

Saving a broken first molar

Dr. Balraj Singh Sohal

Dr. Balraj Singh Sohal restores an upper left first molar with cuspal coverage to help minimize further fracture

A 54-year-old patient broke a portion of her upper left first molar while having a meal. She attended an after hours dentist who temporized the broken tooth with a filling. She had no symptoms or discomfort from the tooth, but as it had broken, she wanted to ensure it was protected.

Examination

The upper left first molar had a glass ionomer cement (GIC) restoration filling the mesio-palatal region of the tooth. The tooth was not tender to palpation, nonmobile and upon radiographic assessment there were no signs of periapical pathology.

Treatment plan

Due to the size of the pre-existing amalgam and the fact there was a fracture on the distal marginal ridge we decided to restore this tooth with cuspal coverage to help minimize further fracture.

Figure 1 shows the preoperative view of the upper left first molar – note the large failing amalgam, the GIC restoration that has been placed to ‘patch’ up the broken mesio-palatal cusp and the fracture line on the distal marginal ridge.

Prior to removal of the restoration, a rubber dam was



Fig. 1: Preoperative view



Fig. 2: Rubber dam was used for isolation before removal of the restoration



Fig. 3: Wooden wedges were placed interproximally to slightly separate the teeth. Caries was noted beneath the failing restorations once they were removed



Fig. 4: Occlusal reduction completed and the preparation margins bevelled. A highly charged flowable composite was used for immediate dentin sealing (IDS)



Fig. 5: A monolithic lithium disilicate (pressed) overlay was fabricated by Simplex Dental Ceramics



Fig. 6: Rubber dam and floss ligature were placed over the prepared tooth to ensure the margins were easily accessible. The adjacent teeth were isolated with Teflon tape



Fig. 7: Immediate postoperative view of the overlay bonded in place



Fig. 8: Immediate postoperative oblique view of the overlay bonded in place. This image is immediately after the rubber dam has been removed so the teeth are still dehydrated

used to isolate the upper left first molar (Figure 2). A floss ligature was used to reinforce the rubber dam apically around the first molar.

I prefer to prepare onlays under rubber dam where possible. I find the rubber dam helps with retracting the soft tissues and provides comfort for the patient – both of which make the preparation appointment easier and more efficient.

Wooden wedges were placed interproximally to apply an interproximal force, slightly separating the teeth (Figure 3). The wedges can help protect the neighbouring teeth during preparation. I routinely pre-wedge or place inter-guards before drilling to protect the neighbouring teeth during the preparation. The failing restorations were removed and there was caries noted beneath the restorations.

The caries was removed with a rose-head bur until a caries-free enamel-dentin junction was achieved. Note the fracture line running through the distal marginal ridge – manual pressure was applied with an excavator and unsurprisingly the disto-palatal cusp fractured off completely as it was undermined – only the buccal wall was left remaining.

An occlusal reduction of 1.5mm was completed and the margins of the preparation were bevelled using Sof-Lex discs and white stones to ensure there were no sharp corners.

Immediate dentin sealing (IDS) was completed to seal the dentinal tubules in order to reduce the chance of postoperative sensitivity. A highly charged flowable composite was used for IDS (Figure 4).

A size 0 retraction cord was placed into the gingival sulcus to enable an accurate impression to be obtained. A beautiful monolithic lithium disilicate (pressed) overlay was fabricated by Simplee Dental Ceramics (Figure 5).

The overlay was tried-in on the preparation in order to assess the marginal fit and the occlusion. Once the fit and occlusion was approved, the fit surface of the overlay was air-abraded with 27-micron alumina oxide particles. The fit surface was then etched with hydrofluoric acid etch for 20 seconds (gently rubbing with a microbrush) – washed thoroughly and then dried. A drop of fresh silane (Monobond Plus, Ivoclar Vivadent) was applied to the etched fit surface and left for 60 seconds.

After 60 seconds the silanated fit surface of the overlay was air-dried to remove the residual solvent. Next, Optibond FL bonding agent was applied to the silanized surface.

Once the overlay was ready to be bonded into place, the tooth needed to be adequately prepared to ensure optimum bonding. A rubber dam and floss ligature were placed over the prepared upper left first molar to ensure the margins were easily accessible. The adjacent teeth were isolated with Teflon tape to prevent the cement from sticking to the adjacent teeth (Figure 6). The tooth surface was air-abraded with 27-micron alumina oxide particles and then etched for 30 seconds with 37% orthophosphoric acid – washed and dried. Optibond FL bond was then applied onto the tooth surface. Nexus (white) dual cure resin cement was used to bond the overlay in place. Figure 7 shows an immediate postoperative view of the overlay bonded in place – the excess cement has been cleared away and the contacts flossed.

The final cure of the overlay was done through a layer of glycerin gel to remove the oxygen inhibited layer. The margins of the overlay were polished with brownies and fine Sof-Lex discs.

Figure 8 shows an immediate postoperative oblique view of the overlay bonded in place. The technician matched the overlay very well to the adjacent teeth as well as the underlying tooth structure. The margin will blend harmoniously once the tooth rehydrates. ■



Dr. Balraj Singh Sobal graduated from King's College London Dental Institute. During his undergraduate days, Bal served as the president of the King's College London Dental Society and he graduated with the Guy's Full Shield, the Richard Dickinson USA trust fund award, King's Opportunity Fund, Gold Star Award and most notably the Jelf Medal – the most prestigious award the dental school offers. Bal has won first place in Mini-Smile-Makeover's Young Maestro as well as being named as the NSK Rising Star 2019.