

The Natural Tooth Pontic; Simplified

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Abstract

This paper's objective is to describe a simple, economical and fast method to replace a single tooth. Utilizing an indirectly fabricated composite resin framework reinforced with polyethylene fiber and the existing tooth as pontic. This tooth can be the natural tooth or the restorative crown. In addition, this particular design allows for exact repositioning of the coronal part of the extracted tooth in its original intra-oral 3-dimensional position. This chair-side technique does not require laboratory involvement.

Tooth loss in the anterior region is for most patients a deeply traumatic experience. Although an anterior tooth has mechanical functionality, it is the compromised facial esthetics associated with tooth loss that is the patient's primary concern. Immediate esthetic replacement of the missing tooth will be required. This replacement can be temporary, semi-temporary or permanent in nature. Depending on many clinical and economic factors, a course of treatment is decided upon by the patient and dentist. The start of the definitive treatment depends on many factors and thus may require short to long temporization times. Final restorations can vary between removable prosthesis, tooth-supported prosthesis and the increasingly popular implant-supported prosthesis. Irrespective of the final treatment, Plan 1 will have to temporarily restore the patient's esthetic appearance while functionally stabilizing the compromised arch.

A transitional prosthesis may vary between simple removable tissue supported dentures; temporary full coverage fixed partial dentures and bonded fixed partial dentures. When the definitive restoration does not require tooth preparation, tooth structure removal is contra-indicated for the provisional restoration. This is exemplified by implant-supported prosthesis. Although interest is developing in the immediate

loading of dental implants,¹ the current protocol requires a period of undisturbed osseointegration. As the final prosthesis will be implant born, the neighboring teeth need no involvement. Temporization then can be fixed with a bonded prosthesis or tissue supported though care should be exercised to not load the underlying implant. Most patients desire a secure, fixed-tooth replacement prosthesis. The bonded prosthesis can be as simple as a singular tooth pontic²⁻⁶ or a resin-bonded fixed partial denture.⁷⁻⁹ The singular bonded tooth has been deemed short lived where the resin bonded FPD has a greatly improved prognosis.^{10,11} The original Rochette Resin Bonded Partial Denture (RBPDP) has a metal backing, requiring dental laboratory involvement.¹² Alternative designs utilize a plasma-treated woven polyethylene fiber (Ribbond, Ribbond Inc, Seattle, Wash.) to reinforce a resin-based framework.¹³⁻¹⁶ The following technique utilizes the same fiber, in an indirect fabrication fashion. Additionally, wings are placed to allow precise repositioning.



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Pontic



Figure 1. Initial positioning of the ribbon fibers wetted with bonding resin.



Figure 2. Build out to full contour of the framework.

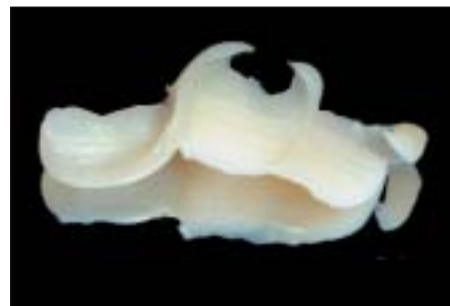


Figure 3. The intaglio of the framework. Note the retentive clasps.

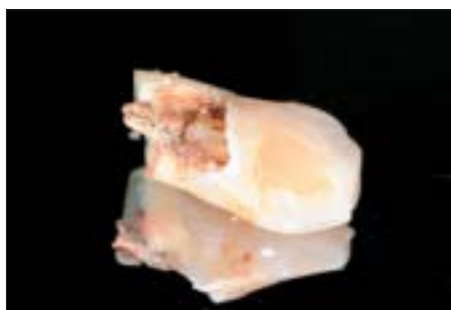


Figure 4. The coronal part of the extracted tooth.



Figure 5. Framework repositioned on the post-operative cast depicting the available spacing for the pontic.



Figure 6. Snug fit of the tooth into retentive clasps.

Technique

■ Take a pre-operative reversible hydrocolloid impression (Jeltrate Plus, Dentsply Caulk Inc., Milford, Del.).

■ Cast with a dedicated poly vinyl siloxane material (Mach-2 Die Silicone, Parkell Bio-materials, Farmingdale, N.Y.) and create a base with a rigid poly vinyl siloxane material (Blu-Mousse, Parkell Bio-materials, Farmingdale, N.Y.).

■ Measure the length and width of the area to be covered and cut the corresponding section of plasma treated woven polyethylene fiber (Ribbond, Ribbond Inc., Seattle, Wash.).

■ Wet this section with a light polymerizing bonding agent (Optibond Fl, Kerr Corporation, Orange, Calif.) and

place a small amount of a flowable light polymerizing micro-filled composite resin (Heliomolar flow, Ivoclar Vivadent Inc., Amherst, N.Y.) over the surface.

■ Place the wetted section in the required position on the poly vinyl siloxane cast and initiate polymerization with a visible light curing light. (Optilux 501, Kerr Corporation, Orange, Calif.) Add flowable composite to create bulk to the framework.

■ Place a small ribbon of flowable composite material originating from the just-created framework over the incisal edge of the abutment tooth and extend it approximately 3 mm onto the buccal part of the tooth. Place this wing over a smooth part of the tooth, as the smooth areas will be less prone to duplication

errors. Repeat once for the other abutment tooth and place two wings over the future pontic site. These wings will create a very secure seat, first for the exact replacement of the tooth segment, and secondly for the accurate positioning of the RRPD.

■ Carefully extract the tooth as not to damage the coronal tooth segment. Place the dental implant, take an implant level impression if indicated and suture the site.

■ Take a post-operative reversible hydrocolloid impression (Jeltrate Plus, Dentsply Caulk Inc., Milford, Del.).

■ Cast with a dedicated poly vinyl siloxane material (Mach-2 Die Silicone, Parkell Bio-materials, Farmingdale, N.Y.) and create a base with a rigid poly vinyl



Figure 7. Prepared coronal tooth part before bonding into framework.



Figure 8. Fitting of the now RBPDP on the post-operative cast. Depicting necessity of pontic shape adjustment



Figure 9. Final gingival contouring of pontic.



Figure 10. Airborne particle cleaning of abutment surface.



Figure 11. Conditioning of the enamel surface with 35 percent phosphoric acid. Note there is no conditioning of the clasp areas.

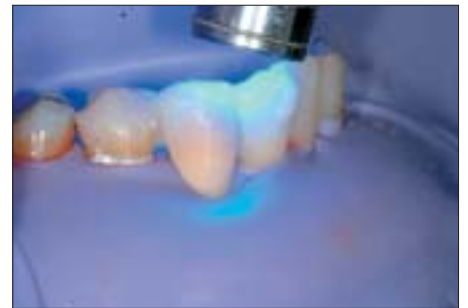


Figure 12. Initiation of the photo polymerization

siloxane material (Blu-Mousse, Parkell Bio-materials, Farmingdale, N.Y.).

- Remove the most apical part of the tooth, shape, etch, bond and fill the remaining root canal space with flowable composite.

- Airborne particle abrade the lingual tooth part that will mate with the pre-made framework, etch with a 35 percent phosphoric etchant (Ultra-Etch, Ultradent Products, Inc., South Jordan, Utah), dry, apply bonding resin and place flowable composite. Place bonding material on the corresponding part of the framework. Reposition the coronal part of the tooth into the mating part of the framework. Due to the polymerization shrinkages of the cast and the composite wings, this will be a very

snug fit. Assure that no material contaminates the abutment areas of the framework. Initiate polymerization with the light curing light.

- Reposition the newly created RBPDP onto the post-operative cast. Adjust the apical part of the tooth so it will have the required shape and relationship with the edentulous site. The post-operative cast allows easy visualization of all aspects of the framework while preventing contamination.

- Place dental dam isolation (Hygenic Dental Dam, Coltene/Whaledent Inc., Mahwah, N.J.). Air particle abrade the to-be covered parts of the abutment teeth. Carefully place 35 percent phosphoric etchant only on the areas to be covered by the framework.

Do not place any etchant on the areas to be covered by the wings. This will facilitate finishing greatly as these wings should not be bonded to the tooth. Apply bonding resin, and a small quantity of flowable composite. Now position the RBPDP in place, the wings will guide the framework exactly in place. Initiate polymerization with the light unit. Place additional composite as indicated and complete polymerization.

- Remove the wings and finish all surfaces with rubber finishing points (Bownie, Shofu Dental Corporation, San Marcos, Calif.).

- Remove the rubberdam. Adjust occlusal contacts on the framework and pontic to minimize stresses on the assembly.



Figure 13. Post-polymerization finishing with abrasive rubber point.



Figure 14. Occlusal relationship post-occlusal adjustment



Figure 15. Birds-eye lingual view of finished RBPB



Figure 16. Case 2. Framework on pre-operative cast.



Figure 17. Finished RBPB Case 2.



Figure 18. Case 3. Potential of RBPB; nine-year post-operative view of replacement of lower right cuspid

Summary

A technique is described to indirectly fabricate a fiber-reinforced framework. After securely repositioning and bonding the coronal part of the natural tooth, the Resin Bonded Fixed Bridge can be precisely repositioned and bonded to the abutment teeth.

References / 1. Wöhrle PS, Single-tooth replacement in the aesthetic zone with immediate provisionalization: 14 consecutive case reports. *Pract Periodontics Aesthet Dent* 10(9):1107-14, Nov.-Dec., 1998.

2. Jordan RE, Suzuki M, Stills PS, Gratton Dr, Gwinnett JA, Temporary fixed partial dentures fabricated by means of the acid etch technique: a report of 86 cases followed for up to three years. *J Am Dent Assoc* 96:994-1001, 1978.

3. Portnoy L, Constructing a composite pontic in a single visit. *Dent Surv* 8:20-4, 1973.

4. Simonsen RJ, Clinical applications of the acid-etch technique. *Chicago: Quintessence*, 71-80, 1978.

5. Simonsen RJ, The acid etch technique in fixed prostheses. An update(I). *Quintessence Int* 11:33-40, 1980.

6. Stolpa JB, An adhesive technique for small anterior fixed partial dentures. *J Prosthet Dent* 34:513-9, 1975.

7. Samama Y, Fixed bonded prosthodontics: A 10-year follow up report. Part I; analytical overview. *Int J Periodontics Restorative Dent* 15:424-35, 1995.

8. Corrente G, Vergnano L, Re S, Cardaropoli D, Abundo R, Resin-bonded fixed partial dentures and splints in periodontally compromised patients: a 10-year follow-up. *Int J Periodontics Restorative Dent* 20:628-36, 2000.

9. Chang HK, Zidan O, Lee IK, Gomez-Martin O, Resin-bonded fixed partial dentures: a recall study. *J Prosthet Dent* 65:778-81, 1991.

10. Minesaki Y, Suzuki S, Kajihara H, Tanaka T, Effect of reinforced methods on the retention of resin-bonded fixed partial dentures using a composite denture tooth as a pontic; In vitro Evaluation. *J Adhes Dent* 5:225-34, 2003.

11. Rammelsberg P, Pospiech P, Gernet W, Clinical factors affecting adhesive-fixed partial dentures. *J Prosthet Dent* 70:300-7, 1993.

12. Rochette A, Attachment of a splint to enamel of lower anterior teeth. *J Prosthet Dent* 30:418-23, 1973.

13. Meiers JC, Duncan JP, Freilich MA,

Goldberg AJ, Preimpregnated, fiber-reinforced prostheses. Part II. Direct applications: Splints and fixed partial dentures. *Quintessence Int* 29:761-8, 1998.

14. Strassler HE. Planning with diagnostic cast for success with direct bonding. *J Esthet Dent* 7:32-40, 1995.

15. Samadzadeh A, Kugel G, Hurley E, Aboushala A, Fracture strengths of provisional restorations reinforced with plasma treated woven polyethylene fiber. *J Prosthet Dent* 78:447-50, 1997.

16. Belli S, Ozer F, A simple method for single anterior tooth replacement. *J Adhes Dent* 2000.

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