Understanding e.max as the ideal material for indirect posterior and anterior restorations

**Fig. 1a:** The patient presented with three non-vital teeth.

**Fig. 2a:** The teeth were prepared for full-coverage restorations owing to significant decay.

**Fig. 3a:** The situation at the five-year recall appointment: the three anterior crowns were completed to improve aesthetics and longevity.

**Fig. 4a:** The patient presented with significant mesial–occlusal decay.

**Fig. 5a:** A mesial–occlusal inlay fabricated from lithium disilicate was adhesively bonded into place along the enamel margins.

**Fig. 6a–c:** The teeth were prepared for full-coverage restorations.

**Fig. 6d–f:** The pressed lithium disilicate restoration was cemented to the titanium abutment.

**Fig. 6g & h:** The lithium disilicate restoration was cemented to the titanium abutment in the mouth.

**Fig. 7a:** The situation at the five-year recall appointment: the three anterior crowns were completed to improve aesthetics and longevity.

**Fig. 7b:** The teeth were prepared for full-coverage restorations.

**Fig. 7c:** The teeth were prepared for full-coverage restorations owing to significant decay.

**Fig. 7d:** The patient presented with worn dentition, a closed vertical dimension of occlusion, and poor occlusion on the left side.

**Fig. 7e:** All of the maxillary teeth were crowned with lithium disilicate restorations to achieve a good occlusion and great aesthetics.

**Fig. 7f:** The situation at the five-year recall appointment: the three anterior crowns were completed to improve aesthetics and longevity.

**Fig. 7g:** The teeth were prepared for full-coverage restorations.

**Fig. 7h:** The teeth were prepared for full-coverage restorations owing to significant decay.

**Fig. 7i:** The patient presented with worn dentition, a closed vertical dimension of occlusion, and poor occlusion on the left side.

**Fig. 7j:** All of the maxillary teeth were crowned with lithium disilicate restorations to achieve a good occlusion and great aesthetics.
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Fig. 10b: The patient presented with minimal enamel, and the teeth were prepared for full-coverage restorations. — Fig. 10a: The maxillary reconstruction with lithium disilicate restorations demonstrated enhanced aesthetics and occlusion compared with the patient's previous treatment. — Fig. 10c: The patient presented with periodontal disease and significant decay. — Fig. 10d: A metal-ceramic implant prosthesis was placed in the maxillary left quadrant, and all of the individual lithium disilicate crowns were fabricated to create a more functional and aesthetic reconstruction. — Fig. 11: Chart documenting the author’s clinical success using lithium disilicate restorations.

16 Trends & Applications

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Unlike other ceramics, e.max offers 560 MPa in strength, which is over twice the strength of other ceramics.6, 7, 8, 9 Another advantage is that e.max can be finished thinner without chipping owing to its higher edge strength.10, 11 Additionally, e.max provides exceptional aesthetics without requiring a veneering ceramic when processed in its monolithic form. This allows restorations to maintain their structural integrity.

The material is available in four translucencies, including high opacity, medium opacity, low translucency, and high translucency.11 In a five-year study conducted by IvoIvar Vivadent, 97 percent of the pressed e.max restorations studied received an excellent rating in aesthetics.7

Research continues to examine the efficacy of lithium disilicate restorations. Fasshinder et al., for example, investigated the longevity of lithium disilicate crowns, following 62 restorations over two years. The researchers found no identified cases of crown fracture or surface chipping. Over the two-year period, the patients were checked three times and none reported any sign of sensitivity.11

Guess et al. examined the fatigue behaviour and reliability of CAD/CAM-processed lithium disilicate compared with zirconia all-ceramic crowns veneered using the hand-laying technique. They concluded that the lithium disilicate crowns were significantly more fatigue-resistant than the zirconia crowns, which were susceptible to early veneer failure.12

Further, e.max can be used for a variety of indications, as demonstrated by Sorensen et al., in whose study e.max was used for the fabrication of three-unit bridges. The researchers concluded that by using e.max they achieved an acceptable clinical success rate.12 Other indications include posterior partial- and full-crown coverage, as well as implant-supported restorations.12

Case studies

IPV e.max can be used for a wide range of universal anterior and posterior indications. It is not unusual for clinicians regarding aesthetics are pleased after receiving their restorations, and clinicians can be assured of functional predictability. Posterior restorations fabricated from e.max demonstrate the requisite strength, aesthetics, and durability. Whether full or partial coverage, e.max restorations provide function and fit to ensure satisfaction of both clinician and patient. The following cases demonstrate the material’s versatility for a number of everyday restorative cases.

Case 1

A female patient presented with worn dentition, a closed vertical dimension of occlusion, and poor esthetics, particularly on the left side (Fig. 1a). She expressed great concern about what she perceived as unacceptable aesthetics. The teeth were prepared for full-coverage restorations owing to the extensive fillings and need to change the vertical dimension of occlusion radially (Fig. 1b). All of the maxillary teeth were restored with full-crown coverage restorations fabricated with e.max. This material was selected based on its strength and durability, which would be necessary to establish a new and comfortable occlusion and desirable aesthetic outcome (Fig. 1c).

Case 2

The patient presented with mesial decay on a maxillary molar (Figs. 4a & b). A minimally invasive mesio-occlusal-inlay preparation was performed in anticipation of a lithium disilicate restoration. The preparation maintained the enamel on all of the peripheral margins. The mesio-occlusal inlay was placed and adhesively bonded to the enamel along all of the margins (Fig. 4c). Once placed, superior aesthetics and marginal fit were confirmed. The lithium disilicate restoration decreased the flourescence of the tooth dramatically, which possibly decreased the risk of future fractures.

Case 3

A patient presented with minimal enamel that was chipping off the maxillary anterior teeth (Fig. 5a). There was insufficient enamel to support a veneer restoration, so the teeth were prepared for full-cover age restorations. Because e.max reflects light in a similar manner to natural enamel and has the same wear coefficient, it was the ideal material in this case. The maxillary reconstruction using e.max restorations demonstrated enhanced aesthetics and predictable function (Fig. 1b).

Case 4

A patient presented needing an implant abutment. A stock titanium abutment (BioHorizons) with Laser-Lok was used to wax and press an e.max implant abutment, which would be cemented on to the titanium abutment (Figs. 6a–c). Since all-ceramic restorations can be subject to failure from the inside out, the stiffness of the core material, which mainly consists of elastic, was a consideration.

A titanium abutment with a high elastic modulus minimises failure when lithium disilicate or zirconia is used. The pressed e.max was cemented to the titanium abutment in the mouth using MuliLink Implant cement (Ivoclar Vivadent; Figs. 6d–f). This represents an entirely different method of implant restoration that is easier and less expensive (Figs. 6g & h).

Conclusion

I have maintained a database for the last 50 years of different confounding variables and parameters on the long-term survival rates of ceramic materials and the conditions that promote failure. Previously, the best long-term survival of a restoration that has been studied was the monolithic leucite-reinforced glass-ceramic (IPS Empress, Ivoclar Vivadent). It has been demonstrated that e.max can be used universally and effectively in all areas of the mouth, including the anterior region, and make it suitable for a range of indications. It has been studied repeatedly to confirm its strength and functionality, and my research confirms that lithium disilicate has been used with impressive long-term success (Fig. 11).