



A Semi-Permanent Crown as an Intermediate Restoration before Orthodontics

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Introduction

It is not uncommon for the occlusal and aesthetic conditions of a patient's teeth to be so severe that orthodontic treatment must be provided to reposition the teeth before a permanent restoration can be pursued. One significant challenge in such cases is often that the teeth lack the structural integrity required to be repositioned. While in theory a provisional restoration of the teeth might provide the needed integrity, in reality provisional crown and bridge materials have lacked the durability to last the duration of the orthodontic treatment.

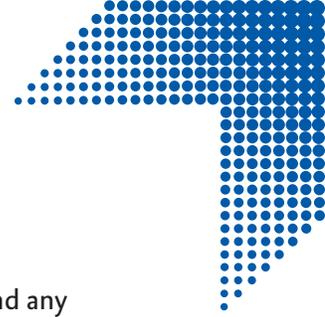
Fortunately, one manufacturer has recently introduced a semi-permanent crown and bridge material designed to last up to five years, which is much longer than the typical time required to complete orthodontic treatment.

Case Report

A patient presented with clinical breakdown that necessitated significant reconstruction. In particular, the upper molars exhibited considerable breakdown as a result of decay around and under an old restoration (Figure 1), and the anterior teeth exhibited significant wear and breakdown as a result of the teeth's positioning (Figure 2). While the patient desired improved aesthetics and function, occlusal and aesthetic conditions required orthodontic treatment to better position the teeth before reconstruction could be initiated. Moreover, the orthodontist required structural integrity to accomplish tooth movement.

One option considered for treating the molars was to place core fillings and provisional crowns that would remain in place until orthodontics were completed. However, a complication to this approach was the possibility of the provisional crowns becoming loose during orthodontics as a result of the force that would be placed on them. The possibility of marginal leakage leading to recurrent decay was an additional concern.

For these reasons, it was decided to use a semi-permanent crown and bridge material (LuxaCrown, DMG) to fabricate an overlay for the molars that would serve as a long-term core filling. A LuxaCrown shell of the upper molar to be restored (Figure 3) was created using a silicone mold consisting of two upper and lower mated sets of posterior occlusal forms (Rapid Waxer, Dentsply Neytech). Materials such as wax, composite or bis-acryl can be added into the form to create aesthetically pleasing tooth shapes. In this case, the semi-permanent LuxaCrown material was utilized as the need for orthodontics precluded a permanent restoration. The LuxaCrown was carefully added into the molar position of the Rapid Waxer (Figure 4), creating a thin shell of material that auto cures. (It is important that the shell be thin, as light-cured packable composite will be added beneath it later.) After curing, the shell was carefully removed from the form (Figure 5).



A 016-round end-tapered diamond bur in a high-speed hand piece was used to remove the flash and any overextended material from the overlay shell (Figure 6). The shell was then carefully trimmed at the margins so that it could passively seat to the correct position in the patient's premolar (Figure 7). (Care must be taken to ensure the shell can be passively seated to the correct position both facial-lingually and occlusal-gingivally; if margins are too long, the restoration will not seat to the correct vertical position, resulting in incorrect occlusal or incisal length. Selective reduction inside the overlay might also be needed to allow this passive seating. Margins that are trimmed excessively are not an issue, as the reline material will compensate for that. A margin that is overextended, however, can be problematic. If proximal contacts are shy, composite must be added, and the overlay must be carefully trimmed.)

Etching and applying primer and adhesive were completed according to the bonding instructions. The shell overlay was then filled with packable composite and carefully positioned to the ideal position. It is essential that acute visual inspection of the facial-lingual and occlusal-gingival positioning occur when the overlay is initially seated. Once the seating position was verified, excess composite was carefully removed. The shell overlay was then light cured, after which marginal discrepancies were corrected by adding a flowable resin specially formulated for use with provisional materials (LuxaFlow, DMG). After the resin was cured, the margins were finished, the occlusion was adjusted, and the intermediate restoration was polished (Figure 6). This intermediate restoration featuring an aesthetic composite core filling with a LuxaCrown exterior allowed for stability during orthodontic treatment, after which the intermediate crown could be replaced with a permanent crown.

A similar process was utilized for the anterior teeth. Instead of sculpting the anterior teeth in the mouth by hand, it was decided to place LuxaCrown shells over the anterior teeth. A stint was fabricated from a completed diagnostic wax-up (Figure 9). Shell overlays were created by adding LuxaCrown material into the stint and allowed to cure (Figure 10). These shells were trimmed to passively fit as previously described. A packable composite was added to the inside of the shells, which were then positioned in place and cured after etching and bonding. The LuxaCrown shells were then shaped, the margins were refined, and the restorations were polished (Figure 11).

Closing Comments

The durability of the LuxaCrown semi-permanent restorations made it possible to initiate orthodontic treatment, and there is every reason to believe that this treatment will be completed successfully.

This technique allows for fast and predictable tooth contouring for both posterior and anterior teeth. Because the bulk of the shape is already completed, refinement is minimized. The strength of these semi-permanent restorations is such that they can serve as a core material when final restorations are initiated following the completion of the orthodontic treatment.



Figure 1: Duplicate of diagnostic was-up and provisional stent



Figure 2: Wear and breakdown of anterior teeth due to teeth position



Figure 3: Upper molar requiring restoration



Figure 4: LuxaCrown added to upper molar position of Rapid Waxer



Figure 5: LuxaCrown shell removed from Rapid Waxer



Figure 6: Shell following bur removal of flash and overextended material



Figure 7: Shell passively seated to correct position in patient's premolar



Figure 8: Finished intermediate restoration following addition of LuxaFlow, curing, occlusion adjustment and polishing



Figure 9: Stint fabricated from a completed diagnostic wax-up



Figure 10: Anterior shell overlays created using LuxaCrown



Figure 11: The finished semi-permanent anterior restoration