problems.



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Fig. 1 47-year-old female patient with slight proclination of anterior teeth in both arches and extrusion and rotation of maxillary central incisors before treatment.

TABLE 1
PERIODONTAL CONDITION OF MAXILLARY LEFT CENTRAL INCISOR

	Before Periodontal Treatment	After Periodontal Treatment	After Orthodontic Treatment
<i>Probing Depth</i>			
Mesial	10mm	4mm	—
Buccal	4mm	—	—
Distal	7mm	—	—
Lingual	—	—	—
<i>Mobility</i>			
	II	I	I
<i>Bleeding on Probing?</i>			
Mesial	Yes	No	No
Buccal	Yes	No	No
Distal	Yes	No	No
Lingual	No	No	No

Treatment

After scaling and root planing, the patient’s periodontal condition was good (Fig. 2), with no bleeding on probing, and her standard of oral hygiene remained high. Although she was informed that she had a posterior crossbite on the right side, she decided not to address that problem. Lingual appliances were used for both esthetic and biomechanical reasons: alveolar bone loss causes the center of resistance of a periodontally compromised tooth to move apically, generating a larger moment on the crown (Fig. 3).

A 3-3 Philippe lingual appliance with an .012" nickel titanium wire was placed in the maxillary arch (Fig. 4). A light elastic thread was inserted between the two central incisors to facilitate derotation of the left central incisor. In the mandibular arch, a 5-5 Philippe lingual appliance was placed, with both first molars bonded buccally. The second molars were banded; with the first and second molars blocked,



Fig. 2 Maxillary left central incisor after nonsurgical periodontal treatment.

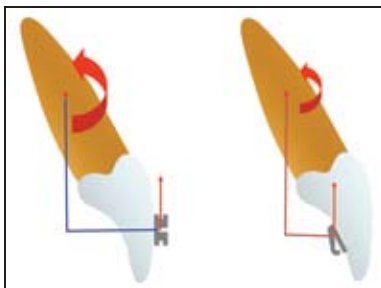


Fig. 3 Biomechanics of facial vs. lingual force application on maxillary left central incisor.

a light elastic chain was applied from the lingual button of each band to the archwire.

These mechanics closed the lower spaces, improved the alignment of the upper teeth, and intruded the maxillary left central incisor while moving it mesially. The movement of the incisor into



Fig. 4 Maxillary 3-3 and mandibular 5-5 Philippe lingual appliances.



Fig. 5 Periapical radiograph taken during treatment, showing improved periodontal condition of maxillary left central incisor (red dot indicates original depth of mesial defect).

the bone defect improved the patient's periodontal condition, as confirmed radiographically (Fig. 5). After 13 months of treatment the periodontal and orthodontic goals had been achieved, and appliances were removed (Fig. 6). Fixed 3-3 retainers were placed in both arches, and the patient was also given a removable upper retainer.

Composite build-ups were performed to reshape the upper incisors. Recontouring of the lower incisors might have eliminated the black triangles that were evident at the end of treatment.

Discussion

The treatment goals in this

case were accomplished using light force and low-friction mechanics. The patient's cooperation and strong motivation to maintain a high standard of oral hygiene were significant. Without histologic examination, however, it was impossible to know exactly what occurred on the mesial side of the maxillary left central incisor root. We do not know whether cleaning the root surface and moving the tooth into the bone defect created a new attachment, as shown by Melsen and colleagues,⁷ or merely a long epithelial attachment, as described by Polson and colleagues.¹⁰

In any event, treatment resulted in a 6mm reduction of the periodontal probing depth on the mesial side (Table 1). In addition, gingival recession was reduced by 2.75mm on the mesial side and 1mm on the buccal side, and the clinical attachment level was increased by 8.75mm. Similar results were reported by Corrente and colleagues.¹¹

One year after the end of treatment, the probing depth was less than 3mm on all sides of the maxillary left central incisor, and the results appeared to be stable (Fig. 7). The periodontal results achieved with orthodontic treatment—including improvements in clinical attachment level, probing depth, and gingival recession—were similar to those produced by guided tissue regeneration, as described by several authors.¹²⁻¹⁵ Because these conditions could be maintained with normal oral hygiene, we decided not to recommend periodontal surgery.

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Fig. 6 Patient after 13 months of treatment.

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Fig. 7 One year after end of treatment. Cortical bone formation around maxillary left central incisor indicates stability of result.

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