

CASE REPORTS

Periodontal Implications of Formocresol Medication

R. A. Kopczyk, DDS, C. J. Cunningham, DDS, and H. Abrams, DDS

A case report that appeared to involve tooth loss associated with the use of formocresol is presented. The displacement of a medicated cotton pellet resulted in a significant amount of supporting bone loss. This case is of particular interest because of the potential formocresol medication has for causing periodontal destruction.

Intracanal medications have historically played an important role in root canal therapy. Their purpose is to establish an antimicrobial environment within the pulp chamber (1). The root canal system may contain significant types and numbers of organisms that cause acute exacerbations, delay treatment procedures, and retard or prevent healing. Although mechanical instrumentation and frequent irrigation eliminate the majority of microorganisms, an intracanal medication is often used to reduce the bacterial population retained within dentin (2). Formocresol is an effective and frequently used medicament. The combined action of cresol, a protein-coagulating phenolic compound, and formaldehyde, an alkylating agent, is highly antimicrobial; but it may cause significant destruction of vital tissues (2). Several studies (3-6) have confirmed the tissue-irritating and cytotoxic effects of formocresol which result in inflammation and tissue fixation

Morse (7), in his review of immunological aspects of pulpal-periapical diseases, states that formocresol can act as a hapten, interact with the host protein, and result in an immunological reaction. He suggests that immunological responses caused by this mechanism can result in endodontic "flare-ups" in the form of pain, swelling, and bone resorption. Others (8, 9) also described the immune response. Because formocresol has the potential to produce severe adverse effects on vital tissue, application of the medication in the canal system must be carefully controlled. Wesley et al. (1) recommend that formocresol be applied to a sterile cotton pellet and squeezed dry in a sterile gauze before being placed into the pulp chamber. Vaporization results in permeation of the medication throughout the

canal system and into the periapical tissues if the apical foramen is open (10).

Cambruzzi and Greenfield (11) described a case in which overmedication of a canal system with formocresol resulted in crestal bone loss. They postulated that the formocresol vapor may have penetrated a dentinal wall that was excessively thinned.

The purpose of this article is to report a case in which the misuse of formocresol appeared to result in a significant loss of periodontal attachment and supporting bone.

CASE REPORT

A 48-yr-old female was referred to the endodontist at the University of Kentucky College of Dentistry faculty clinic for evaluation of persistent discomfort in the mandibular left second molar. A root canal filling had recently been placed in this tooth by the referring dentist. The medical history was noncontributory and revealed only an allergy to "mycin" drugs. The patient complained of "continuous soreness in the area with recession of the gums over the last two weeks." The clinical examination revealed sensitivity to percussion and discomfort when palpating the facial gingiva. The interdental papilla between the first and second molars was missing (Fig. 1) and the exposed interproximal bone was insensitive to probing. A large mesio-occlusal temporary restoration in the second molar was mobile and easily removed. Radiographic examination revealed a root canal filling in the second molar. The root canal filling material had penetrated the apical foramen of the distal root and did not reach the apex in the mesial root (Fig. 2). Removal of the temporary restoration revealed cotton remnants in the interproximal area. The area was debrided, irrigated, and a new temporary restoration was placed. A telephone call to the patient's dentist revealed that a cotton pellet with formocresol had been used and had been squeezed dry before placement. All evidence appeared to implicate the medication used in treating the root canal. Therefore, a clinical diagnosis of necrosis of crestal bone and overlying soft tissue secondary to formocresol contact was

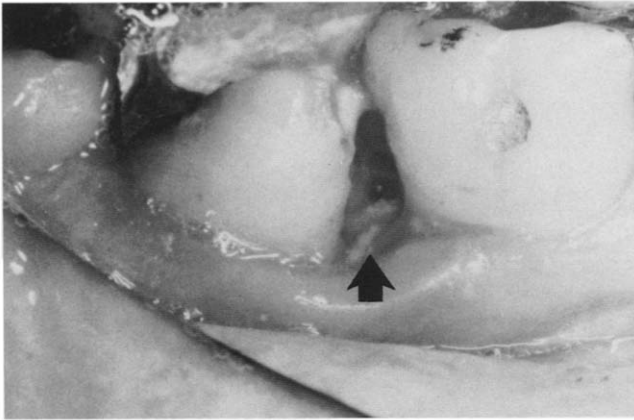


FIG 1. Clinical appearance of involved area between the first and second mandibular molars. The papilla had become necrotic and the bone was exposed (arrow).



FIG 2. Radiograph of the involved area at the initial appointment.

made. The patient was dismissed and appointed for further irrigation and debridement of the interproximal area.

After 1 wk, the patient was still experiencing persistent discomfort. Under rubber dam isolation, the temporary restoration was totally removed. With the dry field, additional cotton pellet fragments were found in the interproximal area. The area was again debrided, irrigated, and a temporary restoration was placed. The patient was told that the prognosis for the second molar was poor. The patient was then given an appointment for follow-up evaluation in 2 wk.

At the next appointment, the area was asymptomatic with no change in the clinical picture. A consultation was arranged with a restorative dentist and a periodontist. At the consultation appointment, the involved area was asymptomatic. A decision was made to allow the nonvital bone to sequester rather than to surgically remove it and risk inadvertently removing vital supporting bone. The patient was instructed to keep the area clean and was appointed for further evaluation with the periodontist.

At the following appointment, no clinical change was

noted but the patient complained of thermal sensitivity on the involved side. The patient was instructed to use a proxybrush and a desensitizing toothpaste was prescribed. The patient's teeth were polished and she was reappointed for further evaluation.

At the following appointment, 4½ months after the formocresol was placed, the clinical picture had changed significantly. The interproximal bone was mobile. Under local anesthesia, two pieces of necrotic bone 1 cm × 1 cm and 0.25 cm × 0.25 cm were removed with hemostats (Fig. 3). As a result of the sequestration, interproximal bone and supporting facial and lingual bone overlying the mesial root of the second molar were lost. Supporting bone on the distal root surface of the first molar was also lost. Interproximal probing revealed an 8-mm defect measured from the cemento-enamel junction of the second molar (Fig. 4). Clinically, the necrotic bone fragments still contained cotton pellet fragments embedded in the bone (Fig. 3). A radiograph of the area revealed a loss of 50% of the

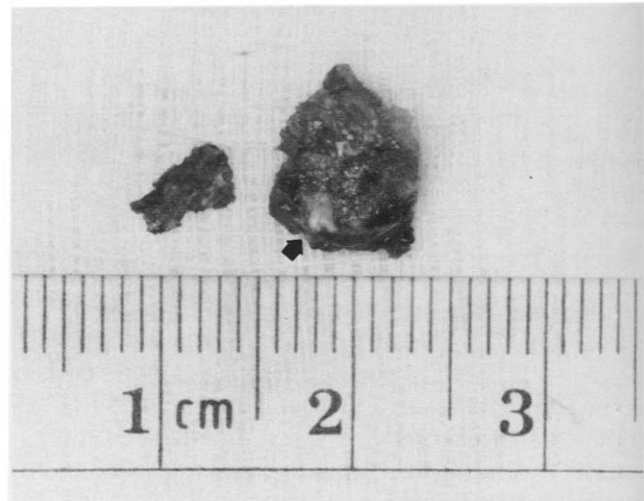


FIG 3. Sequestered bone fragments. The arrow points to the retained cotton fragments.



FIG 4. Probing of the involved area following removal of sequestered bone.



Fig 5. Radiograph of the involved area following sequestration.

supporting bone between the first and second molars (Fig. 5). The specimen was submitted to the Oral Pathology Department for examination. The microscopic examination confirmed the clinical diagnosis of nonvital bone and revealed foreign materials which apparently were cotton fragments. Oral hygiene was reinforced and the patient was given an appointment for a full month periodontal evaluation. The patient failed to keep the next appointment but a conversation with a relative disclosed that she had gone to a general dentist who removed the second molar and placed a fixed partial denture.

DISCUSSION

The case presented in this article demonstrates the potentially destructive effect of formocresol, when misused, on the periodontium. Even though the formocresol saturated pellet was squeezed dry before placement, a severe tissue response was seen when the medicated pellet was displaced interproximally. It is possible that the tissue destruction seen was associated with an immune reaction. It is also feasible that the medicated cotton pellet in continuous contact with tissue could contribute more to tissue destruction than if a single-contact episode had occurred. If this was the case, the destruction may have been minimized if a surgical debridement had been undertaken to remove all of the necrotic bone when it was first noted. It is also conceivable that the formocresol was further disseminated by way of the interproximal vasculature, thereby involving a greater area of destruction.

The most important factors leading to this isolated

problem may well have been case selection and treatment planning. The size of the interproximal restoration was such that an adequate seal may not have been possible and the indicated treatment should have been extraction or hemisection. An alternative would have been to plan a crown lengthening surgical procedure and subsequently place an alloy restoration prior to initiating endodontic treatment. This would have resulted in a restoration with a better seal and less potential for displacement of the medicated pellet.

Regardless of the possibilities that can be considered retrospectively, it is important to realize that formocresol is a medication that has been used extensively and effectively for years. However, it is a potentially destructive material that can cause great destruction when misused.

SUMMARY AND CONCLUSIONS

A case was reported in which formocresol was implicated as the cause of supporting bone loss which resulted in loss of the involved tooth. The circumstances leading to this episode and the severity of the response suggest that caution should be taken when using formocresol.

Dr. Kopczyk is chairman and professor, Departments of Periodontics, University of Kentucky, Lexington, KY, and University of Louisville, Louisville, KY. Dr. Cunningham is associate professor, Department of Endodontics, and assistant dean, Clinical Affairs, University of Kentucky, Lexington, KY. Dr. Abrams is associate professor and director, Periodontics Graduate Program, University of Kentucky, Lexington, KY.

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