

ROOT CANAL TREATMENT IN NECROTIC PRIMARY MOLARS

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SUMMARY

Fifty-three patients (27 boys and 26 girls) with necrotic primary teeth received root canal treatments with a paste consisting of KRI-1 paste and pure calcium hydroxide powder with one drop of formocresol. All cases were followed clinically, radiographically and some histologically at 6, 12 and 17-24 months postoperatively. All cases were clinically and radiographically successful.

INTRODUCTION

Considering that the tooth is the best space maintainer in the primary dentition, pulpectomy treatments with an adequate filling material would be ideal for primary teeth with necrotic pulps, abscesses, fistulous tracts and mobility that otherwise would be indicated for extraction (1,2,3). Maintaining these teeth would prevent space loss and developmental problems.

The purpose of this study was to evaluate pulpectomy treatments in necrotic primary teeth using an iodoform-calcium hydroxide paste with one drop of formocresol.

MATERIALS AND METHODS

Fifty-three children (26 girls and 27 boys) 3-10 years old participated in the study after parental consent. All children were chosen after a clinical and radiographic examination for presence or absence of pain, mobility, fistula, and furcation radiolucency. Cases with more than two-thirds root resorption, perforation of the pulpal floor, bone loss over the permanent tooth bud, bone radiolucency around the subjacent permanent tooth and/or medical problems were not included.

All teeth were treated in one session under local anesthesia and rubber dam isolation. The pulp chamber was cleaned with a water-cooled No. 330 tungsten-carbide bur in a high-speed handpiece and a slow-speed No. 6 round bur. K-files trimmed at 16 mm were used to enlarge the canals up to size No. 40. The pulp was cleaned with 5% sodium hypochlorite and dried with sterile cotton pellets. Paper points were used to dry the canals.

A paste consisting of equal parts of KRI-1 (Pharmachemie AG, Switzerland), pure calcium hydroxide and a drop of a tricresol-formol solution (Tifell,) was used to fill the canals aided with small endodontic condensers, cotton pellets and the K-files rotating counterclockwise (4).

The teeth were restored with stainless steel crowns and evaluated at 6, 12 and 24 months post-operatively.

In 18 cases, a furcation bone biopsy was taken pre- and post-pulpectomy. They were all taken on mandibular teeth to avoid the interference of the palatal root. The biopsy was taken after using a 221/018 Meisinger bur to gain access near the furcation (Fig.1). In order to avoid damage to the permanent tooth, this was verified radiographically with an instrument inserted into the prepared canal. Once verified, a new bur was used to remove the furcation bone. This bone sample was fixed in 10% buffered formaldehyde and processed for histological study with hematoxylin and eosin. The samples were examined with light and polarized microscopy.

One sample was lost and out of the 17 remaining bone biopsies, 6 were taken before the pulpectomy, 5 from 2-6 months post-pulpectomy; 2 from 8-9 months post-operatively, and 4 from 17-24 months post operatively.

RESULTS

Pre-operative pain, in the cases where it had existed, disappeared immediately after treatment. At one week post-operatively, all cases with parulis had healed and all cases with fistula healed in 12-20 days (Fig. 2, 3). Furcation radiolucency was not seen from 3-5 months postoperatively (Fig. 4-6). Mobility was absent from 30 days to 2 months post-operatively.

In the biopsy cases, 83.5% of the sample taken pre-operatively showed granulation tissue while 16.6% showed bone necrosis, medular fibrosis and other degenerative signs.(Fig 7) At 6 months post-operative, 60% of the cases showed a similar picture as before (Fig. 8) and at 17-24 months, 100% showed mature bone, 75% medular fibrosis, 50% necrosis and degenerative signs, and 25% bone neoformation (Fig. 9).

DISCUSSION

The present study shows that a one-session pulpectomy in primary teeth with the resorbable iodoform-calcium hydroxide paste was successful; therefore, we do not agree with Cohen (2), Massler (1) and Brauer (3) when they state that non-vital primary teeth are inappropriate for root canal treatment due to the difficulty in cleaning the canals.

The root canal filling material was used in the present study because it is bactericidal, resorbable, radiopaque, does not damage the permanent tooth, does not set and can easily be removed. Calcium hydroxide was added because of its high alkaline pH which would enhance the antibacterial effects of the paste and because it could penetrate the small canaliculae of the pulpal floor and reach the furcation area activating the phosphatase alkaline promoting bone formation (5).

Other investigators have claimed success by just using a pulpotomy technique in necrotic primary teeth (6,7). These studies reported treatment with two or more visits in which a medicament was placed in the pulp chamber without treating the root canals.

Pulpectomy treatments have also been indicated. Rabinowitz (8) reported that approximately 5.5 to 7.5 visits were needed to treat necrotic teeth. Starkey (9) used three sessions and filled the canals with Oxpara paste

Gould (10) used camphorated parachlorophenol for 5 minutes in the pulp chamber and zinc oxide-eugenol as a filling material using one or two sessions.

Rifkin (11) and Garcia-Godoy (12) recommended two sessions when KRI 1 iodoform paste was used.

Based on the present study, when using an iodoform-calcium hydroxide paste, more than one session is not necessary due to its high antibacterial effects (Grossman (13). According to Castagnola and Orlay (14) the iodoform paste will maintain its antibacterial effect for at least 10 years losing only 20% of its potency. This antibacterial effect is far beyond the lifetime of most primary teeth. Another advantage

of the iodoform paste is that it is resorbable in one or two weeks, while ZOE could last years, possibly producing ectopic eruptions of the permanent teeth.

The results of the present study show that treatment of necrotic primary teeth with an iodoform-calcium hydroxide paste is an excellent alternative to the ZOE filling material or tooth extraction.

Further comparative studies should be conducted to evaluate the use of the iodoform paste without calcium hydroxide and formocresol, as suggested by Rifkin (11) and Garcia-Godoy(12), in one session.

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LEGENDS OF FIGURES

Fig. 1. Bone biopsy with the Meissinger bur.

Fig. 2. Fistulous tract in the second primary molar in a 5 yr-old child.

Fig. 3. Resolution of the fistulous tract 3 months post-operatively.

Fig. 4. Pre-operative radiograph of a case treated with the iodoform-calcium hydroxide-tricresol paste. Note bone furcation radiolucency.

Fig. 5. Same case as in Fig. 4, 6 months post-operatively. Bone regeneration present.

Fig. 6. Same case as in Fig. 4, 12 months post-operatively.

Fig. 7. Histological section before pulpectomy treatment. Granulation tissue and inflammatory cells evident.

Fig. 8. Histological section 6 months post-operatively. Osteoid tissue and fibrosis noted.

Fig. 9. Histological section 24 months post-operatively. Mature bone and fibrosis observed.

Table 1. Symptoms pre- and post-operatively.

SYMPTOM	PRE- OPERATIVELY	%	POST-OPERATIVELY		
			6 MONTHS	12 MONTHS	24 MONTHS
		%	%	%	%
Pain	24	45.2	0	0	0
Mobility	53	100	0	0	20.0
Fistula	53	100	0	0	0
Parulis	41	77.3	0	0	0
External Resorption	12	22.6	14	10	7
			26.4	71.4	70.0
Internal Resorption	2	3.7	0	0	0
Furcation Radiolucency	50	94.3	0	0	0

TABLA VI

ESTUDIO ANATOMOPATOLOGICO BIOPSIAS EN FURCA. 17 CASOS TOTAL

TIEMPO		2-6 ms.	8-9 ms.	17-24 ms.
CASOS	PREPULPECTOMIAS (6)	(5)	(2)	(4)
V A S O S	TEJIDO DE GRANULACION 5 (83,5%)	—	—	—
	ENDOTELIO PROMINENTE 4 (66,6%)	—	—	—
	LUZ DILATADA 2 (33,3%)	—	—	—
C/ I N F L A.	LINFOCITOS 5 (83,5%)	—	—	—
	PLASMATICAS 5 (83,5%)	—	—	—
	NEUTROFILOS 5 (83,5%)	—	—	—
	EOSINOFILOS 3 (50%)	—	—	—
FIBROSIS INTERSTICIAL		3 (60%)	2 (100%)	—
H U E S O	NECROSIS 1 (16,6%)	3 (60%)	2 (100%)	2 (50%)
	OSTEOIDE —	2 (60%)	—	1 (25%)
	FIBROSIS MEDULAR 1 (16,6%)	3 (60%)	—	3 (75%)
	SIGNOS DEGENERAT. 1 (16,6%)	3 (60%)	1 (50%)	2 (50%)
	MADURO —	3 (60%)	—	4 (100%)