

Pulpal management of permanent first molars with open apices: case history

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Abstract

An eight-year-old with extensive decay in both mandibular first permanent molars was examined in October, 1970. Both molars were found to have immature roots. A nonvital molar was treated to achieve apical closure followed later by conventional endodontic therapy. A vital molar was treated with a formocresol pulpotomy followed by conventional endodontic therapy. After 10 years, both molars showed no signs or symptoms of failure.

A difficult treatment problem in pedodontics is pulpal management of vital and nonvital young first permanent molars with incomplete root development. Frank described a technique for apical closure of nonvital teeth in 1966 and 1967.^{1,2} His technique achieved apical closure, followed by removal of the resorptive seal and replacement with a permanent root canal filling. Frank, Day, Van Hassel, Zander, and Stark all have advocated calcium hydroxide as the drug of choice to induce a calcific barrier at the root apex.¹⁻⁶

In 1969 Dylewski evaluated the effect of a calcium hydroxide-camphorated parachlorophenol paste on apical closure in a histologic exam.⁷ Nonvital rhesus monkey anterior teeth were used in his study. Dylewski stated that his study supported the concept that apical bridging is possible in the nonvital, incompletely developed tooth when the necrotic contents of the canal are removed and a suitable dressing is placed. Dylewski concluded that both within the canal and just beyond the apex, a proliferative activity of connective tissue occurred with some differentiation of a calcified material identified as osteodentin.

Prior to 1970 very little clinical research regarding the use of the vital formocresol pulpotomy on permanent molars was available. Some clinical observations were available to indicate that the formocresol pulpotomy was an excellent emergency procedure for permanent molars with large cariously exposed pulps.

Since 1970, Trask has reported success in treating eight badly decayed permanent molars with formocresol pulpotomies.⁸ All of the eight permanent molars were from children 10 years of age or younger.

Fiskio, in a five-year study, found that a formocresol pulpotomy did not preclude conventional endodontic therapy at a later date.⁹

Nishimo stated that the success of the formocresol pulpotomy on primary teeth could not be completely similar to the situation found in permanent teeth since the life span of the primary and permanent dentitions were so vastly different.¹⁰

Case Report

On 19 October 1970 an eight-year-old patient was examined in the Pedodontic Clinic of the University of Michigan. The most serious problem at that time was dental caries requiring pulpal management of both mandibular first permanent molars (Figures 1 and 2). Both mandibular first permanent molars had extensive decay and pulpal vitality could not be determined. Radiographic examination indicated incomplete root formation making both teeth poor candidates for conventional endodontic therapy.

In October, 1970, at the patient's first visit to the Pedodontic Clinic of the University of Michigan, treatment for the mandibular left first permanent molar was initiated. Access was gained to all canals. After removal of all necrotic debris from the canals, the technique outlined by Frank was performed.^{1,2} A temporary zinc phosphate restoration was placed at the initial appointment and followed by a stainless steel crown in November.

Periodic evaluations were scheduled at six-month intervals (Figure 3) to determine when sufficient apical closure had occurred for conventional endodontic therapy. In April, 1972, conventional endodontic therapy began. The distal canal was patent, but the two mesial canals were negotiated to only half their length. The canals were filled with gutta percha and sealer and a postoperative radiograph made (Figure 4). In April, 1973, after further evaluation, the mandibular left first permanent molar was restored with a gold crown (Figure 5).

Concurrent with the treatment of the mandibular left first permanent molar was the treatment of the mandibular right first permanent molar. The mandibular right first permanent molar was found to be vital after gross



Figure 1. (left) The mandibular left first permanent molar with extensive decay and incompletely developed roots. The tooth was nonvital.



Figure 2. (right) The mandibular right first permanent molar with extensive decay and immature roots. The tooth was vital.



Figure 3. (left) The mandibular left first permanent molar in April, 1972. Root development permits conventional endodontic therapy.



Figure 4. (right) The mandibular left first permanent molar immediately after completion of conventional endodontic therapy.



Figure 5. (left) The mandibular left first permanent molar in May, 1981, 10 years after treatment began.



Figure 6. (right) The mandibular right first permanent molar in October, 1971, approximately one year after the formocresol pulpotomy.



Figure 7. (left) The mandibular right first permanent molar immediately after conventional endodontic treatment.



Figure 8. (right) The mandibular right first permanent molar in 1981, 10 years after treatment began.

carious dentin removal. All debris was removed and a vital formocresol pulpotomy was performed as outlined by Berger.¹¹

The mandibular right first permanent molar was restored with a stainless steel crown and evaluated concurrently with the mandibular left first permanent molar (Figure 6). In May, 1972, sufficient apical closure had occurred and conventional endodontic therapy was begun on the mandibular right first permanent molar. Two weeks later all canals were filled with silver points and sealer (Figure 7). Ten months later, after further evaluation, the mandibular right first permanent molar was restored with a gold crown.

The patient was examined every six months until 1975 when released from the Pedodontic Clinic. The patient has since been examined periodically by the author. The latest evaluation in May, 1981, gave a history of more than 10 years' success (Figures 5 and 8); All clinical and radiographic signs have been normal and the patient has been without symptoms for more than 10 years.

Discussion

One additional recommendation is made regarding treatment of nonvital pulpally involved first permanent molars. Silver points should be placed in the canals to a depth of within 2-3 mm of the apex when the calcium hydroxide paste is placed. This may assist in keeping the narrow canals from calcifying at a point too coronal. Gutta percha points instead of silver points might have been used to treat the vital pulpally involved first permanent molar.

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Quotable Quotes

Boys are so consistently overrepresented among children with learning disability — a deficit in spatial orientation that predicts poor reading skills — that it has come to be viewed as a male disorder. The proportion of boys to girls in clinical populations has been reported to be as high as 10 to 1, and it commonly runs about 3 or 4 to 1.

Recent research by three psychologists, however, indicates that while boys may be referred more often for help with their learning problems, the distribution among boys and girls is fairly even. According to Amy Karlen and Rosa A. Hagin of Fordham University and Ronnie Beecher of the New York University Medical Center, over 12,000 kindergartners and first graders from 47 schools were extensively tested for various signs of learning disorder. In the samples drawn from inner city, rural and private schools, the researchers found no sex differences in the incidence of learning disorders. In the suburban sample boys were significantly overrepresented, but even in the suburban schools the ratio of boys to girls was about 1.5 to 1 — much lower, the researchers note, than the commonly reported ratio. These findings indicate, the researchers say, that girls with fundamental learning problems are not being identified in the classroom, perhaps because teachers have different expectations for boys and girls or perhaps because boys and girls cope differently; boys deal with failure through aggression, they say, while girls tend to become withdrawn. Whatever the reason, they conclude, girls are being denied the help that might prevent ultimate school failure.

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