When, and when not, to use MTA: 7 tips and traps.

### Background. >>

MTA (mineral trioxide aggregate) has many applications in dentistry, in particular for dressings over pulpotomies and apexification procedures. The products used in dentistry can be likened to Portland cement with the addition of a radiopacifier to make the materials detectable on radiographs. A valuable reaction product when MTA is mixed with water is calcium hydroxide.\(^1\)

However, the properties of MTA can be adversely affected by:
- Acids
- EDTA
- Blood

Also the presence of the radiopacifier, bismuth oxide, in some products has been associated with staining.

### When, and when not, to use MTA. >>

#### Care needed if using for a Cvek pulpotomy on anterior teeth. >>

The **Cvek Pulpotomy** is an extremely useful technique for treating vital teeth with a trauma-induced pulp exposure.

The standard technique involves:
- Removing the pulp tissue 2 mm apical to the exposure with a high-speed round diamond bur under a water spray.
- Flushing the site with isotonic saline (a good source is local anaesthetic solution) until the bleeding stops. Diluted sodium hypochloride (2.5%) on a cotton pellet is another alternative.
- Placing a layer of calcium hydroxide or MTA over the pulp tissue.
- Sealing with a layer of GIC and restoring tooth.

**Problem area:**

Even white MTA (WMTA) has been found to cause staining over time when used for a Cvek pulpotomy on anterior teeth. The result is in an unaesthetic “show through” darkening.\(^2\)

The presence of bismuth oxide as a radiopacifier in some products has been identified as a possible causative agent.

**Possible exception:**

Although more independent reports are needed, Biodentine (Septodont) has shown a lack of staining when used for traumatic exposures in immature anterior teeth. This product does not use bismuth oxide in its formulation.\(^3\)

**Summary:**

Calcium hydroxide has shown a high success rate (around 96%) when used in Cvek pulpotomies. So if in doubt use a calcium hydroxide preparation such as Pulpdent Paste (Pulpdent Corp). However, keep in mind the promise of the MTA-based Biodentine (Septodont) in this area.

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### Example MTA products

- **Pro Root MTA** (Dentsply)
- **MTA - Angelus** (Angelus Dental)
- **Biodentine** (Septodont)

Aust. distributors:
- Pro Root MTA - Dentsply
- MTA-Angelus - Gunz Dental
- Biodentine - Henry Schein Halas

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\(^1\) Indications are that the MTA product Biodentine (Septodont) may not cause staining because it contains no bismuth oxide.
When, and when not, to use MTA. (cont)

2. Don’t use in the presence of phosphoric acid. >>

MTA does not perform well in the presence of acids. Acids can inhibit the setting process and can decompose the reaction products. Consequently when phosphoric acid is used for etching it should be washed away thoroughly if MTA is to be placed.

Suggestion:
If MTA is to be used in deeper cavities, it has been suggested that it be covered with a layer of GIC before the cavity margins are etched.

3. Don’t use immediately after EDTA. >>

Although not acidic EDTA is a chelating agent and will remove calcium ions and disturb the setting reaction. Therefore if EDTA is used in an endodontic procedure it should be washed away thoroughly before MTA is used.

4. Best to use calcium hydroxide first in an abscessed tooth. >>

It has been suggested that with an abscessed tooth, calcium hydroxide be placed 1-2 weeks before MTA use. This is because exudates can interfere with the setting of the MTA.

5. Best to use calcium hydroxide first for apexification. >>

A short treatment (1 week) with calcium hydroxide can be beneficial in teeth where apexification is required. This can stimulate repair as well as disinfect the canal.

6. Only mix MTA with water. >>

Only use water when mixing MTA. All the following will result in poorer quality set material:
- Saline.
- Sodium hypochlorite.
- Chlorhexidine.

Source: www.dentaloutlook.com.au
Cover MTA after placement. >>

One suggested technique is to cover MTA with a damp pellet of cotton wool after placement whilst the material is setting. However, if the cotton wool is too dry, it will draw water out of the MTA and weaken it and a similar weakening will occur if the cotton wool is too wet.

Clinically, it has been suggested that the best approach is to place the MTA and immediately cover it with a GIC or resin-modified GIC liner. This allows the MTA to set without the risk of water loss or water uptake.¹

Another approach is to wait 10 minutes for the MTA to set and place a bonding agent similar to Clearfil SE Bond (Kuraray) to seal the surface. A restoration can then be placed enabling the whole procedure to be carried out in one visit.

References: