Research Article **ISSN: 2349 – 7106**

Asian Journal of Research in Chemistry and Pharmaceutical Sciences

Journal home page: www.ajrcps.com

COMPARATIVE EVALUATION OF METAPEX WITH HONEY AND SESAME OIL AS OBTURATING MATERIAL

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ABSTRACT

Tooth loss among children will lead to various complications during the eruption of permanent tooth. Hence, there is always a need for the retention of primary teeth. Pulp infection is very common among children which may lead to loss of their canine or molars. Zinc oxide Eugenol cement is the most widely used obturating material by paedodontist. Another widely used material used for filling is Calcium Hydroxide. Metapex is a commercially available obturating material, which is a paste of CaOH and Iodoform. It is having antibacterial activity and is used as a filling material. In the current study Honey and Sesame oil were used in the place of eugenol as an obturating material. Honey and sesame oil were mixed with ZnO and CaOH separately and the antimicrobial activity was studied against *Staph. Aureus, Strep. Mutans, E. feacalis and Candida albicans*. From the current study it can be concluded that plain Honey and Honey in combination with ZnO and CaOH can be substituted as an obturating material. It was found that metapex and eugenol had a lesser zone of inhibition than both Sesame oil and Honey and also when in combination with ZnO and CaOH. The side effects of using naturally available obturating material will have a lesser side effect. However, *in vivo* studies may be carried out for further research.

KEYWORDS

Obturating material, Plain Honey, ZnO and CaOH.

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INTRODUCTON

The primary teeth is prone for pulp infection as it is a highly vascularised tissue. Tooth loss among children will lead to various complications during the eruption of permanent tooth. Hence, there is always a need for the retention of primary teeth. Pulp infection is very common among children which may lead to loss of their canine or molars. Zinc oxide Eugenol cement is the most widely used obturating material by paedodontist. Zinc Oxide

Eugenol is composed of Zinc oxide - 69.0%, White resin - 29.3%, Zinc acetate - 1.0%, Zinc Stearate - 0.7%, Liquid (eugenol - 85%, olive oil - 15%).

Even though there are several advantages for the use of ZnO Eugenol such as anti-inflammatory and anti analgesic, several drawbacks were also cited. Some of the disadvantage of using ZOE are alteration of path of succadeneous teeth, allergic reactions, crossbite, necrosis of bone and cementum to mention a few.

Another widely used material used for filling is Calcium Hydroxide. It is used for deep restorations and as a liner. CaOH is suggested as the last obturating material in primary teeth filling. The resorption rate of CaOH is faster than the physiological process which leads to a "hollow tube effect" where it becomes infection prone due to seepage of tissue fluid. CaOH does not act as a barrier for entry of microorganisms.

Metapex is a commercially available obturating material, which is a paste of CaOH and Iodoform. It is having antibacterial activity and is used as a filling material. According to Nair et al., one of the main cause for the failure of root canal treatment is due to the presence of microorganism seen in the obturating tooth root canal. Dentists often consider procedural errors such as over and under filling, broken instruments etc as the main cause of root canal treatment failure but overlook the presence of bacteria[1].

In the current study Honey and Sesame oil were used in the place of eugenol as an obturating material. Honey and sesame oil were mixed with ZnO and Ca OH separately and the antimicrobial activity was studied against *Staph. Aureus, Strep. Mutans, E. Feacalis and Candida albicans.*

MATERIAL AND METHODS

The antimicrobial efficacy of 6 samples were studied against 3 bacteria and 1 yeast. Honey, Sesame oil, ZnO + Honey, CaOH + Honey, Sesame Oil, Sesame Oil + ZnO and Sesame oil + CaOH were used. Metapex was used as Positive Control and Saline as Negative control. Well diffusion method was done and the zone of inhibition was measured for the evaluation of antimicrobial efficacy.

Preparation of Obturtaing material

1 gm of ZnO and CaOH was measured and each was mixed separately with Sesame oil into a paste like consistency. Similarly, Honey was mixed with 1 gm of ZnO and CaOH into paste. Pure Honey and sesame oil was used for the current study. A sterile glass slab and spatula was used for mixing the test materials into the desired pasty consistency.

Well diffusion method

Muller Hinton Agar was used for *Staphylococcus aureus* and *Enterococcus feacalis*. For *Streptococcus mutans,* Blood agar was used and Sabourauds Dextrose agar was used *Candida albicans*. 4mm wells were cut on the agar plates with the help of a core borer. Each set of test was repeated 5 times. The bacterial isolates were confirmed by using biochemical tests. Germ tube test was done for confirming *Candida albicans*. Inoculum was prepared by inoculating the organisms in BHI broth for 4 hours. The culture was adjusted 1 Mc Farland by adding sterile saline.

The obturating test material was placed into the well. The plates were then kept in incubator overnight for sterility check. With sterile cotton swab the prepared inoculums were inoculated onto the plates. Lawn culture was done. The plates were incubated for 24 hours at 37^{o}C. Zone of inhibition was measured in mm. Mean mm was taken for Zone of inhibition for each microorganism.

RESULTS

From the current study it was noted that Honey showed maximum Zone of Inhibition for *Staph. Aureus*, *E.Faecalis* and *Strep.Mutans* (Table No.1). For *C.albicans* it was noted that maximum zone of inhibition was shown by Honey + ZnO. The above results showed that the least zone of Inhibition was shown by Sesame oil + CaOH. Honey showed maximum zone of inhibition when used as its plain form, whereas, Sesame oil showed maximum Zone of inhibition when used in combination with ZnO against *Strep.Mutans*. Honey in combination with CaOH showed antibacterial activity close to Plain honey when used for *E.Feacalis*.

The above graph (Figure No.1) shows that plain honey is having more antimicrobial activity when in comparison with honey in combination with ZnO and CaOH.

DISCUSSION

According to American Academy of Pedodontics the preservation of primary teeth helps in acceptance in society and esthetics. Samdi *et al* suggested that using of natural materials which are having antimicrobial property as a filling material helps in optimizing the positive outcome of pulp therapy[2]. In the current study Honey and sesame oil in their natural form and in combination with ZnO and CaOH respectively were studied for their antimicrobial activity.

According to Hugar S *et al*, for pulpal disease management, the root canal space should be devoid of microorganisms[3]. Rifkin A. suggested that the oral microflora can penetrate into the pulpal space and lead to necrosis of deciduous teeth[4]. The current study tried to supplement synthetic drugs and chemicals with natural products or natural products in combination with ZnO and CaOH.

In a study conducted by Saumya *et al* on antimicrobial efficacy of Contemporary Obturating materials it was found that Endoflas showed maximum zone of inhibition for E.Feacalis. Endoflas is combination of iodoform, Zinc Oxide, Calcium hydroxide, Barium sulphate, Eugenol and paramonochlorphenicol which is used as a resorbable paste[5]. In our current study it was found that plain honey had more Antibacterial efficacy. When honey was used in combination with ZnO or CaOH it was noted that there was a lesser zone of inhibition in comparison with plain honey. But in the case of Sesame oil it was found that in combination with ZnO it was able to show highest zone of inhibition for *Strep.mutans*.

Group 1	Honey	Commercially available
Group II	Sesame oil	Commercially available
Group III	Sesame oil + ZnO	1: 1 ratio
Group IV	Sesame oil + CaOH	1: 1 ratio
Group V	Honey + ZnO	1: 1 ratio
Group VI	Honey+ CaOH	1: 1 ratio
Group VII	Metapex	Commercially available
Group VIII	Eugenol	Commercially available
Group IX	Saline	Commercially available

Table No.1: Mean Zone of Inhibition for each organism. (In mm ± SD)

	Obturating material	***Stap.aureus***	***E. feacalis***	***Strep. mutans***	***C.albicans***
Group 1	Honey	44.8 ± 1.4	29.6 ± 1.14	30.4 ± 1.14	25.2 ± 0.83
Group II	Sesame oil	20.6 ± 1.3	22 .2 ± 0.8	21 .4 ± 0.8	20 ± 0.7
Group III	Sesame oil + ZnO	17.6 ± 1.8	20.8 ± 1.7	29.5 ± 0.5	21.4 ± 1.0
Group IV	Sesame oil + CaOH	19.2 ± 1.3	11.2 ± 1.4	15.8 ± 0.8	20 .4 ± 1.6
Group V	Honey + ZnO	34.6 ± 1.8	25 ± 1.8	20.8 ± 1.3	27.6 ± 1.1
Group VI	Honey+ CaOH	24.8 ± 1.5	29.2 ± 1.6	25.2 ± 1	24.8± 1
Group VII	Metapex	32.4 ± 1.1	27.1 ± 1.5	18.2 ± 1.3	27.3 ± 1.0
Group VIII	Eugenol	35 ± 1.6	25.8 ± 0.8	11.6 ± 1.1	19 ± 0.7
Group IX	Saline	7.6 ± 1.4	10.2 ± 2.4	8.2 ± 0.83	11.6 ± 0.5

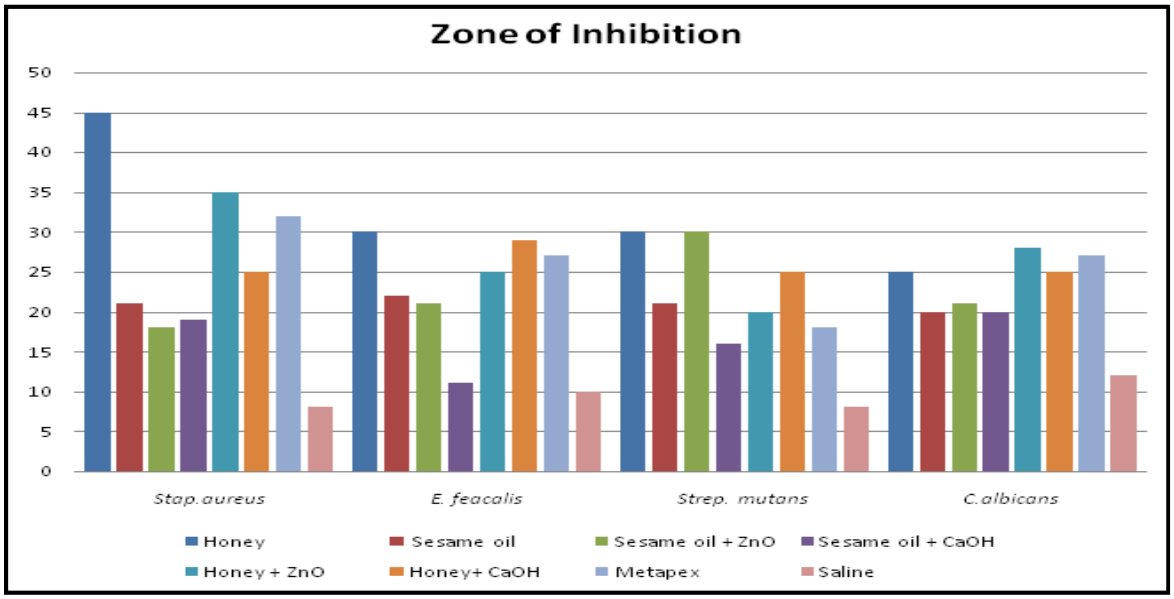

Figure No.1: Comparison of obturating materials with different microorganisms

CONCLUSION

From the above study it can be concluded that plain Honey and Honey in combination with ZnO and CaOH can be substituted as an obturating material. It was found to have metapex and eugenol had a lesser zone of inhibition than both sesame oil and Honey and also when in combination with ZnO and CaOH. The side effects of using naturally available obturating material will have a lesser side effect. However, *In vivo* studies may be carried out for further research.

ACKNOWLEDGEMENT

The authors are sincerely thanks to the Department of Microbiology, SRM Dental College, Ramapuram, Chennai, Tamil Nadu, India for providing the facilities to complete this research work.

CONFLICT OF INTEREST

We declare that we have no conflict of interest.

BIBILIOGRAPHY

1. Nair P, Sjogren U, Krey G, Kahnberg K, Sundqvist G. Intraradicular bacteria and fungi in root-filled, asymptomatic human teeth with therapy-resistant periapical lesions: a long term light and electron microscope follow-up study, *Journal of Endodontology,* 16(12), 1990, 580-588.
2. Samadi *et al*. A Comparative Evaluation of Efficacy of Different Obturation Techniques used in Root Canal Treatment of Anterior Teeth: An *in vitro* Study, *Int. Jouranl of Paedeatric Dentistry,* 7(1), 2014, 1-5.
3. Hugar S M, Shigli A, Suganya M, Hugar S S, Kukreja P. Comparative evaluation of efficiency of three obturation techniques for primary incisors – An *in vivo* study, *Int J Oral Health Med Res,* 2(2), 2015, 15-18.
4. Rifkin A. The root canal treatment of abscessed primary teeth: A three to four year follow-up, *J Dent Child,* 49, 1982, 428-431.
5. Saumya *et al*. Antimicrobial Efficacy of Contemporary Obturating Materials used in Primary Teeth- An *In-vitro* Study, *Journal of Clinical diagnostic Research,* 10(9), 2016, ZC09-ZC12.

Please cite this article in press as: Kanakam Elizabeth and Savithri. Comparative evaluation of metapex with honey and sesame oil as obturating material, *Asian Journal of Research in Chemistry and Pharmaceutical Sciences,* 7(1), 2019, 131-135.