

21ST Century Dentistry Is Mercury Free

5 important questions
answered



**MINAMATA
CONVENTION
ON MERCURY**

- What is 21st century dentistry?
- What is 'drill and fill' (19th and 20th century) dentistry?
- What tooth filling material is ideal for 21st century dentistry?
- What is the W.H.O's recommendation for underserved communities?
- Who makes 21st century mercury free tooth filling materials?

The decision to place the first restoration in a previously unrestored surface of a tooth is a crucial event in the life of a tooth, because a permanent restoration in the true sense of the term 'permanent' does not exist. - IA Mjor and HM Ericson JADA 2008 139 (5): 565-570



What is 21st century dentistry?

21st century dentistry is mercury free.

21st century dentistry is minimum intervention dentistry.

What is Minimum Intervention Dentistry (MID)?



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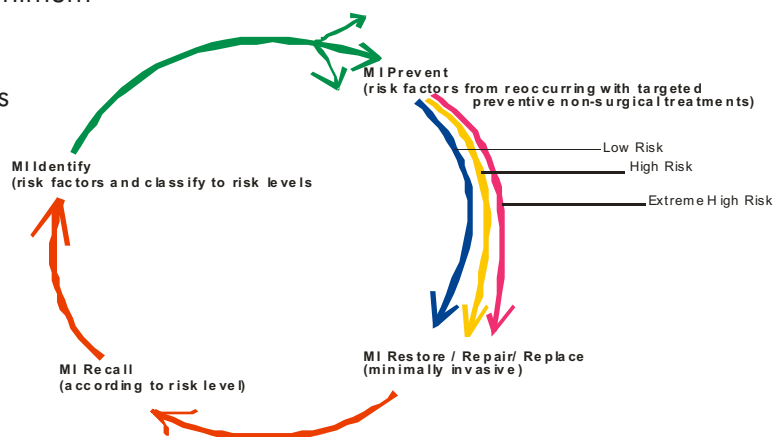
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21st century dentistry (MID), is a holistic, evidence based, patient centered, prevention-focused approach to management of tooth decay (dental caries). The 'drill and fill' approach of GV Black's era (19th & 20th century dentistry) did not control the disease but resulted in progressively larger and more complex cavities, increased costs to both patient and healthcare systems, loss of the tooth and poor oral health outcome. 1, 2, 3 Research has shown that when diagnosed early tooth decay can be healed, arrested or re-mineralized by preventive non-restorative/non-surgical treatments. 4 This lead to the emergence of the new philosophy of managing tooth decay in the 21st century-minimum intervention dentistry (MID). 5, 6, 7, 8

The cornerstone principles of 21st century dentistry (MID) includes early caries diagnosis and risk assessment, oral health promotion, targeted preventive non-restorative treatments, minimally invasive restorative treatments and frequent recalls to evaluate caries risk, caries control, and oral health outcome. 9, 10, 11, 12

The goal of 21st century dentistry (MID) is to keep all teeth and oral tissues healthy and functional for life. 13, 14

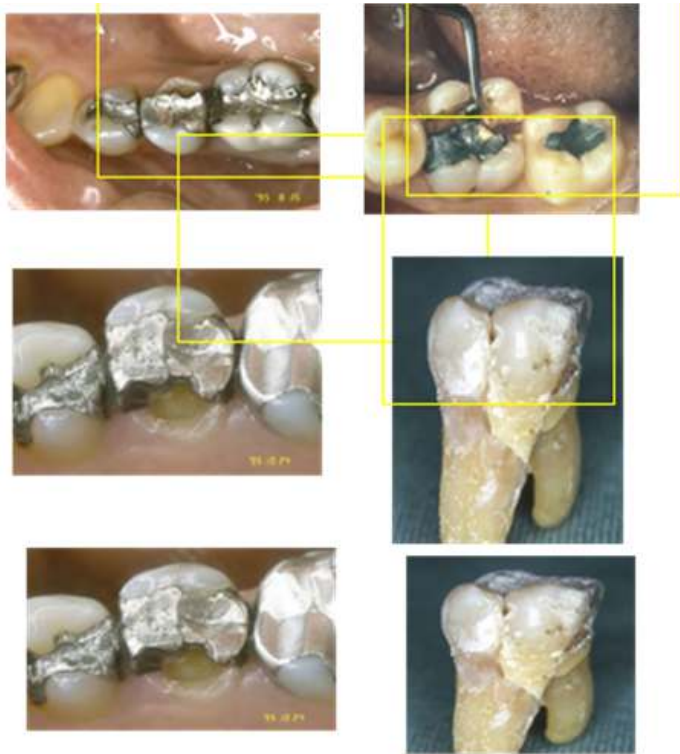


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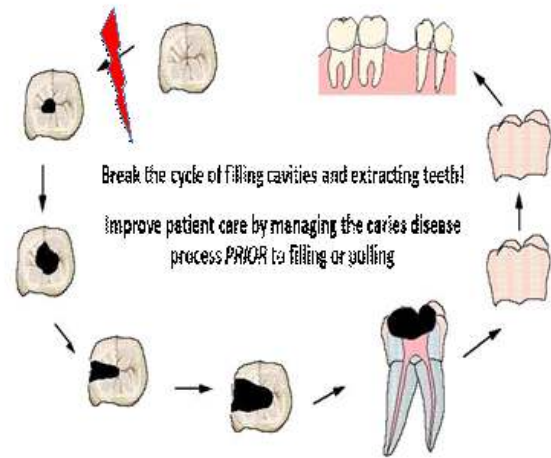


What is 'Drill and Fill' (19th & 20th century) Dentistry?

'Drill and fill' dentistry is the old 19th and 20th century dentistry which treated the symptoms of tooth decay (cavity) rather than the causes of the disease. There is



The Restorative Cycle/Spiral



Elderton R et al. Clinical studies concerning restoration

@ Elderton R et al. Advances in Dental Research 1990 4, 4-9

Restoration Longevity: Effectiveness Matters
Bulletin. York: NHS Centre for Reviews and
Dissemination. 1999.

Drill and fill dentistry with dental amalgam @Tyas at al 2000

unnecessary removal of healthy tooth tissue to enhance the retention of amalgam. 1, 3, 13, 14 Recurrent decay at the margins of dental amalgam means there will be frequent repairs and further removal of healthy tooth tissues resulting in progressively more complex restorations, weakened tooth structure, and eventual loss of the tooth with poor oral health outcome.

Amalgam is an environmental and clinic pollutant because it is 41-50% mercury. Mercury is toxic to virtually all systems and organs in the human body. European scientists have labeled dental amalgam a secondary poison. 16

What tooth filling material is ideal for 21st century dentistry?



The goal of 21st century dentistry (MID) is to keep teeth healthy and functional

for life as no restorative material can adequately replace the physical, chemical and biological

characteristics of the natural tooth tissues (enamel and dentine). 7, 12 The ideal 21ST century

restorative material must have the following characteristics: 7, 17, 18,

- a. It must act as a reservoir for apatite forming ions (Fluoride, Calcium, Phosphate, and Sodium)
- b. It must be capable of ionic release of apatite forming ions to demineralized enamel and dentine; and
- c. It must have the ability to recharge apatite forming ions from saliva

The bio-activity of the restorative over other materials is more important than its compressive strength

relative to that of enamels. Glass ionomer based restoratives have distinct advantages over materials

for MID because of their unique properties which include: 7, 10, 17, 18

- i. Biocompatibility with residual dentine and enamel;
- 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);
- iv. It acts as ionic reservoir for apatite forming ions;
- v. It is capable of ionic exchange (of apatite forming 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 increasing hardness in the hydrophilic oral environment.

New bioactive hybrid long term tooth filling materials material are being introduced but are still rather

expensive for developing economics.17, 18, 19, 20,

Developing countries will need to reduce or remove import charges and taxes on glass ionomer long term

restoratives to ensure their widespread availability before placing restrictions on dental amalgam which will be

discontinued worldwide shortly. 21



What is the WHO recommendation for underserved populations in developing economies?

Frequently, the promoters of prolonged phase down of dental amalgam use the above catchphrase to justify their insistence that developing economics should continue to use this "secondary toxin" because it is a cost effective material. 22 This is in spite of the fact that there are no established systems for collecting, sorting, safe transport and treatment of mercury wastes generated from dental practices.21 Furthermore, developing economics lack the resources and the technology to treat mercury wastes (e.g. stabilization plants). 23 Prolonged phase down will therefore, inevitably result in mercury pollution of the underground water system with potential for fish and aquatic food contamination with methyl mercury.16, 24

The World Health Organization recommendation for underserved communities is the Basic Package of Oral Care (BPOC) 25

What is BPOC

Oral health policies of African countries and other developing economics should have as their cornerstones three principles of Prevention, Promotion, Integration and Partnerships (PPIP) with focus on basic package of oral care (BPOC). 24, 25

BPOC consists of:

i. Oral Urgent Treatment

Oral Urgent Treatment (OUT) is an on-demand service providing basic emergency oral care.

The three fundamental elements of OUT are:

- Relief of oral pain
- First aid for oral infections and dento-alveolar trauma
- Referral of complicated cases

OUT can be provided by trained non-dentist personnel.

i. Affordable Fluoride Toothpaste

Use of Affordable Fluoride Tooth (AFT) is one of the most important preventive measures in managing tooth decay. However, fluoride toothpaste is often too expensive for disadvantaged groups in low-and middle-income countries to purchase.

Approaches to ATF aim at enabling everyone to clean teeth twice daily with quality fluoride toothpaste.

i. Atraumatic Restorative Treatment Atraumatic Restorative Treatment (ART) is a caries management approach, consisting of a preventive (fissures sealant) and a restorative component (restoration). 26

ii. ART can be performed inside and outside a dental clinic, as it uses only hand instruments and a powder-liquid high-viscosity glass-ionomer, and requires neither electricity nor running water. It is relatively painless, minimizing the need for local anesthesia and making cross-infection control easier. It is noteworthy that the restorative material recommended for BPOC is high viscosity glass ionomer long term restoratives (e.g. Fuji IX GP).25 African governments should remove all import duty and taxes on this biocompatible, pulp friendly and bioactive long term restorative materials in order to make it more affordable and widely available for oral healthcare in their underserved communities. 21An Official Publication of Dentists for a Mercury Free Africa @10042020

Make Mercury History Worldwide

The decision to place the first restoration in a previously unrestored surface of a tooth is a crucial event in the life of a tooth, because a permanent restoration in the true sense of the term 'permanent' does not exist.'

-IA Mjor and HM Ericson JADA 2008 139 (5): 565-570



Who makes 21st century mercury free tooth filling materials?

The major manufacturers of solutions and materials for MID (MI restore/repair/replace) include:

1. GC CORPORATION-JAPAN <https://www.gceurope.com/products/> 18
Glass Ionomer long term restoratives
Fuji IX Extra/Fast
Equia
Equia Forte
Equia Forte HT
Composites
G-aenial
Gradia
2. 3M ESPEE-USA https://www.3m.com/3M/en_US/dental-us/ 27
Glass Ionomer long term restoratives
Ketac Molar
Ketac Silver
Ketac Nano
Composite long term restoratives
Filtek supreme
Filtek P 60 Posterior restoratives
Paradigm nano hybrid universal restorative
3. SHOFU-JAPAN <https://www.shofu.com/en/products/restoratives/> 19
Glass ionomer long term restorative.
Hybrid composite restorative.
4. IVOCLAR VIVADENT - www.ivoclarvivadent.com 28
composite long term restoratives
IPS Express direct
Tetricline
Compoglass (Compomer)
Compoglass flow
5. VOCODENTAL-GERMANY - www.voco.dental.us 20
glass ionomer long term restorative
ionostar molar
grandiose flow
grandioso heavy flow
6. SDI-Australia - www.sdi.com.au 29 rok posterior hybrid composite
7. www.dentsplysirona.com/en 30
Rival self cure HV
Chemfil rock
8. ELEVATE ORAL CARE-US - www.elevateoralcare.com 31
smart advantage
9. DMG GmbH <https://www.dmg-dental.com/en/products/direct-restoration/restorative-materials/> 32
Resin infiltration
10. PULPDENT CORPORATION – USA <https://www.pulpdent.com/shop/category/a/> 17



Activa bioactive
Activa bioactive for children

11. ADVANCED DENTAL SYSTEMS – UK
<http://ahl.uk.com/index.php/products/amalomer> 33
Amalomer

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[convention-on-mercury-reject-proposal-to-ban-dental-amalgam](https://www.fdiworlddental.org/news/20191206/parties-to-the-minamata-convention-on-mercury-reject-proposal-to-ban-dental-amalgam)

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29. www.sdi.com.au

30. www.dentsplysirona.com/en

31. www.elevateoralcare.com

32. <https://www.dmg-dental.com/en/products/direct-restoration/restorative-materials/>

33. <http://ahl.uk.com/index.php/products/amalgotmer>



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HISTORY IN AFRICA**

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"Mercury is chemical of global concern owing to its long-range atmospheric transport, its persistent in the environment once anthropogenically introduced, its ability to bio-accumulate in ecosystems and its significant negative effects on human health and the environment".....first preamble of the Minamata Convention on Mercury @ UNEP

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