

Replacement of unsightly amalgams: direct or indirect?

Accreditation Case Type 4

(A posterior quadrant showing two or more direct or indirect restorations)

Oliver Harman BDS, LDS RCS

Introduction and chief complaint

The patient was a 56-year-old female who had had a mixture of gold and porcelain onlays and crowns, and composites, updated partly in the UK and partly in Canada. She had three amalgam fillings remaining that she wanted replaced with tooth-coloured material, as she regretted having the lower right gold restorations despite their high quality.

Examination, medical and dental history including special tests

There was no relevant medical. The patient was a regular dental attender with the previous exam and hygienist visit two months previously. She had worked as a registered dental therapist in New Zealand in her twenties and had had her third molars removed at 20 years of age. Her lower right gold

restorations had been placed in Canada eight years previously.

Extra-oral: Face, head, neck, TMJ and glands showed no relevant history. There was occasional nocturnal bruxism for which a hard acrylic night guard was worn regularly. Mouth opening was normal but with a report of occasional crepitus.

Intra-oral: Retro-molar cheek biting, all teeth were firm. Periodontal score was BPE 200/111. She used a Braun electric toothbrush and red Tepe brushes and had 3mm pocket with bleeding at 16/17. She was in the process of having her amalgam fillings replaced with tooth coloured alternatives. She was content to leave the gold inlays and was happy with the natural colour of the teeth.

Her occlusion was class 1 with mild lower crowding and group function on right and left sides. A full smile design assessment of the macro & micro anatomy of the teeth and their

relation to the soft tissues and full face was carried out. Radiographs: three bitewings revealed slight horizontal bone loss and a periapical showed sound roots on 35,36,37.

Diagnosis and treatment plan

The patient had a dentition in good order with three unsightly remaining amalgam fillings. Mild chronic periodontal disease at 16/17 and mild lower gingivitis associated with insufficient interdental cleaning.

It was decided after discussion to accept the lower left 35 crown despite the less than perfect margins and monotone colour. The 34 and 37 were suitable for conventional composite restorations. The 36 was too large so it was decided to place porcelain onlays. Felspatic porcelain was selected as the cavity had plenty of enamel to bond to and the aesthetics would be superior to



Figure 1: a-b – Occlusal images of the case: *Before (left) and after (right)*

pressed ceramic or hybrid. An equally good alternative in this case would be a polyglass restoration (e.g. Belleglass)

Clinical stages

A hygienist appointment was made to carry out general scale and polish and oral hygiene instruction with the recommendation of larger Tepe brushes for the molars (e.g. Blue). The next stages included placement of lower left first premolar and second molar composites, and preparation, impressions and temporisation of a porcelain onlay in the lower left first molar.

Local anaesthetic was given (left side inferior dental nerve block, 2ml of Lignospan special. Non-latex rubber dam was placed from 33-37 with yellow wedge-it and an HW clamp. A record was made of occlusal contacts and wear facets with red and green 12 micron articulating paper to assist in building the cusps and fossae. The amalgam was removed and the

cavity reshaped using pear shaped diamonds, with copious amounts of cooling water to keep mercury vapour to a minimum. The undercuts on the 36 were removed with a tapered, round ended diamond. The tooth was carefully cleaned with fine diamonds, green abrasive stones and pumice to remove any stains and remnants of amalgam. The exposed dentine was temporarily covered with non-eugenol temp bond to avoid desiccation while the 34 and 37 were restored.

The 34 and 37 were restored using the Didier Dietschi composite technique. A Pallodont sectional matrix was placed with a flexi-wedge and a bi-tine ring. The tooth was etched using the total etch technique, washed for 20 seconds and air dried. The dentine was rehydrated with a damp microbrush. Solo+ bond was painted on for 15 seconds and then air dried and wiped with a dry microbrush before light curing for 20 seconds. Tetric Evo flow was placed on the dentine to a thickness of 1mm to provide an

elastic layer to absorb shrinkage stress.

The Miris 2 White Regular enamel was placed in three sections in the box. The dentine Miris 2 S4 was placed in 1mm thick increments in the centre, and finally enamel applied over the top. Each cusp was sculpted separately with a deep fossa. A fine brown tint was applied to the fissures.

The matrix was removed, glycerine was applied and the teeth cured for a final 40 seconds. The restorations were trimmed with a 12 blade scalpel, medium and fine Soflex discs, enhance rubber cups and silicone polishing brushes. The rubber dam was removed, occlusion adjusted and those areas refinished. Finally the teeth were polished with diamond polishing paste. After a brief break the temp bond was removed from the 36, the cavity polished with pumice and a single phase Doric putty 7 wash impression taken.



Figure 2: Lower Left Quadrant: Before (left) and after (right) images of the case

Figure 3: a-f – Retracted: *Before (above) and after (below) images of the case*



A Doric bite and opposing alginate was also taken. The tooth was temporised with Duralon cement (Espe Polycarboxylate)

The laboratory phase involved Durceram Plus Felspatic porcelain work (Degudent) by Steve Rea at Reatech Dental Laboratory.

Onlay placement

Local anaesthetic was given as above and rubber dam placed on the single 36 with a HW clamp. The onlay was disinfected and tried in with Variolink 2 transparent try-in gel and the colour assessed using a K5500 shade light, which proved good.

The fit surface of the onlay was treated with porcelain etch for 4 minutes, Monobond S silane primer was placed for one minute and then air dried. Excite bond was placed on the fit surface and air dried. It was then kept under an orange light safe while the tooth was prepared. The tooth was polished with pumice slurry to remove the residue of temp

bond. A fine disposable metal matrix band was placed loosely over the tooth. The tooth enamel was etched for 15 seconds and the dentine was etched for 10 seconds, washed for 15 seconds, air dried, Excite bond was worked into the dentine surface for 20 seconds with a micro-brush and air dried.

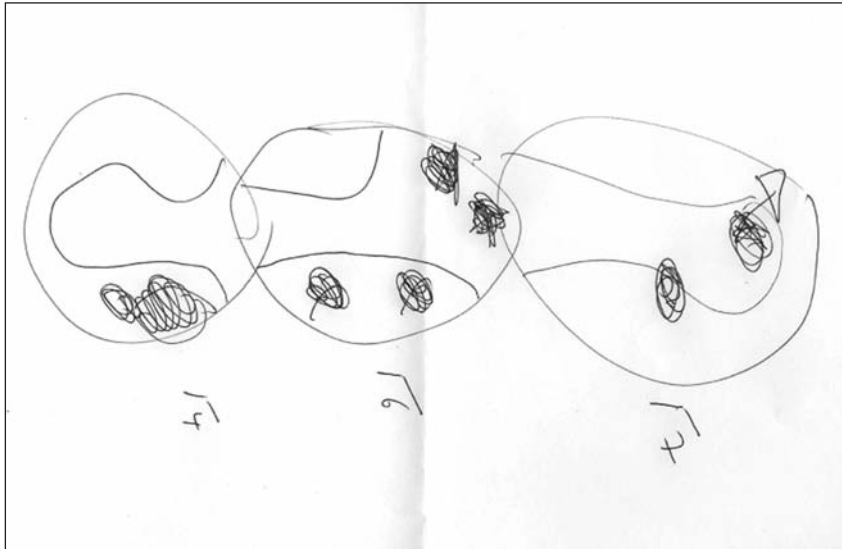
Variolink 2 transparent base and high viscosity a3 catalyst were mixed and placed in the cavity making certain there were no air bubbles or bare spots. The Onlay was placed and seated firmly with a plugger. Gross excess was removed with a microbrush. The matrix band was tightened slightly to give a tight interproximal fit. Glycerine gel was applied to the occlusal surface and was cured for 30 seconds using a ramp curing technique. The tooth was then left for four minutes to catalyst cure. The matrix band was removed and the tooth cured for 20 seconds interproximally from buccal and lingual aspects.

A no. 12 scalpel blade was used to run around the margins, then a fine Enhance cup was used buccally and lingually while holding the gingival tissue clear with a Wards carver. The margins were smoothed with blue, green and white interdental strips. The tooth was polished with a rubber cup and diamond polishing paste. The occlusion was checked with 12 micron articulator film and the tooth felt for heavy contact. The patient was told to brush and floss normally and return for review in two weeks.

Conclusion

Restorations made of Miris 2 and built using the technique advocated by its developer Dr Didier Dietschi, produce very natural and pain free restorations. In this case the porcelain onlay on the lower first molar also provided an equally aesthetic and, hopefully, long-lasting restoration.

Figure 4: Bite Border



Acknowledgement

Steve Rea at Reatech Dental Laboratory for the ceramic work.

Armamentarium

- Nikon 70D Camera with 1:1 Macro lens, R2 Close up Kit
- Vita 3d shade guide
- Swan Morton 12 disposable scalpel blade
- Enhance polishing cup (Dentsply)
- Occlusal Film 12 micro double sided
- Diaglaze
- Shofu Porcelain Polishing Kit
- Doric easy first (Alginate substitute) (Schottlander)
- Doric Quick time putty with Fine Wash
- Variolink II (Ivoclar Vivadent)
- Monobond S Silane Priming Agent (Ivoclar Vivadent)
- Excite DSC bond (Ivoclar Vivadent)
- 10% hydrofluoric acid porcelain etch from Optident
- Ultra-etch 35% (Optident)
- Glycerine gel
- Diatech Composite Preparation & Finishing Kit (Dr D Dietschi Selection 250059AA)



Figure 5: Preps under rubber dam



Figure 6: Shade Selection Vita A2 A3 Tab

- White Stone
- Coarse Soflex disc by 3m
- Miris 2 (Coltene Whaledent)
- Tetric Evo Flow from Vivadent (A1)
- Quicktemp A1
- Tempbond Non Eugenol
- Pumice
- President Impression Trays
- Epitec Abrasive Strips. Coarse, Medium & Fine
- Corsodyl chlorhexidine gel
- Flashlite 1401 (Discus Dental)
- Disposable matrix band (fine orange)
- Unident microbrushes
- Non-Latex Rubber dam from Dental Directory : medium
- Wedge-it rubber dam elastic
- Duralon Polycarboxylate Cement: ESPE
- Kerr Color Plus Composite stains



Figure 7: Post op PA LLQ: before (above) and after (below)

