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## Original Research

### Comparative evaluation of MTA and Biodentine in irreversible pulpitis cases

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#### ABSTRACT:

**Background:** When a tooth has signs and symptoms indicative of irreversible pulpitis and periapical lesion, root canal treatment has traditionally been recommended. This present study was conducted to compare MTA and Biodentine in teeth with irreversible pulpitis. **Materials & Methods:** The present study was conducted on 30 mandibular premolar teeth of both genders. In all patients, endodontic procedure was performed by single endodontist. Teeth were divided into 2 groups. Group I patients were treated with MTA and group II with biodentine. Pain intensity was recorded after 24 hours, 1 week, 3 months and 6 months. Clinical assessment was done at 3 months and 6 months. **Results:** Pain score after 24 hours in group I was 1.8, in group II was 1.5, after 1 week was 0.59 and in group II was 0.68, after 3 months was 0.61 in group I and 0.60 in group II and 0.41 in group I and 0.46 in group II after 6 months. The difference was non-significant ( $P > 0.05$ ). Clinical success rate after 3 months in group I was 82.1%, in group II was 81.8% and in group II was 83.2% at 6 months. The difference was non-significant ( $P > 0.05$ ). **Conclusion:** Authors found that mineral trioxide aggregate and Biodentine were equally effective as pulp capping agents. **Key words:** Biodentine, Mineral trioxide aggregate, Pulp Capping

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#### INTRODUCTION

Partial pulpotomy, one form of vital pulp therapy, has traditionally been indicated only in a carious or traumatically exposed vital tooth with a clinical diagnosis of normal pulp or reversible pulpitis.<sup>1</sup> When a tooth has signs and symptoms indicative of irreversible pulpitis and periapical lesion, root canal treatment has traditionally been recommended. However, root canal treatment is an expensive, complicated, and time-consuming procedure. Recently, the success of vital pulp therapy in challenging cases has been demonstrated.<sup>2</sup>

Many medications have been prescribed to relieve pain in irreversible pulpitis. Opioid and non-opioid analgesics, benzo-diazepines, non-steroidal anti-inflammatory drugs, corticosteroids, or antibiotics, and even usage of mineral trioxide aggregate (MTA), have been prescribed in dentistry.<sup>3</sup>

Mineral trioxide aggregate has attracted attention in the field of endodontics as a potential medicament for pulpotomy procedures, pulp capping, apexification, repair of root perforation, and repair of resorptive defects. Biodentine™ presents high biocompatibility with human dental pulp cells. The pulp tissue in contact with Biodentine™ does not show an irreversible inflammatory response. Previous studies have reported that Biodentine™ has high antibacterial effects and antifungal activity. It has a shorter setting time than MTA, as the result of calcium chloride in the liquid component of Biodentine.<sup>4</sup> This present study was conducted to compare MTA and Biodentine in teeth with irreversible pulpitis.

#### MATERIALS & METHODS

The present study was conducted in the department of Endodontics. It consisted of 30 mandibular premolar

teeth of both genders. The study protocol was approved from institutional ethical committee. All patients were informed regarding the study and written consent was obtained.

Patient information such as name, age, gender etc. was recorded. In all patients, endodontic procedure was performed by single endodontist. Teeth were divided

into 2 groups. Group 1 patients were treated with MTA and group II with biodentine. Pain intensity was recorded after 24 hours, 1 week, 3 months and 6 months. Clinical assessment was done at 3 months and 6 months. Results were subjected to statistical analysis. P value less than 0.05 was considered significant.

**RESULTS**

**Table I Distribution of teeth**

Groups	Group I	Group II
Materials	MTA	Biodentine
Number	15	15

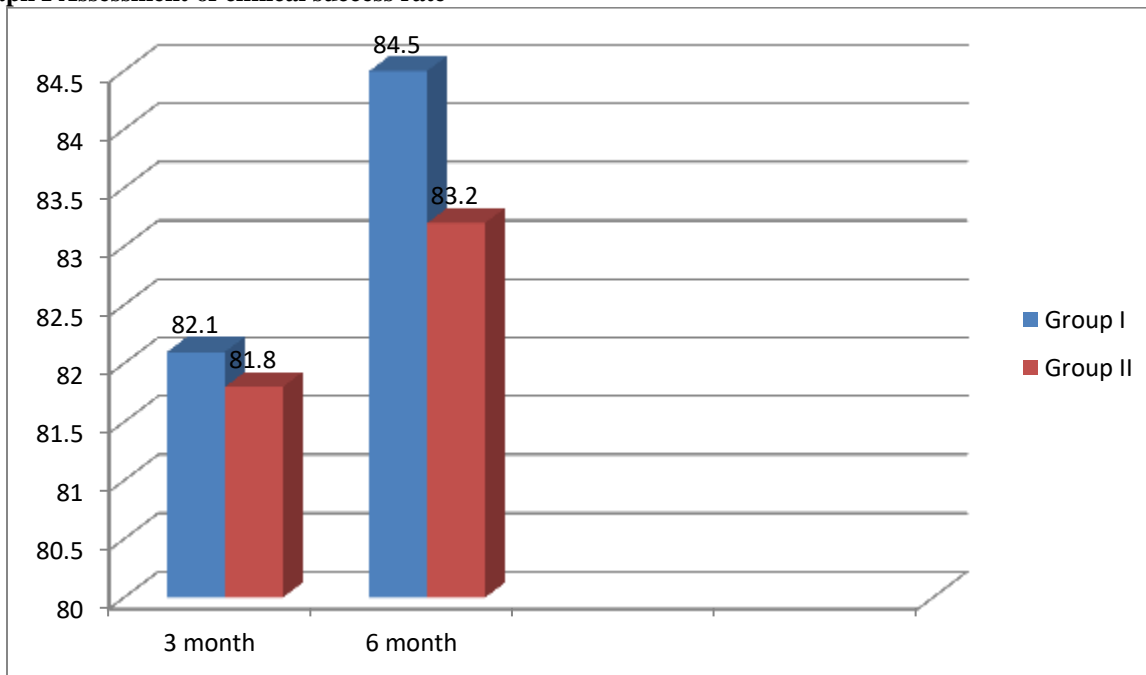
Table I shows that in group I, patients were treated with MTA and group II with biodentine.

**Table II Assessment of pain score**

Duration	Group I	Group II	P value
24 hours	1.8	1.5	0.76
1 week	0.59	0.68	0.27
3 month	0.61	0.60	0.92
6 month	0.41	0.46	0.31

Table II shows that pain score after 24 hours in group I was 1.8, in group II was 1.5, after 1 week was 0.59 and in group II was 0.68, after 3 months was 0.61 in group I and 0.60 in group II and 0.41 in group I and 0.46 in group II after 6 months. The difference was non- significant ( $P > 0.05$ ).

**Graph I Assessment of clinical success rate**



Graph I shows that clinical success rate after 3 months in group I was 82.1%, in group II was 81.8% and in group II was 83.2% at 6 months. The difference was non- significant ( $P > 0.05$ ).

## DISCUSSION

Partial pulpotomy was performed successfully in this case with signs and symptoms indicative of irreversible pulpitis and periapical lesion. Clinical diagnosis of the pulp status has traditionally been used as the main criterion for choosing treatment; however, the correlation between clinical and histological pulp status varies from weak to high.<sup>5</sup> Moreover, a periapical lesion in teeth with vital pulp in young patients may be the result of the process of immunological response to an irritating factor invading from the corona, diffusing through the radicular pulp tissue. Information derived from preoperative clinical and radiographic examination should not be the sole criterion used to determine treatment, and direct evaluation of the pulp can also aid in the evaluation of pulp vitality.<sup>6</sup>

The pain following endodontic therapy is often linked to the inflammatory process. Glucocorticoids inhibit the production by multiple cells or factors that are important in producing the inflammatory response. The post-pulpotomy pain-relieving effect of dexamethasone (DEX) as sedative dressing has not been evaluated previously. In addition, most of the studies involving MTA have only investigated its effect on dentine bridge formation rather than its analgesic effects.<sup>7</sup> This present study was conducted to compare MTA and Biodentine in teeth with irreversible pulpitis.

In present study, teeth were divided into 2 groups. Group 1 patients were treated with MTA and group II with biodentine. Torabinejad et al<sup>8</sup> conducted a study on 54 patients complaining of dental pain due to irreversible pulpitis. Patients were randomly divided into three groups: those in whom a sterile dry cotton (DC) pellet was used, patients treated with a cotton pellet soaked in MTA, and those who were treated with a cotton pellet soaked in DEX. Postoperative pain was assessed at 6-hour intervals for 24 hours, and then every day until day 7 using a visual analog scale. In general, patients treated with MTA suffered the lowest levels of pain at all time intervals. Post-pulpotomy pain was significantly reduced at 18 and 24 hours and from days 2 to 7 post-treatment in the MTA group. DEX lowered the pain level more than the DC pellet. However, the differences observed in the mean pain scores of the DEX and DC pellet groups at all-time intervals were not statistically significant.

We found that pain score after 24 hours in group I was 1.8, in group II was 1.5, after 1 week was 0.59 and in group II was 0.68, after 3 months was 0.61 in group I and 0.60 in group II and 0.41 in group I and 0.46 in group II after 6 months. Holah et al<sup>9</sup> reported the five-year success of Biodentine™ partial pulpotomy in a young permanent molar, with signs and symptoms indicative of irreversible pulpitis and periapical lesion, in a nine-year-old girl. During caries removal, pulp

exposure occurred, and 2-3 mm in depth of pulp tissue at the exposure site was removed. Hemorrhage was controlled within four minutes with 2.5% sodium hypochlorite-moistened cotton pellets. Biodentine™ was then applied as both a pulp dressing and a temporary restoration. At the following visit, composite resin was placed over the Biodentine™ as a final restoration. During a five-year follow-up, the tooth was asymptomatic, had positive responses to sensibility tests, and had no discoloration. Follow-up radiographs showed a dentine bridge and periapical healing.

We found that clinical success rate after 3 months in group I was 82.1%, in group II was 81.8% and in group II was 83.2% at 6 months. Compared to MTA, Biodentine™ has a shorter setting time, better physical and mechanical properties, and easier handling. The sealing ability of Biodentine™ has been shown to be equal to or better than that of MTA, thus allowing it to be used as a temporary restorative material. Biodentine™ does not cause discoloration of the treated tooth because it contains zirconium dioxide, instead of bismuth oxide, the radio pacifier that causes tooth discoloration when MTA is used.<sup>10</sup>

## CONCLUSION

Authors found that mineral trioxide aggregate and Biodentine were equally effective as pulp capping agents.

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