

ART

An evidence-based technique option for non-aerosol generating clinical practice



Reducing the risk of Covid-19 transmission within a dental practice challenges a clinician to consider how to minimise or replace aerosol-generated procedures as part of routine restorative work in day-to-day clinical practice.

One important non-aerosol generating technique option is called **Atraumatic Restorative Treatment (ART)**. ART is a minimally invasive operative intervention where hand instruments alone are used to prepare a cavity atraumatically. The cavity is subsequently restored with a self-adhesive, bulk fill, high strength glass ionomer restorative.

The basis for this technique comes from numerous clinical studies on partial removal of carious tissue followed by sealing and restoration with glass ionomer cement, where the significant outcome is recognition that only soft, decomposed tooth tissue needs to be removed and the remaining softened, partly demineralised dentine on the pupal floor can be left behind to remineralise.

As well as the benefits for the tooth of a minimal intervention approach, the ART technique can offer dental professionals a simplified, yet evidence based system that is less traumatic for the patient, making it an ideal option for today's challenging climate.

Overview

The origin of ART technique comes from research in the 1990s to develop a restorative and preventive sealant technique suitable for developing economies where access to electricity and cavity cutting equipment was limited and an alternative to extraction was needed.

The original research was a collaboration with the World Health Organisation and GC became active participants after developing a new high strength glass ionomer cement for ART called Fuji® IX. Fuji® IX was so called due to the 9-steps taught by WHO as basis for the ART technique.

Products

ART instruments for cavity preparation

- Enamel access cutter
- Hatchet (to improve access to the cavity if required)
- Spoon excavators

High strength posterior glass ionomer cement, eg Fuji® BULK, fast-setting, or a newer generation glass Hybrid material EQUIA® FORTE.

- In more aesthetic, non-stress bearing areas a resin reinforced light cured glass ionomer restorative could be used eg Fuji® II LC
- A dentine conditioner is recommended prior to placement
- A transitional coating is recommended if moisture control during initial set is difficult eg Vaseline or cocoa butter.
- A long-term reinforced coating using resin micro-lamination is an alternative ie EQUIA® Forte Coat

More recently a modification of this technique has been promoted called Simplified Modified ART (SMART) where access to electricity has meant a capsulated glass ionomer is used and newer, even less invasive cavity preparation principles have been adopted.

An alternative SMART (Silver modified ART) technique is actively promoted in USA where the use of Silver Diamine Fluoride is advocated as a pre-treatment prior to glass ionomer cement application to restore a cavity



EQUIA® Forte Fil & Coat



GC Fuji® VII EP CAPSULE*



GC Fuji® BULK



Dentin Conditioner

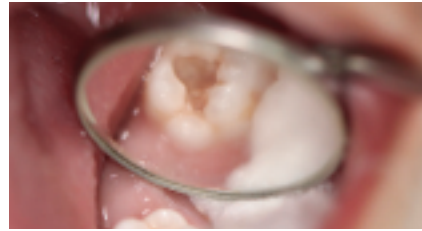


Cocoa Butter

* Schwendicke F, Frencken J E, Bjørndal L et al. Managing Carious Lesions: Consensus Recommendations on Carious Tissue Removal. Adv Dent Res 2016; 28:58–67.

Technique

- Isolation
- Remove plaque with a wet cotton wool pellet, then dry with a dry pellet
- If required, widen the entrance to the cavity using an enamel access cutter or dental hatchet. Place the blade or tip of the instrument into the cavity and turn forward and backward like turning a key in a lock. This movement chips off small pieces of carious enamel.
- Carious dentine is removed with the excavators using circular scooping movements. It is important to remove all the soft caries from the enamel-dentine junction
- Clean the cavity with wet and then dry cotton wool pellets.
- Apply GC CAVITY CONDITIONER for 10 seconds to both dentine and enamel. Wash the cavity with a wet cotton wool pellet at least twice, then dry with a dry pellet
- Activate and mix EQUIA® Forte capsule (or alternative) for 10 seconds
- Immediately inject the mixed cement direct into the cavity and adapt
- If using a “press-finger technique”, rub a small amount of petroleum jelly on the gloved index finger and cement firmly into the cavity and fissures. Remove the finger sideways after a few seconds. The time from the start of mixing until removal of finger should be no more than one minute. Remove excess
- Check the bite. Use the blade of a carver to make occlusal adjustments
- Finish with a single application of EQUIA® Forte Coat, light cure for 10 seconds



1. Place cotton roll at buccal area.



2. Remove soft carious lesion at DEJ by spoon excavator in circular motion only (partial caries removal).



3. Clean floor of the cavity with wet and dry cotton pellets.



4. Apply Dentin Conditioner using a cotton pellet for 20 seconds to remove the smear layer. Clean with wet and dry cotton pellets afterward.



5. Press finger on top of the filling then slide finger out carefully. Carve the excess of GI with spoon excavator. Avoid moisture contamination and dry-out.

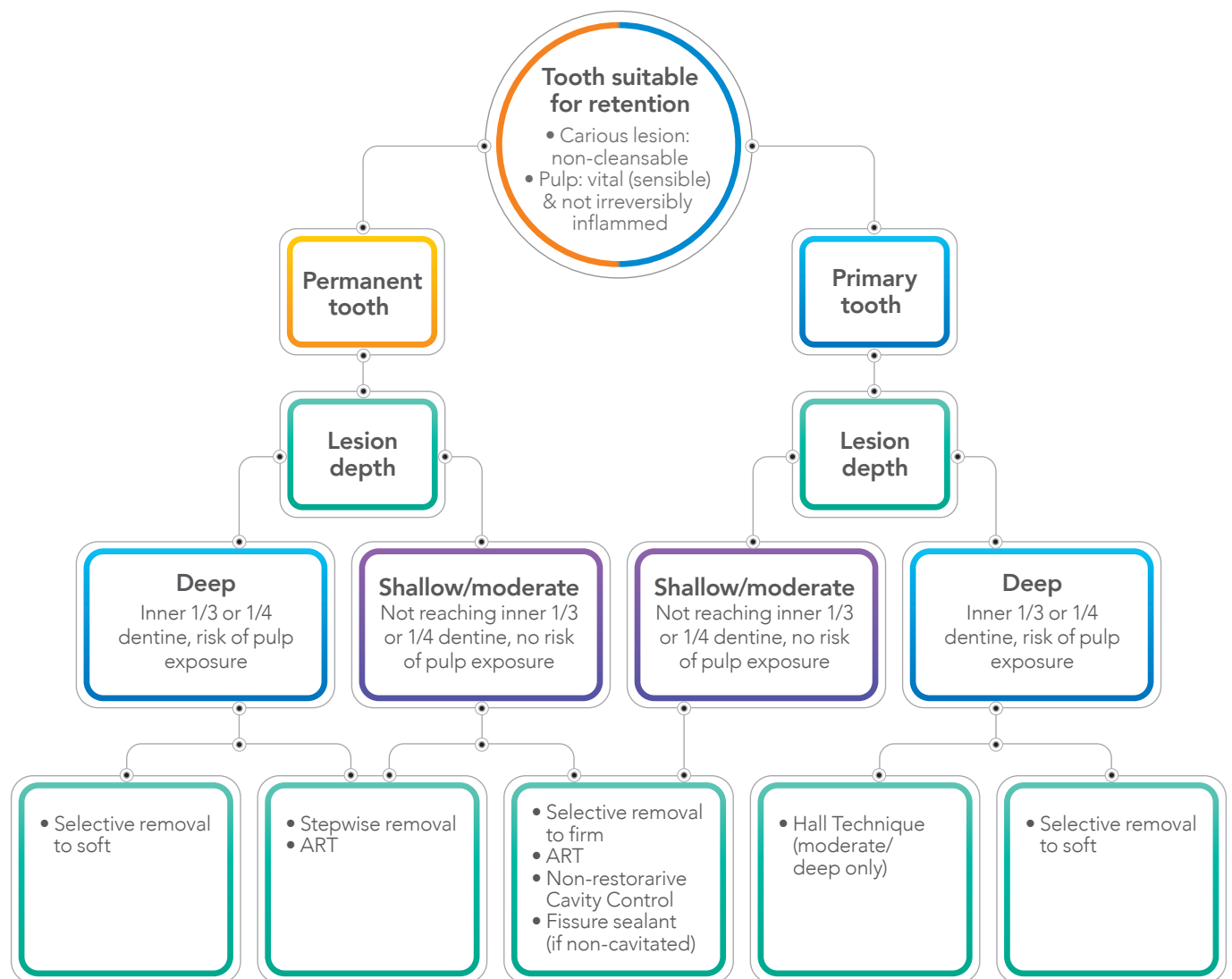


6. Coat GI with Cocoa Butter or Vaseline. Check occlusion by biting from opposite plane and carve the excess GIC.

Images courtesy of
S. Anantavara

Resources

Decision-making flowchart for the minimally invasive operative management of non-cleansable carious lesions in retainable teeth with vital pulps.



(Adapted from Bannerjee 2017)

Evidence

ART technique:

- de Amorim RG, Frencken JE, Raggio DP, Chen X, Hu X, Leal SC. Survival percentages of atraumatic restorative treatment (ART) restorations and sealants in posterior teeth: an updated systematic review and meta-analysis. Clin Oral Investig. 2018; 22:2703-2725.
- Frencken JE. Atraumatic restorative treatment and minimal intervention dentistry. Br Dent J. 2017; 223:183-189.

Partial caries removal:

- Bannerjee A, Frencken JE, Schwendicke F, Innes NPT. Contemporary operative caries management: consensus recommendations on minimally invasive caries removal. Br Dent J 2017; 223:215-222
- Ngo H C, Mount G, Mc Intyre J, Tuisuva J, Von Doussa RJ. Chemical exchange between glass-ionomer restorations and residual carious dentine in permanent molars: An in vivo study. J Dent 2006; 34:608-613.

DISCLAIMERS: The products cited in this leaflet are for professional use only. Always read and follow the instructions for use. The products cited are contraindicated for pulp capping. Avoid use of the cited glass ionomer range of products in patients with known allergies to glass ionomer cement. Avoid the use of DENTIN CONDITIONER, CAVITY CONDITIONER in patients with known allergies to polyacrylic acid. Do not use GC Fuji VII EP in patients with a proven or suspected milk protein allergy or sensitivity. Avoid use of GC Fuji II LC in patients with known allergies to glass ionomer cement, methacrylate monomer or methacrylate polymer. Avoid the use of COCOA BUTTER in patients with known allergies to cocoa butter or nut. Avoid use of EQUIA Forte Coat in patients with known allergies to acrylate monomer, methacrylate monomer or methacrylate polymer.



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GC Australasia Dental Pty Ltd
1753 Botany Road Banksmeadow
NSW 2019 Australia

T: +61 2 9301 8200
E: info.australasia@gc.dental
www.gcaustralasia.com