



5MO as Alternative to MTA in Endodontic Treatments

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Editorial Work

Five mineral oxides (5MO) is a new dental material, its color is white, developed as alternative to mineral trioxide aggregate (MTA) which generally used to treat endodontic accidents and complications. It was developed by Doctor Maisour Ala Rachi in Syria at Faculty of Dentistry, Damascus University, where this material came as the result of a research, according to which Dr. Maisour Ala Rachi attained a doctorate degree PhD in (2007), this research was supervised by Professor Doctor Mohammad Salem Rekab, where Dr. Maisour Ala Rachi made a comparison between MTA and local gray portland cement (GPC) (Syrian Company, Tartous, Syria), and he found that the two materials have similar properties through histological, radiographical, and clinical criteria. So, 5MO was developed based on that research. In (2010) The Syrian Minister of Economy and Trade approved 5MO as a therapeutic dental material for human use (Syrian Patent Number: 5770), then, was approved by The Syrian Ministry of Health in (2012), and The Oman Ministry of Health in (2014).

This material is a powder of fine hydrophilic micro particles, which convert to solid mass by water, consisting mainly of the following mineral oxides: calcium silicate which is the essential component, calcium oxide, silicate oxide, high rate of titanium oxide, aluminum oxide, and magnesium oxide.

5MO has the same indications, mechanism of action, and benefits of MTA, it has better sealing ability and mechanical properties than MTA, better antibacterial property, better handling and application than MTA, and it is less expensive than MTA. Taking into account the low cost of 5MO in comparison to MTA, it is reasonable

to consider 5MO as a possible substitute for MTA in endodontic applications.

Histological and laboratory studies approved that the 5MO material shows: no mutagenic or cytotoxic properties, high biocompatibility and toughness, coherent mixture, and excellent sealing ability, its PH was found to be (13.3-13.5) which is higher than MTA (PH = 11-12 even after 72 hours), it has low solubility, and the antibacterial effects against some facultative bacteria due to fluoride release, it contains filler materials which keep the water needed for good setting. 5MO has high compressive strength is about (100 MPa) after three weeks, which is similar to that of intermediate restorative material (IRM), super ethoxy benzoic acid (Super EBA), and more than that of MTA (70 MPa) (1.5 mm of the material is sufficient to tolerate the strength), but clearly less than that of amalgam (311 MPa), which allow to make preparation and apply any restorative material over it, but 5MO can't be used as a final restoration. Also, it has good opacity, and initial setting time after about 3 hours.

5MO has been used as a root end filling (retro-filling material), for sealing root canal, repairing furcation perforations, internal resorption treatment, direct pulp capping material, dressing material after vital pulpotomy (especially on third molars and primary molars), inducing apexogenesis, inducing apexification (apical plug in one sitting, where can be used easily in apical third of the canal) and as a root canal filling material to fill the entire canal in some special cases as root perforations. The clinical significance of using 5MO as an orthograde root canal filling material comes for repairing perforations and healing apical lesions, where it could be placed without

complexity in irrigation during root canal treatment. Therefore, it can be considered that 5MO is a promising root canal filling material with a good apical sealability in the presence of a smear layer.

So, the extrapolation of the results of these studies to clinical situation must be performed with caution. Post space preparation is often required immediately following root canal obturation with 5MO. In addition, retrieving of the set 5MO from the root canal is difficult if nonsurgical retreatment is indicated. Therefore, it is recommended that the root canal filling with 5MO should be limited to selected cases such as one-visit apexification and situations where future nonsurgical retreatment is infeasible or may not render better tooth prognosis.

Further investigation should be conducted to determine whether some physical properties of 5MO or the technique for its placement could be modified to facilitate its use as an orthograde root canal filling material. Also, several researches are suggested doing to know the effect of different irrigants and solutions on hardness and the other properties of 5MO.

There aren't enough scientific studies or researches about this material, there are only four studies regarding 5MO clinical efficacy as a pulpotomy agent in human primary molars, with successful clinical and radiographical outcomes, as a direct pulp capping material compared with Dycal, as retrograde apical sealing material, and as root canal filling material after smear layer removal. Therefore, it is imperative to conduct many scientific studies and researches to find out the properties of 5MO and its importance in endodontic treatments.

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