For the majority of dentists, general practice has changed beyond recognition over the past decade. Minimal Invasive Dentistry, digital imaging and the computerisation of records, amongst many other changes, have altered the way dentists practise in their surgeries throughout the country.

But, although this is hardly ever mentioned, the greatest change that has occurred in the day-to-day running of a general practice has been the increasing use of composite filling materials in the restoration of posterior teeth.

Amalgam or Composite?

Dental amalgam has been the material of choice for restoring posterior teeth during the past 160 years. Despite repeated attempts to prove the dangers to the patient of using this material no significant link has been shown and, on July 28, 2009 the US Food and Drug Administration stated that unless the patient is allergic to mercury “the levels (of mercury) released by dental amalgam and batteries, as next to chloralkali production for batteries (to be phased out by 2020), dental amalgam will be the largest mercury use in the EU.”

In June this year, a joint DoH and DEPRA meeting issued a statement that the UK should support the EU strategy to reduce the environmental impact of mercury, and should, subject to certain exemptions, support a ban on the use of dental amalgam from 2016.

The exemptions, which would be reviewed after five years to identify if they were still required, would allow amalgam to be used under the following conditions:

- Poor moisture control
- Difficult cavity accessibility
- Large cavities
- Large interdental spaces to be bridged.

It is at this point that some readers may be thinking that the banning of amalgam is long overdue, but it must not be forgotten that amalgam, for all its faults, is a very forgiving material and even the EU is aware that there are situations indicating that over one-third of an American’s mercury exposure is from dental amalgam.

Even though there are many other sources of mercury in the environment, the continued action from pressure groups in Europe led to the European Union (EU) commissioning the BIO Intelligence Service (BIOS) to review the potential for reducing mercury pollution from dental amalgam and batteries, as next to chloralkali production for batteries (to be phased out by 2020), dental amalgam will be the largest mercury use in the EU.

The exemptions, which would be reviewed after five years to identify if they were still required, would allow amalgam to be used under the following conditions:

- Adhesive bonding improves the environmental impact of mercury, and should, subject to certain exemptions, support a ban on the use of dental amalgam from 2016.
- The exemptions, which would be reviewed after five years to identify if they were still required, would allow amalgam to be used under the following conditions:
  - Poor moisture control
  - Difficult cavity accessibility
  - Large cavities
  - Large interdental spaces to be bridged.

It is at this point that some readers may be thinking that the banning of amalgam is long overdue, but it must not be forgotten that amalgam, for all its faults, is a very forgiving material and even the EU is aware that there are situations

1. Poor moisture control
2. Difficult cavity accessibility
3. Large cavities
4. Large interdental spaces to be bridged.

Frequently, amalgam is used to replace posterior restorations. However, composite is not ‘tooth-coloured amalgam’ and must be handled and placed differently.

Who will teach how to place composite restorations?

Older dentists had little teaching in the use of composite resin for posterior teeth at Dental School. Only 15 years ago, Effective Health Care was able to report that composites are 1.7 to 3.5 times more expensive than amalgam with a 5-year survival rate only half that of amalgam.

Over the past 10 years, techniques, materials and aids have improved so that Opdam’s study published in 2007 showed that survival rates for
Discover Atlantis™ crown abutment

Atlantis™ crown abutment is an efficient, effective and aesthetic alternative to traditional cast abutments for single-tooth, screw-retained restorations.

Like Atlantis™ patient-specific CAD/CAM abutments for cement-retained restorations, the Atlantis crown abutment is uniquely designed from the final tooth shape for more natural aesthetic results and available for all major implant systems. It is also precision-milled from a solid blank of biocompatible zirconia, which eliminates the need to cast with precious metals.

What’s more, because porcelain is applied directly to the Atlantis crown abutment, it can be easily retrieved, if needed, and the time and cost of preparing a separate coping is recaptured. Atlantis crown abutment is available in five shades, including a new translucent zirconia in white. It can be placed in all positions in the mouth and is covered by a comprehensive warranty.

For more on the benefits of Atlantis™ screw- and cement-retained solutions, visit www.astratechdental.co.uk.

Experience the freedom of unlimited possibilities. Experience Atlantis™.

Moisture control: Moisture control is essential, but a rubber dam is not mandatory!
Rubber dam is mandatory for root canal treatment and strongly advised in areas of difficult access and for certain procedures, such as the placement of posterior Resin Bonded Bridges. However, the financial cost of rubber dam precludes its use for routine restorative work in most NHS practices.

Does this affect the longevity of the subsequent restoration?
One study has shown that rubber dam incorrectly applied affected the proximal contact strengths of posterior composites leading to food impaction and periodontal problems.

So rubber dam is no sub-

page 24
Matrix techniques: On the advice of the Chief Dental Officer, all dentists should be using single-use, disposable matrix bands, as it is impossible to clean assembled conventional bands such as Siqveland adequately. 5, 14

The use of disposable products such as Omni-Matrix (Ultradent) and AutoMatrix (Dentsply) provide affordable, well-fitting matrix bands that act as a mini-dam in keeping oral fluids out of the prepared cavity. The band must be shaped so that the correct contact area is produced on the proximate tooth to reduce the risk of food packing and drifting. A sectional matrix, such as Palodent (Dentsply) is excellent at producing a good contact, but care should be taken in older patients as the wide contact area produced by wear over time is not reproduced by most sectional systems.

Bulk fillers: Returning to the original scenario, already 5-10 minutes of the half-hour appointment has been used. To enable the rapid placement of a composite restoration a new generation of flowable composites has been developed to use as a liner or bulk filler, such as SRD (Dentsply), Venus Bulk Fill (Heraeus) and Tetric EvoCeram Bulk Fill (Ivoclar Vivadent). These generally overcome the problem of light-activated composites and presents Webinars on Aesthetic Dentistry and Posterior composites, bleaching and Minimal bridge updates, posterior and anterior composites, bleaching and Minimal Intervention Dentistry. He also runs ‘hands-on’ courses on Contemporary esthetic Dentistry and Posterior Composites and presents Webinars on Bicroning and Posterior Composite Restorations.

Although the manufacturers state that it is possible to bulk fill using these materials in 4 mm increments, anecdotal evidence suggests the following protocol:

1. Place a 0.5 mm liner at first, as the base of a thicker layer may be further than the maximum depth of 4 mm when a matrix band has been fitted or a deep cavity is present. The initial thin layer is self-leveling as it flows into the irregularities of the cavity floor and may increase marginal adaptation in the gingival margin area. It also acts to stabilize the matrix band, preventing slippage if little tooth is left supra-gingivally. (Fig. 7)

2. Place a further layer of liner, or bulk fill if the cavity is deep, allowing a minimum of 2 mm of conventional composite occlusally to improve wear resistance and appearance. Adaptation of the second layer of flowable or conventional composite is enhanced by the smooth surface left by the initial lining.

Finishing techniques: Good finishing techniques reduce the failure rate caused by secondary caries in composite restorations:

• Trim using a copious quantity of water as coolant, as overheating the composite encourages rapid shrinkage causing failing margins in time
• Try not to use ‘coarse’ diamonds, as they can cause deep surface scratches and loss of filler particles
• Do not ‘over-carve’ the surface, as deep fissures can make cleaning more difficult in some cases and could predispose towards fracture

Materials research is slowly improving the outcome of these restorations and part of a dentist’s Continuing Professional Development should be in engaging in these advances so that a long lasting, functional and aesthetically pleasing restoration can be provided in a realistic time-scale, to the benefit of the dental health of our patients and the financial health of our practices.

References:
7. Dr Bigg has been working in private practice in West Oxfordshire for nearly 40 years and trained up in four generations of some families. He takes referrals for cosmetic dentistry, the non-invasive restoration of the worn dentition and treatment of Temporo-Mandibular Dysfunction. Dr Bigg has the Membership in General Dental Surgery at the Royal College of Surgeons, London and Fellowships from the College of Surgeons in Edin- burgh and London. He is a past President of the British Society for General Dental Surgery. He lectures at home and abroad on courses and bridge updates, posterior and anterior composites, bleaching and Minimal Intervention Dentistry. He also runs ‘hands-on’ courses on Contemporary esthetic Dentistry and Posterior Composites and presents Webinars on Bicroning and Posterior Composite Restorations.

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12.