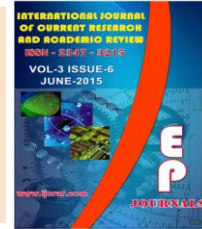




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The Comparison of pain after using of formocrezol and *Elaeagnus Angustifolia* Fruit Powder for Pulpotomy of deciduous Teeth

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KEYWORDS

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Deciduous teeth,
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Pulpotomy.

A B S T R A C T

Pulpotomy is the most common pulp treatment of deciduous molars. Pulpotomy with formocresol has relatively long-term clinical success, but concerns over its toxicity and mutagenicity have prompted research into other pulpotomy techniques. *Elaeagnus Angustifolia* fruit have anti-inflammatory, analgesic and coagulation effects because of its Flavenoides, and the Terpenoids. The aim of this study was to compare the postoperative pain after using formocresol versus *Elaeagnus Angustifolia* fruit powder as pulpotomy agents in the deciduous teeth. In this clinical trial study, 32 patients (6-10 years old) with two similar deciduous molars that need pulpotomy treatment selected and these 64 teeth randomly divided into two groups: 32 teeth in formocresol group and 32 teeth in *Elaeagnus Angustifolia* group. The teeth were pulpotomized and restored with SCC. A Visual Analog Scale assessed pain levels in first to tenth day. The results indicated that the pain was decreased significantly in both two groups ($P < 0.05$). The decrease in formocresol group was more than *Elaeagnus Angostifolia* group, however, the age ($p = 0.47$), gender ($p = 0.63$) and type of tooth ($p = 0.77$) had no effect on pain experience. During 10 days after treatment, the pain was decreased significantly in both two groups ($P < 0.05$).

Introduction

The deciduous teeth are important due to their role in speech, beauty, chewing, maintaining of dental arch, and prevention of abnormal oral habits.¹ Pulpotomy is the preferred treatment for reversible

inflammation in coronal pulp of deciduous teeth. This treatment is doing when the pulps of root canals are not affected and there is the possibility of preserving

deciduous teeth until their normal exfoliation.²

In recent decades, formocresol has been the most common agent used in treatment of deciduous teeth. Concerns about formocresol safety had come into attention for more than 20 years in medical and dental studies.² Many studies have focused on the risks of exposure to formocresol due to its toxicity and carcinogenesis in human.³ Due to the problems concerning the use of formocresol, it seems necessary to pay attention to alternative agents.² During the recent years, researches have been seeking to find a better substitute for formocresol and proposed different studies on calcium hydroxide, Glutaraldehyde, Ferric Sulfate, Mineral Trioxide Aggregate (MTA), bone morphogenic protein, calcium-enriched mixture cement, (CEM), derivation of enamel matrix, beta-tricalcium phosphate and electrosurgery method.³⁻⁶

In addition, there are some studies concerning the application of herbal products as the substitute for formocresol in pulpotomy of deciduous teeth.²

Haqgo et al showed that SUAB2 herbal product (a product including Sumac, Camomile and Oak apple) can be a suitable substitute for formocresol in pulpotomy of deciduous teeth.⁷

In an animal study, El-tawil et al investigated and compared histologic and immunohistochemical response of the pulp of deciduous teeth with Jojoba oil versus formocresol and found that the pulp response to the oil of this plant is more proper.² In another animal study, the usage of *Elaeagnus Angustifolia* fruit extract in pulpotomy of deciduous teeth of dog has been successful.⁸ *Elaeagnus Angustifolia* tree is from *Elaeagnaceae* family and its fruit has some treatment properties.⁹ This fruit

have previously been used in Iran traditional medicine as an analgesic, antipyretic and healing peptic ulcer and also as a dried fruit.⁹ It also contains A, B, K vitamins and reported the analgesic and anti-inflammatory properties of *Elaeagnus Angustifolia* are due to Flavenoides and Terpenoids¹⁰. Flavenoid derivations have anti-oxidant properties and catecholamines retention. These properties are considered as the main factors creating anti-inflammatory effect of them¹¹. Many studies have been done all over the world concerning the healing effects of this fruit^{12,13}.

In a study, the toxicity of *Elaeagnus Angustifolia* on mouse embryos has been investigated and the results indicated that this fruit has no toxicity and has osteogenesis and chondrogenesis properties but caused a reduction in the bone mass in mouse embryos, however it had no effect on calcium amount¹⁴.

Pain is a multi-dimensional and complex reaction of physical, chemical, hormonal, emotional, perceptual, mental, behavioural and social factors¹⁵. Pain after treatment is something which had not exist before treatment or had been aggravated after it¹⁶. It can limit the daily activities, thus it is a main threat to public health¹⁷.

It might seem difficult to measure severity of pain in a child, especially in pre-school ages, due to speech evolution and perception level. The studies indicate that the Visual Analogue Scale is one of the most valid scales for self-report of pain in children¹⁸. Post-treatment pain is important both for patient and dentist. Pain after root canal therapy has been investigated after 10 days in permanent teeth¹⁹.

Some studies have been done on children for assessment of pain after extraction of deciduous teeth²⁰. However, as far as we

knowl, no study has been done concerning the investigation of pain after deciduous teeth pulpotomy in short-time. In regarding to need for evaluation of this issue due to the complains of parents for the pain after deciduous teeth pulpotomy of their children, this study as a part of a more extensive study was done.

Materials and Methods

In this clinical trial study, 32 patients from the children referring to the dental faculty of Kerman were selected. The study was approved in the ethic committee of Kerman university of medical sciences with ethical code K/92/222.

Including criteria for the patients was that the children should be 6-10 years old without systemic disease and with desired physical and mental evolution and good behavior^{21,22}. These individuals had at least two similar deciduous molars with deep caries who had no symptoms and signs including abnormal loosening, abscesses, fistulas, Tender to percussion, durable pain and nocturnal pain except for pain at the time of eating and no undesired radiographical findings like pathologic root resorption, lucency in furcation area and widening of PDL. The teeth had restorable crowns²¹.

Before the study, Fresh *Elaeagnus Angustifolia* fruits picked from the tree and dried. The stone of fruits were separated and pure powder was prepared and then the prepared powder was sterilized. After getting the written informed consent of the parents, the teeth of each child were randomly pulpotomized. A checklist was prepared for each child and the demographic information, the medical and dental history, the date of treatment and the used agents were recorded. After the selection of tooth,

local anesthesia (Lidocaine 1,80000 Daroo pakhsh Co,Iran) was done and for preparing isolation, rubberdam was used. After removing the decays by round burs (Tiz Kavan Co, Iran), the roof of pulp chamber was taken and an access cavity was prepared. The pulp tissue was cut by sharp spoon excavator (Joya Co, Iran) and after washing with Sodium chloride 0.9% solution a cotton ball soaked in the solution was placed in the canal orifices for 5 minutes to stop bleeding²¹. In case of bleeding, the tooth was eliminated from the study and pulpectomy treatment was done. Then, randomly (through the table of random numbers) the molar of one side was treated by formocresol and the another side with *Elaeagnus Angustifolia* powder in the next visit.

After control of bleeding, the soaked cotton in formocresol with concentration of 1.5 (Kimia Co, Iran) was placed on the orifices for 5 minutes and after observing that the pulp tissue was fixed, a layer of zinc oxide eugenol paste (ZOE) in 2 mm thickness was placed on the pulp chamber and coated it with Zinc Phosphate cement. At the end, the tooth was restored with SSC (3M Co, US). In the another group, the mixture of 15 mg of *Elaeagnus Angustifolia* powder⁸ and Sodium chloride 0.9% solution (in consistency of a soft paste) was placed on the orifices in 1 mm thickness. Then ZOE with 1 mm thickness was placed on the pulp chamber and covered with Zinc Phosphate cement. At the end, the tooth was restored with SSC.

Then a checklist related to pain with Visual Analogue Scale was delivered to the parents and they were trained to fill the checklist during 10 days after treatments¹⁹. In this questionnaire, the degree of pain after treatment was specified with some smiles from happy to sad. The degree of pain for

patients was defined in this way: painless (point 0), mild pain (points 1-3), moderate pain (points 4-6), severe pain (points 7-9).²³

The checklists were returned to the researchers after 10 days. SPSS 18 software and repeated measures ANOVA were used for data analysis and the significant level was considered less than 0.05.

Results and Discussion

From 32 patients, 21 were male and 11 were female. The average age of children was (7/28). The results indicated that the pain was decreasing during 10 days which was significant in both groups ($p < 0.05$), however, in formocresol group it was rather than *Elaeagnus Angustifolia* group ($p = 0.01$) [Table 1 and Figure 1], While the variables of age ($p = 0.47$), gender ($p = 0.63$) and tooth type ($p = 0.77$) had no effect on pain reduction trend.

The results showed that the pain was decreasing within 10 days which was significant in both groups.

Concerning the use of *Elaeagnus Angustifolia* in pulpotomy of deciduous teeth, we found just one paper among available sources. Poureslami et al investigated the pulp status of dog deciduous teeth after using formocresol and *Elaeagnus Angustifolia* extract histologically and radiographically; however, the pain after treatment was not investigated in both test and control groups. We had access to no other papers related to the pain immediately after deciduous teeth pulpotomy with herbal materials, so there is some limitation for comparison and discussion in the present study. Pain in deciduous teeth after pulpotomy can be related to some reasons including damage to gingiva when using rubberdam or SSC or due to using the

different instruments. In so far as, in this study all these variables were the same in both groups and all treatment procedures were done by the same person, it is possible to compare pain degree after the treatments.

The results of our study was agree with the results of Nematollahi et al study about the pain after pulpotomy. However, in that study nocturnal pain was investigated in three groups of formocresol, ferric sulfate and MTA within 3 and twelve months²⁴.

El-tawil et al reported that histologic and immunohistochemical responses of dog teeth pulps to Jojoba oil is better than formocresol, however, they did not investigate pain after using of two agents. Jojoba oil is prepared from the stone of *Simmondsia chinensis* and has anti-bacterial and anti-inflammatory effects. However, in that study, jojoba oil was mixed with ZOE and then placed on pulp, the better effect might be due to this mixture².

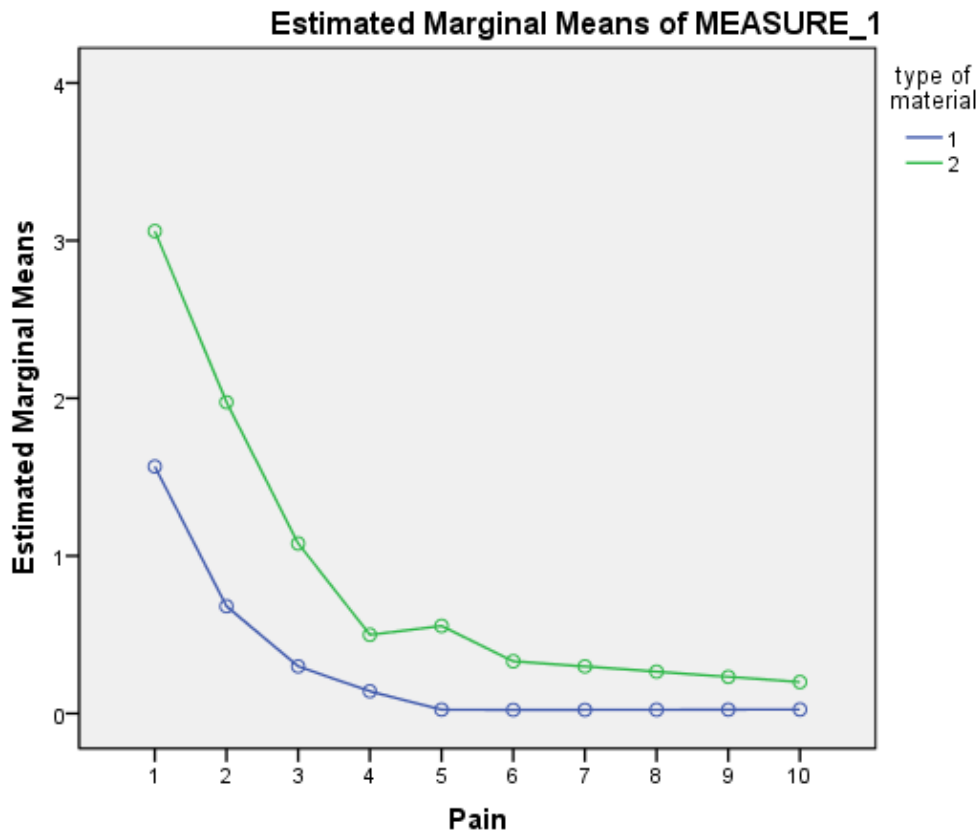
In pulpotomy of deciduous canines with SUAB2, Haqgo et al argued that the inflammation in pulpotomized teeth with this herbal extract is less than that of formocresol. In that study, the cotton soaked in the herbal extract and was placed on pulp for 5 minutes and then the pulp chamber was filled with zinc oxide paste. Furthermore, in that study, the pain after treatment had not been investigated⁷. The reason for placing *Elaeagnus Angustifolia* powder directly on pulp in the present study is due to the use of its anti-inflammatory effects on the vital pulp.

After application of ABS (Ankaford Blood Stopper) in pulpotomy of deciduous teeth, Yaman et al didn't report significant difference in severity of pain within 3, 6 and 12 months between the herbal composition and formocresol.

Table.1 Mean of the Pain in first till tenth days after the treatment in control (1) and Experimental (2)groups

The groups		Mean(SD)	Std. Deviation	N
Day 1	1	1.56	1.966	32
	2	3.06	2.476	32
	Total	2.30	2.339	64
Day 2	1	.69	1.731	32
	2	1.97	2.523	32
	Total	1.32	2.235	64
Day 3	1	.34	1.599	32
	2	1.03	2.152	32
	Total	.68	1.908	64
Day 4	1	.16	.574	32
	2	.48	1.151	32
	Total	.32	.913	64
Day 5	1	.03	.177	32
	2	.55	1.207	32
	Total	.29	.888	64
Day 6	1	.03	.177	32
	2	.32	.832	32
	Total	.17	.610	64
Day 7	1	.03	.177	32
	2	.29	.739	32
	Total	.16	.545	64
Day 8	1	.03	.177	32
	2	.26	.682	32
	Total	.14	.503	64
Day 9	1	.03	.177	32
	2	.23	.617	32
	Total	.13	.458	64
Day 10	1	.03	.177	32
	2	.19	.601	32
	Total	.11	.444	64

Figure.1 Level of the pain reduction in the two groups since first day till tenth day



Covariates appearing in the model are evaluated at the following values: sex = 1.35, tye of tooth = 4.60, age = 7.19

The herbal composition includes *Thymus vulgaris*, *Glycyrrhiza glabra*, *Vitisvinifera*, *Alpinia officinarum*, *Urticadioica* which is said to have some effects on endothelium, blood cells, angiogenesis, cellular proliferation, vascular dynamics and cell mediators. In that study, the cotton soaked in the herbal extract was placed for 10 to 15 seconds on pulp tissue which differs from the methodology of the present study²⁵.

Based on the studies, the methods used in pulpotomy of deciduous teeth could be placed into devitalization, preservation and regeneration methods²⁶. Formocresol in placed in devitalization group and can lead to life loss of the remained pulpal tissue.

According to the studies, *Eleagnus Angostifolia* extract could be placed in preservation group due to wound healing effects⁹. Thus, the vitality of pulp will be retained after its application. The feeling of more pain in *Eleagnus Angostifolia* group rather than in formocresol group can be attributed to this feature.

Conclusion

The results of present study showed that 10 days after pulpotomy treatment, the pain in both treated groups was decreased, however, the pain was decreased in Formocresol group more than anoter group.

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