Original Article

Evaluation of Electrosurgery and Formocresol Pulpotomy Techniques used on Children Primary Teeth

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Abstract

The purpose of this study was to prospectively compare electrosurgical pulpotomy with formocresol pulpotomy technique used on children's primary teeth by evaluating clinical and radiographic success. During the research period, 260 patients were included in the study. It ranges in age from 2 to 10 years. Among the studied patients, electro surgery patient was 140 and formocresol pulpotomy patient was 120. Teeth were evaluated clinically and radiologically after 6, 12 and 18 months. After 12 months postoperative observation time, the clinical and radiographic success rates for the electrosurgery was 89.29% and 80.52% respectively when 67.50% and 59.71% were for the formocresol technique. There was a statistically significant difference between the electrosurgery and formocresol pulpotomy techniques for both clinically or radiographically techniques.

Keywords: Electrosurgery, Formocresol, Pulpotomy, Children, Primary Teeth.

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Introduction

According to the Universal Problems of Infection Review, incisor decay in permanent teeth may be the actual regular oral syndrome, yet it is highly related to the primary teeth through the worldwide pain of an additional 5.[3] billion children's tooth decay.[1,2] Between the ages of five and twelve years, with tooth decay decreasing with wound severity, despite movements to prevent tooth decay, a large fraction of rest worldwide suffer from infection.[3]

The National Dental and Craniofacial Research Institute estimate that 42% of children between the ages of two and eleven develop internal tooth decay. Although the teeth are vital at that time and the decay has progressed into the soft tissues, the pulpotomy may end above the primary teeth.[4,5]

Electrosurgery is not medicinal hemo-static procedure that was recommended in favor of the pulpotomy process.[6] Phased electrosurgery is aimed at using higher incidence, gradually generating higher temperatures in the electrical signal decor. High temperature applied for complete preferred pulp result pulp remove, drying, whether the mixture of outcomes. Electrosurgical units were commonly used in gastro-enterology, general surgical procedures, Ob Gyn, dermatology along with pulmonary therapeutics. Electrosurgical parts were generally utilized within gastro-enterology, common surgical procedure, Ob Gyn, pulmonary therapeutic with dermatology.[5]

Electrosurgery was decided as the signal mode of peak regularity or the preplanned course of electricity during the pulp of the organism towards achieved suppressible surgical results.[7] With various forms of electricity acting as a form of electricity, dentists can apply ES to cut or coagulate pulp. Goldwyn outlines 3 eras around the

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development of new electro-surgical skills.[8] In 1881, Morton stated that a swing of electricity at a rate of 100 kHz could pass through the human body without tenderness, tremors, or otherwise glow.[9]

Formocresol is the accepted ingredient in the pulpotomy process, as it is mostly worn and has excellent clinical success. Nevertheless, despite its frequency of brilliant clinical success, formocresolpulpotomy appears under closer scrutiny due to safety concerns.[10] In 1904, Buckley introduced the first formocresol pulpotomy. According to Buckley, formocresol composed by Formaldehyde (19%), Cresol (35%), Glycerine (15%) with water. presently 1:5 solvent of Buckley's formocresol is normally applied. The solvent was made up of three parts concentrated glycerin (90 ml) and one part (30 ml) purified water.[11]

The use of electrosurgery as a non-pharmacological pulpotomy technique is well documented and has proven merit. Self-limiting, papular infiltrates are only a few cell layers deep.[12] There is good visualization and homeostasis without chemical coagulation or systemic involvement. It is less time consuming than formocresol method.[13] The intention of this study is to compare the clinical and radiographic success of electrosurgery and formocresol pulpotomy techniques used in human primary molar teeth.

Materials and Methods

The study was carried out at the Dentistry Department of City Dental University, Dhaka, Bangladesh. Three pulpotomy methods such as Electrosurgery, MTA and Formocresol were performed in primary teeth of 360 children. It ranged in age from 2–10 years. All treated molars were covered with stainless steel crowns.

Procedure

Before the start of the clinical procedure the patients were assessed using different clinical and radiological parameters which were also used for future post-operative evaluations. The absence/presence of all the clinical and radiological signs was recorded. Clinical parameters included Pain, Sinus formation, swelling (Intra Oral) and mobility while the radiological parameters included periodontal ligament widening, internal resorption, external resorption, periapical radiolucency, canal obliteration and furcation radiolucency.[14]

Patients follow up

All patients were instructed to maintain good oral hygiene and recalled for clinical and radiographic evaluation at 6-, 12- and 18-months intervals and the results were recorded.

Statistical analysis

Clinical evaluation and standardized radiographs were done after 6, 9 and 12 months. The data were collected, tabulated, and statistically analyzed using the Fisher's exact test using SPSS version 16. As well as significance value accepted at 5% level ($p<0.05$).

Result

During the study time, 260 children (both boy and girl) were included in the study. It ranges in age from 2 to 10 and divided into three age groups such as 2-4, 5-7 and 8-10. Maximum 100 (38.46%) in children aged 5-7 years (Table 1). Among the studied children, electro surgery children were 140 (53.85%) and formocresol pulpotomy children was120 (46.15%).

Table 1: Different age groups of the children

Age (years)	Pulpotomy		Total (%)
	Electrosurgery	Formocresol	
	No. of patients (%)	No. of patients (%)	
2-4	31 (22.14)	39 (32.50)	70 (26.92)
5-7	49 (35.00)	51 (42.50)	100 (38.46)
8-10	60 (42.86)	30 (25.00)	90 (34.62)
Total	140 (53.85)	120 (46.15)	260 (100.00)

We observed clinical success rate at 6-, 12- and 18-months interval between the two types of pulpotomy. Electrosurgery pulpotomy showed maximum 89.29% success rate at 12 months (Table 2). On the other hand, formocresol pulpotomy showed 67.50% success rate at 12 months but this decreased to a success rate of 36.67% at 18 months follow-up. Significant differences in success rates were noted between the pulpotomy at follow-up intervals of 6, 12, and 18 months.

Table 2: Comparison of clinical success rate between the electrosurgery and formocresol pulpotomy techniques.

Pulpotomy	**Clinical success rate (%)**			P value
	6 months	**12 months**	**18 months**	
Electrosurgery	61.43	89.29	51.43	0.013[S]
Formocresol	48.33	67.50	36.67	

P value reached from Fisher's exact test.

The radiographic success rate for the Electrosurgery pulpotomy was 80.52% at 12 months (Table 3). Conversely formocresol pulpotomy reduced the success rate to 29.86% at 18 months (Figure 1). This difference was statistically significant at the P > 0.05 level using Fisher's exact test.

Table 3: Comparison of radiographic success rate between the electrosurgery and formocresol pulpotomy techniqueP value reached from Fisher's exact test.

Pulpotomy	**Radiographic success rate (%)**			P value
	6 months	**12 months**	**18 months**	
Electrosurgery	58.64	80.52	45.92	0.021[S]
Formocresol	41.85	59.71	29.86	

Initial xray 12 month xray 18 month xray

Figure 1: Radiographic success of pulpotomy.

Discussion

The experiment performed on early tooth of 260 children by two pulpotomy methods like electrosurgery and formocresol that treat infected primary teeth. In this study, 260 patients (both boy and girl) were included and ranged in age from 2 to 10 and divided into three age groups such as 2-4, 5-7 and 8-10. Maximum 157 (43.61%) in patients aged 5-7 years. Among the studied children, electro surgery children were 140 (53.85%) and formocresol pulpotomy children was120 (46.15%). This study depicted a comparison of clinical success rates between two pulpotomy types at 6, 12, and 18-month intervals. Electrosurgery pulpotomy showed the highest success rate of 89.29% at 12 months while formocresol pulpotomy showed a success rate of 67.50% at 12 months although this decreased towards a success rate of 36.67% at the 18-month follow-up interval. A significant difference in success rates between the two types of pulpotomy was observed at follow-up

intervals of 6, 12, and 18 months. Similarly El-Meligy and Mahmoud (2014)15 found near about 100% success of electrosurgical pulpotomy which coincide with the results of present study.

In the present study, Considerable variation in radiographic success rates electrosurgery pulpotomy showed the highest average radiographic success rate of 80.52% when formocresol pulpotomy showed the lowest radiographic success rate at 59.71% at 12 months follow up intervals. There was also a significant difference in radiographic success rates between the two types of pulpotomy at follow-up intervals of 6, 12 and 18 months. Khorakian et al. (2014)[16] demonstrated that after 24 months, clinical success rates were 100% while radiographic success rates were calculated as 95.2% for electrosurgery pulpotomy.

Conclusion

Clinical and radiographic success rates were better for electrosurgery pulpotomy than formocresol. In conclusion, electrosurgery pulpotomy confirm to be adequate substitute to pharmacotherapeutic pulpotomy.

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