



# Developing a Functional Composite Resin Provisional

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The functional composite resin provisional restoration is an integral tool for enhancing communication between the patient and restorative team. Further, this noninvasive technique aids the clinician and technician during the design and fabrication of the definitive restoration, which can be preapproved by the patient. This article presents a case report involving the use of a composite resin provisional to restore worn and chipped maxillary anterior teeth. The composite resin provisional technique provides valuable information to the dental team and patient and allows any functional and esthetic concerns to be resolved before final restorative treatment is initiated. (*Am J Esthet Dent* 2012;2:56–66.)



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Restorative treatment concepts of the past considered the provisional restoration to be of little value other than as a space holder used to provide the patient with a functional prosthesis until the permanent restoration was received from the dental laboratory.<sup>1</sup> The old adage, “Do not make the temporary too nice or the patient will not come back,” relied on this philosophy.<sup>2</sup> A provisional restoration of mediocre quality replaced by an improved definitive restoration often pressured or persuaded patients to accept the final result.<sup>3</sup> Since prosthetic failures arise not only from technical challenges but also from differences in expectations and perceptions among the patient, clinician, and technician,<sup>4</sup> the modern restorative treatment concept has abandoned this original philosophy and used the provisional restoration to provide the patient and dental team with an evaluative tool while reaffirming the treatment goals.

The functional composite resin provisional technique is an excellent method to increase the patient’s understanding of the planned clinical procedure and anticipated final result.<sup>1</sup> Composite resin provisionals allow the patient and restorative team to establish parameters for occlusal function,<sup>5</sup> tooth position and alignment,<sup>6</sup> restoration shape and physiologic contour,<sup>7</sup> restorative material color and texture, lip profile, phonetics, incisal edge position, and gingival orientation while eliminating confusion and misunderstanding.<sup>1</sup> This provisional technique has also become an integral component in the development and management of soft tissue profiles and in the design of the definitive restoration.<sup>8–11</sup> The clinician and technician can use this reversible and preparation-less technique as a guide for developing a preapproved functional and esthetic definitive restoration. In some cases, these transitional restorations can be worn for months or even years by patients during long-term interdisciplinary rehabilitation.

This technique can be performed intraorally without anesthesia. Clear vinyl polysiloxane impression material is used to replicate the diagnostic wax-up. This wax-up is an additional resource for patient education and satisfaction and for increasing the survival rate of definitive restorations.<sup>1,6,12</sup> The clear matrix can be placed over the unprepared teeth and used as a transfer vehicle for the flowable composite resin to be injected and light cured. After adjustment and polishing procedures, the provisionals can be further modified to satisfy the functional and esthetic needs of the patient. This procedure can reduce the potential for patient dissatisfaction since the process is reversible, can be performed without preparation, and allows the patient to accept the visual and functional result before the definitive restorations are fabricated. In addition, this simple procedure helps to regulate the dimensions of the preparation design, ensures uniform spatial parameters for the restorative material, and increases the potential for a more conservative preparation design.



**Figs 1 and 2** Preoperative views showing incisal wear and fracture of the maxillary anterior teeth.

## CASE REPORT

A 40-year-old male patient presents with concerns regarding incisal wear and chipping of his anterior teeth (Figs 1 and 2). The occlusal findings indicate insufficient canine guidance and posterior disocclusion (Figs 3 to 5). After

occlusal evaluation, a new occlusal scheme is developed with a diagnostic wax-up (Figs 6 to 8). A clear vinyl polysiloxane impression (Memosil 2, Heraeus Kulzer) is used to replicate the wax-up. The impression is taken in a nonperforated plastic tray (Fig 9).



**Figs 3 to 5** Intraoral views showing inadequate posterior disocclusion and anterior guidance.



**Figs 6 to 8** Diagnostic wax-up used to establish new esthetic and functional parameters for the definitive restorations.



**Fig 9** Clear vinyl polysiloxane matrix fabricated to replicate the diagnostic wax-up.



**Figs 10 to 12** Adhesive surface preparation using the total-etch technique.



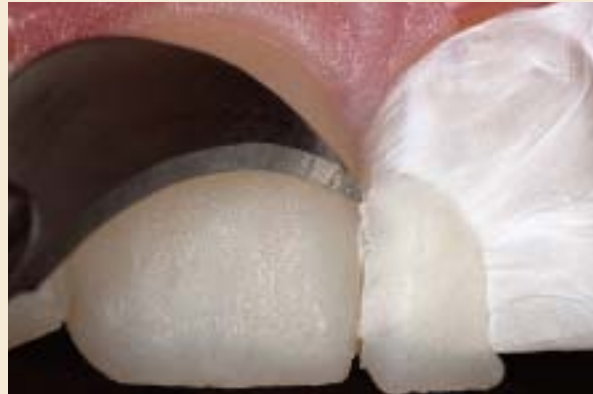
Before adhesive surface preparation, each tooth is pumiced and cleaned with 2% chlorhexidine (Consepsis, Ultradent). Depending on the duration of treatment, the method for bonding (the adhesive procedure) requires selective spot etching or complete etching of the tooth surfaces to be restored.<sup>1</sup> A 37.5% phosphoric acid semi-gel (Gel Etchant, Kerr/Sybron) is applied to the enamel surface for 30 seconds, rinsed for 5 seconds, and gently air dried. A two-component adhesive (All-Bond 3, Bisco) is applied, air thinned, and light cured (Figs 10 to 12). After adhesive

surface preparation is complete, each tooth is separated by applying Teflon tape (DuPont) or a small amount of glycerin to the adjacent teeth. This proximal adaptation technique allows for optimal integration of flowable composite resin in the interproximal region while preventing adhesion of the material to adjacent tooth surfaces.<sup>13–15</sup> The clear silicone matrix is placed over the arch, and flowable composite resin (shade A-1, Filtek Supreme Ultra, 3M ESPE) is injected through a small opening above each tooth. The composite resin is cured through the clear resin



**Fig 13** (above) The flowable composite resin material is injected through a portal in the matrix, allowing the material to completely cover the conditioned enamel surface.

**Figs 14 and 15** (top and bottom right) Excess polymerized resin is removed with a scalpel.



matrix for 40 seconds (Fig 13). The excess polymerized composite resin is removed with a scalpel (no. 12 BD Bard-Parker, BD Medical). This restorative procedure is completed for each tooth prior to initiation of the next tooth (Figs 14 and 15).

An optimally finished provisional restoration should provide a smooth surface that will prevent plaque accu-

mulation<sup>16-19</sup> and resist staining.<sup>16,20</sup> The provisional should also possess proper marginal adaptation and integrity<sup>16,21</sup> with the ideal contours and emergence profile for improved tissue compatibility.<sup>16</sup> The initial finishing procedure is accomplished using a 30-fluted short, tapered finishing bur (ET-3, Brasseler USA) at the gingival tooth-composite resin interface.

**Fig 16** (*below*) The gingival tissue is retracted with a gingival protector and the tooth–composite resin interface was finished using a 30-fluted short, tapered finishing bur.

**Fig 17** (*right*) The lingual tooth–composite resin interface is finished using a 30-fluted pyramidal-shaped finishing bur.



**Fig 18** Proximal surfaces and contours are smoothed with finishing strips.



**Fig 19** The incisal and proximal contouring and smoothing is accomplished with finishing and polishing disks.

The gingiva is reflected with a gingival protector (Zekrya Gingival Protector, Zenith/DMG) to prevent tissue laceration. The palatal tooth–composite resin interface is finished using a 30-fluted pyramidal finishing bur (Neumeyer H274, Brasseler USA). This bur has an ideal shape that conforms to the ap-

propriate curvature of the tooth surface and restoration (Figs 16 and 17).

The interproximal surfaces are smoothed with aluminum oxide finishing strips (Finishing and Polishing Strips, KerrHawe), which are used sequentially according to grit and range from fine to extrafine (Fig 18). The incisal edges of



**Fig 20 (left)** The facial surfaces are polished with silicone points.

**Fig 21 (below)** The gingival region is polished with silicone hollow cups.



**Fig 22** A goat-hair wheel and diamond polishing paste are used to further refine the surface luster of the composite resin.



**Fig 23** High surface reflectivity is accomplished with a dry cotton buff applied with an intermittent staccato motion.

the composite resin are contoured with finishing and polishing disks (OptiDisc, KerrHawe) (Fig 19). Pre-polish and high shine silicone points (ET Illustra Polishing Points, Brasseler USA) are used to smooth and polish the composite resin surface while improving the color and gloss (Fig 20).

The gingival region is smoothed and polished with pre-polish and high shine silicone hollow cups (ET Illustra Polishing Cups, Brasseler USA). The cup provides additional flexibility at the cervical curvature of the tooth (Fig 21). The facial surface is polished to a high luster with synthetic diamond paste using





**Figs 24 to 26** The functional composite resin provisional is completed and inspected in centric relation and protrusive and lateral excursions.

a goat-hair wheel, and the final surface reflectivity is accomplished with a dry cotton buff using an intermittent staccato motion applied at conventional speed (Figs 22 and 23).

The functional composite resin provisional is completed and inspected in

centric relation and protrusive and lateral excursions (Figs 24 to 26). A natural esthetic and functional provisional can be predictably developed when restorative and esthetic principles coincide (Figs 27 to 29). This technique allows for an excellent final result (Fig 30).



**Figs 27 to 29** The provisional establishes the optimal esthetic parameters for a natural smile.

**Fig 30 (left)** A natural esthetic and functional result is achieved.



## CONCLUSIONS

The functional composite resin provisional is a valuable tool for increasing patient understanding of the clinical procedure and anticipated final result. The provisional technique has become an integral component in the development and management of the design of the definitive restoration. This process allows any functional and esthetic

concerns to be resolved by the entire restorative team before final restorative treatment is initiated.

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Scan the QR code to view a YouTube video by Dr Terry demonstrating how to develop a functional composite prototype. Dr Terry received financial support from GC America for the filming and development of this video.

