

Improved Protocol for Temporary Pontics: Combined Prosthodontic–Orthodontic Treatment

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“Clinical Showcase” is a series of pictorial essays that focus on the technical art of clinical dentistry. The section features step-by-step case demonstrations of clinical problems encountered in dental practice. If you would like to contribute to this section, contact editor-in-chief Dr. John O’Keefe at jokeefe@cda-adc.ca.

Patients requiring combined prosthodontic and orthodontic treatment, including adult patients who need treatment as a direct result of dental trauma, are often seen in an orthodontic specialist practice. For patients with anterior edentulous areas, the esthetic aspects of the treatment process are often of as much concern as the final result. A common approach in the traditional orthodontic canon involves the temporary use of a denture tooth as a pontic. The denture tooth is typically bonded to a labial bracket, to camouflage any space during orthodontic alignment.

This simple pontic-to-bracket bonding protocol may be acceptable with traditional labial appliances, because visible labial attachments and wires are already present. However, the use of more esthetically pleasing appliances, such as Invisalign (Align Technology, Santa Clara, Calif.) and lingual orthodontic appliances, complicates such routines. In either case, alternatives may be considered, including the bonding of resin facings to adjacent teeth; however, undesired debonding may occur because of lack of pontic strength.

The following case illustrates an original approach which addressed esthetic issues during treatment and improved pontic retention.

A healthy 22-year-old male model presented with loss of teeth 11 and 21; these teeth had been avulsed several years earlier as a result of a motor vehicle crash (Figs. 1 to 5). A removable “flipper” type appliance was in place.

Insertion of a traditional bridge had been considered, but was ruled out because of unsatisfactory esthetics; the upper lateral incisors and canines were significantly malaligned, and there was minimal available space for properly proportioned pontics (Figs. 6 and 7). The patient had been referred several times for orthodontic consultation, to address the insufficient space for permanent implants and to improve overall alignment and interarch occlusion. However, the patient had refused any labial braces for esthetic reasons, choosing instead to endure the inconvenience of the partial denture for several years. Furthermore, clear Invisalign-type splints would have been insufficient for precise opening of



Figure 1: The patient at the time of initial presentation, without the “flipper” type partial denture.



Figure 2: Facial view of the patient with the partial denture in place.



Figure 3: A closer view illustrates that insufficient space was available for prosthodontic treatment.



Figure 4: Palatal view of the partial denture in place.



Figure 5: Frontal view of the partial denture in place.



Figure 6: Without orthodontic intervention, the placement of a bonded bridge would have necessitated excessive incisogingival height for the pontics, in relation to the limited edentulous space available.



Figure 7: The diagnostic wax-up highlights the inadequacy of a non-orthodontic treatment result.



Figure 8: Lingual orthodontic appliances were used to expand the maxillary arch, which improved the alignment and increased space in the area of teeth 11 and 21.



Figure 9: The Nance appliance provided anchorage. Micro-implants could also have been used to similar effect.



Figure 10: A modified temporary pontic approach was employed, using steel ligatures placed through vertical slots in the pontics. The pontics were trimmed mesiodistally to the available space.



Figure 11: The steel ligatures were ligated to the arch wires on the lingual surface and were supported by composite resin pads.

the space and expansion of the arch. However, once the patient became aware that the problem could be treated with lingual orthodontics, his attitude toward treatment changed.

Lingual orthodontic appliances and temporary pontics were bonded in the upper arch (Fig. 8); a Nance appliance was added 1 month later to maintain anchorage (Fig. 9) and to allow effective expansion of the arch.

Instead of attempting to bond the denture teeth to brackets, as is done with conventional

methods, 2 pontics were trimmed to the available space and modified with vertical slots drilled by means of an air-rotor handpiece in the laboratory. The pontics were then secured to the lingual arch wires with stainless steel ligatures and were further reinforced with light-cured composite resin for stability (Figs. 10 and 11). The use of a multi-slotted lingual bracket allowed the use of tandem arch wires, for extra stability and 3-dimensional torque control; most importantly, this allowed free orthodontic mechanics with minimal interference.



Figure 12: After several months, improved alignment and spacing is apparent.



Figure 13: The use of this modified pontic design allowed an acceptable interim solution for the patient. At no time during the treatment was the space left uncovered.



Figure 14: Radiographic evaluation confirmed opening of the anterior space, with achievement of acceptable parallel positioning of the roots.



Figure 15: Once the permanent crowns are inserted, the benefits of alignment and expansion become evident.



Figure 16: Orthodontic alignment allowed achievement of a well-interdigitated Class I occlusion.



Figure 17: The final fixed restorations in place.

Even if labial brackets were to be used, the same technique could be applied, using a single labial arch wire and stainless steel ligatures and resin, as outlined.

Arch expansion and alignment proceeded unimpeded for about 10 months (Figs. 12 and 13). Once sufficient space had been achieved, as confirmed by clinical mesiodistal measurements and radiographic assessment (Fig. 14), the lingual appliances were debonded and the patient was sent for immediate placement of permanent osseointegrated implants and crowns (Figs. 15 to 17). The timing of this procedure was critical to avoid orthodontic relapse.

During the entire phase of active orthodontic treatment, the temporary pontics were strong enough to withstand occlusal forces, and only minimal adjustment was required for anterior function and esthetics. The patient was able to continue his routine without hindrance to speech, masticatory function or his modelling career. Although the treatment mechanics and pontic design were more difficult for the practitioner to

execute, the additional effort and resources were well justified, as the patient would not otherwise have undertaken such long-term treatment. With minimal modification, it should be possible to apply a similar ligature technique to labial orthodontic arch wires. ♦

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