

# Single-Visit Natural Tooth Pontic Bridge with Fiber-Reinforcement Ribbon

Sudden loss of an anterior tooth as a result of trauma, periodontal disease, or endodontic failure is a true esthetic emergency for a patient. A missing anterior tooth has implications for how we present ourselves to others and affects how we feel about ourselves. If the tooth or tooth crown is still intact and the patient brings it with them to the dental office, it is easiest to use it as a natural tooth pontic, joining it to the adjacent teeth with an adhesive composite with fiber reinforcement ribbon. When the tooth crown is not available, a denture tooth or a composite resin pontic can be shaped to fit the space of the missing tooth.

Techniques to replace a single missing anterior tooth by adhesive splinting using a natural tooth pontic, denture tooth, or composite resin tooth pontic embedded in wire, metal mesh, nylon, mesh, and cast metal frameworks have been described.<sup>1-6</sup> The inherent problems with these techniques have included lack of bonding between composite and metal or nylon, leading to fracture at the composite interface. Furthermore, to extend the durability of the restoration with submerged wires and mesh grids, composite resin had to be thick and bulky to minimize fracture.<sup>7,8</sup> This thick and overcontoured restoration led to an increase in food and plaque retention and difficulties in maintaining periodontal health (AQ: ok as edited?).

The introduction of bondable fiber reinforcement materials made from ultra-high molecular weight polyethylene and glass allows for the placement of both periodontal splints and thin, but strong, bonded composite resin based single-visit bridges (Table 1). (AQ: please provide Table

1) The author has been using one brand of fiber reinforcement ribbon, Ribbond reinforcement ribbon (Ribbond), for more than 16 years with success. The lock-stitch weave of Ribbond ribbon provides multidirectional reinforcement when embedded within composite, creating a laminated structure that increases flexural strength and is resistant to fracture.<sup>9-11</sup>

## Case Report

A patient with severe periodontal pocketing, severe bone loss, and pain in a mandibular central incisor leading to a diagnosis of severe periodontal disease and a periodontal abscess presented to a dental school clinic (Figure 1). A treatment plan was made for periodontal splinting, because of tooth mobility, and replacement of the extracted tooth with the patient's tooth crown bonded to the adjacent teeth for esthetic reasons. After the incisor extraction, the root was cut off, leaving the crown intact.

The tooth was removed and pressure applied with gauze to the extraction site for 30 minutes to control bleeding. Before placement of the dental dam, the length of the natural tooth pontic was determined by measuring the distance from the incisal edge of the central incisor to the extraction site. Additional length was added so the



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Figure 1—Radiograph of severe periodontal bone loss on the mandibular left central incisor.



**Figure 2**—Natural tooth pontic after filling in root canal space, shaping the root surface to be the pontic, and placing the lingual channel in the tooth crown.



**Figure 3**—Lingual view of Class III preparations on the abutment teeth for the bridge.

pontic would be touching the gingival tissue when the extraction site healed. The root was cut from the crown to this measurement with a 556 bur (SS White Burs, Inc) and then formed with a flame-shaped finishing bur (SS White Burs, Inc). The opening in the root where the root canal was present was filled with a bonded composite resin, (AQ: Please provide product name and manufacturer for this and all products used) smoothed, and rounded.

To improve the longevity of the pontic bonded to the adjacent teeth, a groove with a 3 mm to 4 mm width was cut into the lingual surface (Figure 2). This was the same width as the Ribbond-THM reinforcement ribbon that was to be used for bonding the tooth to the adjacent teeth. A dental dam was used to help keep the field free from contamination after the tooth extraction and for the bonding procedure. The teeth were cleaned. A thin diamond was used to barrel into the facial interproximal contacts to minimize the thickness of the splint on the esthetic facial surfaces and to stabilize the teeth during splint placement using composite resin. The mesiolingual surface of the left

lateral incisor and mesiolingual surface of the right central incisor had Class III preparations made to further reinforce the bridge connectors and create room for a double piece of fiber reinforcement ribbon once the pontic was placed (Figure 3). A double piece of fiber ribbon with composite resin placed between both ribbons provided additional strength and stability when placing the pontic by creating a laminated composite beam.<sup>12</sup>

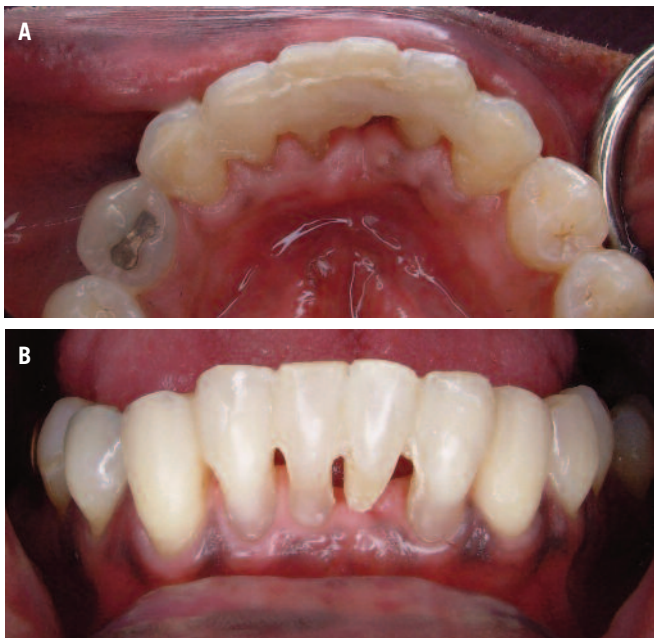
To measure the length of fiber ribbon needed, a piece of dental floss was placed on the facial surfaces of the teeth, extending from the mesial of the left mandibular canine to the mesial of the right mandibular canine. The fiber ribbon was cut with special scissors to the same length as the dental floss. A smaller piece of fiber ribbon was cut and placed into the pontic channel and the Class III preparations. (AQ: ok as edited?) Both ribbons were wet with a 5th-generation adhesive (AQ: Please list product names and manufacturers) and then blotted with a patient napkin to remove resin excess. The natural tooth pontic and the teeth to be splinted were etched with a phosphoric acid etchant for 15 seconds, rinsed with water, and dried. To minimize excess composite in the gingival embrasure spaces, a heavy viscosity polyvinylsiloxane impression material was syringed into these gingival embrasure areas.<sup>13</sup> It is important that the impression material is placed after tooth etching, rinsing, and drying to avoid trapping moisture, which can occur if the technique is performed earlier. The adhesive was painted on the facial and lingual etched surfaces but not light cured.

The pontic was joined to the adjacent teeth on the facial surface with a nanohybrid composite resin. (AQ: Please list product names and manufacturers) The tooth pontic was picked up with a cotton pliers and placed in the area where it was extracted, with the root side pushing into the rubber dam and incisal edge height at the same height as the adjacent central incisor (Figure 4). Excess composite was removed and the facial surfaces were light cured for 20 seconds to stabilize.

The composite resin was first placed on the facial surfaces and light cured, then the composite was placed on the lingual surfaces. The short ribbon was placed into the Class III preparations and the lingual channel in the pontic. The remaining longer fiber ribbon was embedded into the composite at the transition between the middle and



**Figure 4**—After etching and placement of adhesive and composite resin on facial surfaces, natural tooth pontic of lateral incisor was placed between the right central incisor and left lateral incisor using cotton pliers. (AQ: OK as edited?)



**Figure 5**—Case patient at 6-month recall visit. **A:** Lingual view of final esthetic result of the natural tooth pontic bridge reinforced with Ribbond-THM and bonded composite resin. **B:** Facial view of the natural tooth pontic bridge reinforced with Ribbond-THM and bonded composite resin.

incisal third of the teeth for the periodontal splint. The fiber ribbon was placed to be closely adapted to the lingual surfaces of the teeth and completely embedded into the composite resin. If fiber shows on the lingual surface, this can be covered with flowable composite. All composite was light cured, then finished and polished. The completed splint-bridge is both esthetic and highly functional, stabilizing the mobile teeth and replacing the extracted incisor with an esthetic pontic.

The bridge is functioning well after 6 months (Figure 5).

## Conclusion

The research has demonstrated good durability for the technique described in this article. The author's experience is that using the bridge technique described in this case study—the groove in the pontic on the lingual surface, Class III preparations on the adjacent teeth, and composite resin on the facial interproximal surfaces—can provide a patient with many years of service.<sup>14</sup>

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