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A RANDOMIZED CLINICAL TRIAL TO EVALUATE AND COMPARE THE ANTIMICROBIAL EFFICACY OF CALCIUM HYDROXIDE, HERB MIMUSOPS *ELENGI* AND TRIBULUS *TERRESTRIS* AS AN INTRACANAL MEDICAMENT ON ENTEROCOCCUS *FAECALIS* IN PERMANENT TEETH.

By

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ABSTRACT

Background

The root canal treatment focuses on the complete elimination of microbes from the pulp space. This is achieved through chemo-mechanical preparation followed by three-dimensional obturation. The persistent bacterium such as Enterococcus *faecalis* in the intricacies of pulp spaces poses a problem of endodontic treatment failure. To prevent such failures, Chemo-mechanical preparation along with the placement of intracanal medicament enhances the elimination of microbes and healing. Thus, this study aims to evaluate and compare the antimicrobial Efficacy of calcium hydroxide, herbal Mimusops *elengi and*
Tribulus terrestris as an intracanal medicament on Enterococcus *faecalis* in permanent teeth.

Objective:

To evaluate and compare the antimicrobial efficacy of calcium hydroxide, herbal preparationof Mimusops *elengi* and Tribulus *terrestris* as an intracanal medicament on Enterococcus *faecalis*

Methods:

81 patients between the age group of 6-14 years requiring root canal therapy were selected for the study and randomly divided into 3 groups of 27 participants each namely:

- Group A - Control; a mixture of Calcium hydroxide with saline was placed as an intracanal medicament.
- Group B - a mixture of raw powder of *Mimusops Elengi* with saline was placed as anintracanal medicament.
- Group C - a mixture of raw powder of *Tribulus Terrestris* with saline was placed as an intracanal medicament.

Three intracanal samples were collected for each patient comprising one baseline sample, and two samples post-placement of intracanal medicament after an interval of 15 and 30 days respectively. These collected samples were sent to the laboratory for microbiological analysisto check the Colony Forming Unit counts of bacteria E.*faecalis*. The data collected will be tabulated and sent for statistical analysis.

Results

The results demonstrated that all groups had antibacterial activity against E.*faecalis*. The intergroup comparison of CFU across the three groups revealed a significant difference in CFU at baseline ($P < 0.05$), but no significant difference in CFU counts at the 15^{th} and30^{th} days. The intragroup comparison of CFU revealed substantial reductions in CFU at each interval, with mean CFU counts of the calcium hydroxide group, M.*elengi* and T.*terresteris* groups on the 30^{th} day showed 7461.85, 3744.48 and 7427.41 respectively, suggesting a reduction in CFU counts from baseline validating the significant antimicrobial activity. All three groups successfully decreased bacterial load from baseline to the 30th day. The overall reduction percentage of Groups A, B, and C is 65%,77.9%, and 81.79 respectively. Group C demonstrates the greatest antimicrobial efficacy.

Conclusions:

The present study shows that all three intracanal medicaments have antimicrobial efficacy against E.*faecalis.* The study results reveal clinically successful outcomes, with Groups A, B, and C showing overall reductions in percentages of the mean CFU counts from baseline to the 30-day interval of 65%, 77.7%, and 81.79%, respectively. These results indicate that the antimicrobial efficacy of M. *elengi* and T. *terresteris* herbs was better than traditional calcium hydroxide, though not statistically significant. Among the two herbs, T. *terresteris* demonstrated a better antimicrobial efficacy.

The current study has explored these herbs as a safe, natural, easily available, sustainable, biocompatible, economical, and easily accessible substitute for calcium hydroxide in pediatric applications making this study the first of its kind.

Keywords: Enterococcus. *faecalis* , intracanal medicament, Mimusops *elengi,,* Tribulius. *Terresteris,* antimicrobial efficacy, Calcium hydroxide and Colony Forming Units

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