



Using A Lithium Disilicate Material To Restore Fractured Anterior Teeth

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The passion for dentistry that I feel continues to be fueled by the confidence and trust our patients—guests in our practice—have in my team and me. That trust is supported by the years of research and development that goes into the development of the materials we select when providing our patients with amazingly aesthetic restorations.

One such example is the lithium disilicate material (IPS e.max, Ivoclar Vivadent, Amherst, NY) highlighted in the following case study. The manufacturer of this material, Ivoclar Vivadent, has continued to provide materials that not only provide form and function, but which can be used to create masterful works of art. As demonstrated in this case, the diversity of IPS e.max becomes apparent in its natural tooth-supported and implant-supported restorations, as well as its ability to aesthetically match natural dentition.



Figure 1. Preoperative view of a 61-year-old male patient who presented with dental trauma after being knocked off balance on his scooter and landing face first on the throttle.

Clinical Presentation

A 61-year-old male presented after sustaining injuries from a fall while riding a Vespa scooter. He was knocked off balance by an automobile and landed face first onto the throttle of his scooter (Figure 1). The impact resulted in multiple soft tissue abrasions and three fractured anterior dentition (Figure 2). Tooth #7 had a previously treated root canal, a crown that appeared to be fractured below the gum line, and was deemed non-restorable. Tooth #8 had broken off at the gingival level, exposing the pulp but leaving sufficient ferrule for restoration. Tooth #9 had a clinical crown that was fractured in half without pulp exposure (Figure 3).



Figure 2. Preoperative retracted close-up view of the patient's trauma revealing multiple soft tissue abrasions and three fractured anterior dentition.

Initial Clinical Treatment

The patient was immediately referred for endodontic treatment on tooth #8, and preliminary impressions (Kromopan 100, Lascod) were made for a diagnostic wax-up. The patient also was referred for later extraction of tooth #7 and immediate implant placement at that site.

The models were used to fabricate provisional restorations for teeth #7, #8, and #9. Following endodontic treatment, the patient returned for temporization of teeth #8 and #9 using a bleach white shade of temporary



Figure 3. Radiographic view revealing the extent of the damage.

material (Integrity Temporary Crown and Bridge material, Dentsply).

The crown on tooth #7 was removed. A cantilever bridge was fabricated with an abutment on tooth #8 (e.g., a fibercore post was used as a temporary post in order to support the bridge), an abutment on tooth #9, and a pontic on tooth #7 over the temporarily retained root. The temporaries were seated using a temporary cement (Temp Bond NE, Kerr) (Figure 4).



Figure 4. View of the temporary restorations prior to extraction.



Figure 5. Close-up right lateral view of the patient's restorations.



Figure 6. Close-up left lateral view of the patient's restorations.

Periodontal/Implant Treatment

Prior to the extraction of the root of tooth #7, the provisional restoration was removed. A 4.0 x 15 mm implant (Astra) with a healing abutment was placed immediately (Figures 5 and 6). Allograft putty (RegnerOss) was placed adjacent to the implant. The temporary cantilever bridge was re-cemented (Temp Bond NE) to allow osseointegration of the implant.

Restoration

Once osseointegration of the implant had occurred, the temporary bridge was removed and a temporary abutment (Temp Design, Astra Tech) was customized and placed to simulate the tooth emergence and further support the papillae. New temporary restorations were fabricated to ensure proper papillae formation.

The final impressions were obtained using a fast-set, heavy body polyvinyl siloxane tray material (Aquasil Ultra Heavy Body, Dentsply) and fast-set wash material (Aquasil Ultra XLV wash material, Dentsply). Color mapping and a shade guide (Vitapan 3D-Master Shade Guide) were used for shade selection, which determined that shade 1M1/1M2 with incisal characterization would best match the existing teeth #6, #10, and #11. The die/stumpf selected was ND3 (IPS Natural die material guide, Ivoclar Vivadent).

Restoration Fabrication

A zirconia abutment was fabricated for the implant at the #7 site,

and a vectris post was fabricated for the endodontically treated tooth #8. IPS e.max full-coverage restorations were created for natural teeth #8 and #9, as well as the implant-supported zirconia abutment at #7.

Seating Appointment

A custom vectris post was placed in tooth #8. The post was treated with silanate (Monobond S, Ivoclar Vivadent) for two minutes and then evaporated. The tooth was then rinsed with an antimicrobial scrub (Consepsis, UltraDent Products, Inc.). A universal cement primer (Multilink a+b, Ivoclar Vivadent) was mixed and applied onto the tooth surface for 30 seconds, evaporated, and dried. The post was seated with the self-curing resin cement (Multilink Automix).

The custom zirconia abutment was placed at tooth #7 and torqued to 20Ncm. A direct composite (IPS Empress Direct, Ivoclar Vivadent) in a dentin shade BL-XL was applied over the screw hole and light-cured using an LED curing light (Bluephase, Ivoclar Vivadent).

The IPS e.max crown restorations for teeth #7, #8, and #9 were adhesively bonded into place. First, the teeth were rinsed with an antimicrobial scrub (Consepsis), and the inside of the crowns and zirconium abutment were silanated (Monobond S). A uni-



Figure 7. Close-up view showing tissue response.



Figure 8. Postoperative close-up view of the patient's full smile.



Figure 9. Postoperative portrait view of the patient's final restorative outcome.



Figure 10. Postoperative view of the patient showing off his new smile.



Figure 11. Postoperative radiograph showing the implant with the abutment and crown and the adjacent custom post and crown in place.

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versal cement primer (Multilink a+b, Ivoclar Vivadent) was mixed and applied to the natural tooth structure. A self-curing resin cement for implants (Multilink Implant Automix) was then placed inside the crowns, which were seated using firm pressure.

Excess cement was removed using a rubber tip and then light-cured using an LED curing light. After receiving patient approval of the final esthetics, photographs of the definitive restorations were taken (Figures 7 and 8).

Conclusion

During the follow-up appointment (Figures 9 and 10), the patient’s occlusion was checked in centric and functional chewing movements, and radiographs were obtained to confirm cement removal (Figure 11). The patient approved of the final esthetics and recalled his pre-treatment condition: “After my motorcycle accident, I was a mess and thought I’d never look the same again. My wife said, ‘I just want your beautiful smile back!’ So we called Dr. Barton, and he really did give me my smile back!”

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Dr. Barton received his college and doctor of medical dentistry degree from the University of Florida in 1986. He is an LVI graduate and instructor, and has achieved the LVI Mastership award. He teaches dentists from all over the world in the latest treatments for aesthetic dentistry, full mouth reconstruction and neuromuscular occlusion. The past president of IACA, he is a frequent speaker to study groups and associations.

