

Predictable Aesthetic Reconstruction Of Fractured Anterior Teeth With Composite Resins: A Case Report

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Full-coverage rehabilitation is generally the treatment modality indicated for restoration of severely fractured anterior teeth. However, the advanced formulations of composite resins present improved physical properties, an expanded range of shade selection, and high sculptability, allowing predictable restoration of the anterior dentition and replication of the polychromatic characteristics of natural teeth. The learning objective of this article is to present the utilization of composite resin materials in the treatment of fractured maxillary anterior incisors, implementing the concepts of polychromatic characteristics, hue, translucency, opacity, chroma, value, strength, and polishability. Also presented are several practical clinical observations that will assist the practitioner in attaining predictable aesthetic results with composite resin material.

Aesthetic restorations are an ongoing challenge for the clinician, and patient expectations dictate the utilization of the state-of-the-art aesthetic anterior restorations. Regardless of whether the technique selected is direct bonding or indirect application of laboratory fabricated ceramic restorations, the ultimate objective is to replicate the appearance of natural dentition so that the restoration is indistinguishable from the adjacent natural dentition.

Several current porcelain systems offer highly aesthetic options. However, regardless of the system utilized, the overall aesthetic result of a ceramic restoration frequently relies on the artistic skill and knowledge of a dental technician. Except for slight modifications of anatomic details, extrinsic staining, or the use of colored luting resin cements, there is little that may be achieved chairside to

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Figure 1. Preoperative view of the anterior dentition. Note the compromised appearance of both maxillary central incisors due to defective composite restorations.

modify the final aesthetics once a ceramic restoration is fabricated.

The free-hand bonding technique, on the contrary, allows complete control of each restorative step in the chairside repair of fractured anterior dentition. Considerable progress has taken place since the early reports,^{1,2} and advances in adhesive technology and the properties of composite resin materials now allow the creation of truly aesthetic restorations. Using an incremental technique, a restoration can be sculpted to the desired morphology and color, monitoring the aesthetic outcome from shade selection to final polishing.

The principles of a thorough and methodical protocol for the application

of composite resin material in the restoration of anterior teeth have been presented by the author.³ This article presents the clinical implementation of these principles, and the author advises the reader to refer to the previous work for a more complete comprehension of the technique presented herein.

INITIAL PATIENT EVALUATION

A 28-year-old female patient presented with extensively defective composite restorations of both maxillary central incisors (Figure 1). Both teeth had been endodontically treated, and the left central incisor exhibited moderate discoloration. After radiographic, periodontal,

and occlusal examination, restoration of the two central incisors with etched porcelain resin-bonded crowns was proposed as the appropriate treatment.

The advantages and disadvantages of laboratory fabricated ceramic restorations were presented and thoroughly discussed as opposed to the applications of direct composite restorations. However, the patient rejected the option of full coverage restorations and requested a direct bonded composite restoration. As part of a more comprehensive treatment plan, at-home bleaching was suggested to improve the appearance of the dentition prior to the restorative appointment; this suggestion was also declined.

AESTHETIC EVALUATION

Several principles were considered in the design of an aesthetically improved maxillary anterior dentition. The incisal edges of the patient's anterior dentition



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formed a straight line from canine to canine (Figure 2). The prematurely shortened central incisors depicted the appearance of an elderly person,⁴ which was not the case of the patient.

The width-to-length ratio of the central incisors presented a disharmonious discrepancy. The correct ratio suggests a width of approximately 75% to 80% of the length of the clinical crown.⁵ According to the concept of dominance,⁶ the maxillary central incisors must be the dominant elements in a smile and should prevail over the lateral incisors.⁷ Finally, the golden proportion⁸ was considered to determine whether any further adjustments to the central-to-lateral proportion was necessary. Even though one study suggests that the golden proportion holds true only for a small percentage of the population,⁹ it can still be regarded as a starting point and a valid complementary concept for a restorative design.

The optimal length of the central incisors was determined, and a composite



Figure 2. Shortened incisors effect a straight line along the incisal edges of the maxillary anterior dentition, imparting the appearance of an elderly person to a young patient.

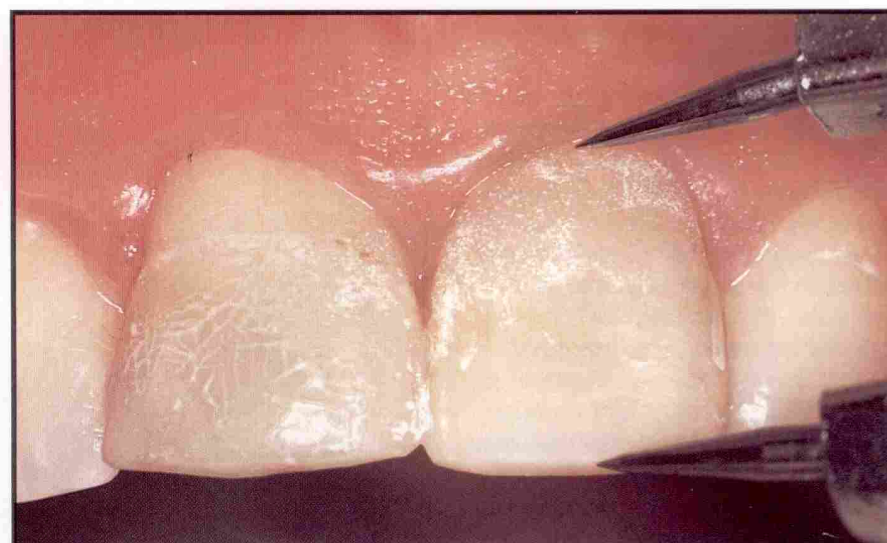


Figure 3. The correct width-to-length ratio was determined, to be reproduced during the restorative phase.

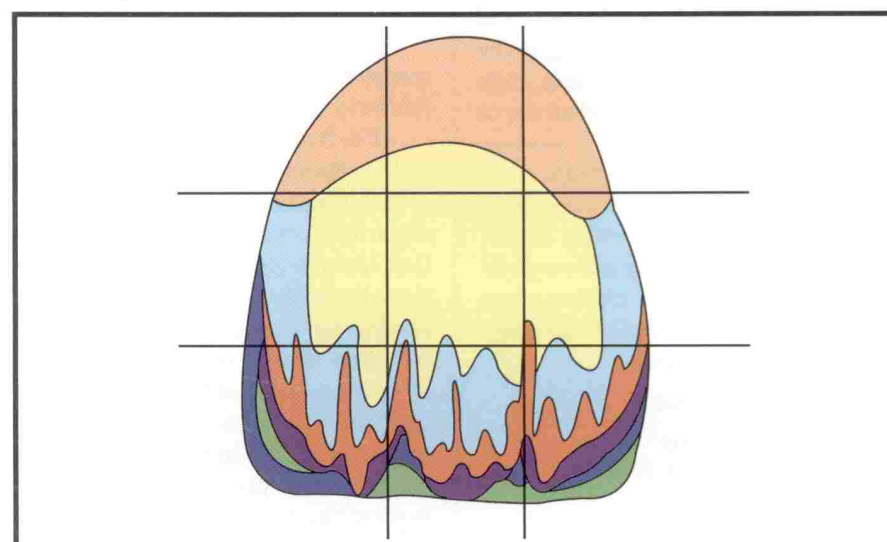


Figure 4. Diagram, drawn from the tooth used for color reference. The four dimensions allow visualization of polychromy for selection of the restorative composites and color modifiers.

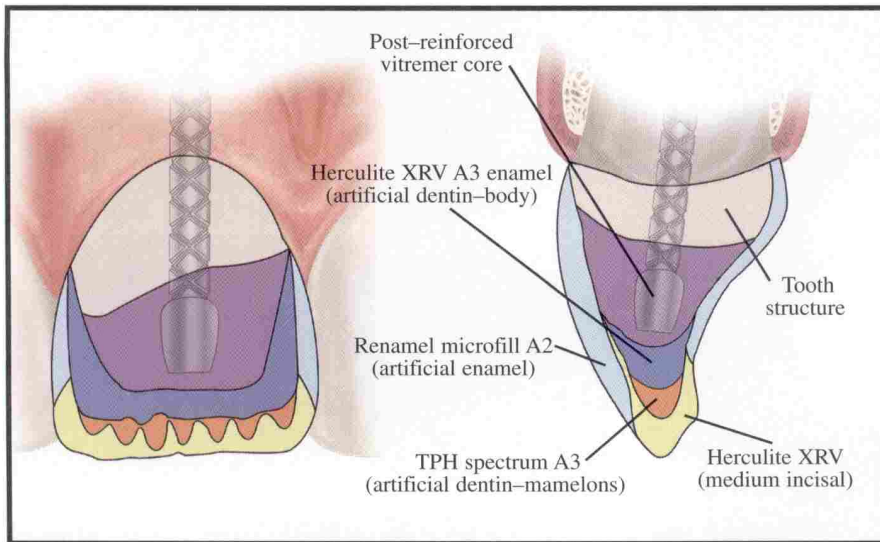


Figure 5. In moderate-to-large composite restorations, the clinician is advised to chart in color diagram the resins to be used, by shape of each increment and sequence of application.

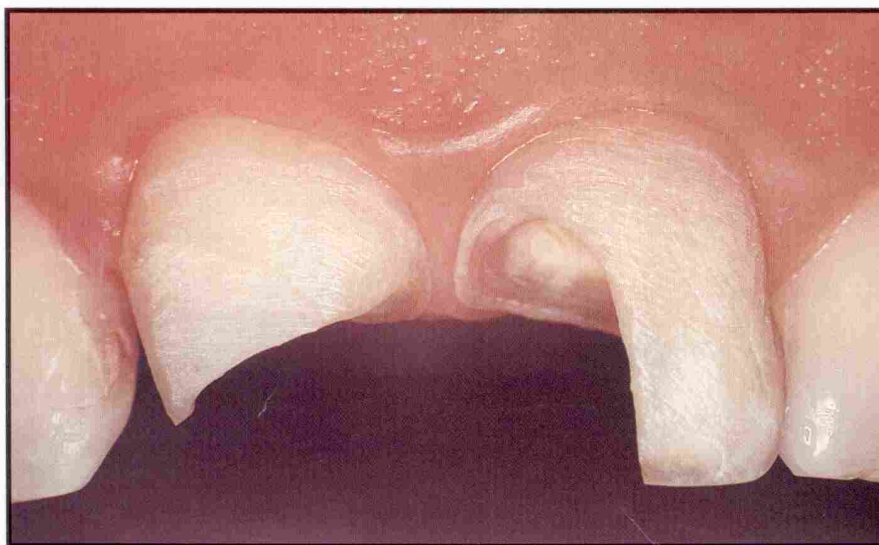


Figure 6. The previous restorations and existing caries were removed with round burs at low speed.



Figure 7. Rubber dam was placed for better visualization, isolation, and field control.

mock-up was used for further subjective aesthetic assessment. A caliper was used to record the length measurement (Figure 3). The use of a caliper or a similar device (eg, a polyvinylsiloxane impression, taken from the mock-up)¹⁰ is essential in building the artificial dentin to its exact contour, without trespassing the boundaries of the incisal edge.

PREOPERATIVE CONSIDERATIONS

Shade Selection

Shade selection must be performed prior to rubber dam isolation, since tooth dehydration results in an elevated value and may cause the selection of an incorrect shade. Prior to shade selection, the teeth were cleaned with a prophyl cup, a slurry of pumice, and 4% chlorhexidine. Since the central incisors were discolored, an intact lateral incisor was used as a ref-

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erence. A "blinder" — a device consisting of a small piece of neutral gray cardboard with a cut-out in its center approximately the size of a maxillary central incisor — was used as a practical adjunct in shade selection.¹¹ The "blinder" is held against the dentition, with only the individual tooth visible through the cut-out, thereby eliminating any color interference from its surroundings. Using a shade guide (Vita, Vident, Baldwin Park, CA), rearranged according to the value, the following steps were taken:

- **Value Selection.**

The Vita shade guide was divided into three thirds by imaginary lines, and the third closest in value to the lateral incisor was selected with the aid of a color-corrected shade selection light (Esthelite, Efos, Williamsville, NY).

- **Hue Selection.**

A keen sense of perception is necessary to determine the basic hue of

the tooth, best seen in the middle and cervical thirds. In this case, an A (brown) hue was selected according to the Vita shade guide.

- **Compartmentalization of the Tooth.**

Horizontal and vertical imaginary lines were pictured along the thirds of the clinical crown for the purpose of compartmentalizing the surface area. This procedure facilitated a more detailed visualization of the intricate polychromatic characteristics of each area of the crown (Figure 4).

- **Chroma Selection.**

Subtle or marked chroma variations could be perceived for each individual compartment. A3 was selected for the cervical third, A2 for the middle third.

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- **Selection of Maverick Colors.**

Along the tips of the mamelons, maverick colors¹² were observed as well as hypoplastic spots and mottled enamel, which contribute to an aesthetic hue variation.

- **Charting the Polychromatic Characteristics.**

A schematic drawing, depicting the four-dimensional color pattern of the tooth, serves as a reference for the restorative sequence (Figure 4). Its use is advisable to facilitate the reconstructive stage, particularly in cases of severely impaired teeth (Figure 5).

Selection of the Restorative Composite Resins

Perhaps the most important phase was to correlate the color chart with the restorative materials and to select the composites to be utilized as the "artificial dentin" and "artificial enamel," as described by the author.³

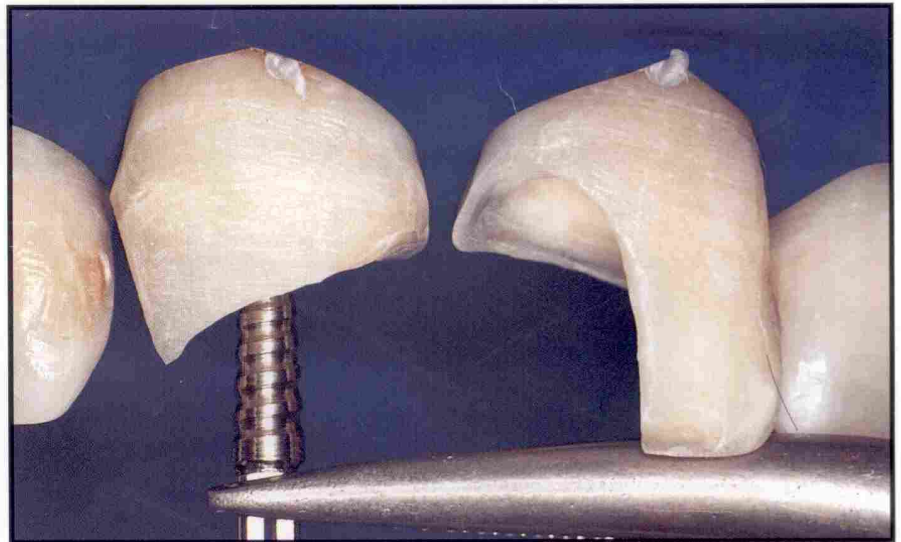


Figure 8. Prefabricated titanium posts were used to reinforce the endodontically treated teeth.

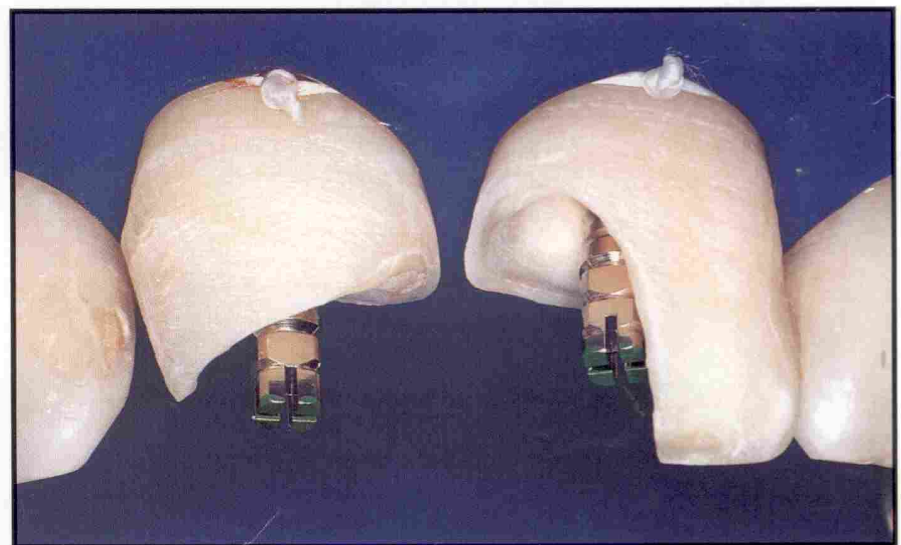


Figure 9. The posts were positioned and affixed, retaining the projecting end approximately 3 mm to 4 mm short of the anticipated incisal edge.



Figure 10. A resin ionomer core was built-up and polymerized.



Figure 11. Identical preparations were performed for both maxillary central incisors.

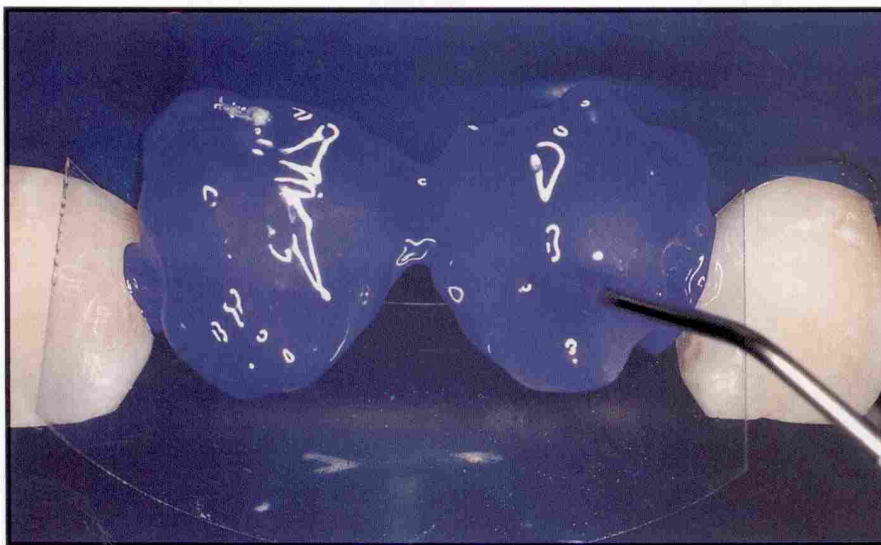


Figure 12. Both incisors and cores were etched with a 35% phosphoric acid gel for 15 seconds.

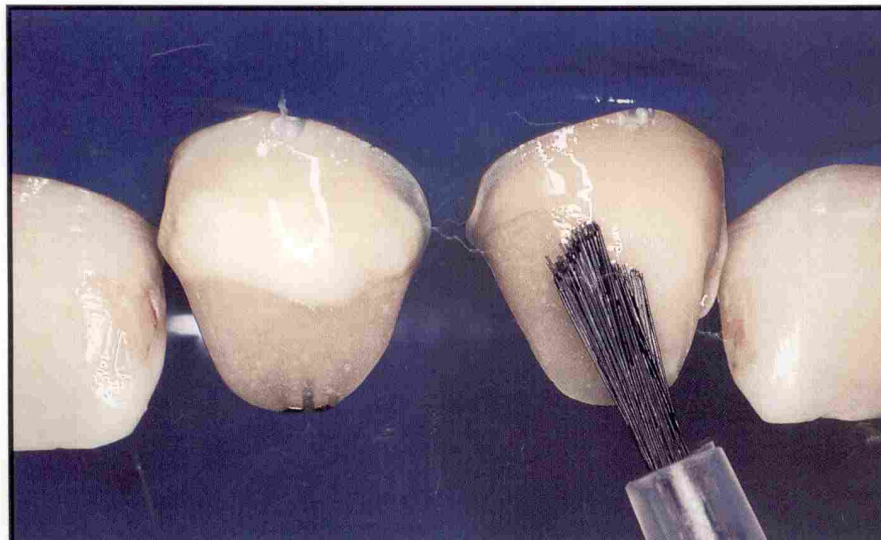


Figure 13. The primer and the unfilled resin were applied over the enamel, dentin, and resin ionomer.

- ***Selection of the Artificial Enamel.***

The artificial enamel is a translucent microfilled resin that overlays the entire restoration, and it must be determined first. Using the color chart, an enamel (Renamel Microfill A2, Cosmedent, Chicago, IL) was selected, whose hue and chroma were in direct harmony with those characteristics in the tooth. A small increment (no more than 2 mm thick) of the artificial enamel was placed onto the middle third of the tooth and polymerized. The microfill was moistened with the patient's own saliva to simulate the appearance of a highly polished composite once the restoration is completed. Only then can it be determined whether the selected resin will accurately match the tooth, since there are shade dissimilarities among

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brands or even "batches" of restorative microfills within the same brand.¹³ It should be remembered that microfilled composite resins are generally "darker" (of lower value and higher chroma) at an unpolymerized stage, becoming lighter (of higher value and lower chroma) after polymerization. Therefore, it is imperative that this protocol be strictly followed in order to accurately select the microfill resin. If a chroma variation is perceived cervicoincisally, the same process must be repeated for each specific third or other more compartmentalized area of the tooth.

- ***Selection of the Artificial Dentin.***

The artificial dentin is the core of the restoration. Generally, a hybrid or microhybrid resin, bearing a chroma one degree higher (more saturated) than that of the microfill corresponding to the artificial

enamel, should be utilized. Unlike a microfilled composite, hybrids are usually "lighter" (of higher value and lower chroma) at an unpolymerized stage, attaining a darker tone (of lower value and higher chroma) after polymerization. To determine the shade, the hybrid composite try-in was performed in the same manner as for the microfill. As a variation in hue, chroma, translucency, and opacity emerged along the hybrid composite core, distinct resins bearing those properties had to be used in different portions of the artificial dentin to render the desired polychromatic nuances. The contour of the mamelons was established by direct clinical observation and transillumination, and it was charted accordingly.

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- ***Selection of the Translucency and Polychromatic Characteristics of the Incisal Third.***

The incisal third usually presents the greatest restorative challenge due to its frequent variations in hue, chroma, translucency, opacity, and the presence of maverick colors and (sometimes) an opalescent halo. Therefore, observation is the most crucial link between an aesthetic, natural-appearing restored incisal third and that of an intact natural tooth. It must be remembered that "the hand is capable of reproducing only what the eye has been taught to recognize," and examination of the intact incisal third of the lateral incisor revealed the pattern to be followed. Knowing that "art cannot be subject to fixed rules,"¹⁴ morphologic and color variations of composite restoratives, tints, and opaques

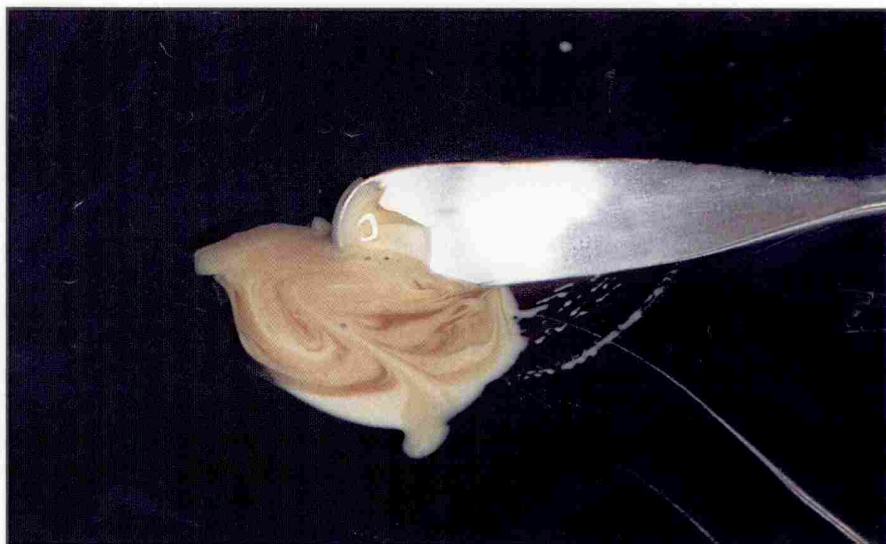


Figure 14. A mixture of opaques and tints was used to elevate the value of the resin ionomer core, achieving the value of the tooth structure.



Figure 15. The first increment of artificial dentin was applied proximally.



Figure 16. The first layer of artificial dentin was contoured and finessed with instruments and brushes.



Figure 17. The final length of the tooth was measured and checked with a caliper.



Figure 18. A #2 carver was used on a glass slab to shape and contour the composite.



Figure 19. The second layer of artificial dentin was applied along the incisal composite ridge.

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ted, to be applied at the restorative
phase.

CLINICAL PROCEDURE

- The defective composite restorations were removed with long, tapered, coarse diamond burs (#0850-014, Brasseler, Savannah, GA). To avoid weakening the tooth by enlarging the root canal, some composite (that clinically appeared to be bonded) was allowed to remain. Any secondary carious lesions were removed with round burs at low speed (Figure 6).
- Rubber dam isolation was placed, and the maxillary central incisors were ligated for more effective retraction and better access to the cervical area (Figure 7).

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- A titanium prefabricated post system (Unimetric, Maillefer, Ballaigues, Switzerland) was used to strengthen the teeth (Figure 8).¹⁵ Care was taken to position the posts approximately 3 mm to 4 mm short of the projected incisal edge, thereby permitting sufficient space for the incremental incisal third build-up (Figure 9).
- A slurry of pumice and 4% chlorhexidine was used on a prophyl cup to clean the outer aspects of the crowns, and a premixed slurry of 2% chlorhexidine (Consepsis Scrub, Ultradent, South Jordan, UT) was used to clean the inside of the root canal. The teeth were thoroughly rinsed for 30 seconds and dried with compressed air.
- The root canal and all of the dentin surfaces were etched with a 35% phosphoric acid gel (Ultra-Etch,

Ultradent, South Jordan, UT) for approximately 15 seconds in order to remove the smear layer.

- A dual-cure core build-up / restorative resin ionomer (Vitremer, 3M, St. Paul, MN) was mixed as per manufacturer's instructions and injected with a syringe (Centrix, Shelton, CT) into the root canal until it overflowed. With the aid of a lentule, the resin ionomer was further confined into the canal to assure that no air voids had been incorporated. The posts were seated with gentle pressure, the core material was brought to full contour with the aid of composite instruments (Almore, Portland, OR), and labial and palatal aspects were polymerized for 40 seconds each (Figure 10).
- Using a tapered coarse diamond bur (#6856L-016, Brasseler, Savannah,

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GA), the teeth were prepared to closely resemble an all-porcelain crown preparation, removing the exact amount of tooth structure to allow the incremental placement of composite (Figure 11). Even though the distal aspect of tooth #9 presented some sound structure, it was opted to prepare it in a "mirror image" of tooth #8, so that the layers of composite could be evenly placed on both teeth to achieve an identical restorative result, ie, the morphology and shade (Figure 11). The palatal aspect was reduced by approximately 2 mm to allow space for an anatomically correct composite layer.

- Enamel, dentin, and resin ionomer core were etched with a 35% phosphoric acid gel for approximately 15 seconds. The etchant was rinsed thoroughly, and the surfaces were lightly air-dried to avoid desiccation (Figure 12).



Figure 20. The final shape of the mamelons was achieved with a high strength and high chroma composite.



Figure 21. A translucent, high strength incisal composite was applied to achieve the final length of the tooth.



Figure 22. Opaquers were applied to accentuate the maverick colors along the mamelons.



Figure 23. Blue, gray, and lavender tints were applied between the mamelons and over the proximal flange to emphasize translucency.



Figure 24. Red tint was applied sparingly over the cervical and middle thirds to establish a degree of "warmth" in the restorations.



Figure 25. A "compoball" was created to facilitate the placement of the artificial enamel.

- A hydrophilic adhesive system was used (All Bond 2, Bisco, Itasca, IL). According to the manufacturer's instructions, the primer and the unfilled resin were applied over the enamel, dentin, and resin ionomer (Figure 13).
- A discrepancy in hue and particularly in value became evident between the tooth structure (higher value) and the resin ionomer core (lower value). One basic rule is to first neutralize the low value area by eliminating the gray tones. Only after this is achieved should the clinician proceed with the "chromatization" of the tooth, ie, the incremental application of composites of varying hues and chromas.
- A mixture of 45% A1 opaque with 45% A3 opaque and 10% ochre tint

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from a tint and opaquer kit (Kolor Plus, Kerr, Glendora, CA) was applied over the tooth-resin ionomer substrate until the desired value intensity was ensured (Figure 14). The cervical one-quarter of the tooth was purposely left uncovered, since a desired higher chroma was already present at the site.

- In large anterior composite reconstructions, a build-up of the mesial-distal width, 1 mm short of the proximal contact, is achieved first, followed by a full build-up of the desired cervicoincisal length of the tooth with the artificial dentin, yet allowing sufficient space for the artificial enamel. This technique can best be described as building a "frame" of material to establish a point of reference for the subsequent layers of composites to be applied labially, proximally, and palatally.

- A single increment of a hybrid composite (Herculite XRV A3 Enamel, Kerr, Glendora, CA) was applied proximally with a golden composite instrument (Almore, Portland, OR). The author recommends using this instrument for most of the initial increment placement and sculpting. Its one end is spoon-shaped and quite slender, and the other end is a thin, flexible spatula that renders a great tactile sense. Both ends are fabricated of nonadherent, highly polished stainless steel (Figure 15).
- After the first layer of the artificial dentin was tacked down and sculpted with the composite instrument, several nylon or sable artist brushes were used to contour the build-up to a smooth and exact morphology (Figure 16). The use of these brushes

The entire restoration was buffed with a polisher to eliminate some of the undesired accentuated texturization.

is described in more detail later in the restorative sequence. From among the brands available, the author recommends the following: Fine-tipped brushes (#00 Takanishi, Renfert, Hilzingen, Germany, and #0, #1, and #2 Loew-Cornell, Teaneck, NJ); flat-tipped brushes (#4 Loew-Cornell, Teaneck, NJ).

- Throughout the restorative procedure, each increment was polymerized with a curing unit (Optilux 400/403, Demetron/Kerr, Danbury, CT) for only 10 seconds to harden the restorative material. This allows placement of subsequent increments without deforming the underlying composite sculpture.
- A sharp-ended caliper, set at the predetermined final crown length, was used at this stage to allow better visualization of the amount of space left for the incisal third build-up (Figure 17).

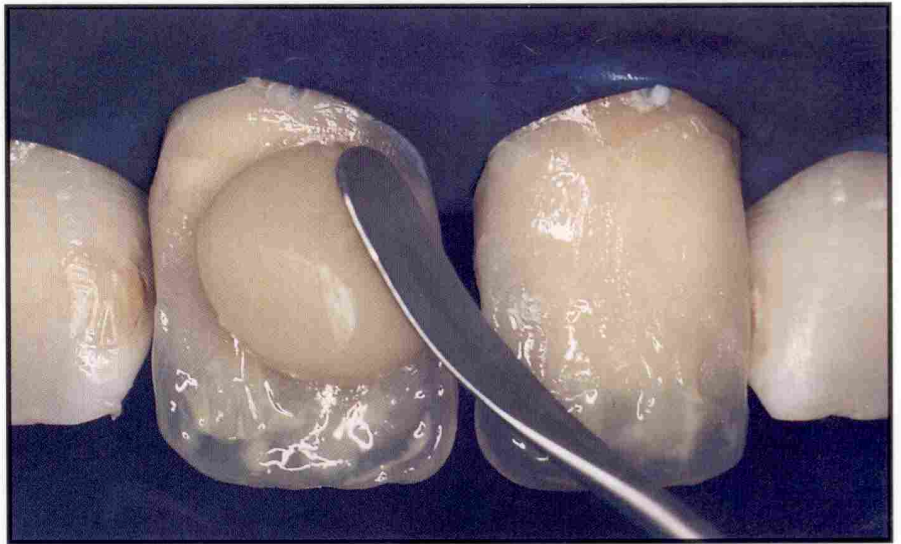


Figure 26. A single increment of a microfill composite (artificial enamel) was used to veneer the underlying "frame."



Figure 27. A flexible spatula was used to contour the facial and proximal anatomy.



Figure 28. A flat-tipped brush was used to smooth the surface irregularities and refine the labial anatomy.



Figure 29. Fine-tipped brushes were used for embrasure contouring and further refinement.



Figure 30. After polymerization of the final microfill layer, the polychromatic characteristics could already be noticed throughout the restoration.



Figure 31. Diamond metal strips were used proximally to remove the oxygen-inhibited layer.

- A second increment of the same hybrid composite was used to begin forming the dentin mamelons.
- Since freehand bonding relies on the artistry of sculpting composites into a precise anatomic form, the clinician must have a way of determining the exact size and shape of each increment prior to its placement. A suggested technique is to place some composite onto a clean glass slab. The amorphous mass of composite can be manipulated and carved with a thin, semi-flexible, sharp-edged composite instrument to the desired shape and thickness (Figure 18). The author recommends the carver #2 instrument (Thompson Dental, Missoula, MT) which can also be successfully used for sculpting gingival embrasures and other areas.

An aesthetic and natural-appearing restoration was achieved, satisfying the functional and aesthetic expectations.

- To prevent composite adherence to the instrument, the carver #2 was slightly “lubricated” with unfilled resin, and the “sausage-shaped” increment was gently placed along the incisal ridge and sculpted with the aid of instruments and brushes (Figure 19).
- The final contour of the mamelons was established by using a higher chroma hybrid composite (TPH Spectrum A3, Caulk/Dentsply, Milford, DE) for its excellent sculptability and for the added essential attribute of imparting the necessary strength to that area (Figure 20).
- In order to achieve the necessary translucency and strength at the incisal third, a translucent hybrid incisal composite (Herculite XRV Medium Incisal, Kerr, Glendora, CA) was selected. Depending on the depth of light penetration desired, the incisal hybrid must not only fill

in the spaces between the mamelons and around the incisoproximal edges, but also cover the mamelon lobes labially and palatally (Figure 21). For strength, it must comprise the full labiopalatal thickness.

- To highlight the brilliance and polychromy of the incisal third, tints and opaques (Kolor Plus, Kerr, Glendora, CA) were sparingly applied and individually light cured for 10 seconds. A3 opaquer was used to accentuate the maverick colors along the mamelons (Figure 22). A mixture of equal proportions of blue, gray, and lavender tints was applied between the mamelons and over the proximal flange to intensify the translucent effect (Figure 23). These tints can also be applied mesiodistally, in a stratified, alternating fashion, to produce distinct hue impressions.

There are no short-cuts in aesthetic dentistry; it demands keen observation, patience, and meticulous application of technique protocol.

- An infinitesimal amount of red tint was painted over the cervical and middle thirds of the tooth to impart a degree of "warmth" to the restoration (Figure 24).
- Until this restorative phase, both teeth were restored simultaneously to permit greater control over size, shape, and thickness of each increment. The artificial enamel, however, had to be implemented on each individual tooth to obtain the correct proximal contour and contact.
- An amount of microfill composite (Renamel Microfill, Shade A2, Cosmedent, Chicago, IL) was placed onto a glass slab. After cleaning the gloves with alcohol-moistened gauze, the microfill composite was rolled between the fingertips to take an ellipsoid form — a "compoball" (Figure 25). Care must be taken not to fold the composite over itself which would incorporate air voids.



Figure 32. Final proximal polishing was accomplished with a disc. This step is fundamental to avoid bonding when achieving proximal contacts.



Figure 33. The contact was "clicked open" with a composite instrument.

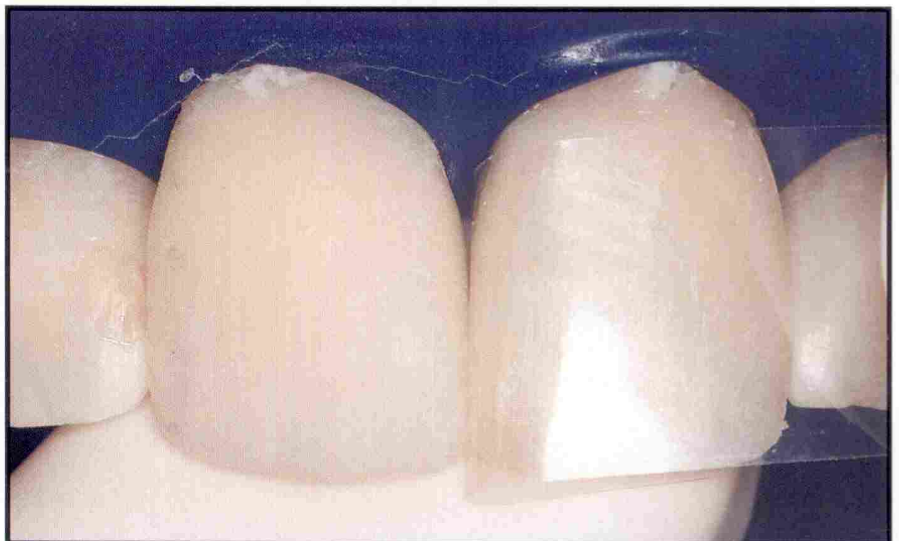


Figure 34. The Mylar strip "pull-through" technique was used to achieve palatal shape and contour.



Figure 35. Facial view of the maxillary central incisor restorations, prior to finishing and polishing procedures.



Figure 36. Demarcations are placed to determine the exact position of proximolabial line angles.



Figure 37. Postoperative facial view of the functionally and aesthetically restored maxillary central incisors, indistinguishable from the natural teeth.

- The “compoball” was tacked against the labial aspect. The spoon-shaped end of the golden instrument was used to smear the microfill, veneering the underlying “frame” cervico-incisally and mesiodistally. Using light strokes, the “compoball” was compressed against the cervical third in order to adapt it and obtain an anatomically correct emergence profile (Figure 26).
- The flexible end of the composite instrument was used to thin out the bulk of the microfill by gently sliding it in a cervicoincisal motion, cutting away the excess resin at the incisal edge. Because it is very thin and flexible, this spatula was used to pull the composite mesially, achieving the optimal contour (Figure 27). The distal contact was achieved by



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the Mylar strip “pull-through” technique, which is described further in the article.

- After the artificial enamel was sculpted to its correct anatomic form, brushes were used in finessing the primary anatomy of the labial aspect. The #4 flat-tipped brush, slightly lubricated with unfilled resin, was employed to smooth the surface irregularities, while bringing the labioproximal line angles into presence (Figure 28). Further refinement and adaptation were carried out with fine-tipped brushes (Figure 29). Brushes #1 and #2 are used for gross refinement; brushes #00 and #0 are tools for ultimate morphologic refinement and close adaptation of the composite in the sulcular region. The labial microfilled veneer was light cured for 40 seconds.
- The palatal aspect was restored in a similar manner and light cured.

- As described in the literature, an opaque microfill, bearing a higher chroma than that desired for the middle third, is indicated for the cervical third. In this case, the tooth structure at the cervical third (Figure 30) contained the desired hue and chroma. Therefore, only a layer of translucent microfill was used to cover the entire tooth "frame," allowing the underlying color to project through. Since the artificial enamel composite was thinner at the cervical third than at the middle third, a chroma degression was naturally attained (Figure 30).
- Diamond strips (Compo-Strips, Premier Dental, Norristown, PA) were used sequentially, according to their grits, to commence finishing the mesial aspect of tooth #8 and to completely remove the composite oxygen-inhibited layer (Figure 31). Final polishing was achieved with aluminum oxide discs (Sof-Lex Pop-On XT, 3M, St. Paul, MN) (Figure 32). This is an important step and must never be omitted, since the attainment of the proximal contact depends on the correct execution of this step.
- Labial and palatal aspects were also polymerized for 60 seconds each.
- The restorative protocol for the artificial enamel was reproduced on tooth #9, with slight modifications. A Mylar strip (Epitex, GC America, Chicago, IL) was placed mesially between teeth #8 and #9, as the microfill was being applied and contoured. With a swing motion, the strip was pulled labiopalatally, pulling the microfill interproximally and roughly determining the labial embrasure anatomy. Excess composite removal and embrasure forms were achieved with a #2 carver. Brushes were used for refinement of primary anatomy.
- An absolute morphologic symmetry of width, length, embrasure forms, and line angles was now present. Achieving labial symmetry prior to restoring the palatal aspect is the key to achieving harmoniously shaped central incisors.

- After polymerization of the labially applied microfill, the spoon-shaped end of the composite instrument was positioned into the gingival embrasure, firmly resting against both teeth; the proximal contact was "clicked" open (Figure 33) by applying a rotational movement to the instrument.
- While still applying some torque to keep the teeth slightly apart, a Mylar strip was slid between them. A microfill "compoball" was applied in a single increment to the palatal aspect and contoured with the aforementioned instruments in addition to a #6 burnisher (Hollemback, American Eagle Instruments, Missoula, MT), which was used to shape the fossa. The initial palatal embrasure anatomy was formed at this stage, using the thin, flexible,

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and curved end of the green instrument from the same kit (Almore, Portland, OR); the #2 carver (Thompson Dental, Missoula, MT) performs a complementary task. The strip was gently folded over the composite resin and pulled in a palatolabial direction, while applying gentle finger pressure. The composite was thereby carried interproximally to form the palatal embrasure (Figure 34). The distal contour was formed in the same manner. The final contour refinement was accomplished with instruments and brushes.

- Labial and palatal aspects of tooth #9 were additionally light cured for 60 seconds each.
- The final morphology of both incisors was established, and the teeth were ready to be finished and polished (Figure 35).
- Contouring was initiated with a coarse disc until the desired primary

anatomy was established; the desired length was checked once again. For achieving secondary anatomy (developmental grooves, lobes, cingulum, and marginal ridges), a combination of medium-grit diamonds (#859-018 and #856L-016, Brasseler, Savannah, GA) and 12-fluted carbide finishing burs (#7901, S.S. White, Lakewood, NJ) was used.¹⁶ Surface texturization was accomplished, using medium-grit tapered diamonds (6856L-016, Brasseler, Savannah, GA).¹⁷ Lines were drawn along the ideal position of the proximolabial line angles to guide the attainment of symmetrical light-reflecting areas (Figure 36). Diamond (Compo-Strips, Premier, Norristown, PA) and plastic strips (Epitex, GC America, Chicago, IL) were used for interproximal finishing and polishing.

- The entire restoration was buffed with a green polisher (Vivadent, Amherst, NY) to eliminate some of the undesired accentuated texturization. A composite polishing paste (Foto-Gloss, Kota, Sao Paulo, Brazil) was used with a buffing disc (Flexibuff, Cosmedent, Chicago, IL) to impart a high gloss to the restoration surface, while still retaining the designed surface texture. The convex areas of the restoration (ie, labial lobes, line angles, marginal ridges, and incisal edges) were highlighted with a superfine disc. After final polishing, the labial and palatal aspects were light cured for 60 seconds each.
- An aesthetic and natural-appearing restoration was achieved, completely satisfying the functional and aesthetic expectations of the patient (Figure 37).

CONCLUSION

This article has presented a clinical implementation of a restorative protocol with composite resins, published in the October 1995 issue of *Practical Periodontics and Aesthetic Dentistry*.³ The author has attempted to provide the reader with insights on shade selection, color charting, and restorative material manipulation, while stressing the concepts of polychromy, hue, chroma, value, translucency, and opacity and their relation to sculptability, polishability, and strength of composite resin restorations.