Treatment of Occlusal Load-Bearing Posterior Cavities

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Introduction
Direct composite restorations together with acid etch technique have been used in anterior regions for several decades and for more than 20 years in the masticatory-load-bearing posterior region as an aesthetic alternative to metal restorations. The results of early posterior composite restorations were not encouraging, mainly due to their inadequate mechanical properties, including low abrasion resistance, early fractures and marginal leakages consequent to polymerization shrinkage. However, recent material development has eliminated these shortcomings considerably. The effects of shrinkage can further be minimized by the synergetic combination of minimally invasive cavity preparations, effective adhesives, low-shrinkage composites, new light-curing techniques (e.g., soft-start or pulse-delay), and the incremental layering technique.

Case History
The following case demonstrates the replacement of an upper posterior composite restoration with Ceram-X MONO nano-ceramic restorative material. The chief complaint of the 20-year-old female patient was dental floss always catching and fraying on the mesio-occlusal margin of the composite restoration on tooth 16 (Fig. 1). During clinical examination, a marginal gap was detected in the proximal box. The patient agreed to have it replaced with Ceram-X nano-ceramic restorative material.

Ceram-X MONO, available in seven shades of intermediate translucency, is a universal composite and does not have separate dentin and enamel materials. The cavity can completely be restored with one shade using simple incremental layering technique. The tooth was first thoroughly cleaned of external deposits using Nupro fluoride-free prophylaxis paste (Dentsply) on a rubber polisher (Fig. 2). The shade (A2) was taken in natural daylight with the Vitapan Classic shade guide under moist condition (Fig. 3) and before placement of rubber dam to avoid incorrect determination due to dehydration and strong contrast of the surroundings.

After removal of the old restoration, a bit of Ceram-X MONO M2 (corresponding to Vita shade A2) material was applied to the tooth and light cured to verify the shade. This was easily removed with a hand instrument as the tooth had not been pretreated with adhesive (Fig. 4).

Rubber dam was placed to ensure that the working area is free of contaminants that could greatly reduce the adhesion of the composite which in turn will have detrimental effect on the marginal integrity. A precontoured Palodent® sectional metal matrix was placed to confine the proximal extension (Fig. 5). Xeno® III (Dentsply) was selected as a bonding agent, its self-etching effect (pH < 1) activated by the mixing of the two adhesive components A & B. This was applied to the entire cavity using a mini-brush (Fig. 6). After 20 seconds, the solvent (water/ethanol) was evaporated with oil-free compressed air. It was then light-cured for 10 seconds, producing a shiny surface over the entire cavity. The adhesive should not be reapplied to any dull areas. Otherwise, the bond might be affected and postoperative hypersensitivity could arise.

The mesial wall was first adapted carefully against the matrix and built up to the marginal ridge with Ceram-X MONO (Fig. 7). After anatomically contouring the marginal ridge area, it was polymerized for 20 seconds (intensity > 500 mW/cm²). The matrix was then removed (Fig. 8), effectively transforming the original Class II into a Class I cavity.

The center of the cavity was then filled and light-cured with Ceram-X MONO in 2 mm-increments, followed by the mesiostapalatal, mesiobuccal and distobuccal cusps. The occlusal surface was given a final polymerization cycle. The correct shaping of occlusal anatomy and excess removal while the composite is still pliable greatly facilitates finishing (Fig. 9).

The rubber dam was removed. The restoration might be too dark (as compared to surrounding tooth structures) due to dehydration of the tooth; therefore rehydration was required prior to final evaluation of the shade of the new restoration. The pits and fissures were accentuated with a small, pear-shaped finishing diamond (Fig. 10) while the convexity of the triangular ridge and the smooth transition of various occlusal anatomies were prepared with a point-shaped finishing diamond (Fig. 11). Any remaining roughness

Fig. 1: Preoperative.
Fig. 2: The tooth is cleaned with fluoride-free prophylaxis paste.
Fig. 3: Shade-taking (A2) on the moist tooth with Vitapan Classic shade guide under daylight.
Fig. 4: Checking shade using some Ceram•X MONO M2 material.
Fig. 5: Separation of the proximal extension with a precontoured, metal sectional matrix, retained in position by the BiTine ring.
Fig. 6: Application of Xeno® III self-etching bonding with a minibrush.
Fig. 7: Full reconstruction of the mesial wall up to the marginal ridge with Ceram•X MONO M2.
Fig. 8: Effective transformation of the original Class II cavity into a Class I cavity.
Fig. 9: Finished and contoured tooth.
Fig. 10: The pits and fissures are accentuated with a pear-shaped finishing diamond.
Fig. 11: The convexity of the triangular ridge is prepared with a point-shaped finishing diamond.
We are pleased to announce Ms. Patcha Angsuchotmetee of Chiang Mai University was awarded first prize in the DeTrey Global Ceram•X™ Case Contest. We should all be very proud of this achievement in Asia. We should all be very proud of this achievement in Asia. We should all be very proud of this achievement in Asia.

In the ever-advancing development of better dentistry, new products are being introduced almost every day. Seldom, however, do we come across a product that has so many dentist (and “would-be” dentists) talking. This new material is Dentsply’s Ceram•X nanocomposite restorative.

A perfect synergy of simplicity, beauty and strength, Ceram•X provides an easy approach to the practice of aesthetic dentistry as well as general restorative dentistry. To seek such consensus within the dental profession, a case competition was recently organized by Dentsply Asia in the most prestigious dental colleges across the region. A total of 42 universities from 11 locations (China, Hong Kong, India, Indonesia, Korea, Malaysia, Philippines, Singapore, Taiwan, Thailand and Vietnam) participated in this student-only competition. In this competition, universities were provided with assortment of the single-opacity Mono and double-opacity Duo materials together with all the accessory materials (such as etching, bonding, and polishing) from the complete line of restoratives from Dentsply. Students, under the supervision of their professors, were then given a free hand to select their cases, utilizing either versions of the composites.

Each clinical procedure, complete with photos and detailed write-ups, was properly documented. These were then compiled very professionally prior to submission. From incisal fractures to diastema closures, from cavities to amalgam replacements, from veneers to inlays, this competition completely explores and exemplifies the wide indications of an excellent composite material.

The response was so overwhelming and the cases submitted were of such high standard that it took a panel of judges several days of heated debate to decide on the winners. After careful consideration, a total of four Asian awards (two each for the Mono and Duo Competitions) were announced.

In the Mono category, the first prize went to Rohani Mahmood of the University of Malaya, Malaysia and the second prize to Prashant S. of JSS Dental College & Hospital, India. Patcha Angsuchotmetee of Chiang Mai University, Thailand and Leke-Weiping of the National University of Singapore earned the top two honors.

Aside from fabulous prizes in each category, these students also competed with their European contemporaries in the DeTrey Global Ceram•X Case Contest where our Asian winners have won the first prize in this event. Other than these accolades, two country prizes were also awarded to each of the participating locations.

The event proved to be even more gratifying and went beyond the organizer’s expectations. Not only did these future dentists fully and easily capture the essence of manipulation of the material, they had seamlessly revealed the after-grade of their patients. Our dental professionals, these contributions will raise the overall standard of dentistry in Asia.

As testified by working clinicians, Ceram•X is indeed a fantastically user-friendly material. With its non-stickiness and simplification of shade system (7 shades for all), chairtime can be significantly reduced. Its nanocomposite technology also allows us to sustain heavy masticatory forces in the posterior. Operations are also given flexibility to elect the one-opacity Mono system or go for the two-opacity Duo configuration.

The following is a collage of cases from the various winners of this competition. More documentation can be found on www.dentsply-asia.com.