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A Comparative Evaluation of Conventional Vs Endovac Irrigation System in Primary Molars

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Abstract

Background: EndoVac irrigation system which was introduced in 2006 and works on the principle of apical negative pressure. The present study was conducted to compare conventional vs Endovac irrigation system in primary molars. **Methods**: 40 human extracted primary molars which were divided into two groups of 20 in each group with an equal distribution of apical foramen area. Group I roots were treated with Endovac and group II with manual irrigating system. **Results**: The mean weight of extruded irrigant with group I was 1.21 grams in with group II was 2.31 grams. The percentage of penetration depth of the irrigant into dentin at 2 mm was 15.4%, at 4 mm was 32.6% and at 6 mm was 49.6 mm in group I and 5.48%, 14.8% and 30.5% at 2 mm, 4 mm and 6 mm in group II respectively. The difference was significant (P< 0.05). **Conclusion**: EndoVac irrigation system found to be superior as compared to the manual irrigation system in primary molars.

Keywords: Endovac, Molars, Irrigation System.

INTRODUCTION

The largest portion of endodontic success depends upon the ability to remove microorganisms and prevent reinfection, though mechanical and manual root canal debridement. The variations in root canal anatomy of primary molars with widely divergent and curved roots holds the difficulty in achieving a thorough debridement of the necrotic tissue.[1] This is usually not possible to achieve by instrumentation alone but also requires copious irrigation with a suitable irrigant that cleans the root canal system by eradicating the intraradicular microbial infection along with an appropriate biocompatible seal.[2]

Conventionally, pulpectomy procedures were carried out using hand instrumentation (reamers, K-files, or H-files). Barr et al,[3] introduced the use of rotary file instrumentation for this procedure,

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and the motorized instrumentation was found to be an efficient technique. With the use of rotary files, instrumentation time decreased, increasing children's cooperation during treatment. In spite of the fact that rotary files have been widely used for root canal treatments of permanent teeth, their use for primary dentition is still emerging.

EndoVac irrigation system which was introduced in 2006 and works on the principle of apical negative pressure. It consists of two cannulas, a macro-cannula which is used for gross initial flushing of the coronal part of the root canal and a micro-cannula for irrigation and cleansing of the apical part of the root canal.[4]Manual irrigation includes positive pressure irrigation, NaviTip and Max-I-Probe and manual dynamic irrigation. Machine assisted irrigation devices include sonic as well as ultrasonic devices like the Endoactivator, Vibringe, Rinsendo and Proultra Piezoflow System.[5] The present study was conducted to compare conventional vs Endovac irrigation system in primary molars.

MATERIALS AND METHODS

The present study comprised of 40 human extracted primary molars which were divided into two groups of 20 in each group with an equal distribution of apical foramen area. Group I roots were treated with Endovac and group II with manual irrigating system.

The teeth were mounted in pre-weighed glass bottles and the canals were irrigated with both the irrigating systems using 5.25% sodium hypochlorite solution mixed with acid fuchsin which enables the irrigating solution to penetrate efficiently into the dentinal tubules. The amount of irrigant extruded was recorded. The roots were sectioned at 2mm, 4mm and 6mm from the apex and examine the depth of irrigant penetration into the dentinal tubules under a stereomicroscope. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table 1: Distribution of teeth

Groups	Group I	Group II
System	Endovac irrigating system	Manual irrigating system
Number	20	20

[Table 1] shows type of irrigating system used in both groups.

Table 2: Comparison of weight of extruded irrigant in both groups

Groups	Mean weight (G)	P value
Group I	1.21	0.01
Group II	2.31	

[Table 2, Figure 1] shows that mean weight of extruded irrigant with group I was 1.21 grams in with group II was 2.31 grams. The difference was significant (P< 0.05).

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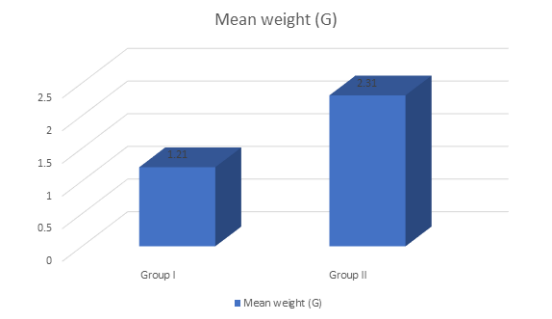

Figure 1: Comparison of weight of extruded irrigant in both groups

Table 3: Percentage of penetration depth of the irrigant into dentin.

Groups	2 mm	4 mm	6 mm	P value
Group I	15.4	32.6	49.6	0.01
Group II	5.48	14.8	30.5	

[Table 3, Figure 2] shows that percentage of penetration depth of the irrigant into dentin at 2 mm was 15.4%, at 4 mm was 32.6% and at 6 mm was 49.6 mm in group I and 5.48%, 14.8% and 30.5% at 2 mm, 4 mm and 6 mm in group II respectively.

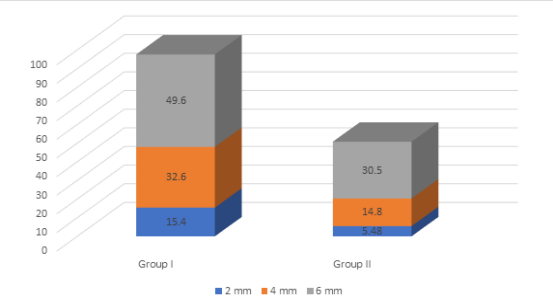

Figure 2: Percentage of penetration depth of the irrigant into dentin

The difference was significant (P< 0.05).

DISCUSSION

A current trend in pediatric dentistry is to perform pulpectomy procedures on necrotic primary teeth to maintain their function and avoid extraction and space loss. The aim of root canal instrumentation in primary teeth is the mechanical shaping of the entire root canal space, chemical cleansing (using a desired root canal irrigant to the apex), and subsequent obturation (to the apex), which must all take place in a short duration of time. Root canal instrumentation should result in the removal of vital and necrotic pulp tissue, infected dentine, and debris from the root canal system and its irregularities.[6]

Chemo-mechanical debridement helps in elimination of pulpal tissue, microbiota and by-products and organic and inorganic.[7] To achieve this objective, selection of an appropriate irrigant delivered through an effective and safe irrigating system is essential. Endeavors have consistently been made to develop more effective irrigant delivery systems which can be broadly categorized as manual agitation and machine assisted agitation techniques for the purpose of root canal irrigation.[8] Apical extrusion has been assessed in various studies using different techniques like the photographic technique dry weight technique and qualitative assessment. This method was adapted as it was easy to use and convenient without any material loss due to immediate direct weighing of the extruded material with a Sartorius analytic balance.[9] The present study was conducted to compare conventional vs Endovac irrigation system in primary molars.

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In present study, mean weight of extruded irrigant with group I was 1.21 grams in with group II was 2.31 grams. Venumbaka et al,[10] in their study 25 extracted primary molars satisfying the inclusion and exclusion criteria were divided into two groups of 29 roots in each group with an equal distribution of apical foramen area. The teeth were mounted in pre-weighed glass bottles and the canals were irrigated with both the irrigating systems using 5.25% sodium hypochlorite solution mixed with acid fuchsin which enables the irrigating solution to penetrate efficiently into the dentinal tubules. The amount of irrigant extruded was recorded. Apical extrusion of the irrigant was significantly less with the EndoVac system (1.18±1.04gms) when compared to manual irrigation system (2.3±1.55gms) (P<0.05).

We found that percentage of penetration depth of the irrigant into dentin at 2 mm was 15.4%, at 4 mm was 32.6% and at 6 mm was 49.6 mm in group I and 5.48%, 14.8% and 30.5% at 2 mm, 4 mm and 6 mm in group II respectively. Saini M et al,[11]suggested that the penetration of irrigant with EndoVac was better at 1mm and no difference was noted at 3mm level from apex when compared to the conventional irrigating device. Similar findings were seen in a study done by Hauser et al,[12] who used RinsEndo system and compared it with the conventional system.

Pawar et al,[13] 75 primary molars requiring pulpectomy treatment, divided into three groups (n = 25 per group). The teeth in Group 1 were instrumented with an adaptive technique, Group 2 with pediatric rotary files and Group 3 with a manual technique (hand K-files). The apical size of the final instrumentation was maintained at #30 for all groups. Instrumentation time and the grade of the root canal obturation were evaluated. Instrumentation duration was recorded, employing a digital stopwatch from the insertion of the first file until the completion of final irrigation. Obturation quality was assessed using radiographs. The criteria taken as a reference for obturation were: optimal (1 mm short of the apex), underfilled (2 mm short of the apex), or overfilled (beyond the apex). The use of an adaptive technique was associated with the lowest instrumentation time ($p < 0.0001$) when used for instrumenting primary molars and with the highest root canal filling quality of the three groups. The application of the new concept of adaptive instrumentation for pulpectomy of primary molars was a favorable technique, considering the significant reduction in instrumentation time and better obturation.

CONCLUSION

Authors found that EndoVac irrigation system found to be superior as compared to the manual irrigation system in primary molars.

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