ENDODONTICS

Pulpotomy for young vital pulps with carious exposure

BACKGROUND

The minimally invasive endodontic techniques of vital pulp therapy (VPT) are based on improved understanding of the capacity of pulp tissues to heal and regenerate plus the availability of biologically active endodontic materials. Having spontaneous or severe pain does not necessarily mean that the pulp cannot repair itself, and irreversible pulpal injury does not necessarily follow the presence of deep carious lesions. The medium- to long-term outcomes of VPT in symptomatic permanent teeth with caries, especially in young people, indicate that pulpotomy can be a viable alternative to root canal therapy (RCT). Although mineral trioxide aggregate (MTA) has been considered the best material for VPT in permanent teeth, this material is associated with difficulty in handling and mixing as well as tooth discoloration. Biodentine is a newer calcium silicate–based material that offers good sealing ability, acceptable compressive strength, a 12-minute initial setting time, support for reparative dentin formation, and a positive effect on vital pulp cells. A prospective study was undertaken to determine the outcome of Biodentine pulpotomy for young permanent teeth with caries.

METHODS

Fourteen patients (age range 9 to 17 years) presented 20 permanent molar teeth with carious pulp exposure. Pain levels were measured before treatment and 2 days after treatment. Once the pulpal and periapical diagnosis was established, the tooth was anesthetized, isolated using a rubber dam, and disinfected before caries excavation. The exposed pulp was amputated to the level of the canal orifices, then a cotton pellet soaked in 2.5% sodium hypochlorite was placed, followed by a 3-mm layer of Biodentine as the pulpotomy agent and a liner. A restoration was done, after which postoperative periapical radiographs (PAs) were taken. The tooth's clinical and radiographic status was evaluated after 6 months and 1 year.

RESULTS

Twenty-five percent of the patients reported severe spontaneous pain of 9 to 10 on a scale from 0 to 10 preoperatively, and all reported severe lingering pain after drinking cold drinks that was replicated by cold testing. Five patients were diagnosed with symptomatic irreversible pulpitis and normal periapical tissues, and 15 were determined to have symptomatic apical periodontitis. Hemostasis was achieved after 4 minutes. All patients reported complete relief of pain 2 days after pulpotomy and none took analgesics once the procedure was done.

All of the cases were considered clinically successful after 6 months and 1 year postoperatively. At 6 months the periapical index had improved in those with rarefaction and 2 of 7 cases had complete healing. After 1 year, the radiographs demonstrated dentin bridge formation in 25% of cases, 5 of 7 had

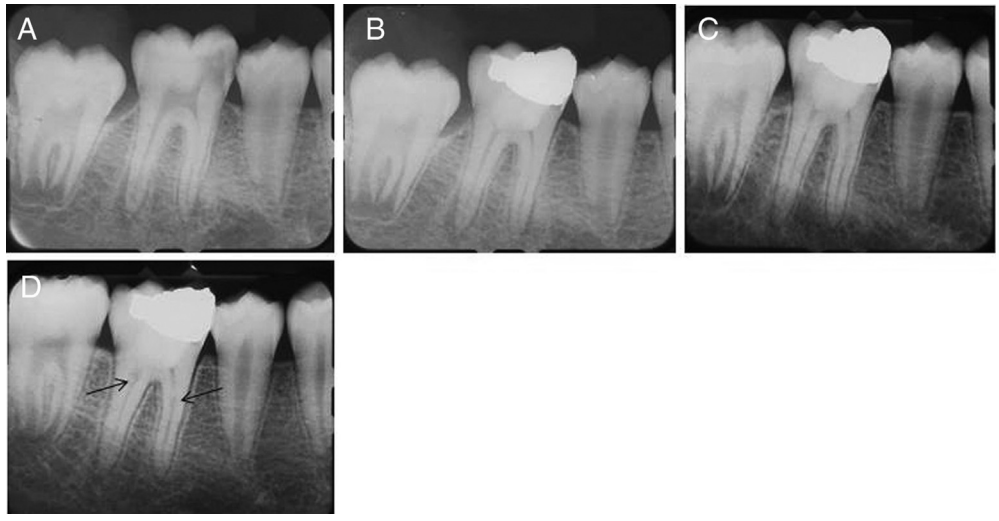

Figure 3. The lower right first molar in a 12-year-old male patient with clinical symptoms of irreversible pulpitis and asymptomatic apical periodontitis. **A,** The preoperative PA. **B,** The postoperative PA after Biodentine pulpotomy. **C,** The 6-month follow-up. **D,** The 12-month follow-up showing healing of periapical rarefaction but with localized areas of internal resorption *(arrows).* (Courtesy of Taha NA, Abdulkhader SZ: Full pulpotomy with Biodentine in symptomatic young permanent teeth with carious exposure. *J Endod* 44:932-937, 2018.)

Clinical Significance

Young patients with cariously involved pulp tissues may be treated with full pulpotomy using materials such as Biodentine. This conserves the vitality of the pulp tissues and appears to offer a less painful alternative to RCT. The procedure is relatively short in duration and was able to relieve patients' preoperative pain completely within 2 days. This option is also likely to be associated with good patient cooperation and lower cost. Full pulpotomy should be considered as an option in selected cases for young permanent teeth with carious pulp exposure.

their preoperative periapical rarefaction completely healed, and in 2 cases the lesion size was reduced to localized widening of the periodontal ligament (Figure 3). After 1 year, 1 patient had evidence of internal resorption despite complete healing of the periapical rarefaction and was considered a failure. Although RCT was advised, the patient's parent chose to continue follow up. One tooth had narrowing of a canal. All restorations but 1 remained functional. The exception was a stainless steel crown that required replacement with a smaller restoration.

DISCUSSION

These young permanent teeth had success with full Biodentine pulpotomy. No RCT was required.

Taha NA, Abdulkhader SZ: Full pulpotomy with Biodentine in symptomatic young permanent teeth with carious exposure. *J Endod* 44:932-937, 2018

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FLUORIDE

Re-thinking fluoride intake guidelines

BACKGROUND

The use of fluoride to reduce dental caries began back in the 1930s and included the consideration of how to balance the positive effects of fluoride against the negative effects, specifically, fluorosis. Originally the main source of fluoride was fluoridated drinking water, but today fluoride can also be ingested from toothpastes, varnishes, tablets, gels, milk, and salt that have been fortified with fluoride. The appropriateness of the current guidelines for fluoride intake in populations, whether changes in guidelines are needed, and what research is needed to guide future decisions in this area were investigated.

CURRENT GUIDELINES

The current guidelines for fluoride intake are designed to achieve balance between preventing caries and minimizing the risk of fluorosis. These guidelines are designed for populations, not individuals, and recognize that there will be individual variations that cannot be controlled. The focus is on young children (Table 2), although adult values have also been set.

Children

The optimal intake of fluoride for children up to age 6 years is 0.12 mg/kg body weight/day based on the observation that fluoride intakes up to this level are detected in areas with fluoridated water and such intakes are not associated with esthetically significant fluorosis. Some set the value for fluoride at 0.5 mg/kg body weight/day.

Adults

Adult values consider adequate mean fluoride intake (AI) as well as dietary reference values (DRVs). AI analysis indicates that the maximal reduction in caries in a population that does not cause adverse effects occurs at a fluoride intake level of 0.05 mg/kg body weight/day for all ages over 6 months.

Monitoring Risk

The ongoing evaluation of fluoride exposure relies on urine analysis. Renal fluoride excretion can be used to survey fluoride exposure when community prevention programs are using fluoride. Fluoride intakes between 0.05 and 0.06 mg/kg body weight/day are accepted as optimal. Those over 0.1 mg/kg body weight/day are associated with an increased risk for enamel fluorosis. However, these assessments are complicated by within-subject variation, lack of correlation between urinary fluoride excretion and fluoride intake, and uncertainty about what levels provide protection against caries. In addition, few studies have used standardized means for evaluating how much fluoride children ingest from toothpaste. Children age 1.5 to 2.5 years are estimated to ingest an average of 64% to 84% of the toothpaste that is dispensed. Thus the current estimates of fluoride intake