



Long-Term Provisionalization Following Tooth Extraction

An Innovative Approach

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One intriguing aspect to treatment immediately following single-tooth extraction is the various methods available for tooth replacement.

Options include-but are not limited to- implants and fixed and removable partial dentures.¹⁻⁶ In all cases, there is a healing period during which the gingival and bony architecture undergo change.

In order to replace the missing tooth, a long-term provisional fixed prosthesis can be placed immediately following the extraction. This allows the surgically altered tissues to fully mature in preparation for the definitive fixed prosthesis. It also maintains the pontic space to its original proportions and allows the occlusion to remain stable and in harmony. When placed immediately after an extraction, the provisional can serve as a protective covering over the extraction site, preventing debris and contaminants from entering the surgical area.

It has been demonstrated that the use of a well-formed provisional restoration offers the ability to maintain oral health and promote healing of a surgical site.

The challenge is to fabricate a provisional bridge *directly* without contaminating the surgical site. Ideally, a method of temporization prior to extraction allows for direct fabrication in a nonbloody field, preventing contamination of the provisional material itself. The following case demonstrates the ease with which a fixed provisional restoration can be fabricated directly in the mouth using the patient's pre-existing occlusal pattern and tooth morphology without contaminating the socket or surgical site. In addition, this technique employs a method whereby the provisional is further strengthened in order to allow it to function for many months during the healing phase.

CASE REPORT

The patient, a 45-year-old male, presented with a history of gingival swelling and pain during occlusion in the lower left posterior quadrant. A buccal abscess was noted adjacent to the lower left first molar (tooth No.19), and a probing depth on the lingual surface recorded 14 mm (Figure 1).

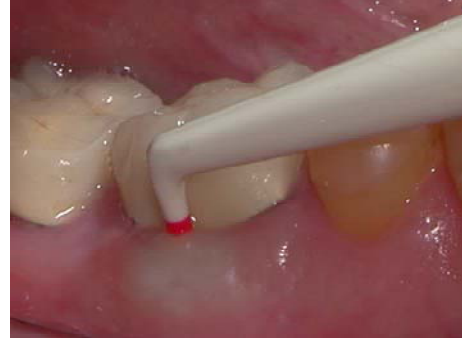


Figure 1. The lower left first molar (tooth No.19) with a midline root fracture demonstrates a periodontal lesion with a probing depth of 14 mm.



Figure 2. A triple-tray impression is made using Status Blue polyvinyl, an alginate substitute that allows for long-term use and dimensional stability.



Figure 3. The abutment teeth are prepared and the tooth to be extracted is prepared just below the gingival crest.

The patient was referred for endodontic consultation, and it was determined that the tooth was not restorable because of a midline root fracture. It was recommended that the tooth be extracted and the site restored. An implant was contraindicated, as the patient had uncontrolled diabetes with a history of poor healing. In this case, the most ideal treatment plan would be a traditional fixed prosthesis from the second lower left molar to the second lower left premolar (teeth Nos. 18 through 20).

Following a 10-day regimen of antibiotic therapy, the patient was appointed and the lower left quadrant anesthetized. A temporization technique was employed that required the use of a posterior triple tray⁷ (Premier). An impression was made of the preoperative site (Figure 2) using Status Blue (Zenith DMG), a polyvinyl "alginate substitute." This was followed by removal of the PFM crown on tooth No.18 with a 557 metal-cutting carbide bur (SS White) and full-coverage preparation of abutment tooth No.20. In addition, the PFM crown of the hopeless tooth No.19 was removed, and the remaining coronal structure was reduced down to the gingivoalveolar height with a concavity-shaped preparation made in the pulpal floor (Figure 3). *This was created in order to mimic the future pontic space following extraction.* Prior to extraction of this tooth, the long-term 3-unit fiber-reinforced provisional could now be fabricated directly in the mouth.

Luxatemp (Zenith DMG), an auto-cure bis-acryl composite temporary restorative material, was selected as the provisional material of choice. It has been shown to have a high flexural strength,⁸ is easy to work with, creates highly detailed anatomy, has clearly definable margins,⁹ and is color stable,¹⁰ an important aspect in long-term use. Luxatemp was injected into the intaglio of the triple tray impression (Figure 4).

A polyethylene reinforcement ribbon, Ribbond Triaxial (Ribbond Inc), was impregnated with resin and gently submerged into the uncured Luxatemp (Figures 5 and 6). It has been demonstrated that the use of fiber reinforcement improves strength and increases the longevity of the restoration.¹¹⁻¹³

The filled triple tray was seated to place intraorally, and the patient was instructed to close into occlusion. Following the 2-minute setting time, the triple tray and temporary bridge were removed (Figure 7). Note that the Ribbond Triaxial ribbon becomes completely invisible once incorporated into the cured bis-acryl material. Following trimming and polishing, the provisional was tried in the mouth and verified for overall fit and occlusion. Luxaglaze (Zenith n DMG), a light-cured glazing resin, was applied to the fiber-reinforced provisional bridge in order to provide a long-lasting, highly polished surface (Figure 8).

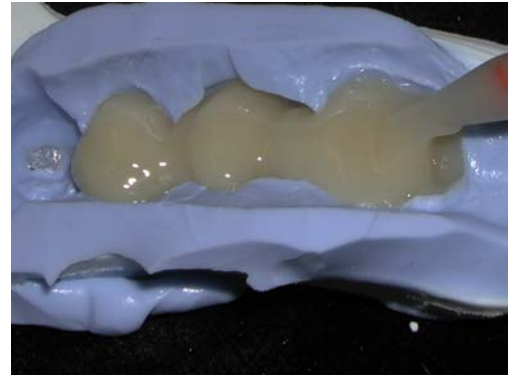


Figure 4. Luxatemp, a bisacryl composite provisional restorative material, is injected into the intaglio of the Status Blue impression.



Figure 5. A 3-mm section of resin-coated Ribbond Triaxial, a fiber reinforcement ribbon, is placed across the uncured resin.

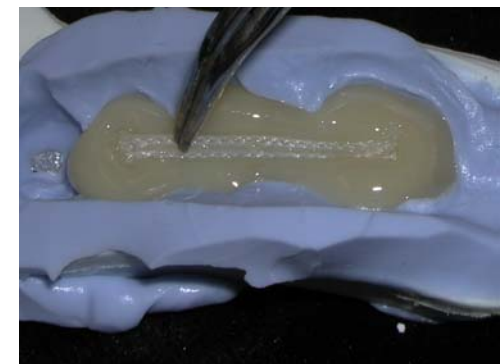


Figure 6. The Ribbond is gently pressed into the Luxatemp. The triple tray is then inserted intraorally and the patient instructed to close into occlusion (not shown).



Figure 7. The cured Luxatemp 3-unit fixed partial denture. Note that the Ribbond is completely incorporated in the composite and is no longer visible once the composite is cured.



Figure 8. The completely trimmed and polished provisional. Note the ability of this material to capture the highly detailed tooth morphology.

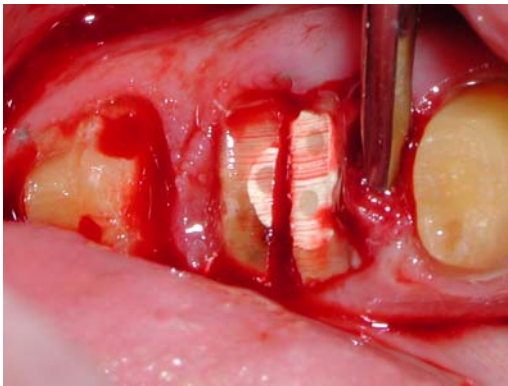


Figure 9. The remaining hopeless tooth is hemisected and the mesial root elevated.

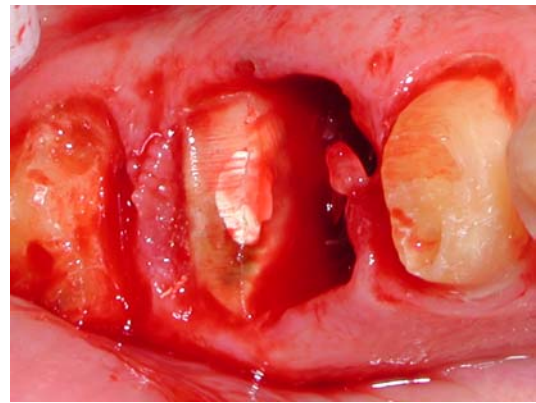


Figure 10. The mesial root has been removed, allowing easy access and removal of the distal root



Figure 11. The extracted roots have been removed completely intact, demonstrating the gentle nature of this surgical technique.



Figure 12. The socket has been debrided and grafted using allograft and xenograft in combination. The site was then sutured with 4.0 vicryl in a figure-8 pattern.

At this point, the remaining roots of the lower left first molar were hemisected, and each root was elevated and removed (Figures 9 through 11). The socket was debrided and grafted (Figure 12) with a combination of a freeze-dried demineralized cortical bone (Musculoskeletal Transplant Foundation), a particulate allograft material, and Osteograft N-300 (DENTSPLY Ceramed), a particulate xenograft material, mixed in equal parts and saturated with sterile saline.

Grafting the socket has been shown to preserve the architecture of the alveolar ridge and supporting structures, thus preventing resorptive defects from occurring.¹⁴ A single 4.0 vicryl suture was placed in a figure-8 configuration, and gelfoam was placed and adapted over the site. The provisional restoration was cemented to place with a noneugenol temporary cement, Tempocem NE (Zenith DMG, Figure 13).

After several weeks, the site was observed for healing (Figure 14) to determine readiness for a final impression and receiving the definitive laboratory-fabricated prosthesis.

CONCLUSION

It has been demonstrated that the use of a well-formed provisional restoration offers the ability to maintain oral health and promote healing of a surgical site. Using the technique of a fiber-reinforced, directly fabricated provisional prior to extraction is a simple, elegant way to provide this type of care. The technique demonstrated in this case report is simple, reliable, and repeatable.

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Figure 13. The provisional is luted to place with Tempocem NE, a noneugenol temporary cement.



Figure 14. Following several weeks, the provisional is removed and the postsurgical site evaluated for healing

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