

# What Restorative material is ideal for Minimum Intervention Dentistry?

Minimum Intervention Dentistry is 21<sup>st</sup> century dentistry and is mercury free!

## 20<sup>th</sup> Century Dentistry

Twentieth century dentistry was characterized by GV blacks' "drill and fill" approach to the management of dental caries. This approach treated the symptoms rather than the causes of the disease and resulted in progressively larger and more complex cavities and restorations and eventual loss of the tooth (the restorative cycle spiral of Elderton et al).

## 21<sup>st</sup> Century Dentistry

Surgical intervention (restoration) should be used as a last resort because no current restorative material can perfectly replace or mimic natural teeth structure in the long term. Furthermore current caries research by several clinical and laboratory caries research experts has proven that caries when diagnosed early can be arrested, healed (remineralised) or reversed by preventive chemical treatments. This led to the development of minimum intervention dentistry approaches to caries management in North America (CAMBRA \*), Europe (MITP\*\*), and Australia (CMS\*\*\*). Further collaborations between caries researchers in UK and USA led to the development of the ICDAS-ICCMS\*\*\*\* caries management systems. These are the four 21<sup>st</sup> century evidence based approaches to implementing minimum intervention dentistry in clinical practice.

What is Minimum Intervention Dentistry?

The ideal restorative material for minimum intervention dentistry is mercury free and should have these 3 properties: <sup>8,31</sup>

- a. It must act as a reservoir for apatite forming ions (Fluoride, Calcium, Phosphate, and Strontium)
  - a. It must be capable of ionic release to demineralized enamel and dentine; and
  - b. It must have the ability to recharge apatite forming ions from saliva. The bioactivity of the restorative material is more important than its compressive strength relative to that of enamel.
- The major manufacturers of solutions and materials for MID and MI restore/repair/replace include GCC, 3 M ESPEE, Shofu, Pulpdent corporation, DMG GmbH (resin infiltration), Ivoclar Vivadent and Advanced Dental Systems to mention a few.



\*Caries management by risk assessment.  
\*\* Minimum Intervention Treatment Plan  
\*\*\*Caries Management System  
\*\*\*\*International caries diagnosis and assessment system (ICDAS)-International caries management System (ICCMS)

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It is common knowledge in dental academic and research circles that mercury dental amalgam does NOT possess any of these 3 attributes.

Glass ionomer based restoratives have distinct advantages over other materials for MID because of their unique properties which include:<sup>8, 31</sup>

- i. Biocompatibility with residual dentine, enamel and ;
- ii. Hydrophilic properties- therefore they can be placed in the wet oral environment without the need for strict isolation/placement of a rubber dam (saliva is 99% water);
- iii. It chemically bonds to enamel and dentine (no etching with acids required). Failure will not occur at tooth material interface but rather within the restorative material;
- iv. It acts as ionic reservoir for apatite ions;
- v. It is capable of ionic exchange (of apatite ions) with demineralized dentine and enamel;
- vi. It is capable of ionic recharge (of apatite ions) from saliva; and
- vii. The restoration matures with time with increasing hardness in the hydrophilic oral environment.
- viii. It is nontoxic/nonirritant to the pulp.

There are now many manufacturers of high viscosity glass ionomers, hybrid glass ionomers, resin modified glass ionomers and nano-hybrid glass ionomers and bioactive composites which in clinical studies have outperformed mercury dental amalgam.

In current clinical dental practice with minimum intervention dentistry we do not talk of permanent restorations/restorative materials anymore. We now speak of short –term and long-term restorations/restoratives because no restorative material can competently replace the biological, physical or esthetic properties of the teeth (enamel. Dentine).

Reputable manufacturers of materials for minimum intervention dentistry which is mercury free include: GC Corporation, 3M ESPEE, Shofu, Ivoclar vivadent, Advanced healthcare limited, Pulpdent corporation and others.

Furthermore, in minimum intervention dentistry there is provision for provisional restorations with medium viscosity glass ionomer restoratives when the caries cavities are gross because patients report late because of poor oral health awareness and poor access to healthcare facilities. This provisional restorations are later replace with long term restoratives when good caries control has been achieved.

