



Refractory suppurative apical periodontitis due to cellulose fibers in the periapical tissues: case report

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The use of a cotton pellet as a spacer or as a medication carrier in the tooth pulp chamber between root canal therapy appointments is an accepted and common practice.¹ Retaining the pellet in the proper position within the tooth is very important. Cellulose fibers from disposable drapes, gowns and cotton can cause foreign body reactions if left in a surgical wound.²⁻⁴ In addition, cellulose fibers from paper points, sealed inside the pulp canal, can cause refractory apical periodontitis.⁵⁻⁷

The following is a report of refractory suppurative apical periodontitis, apparently secondary to foreign material in the periapical area. It is suspected that the foreign material consisted of cotton fibers that were displaced from the pulp chamber, through the canal, into the periapical area.

Case report

History

A 10-year-old Caucasian male presented to an emergency room 1 1/2 hr after sustaining a blow to the face during a kickball game. His chief complaint was "my front tooth is cracked." The patient reported good health, was taking no medications and had no contraindications to treatment. The mesial segment of the maxillary right permanent central incisor had class III mobility. Sulcular hemorrhage was evident. No other soft tissue injury was recorded. A radiographic evaluation revealed a mesioincisal fracture of the maxillary right permanent central incisor, which appeared to involve the pulp (Fig 1). At this time no attempt was made to remove the fractured portion of the tooth. The mesial segment was secured in place with Silux composite resin™ (3M Dental Products Division, St Paul, MN) on the facial and lingual surfaces of the tooth. One week later, the fragment was removed, a calcium hydroxide pulpotomy completed, and the fragment bonded in place with Silux composite resin.

Two months later, the patient had a draining sinus tract in the mucosal tissues facial to the maxillary right

permanent central incisor, with no other signs or symptoms. A diagnosis of necrotic infected pulp with suppurative apical periodontitis was made. Chemomechanical instrumentation was completed and formocresol on a paper point was sealed inside the canal space. Three months later, the patient returned complaining of painful, swollen gums, and the sinus tract was still present. Radiographic evaluation revealed a radiolucent area apical to maxillary right permanent central incisor (Fig 2). Chemomechanical instrumentation, calcium hydroxide paste, and cotton pellet were repeated. The tooth was sealed with composite resin. Two weeks later, the sinus tract had still not resolved. The canal was reinstrumented and calcium hydroxide was replaced.

The patient returned again after 6 months, having fractured the mesial fragment of the tooth. Evaluation

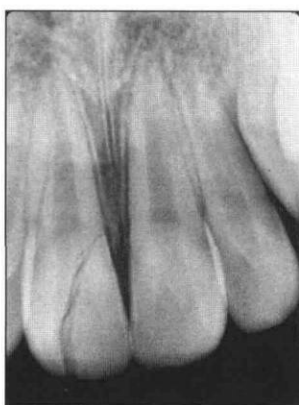


Fig 1. Oblique crown root fracture of maxillary right permanent central incisor at time of emergency visit. Fracture extends below crestal bone level and the periodontal ligament space appears widened. Incomplete root formation exists.

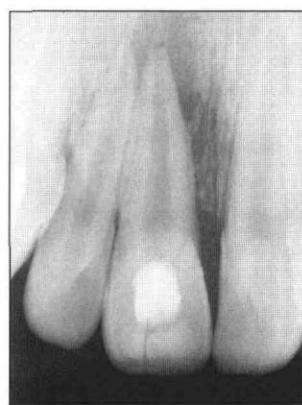


Fig 2. Radiolucent area apical to maxillary right permanent central incisor. Resorption of crestal bone mesially, association with tooth fracture.

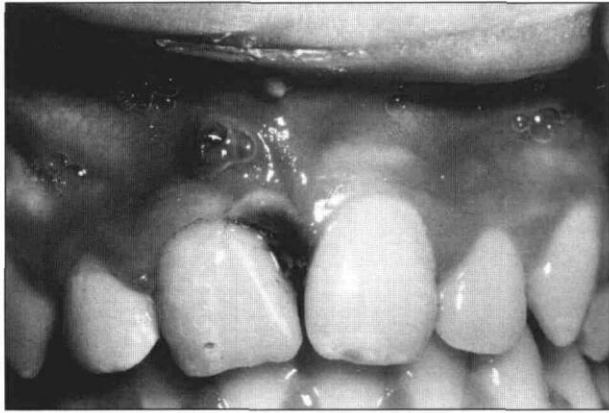


Fig 3. After 6 months the sinus tract facial to maxillary right permanent central incisor was still present. Marginal gingival tissue mesial to the tooth was necrotic, possibly due to impingement by the restoration or chemical burn by the restoration.

revealed necrosis of the marginal gingiva, mesiofacial to the maxillary right permanent central incisor (Fig 3) and sinus tracts on both facial and palatal tissues. The mesial fragment was removed, calcium hydroxide was replaced, and a restoration was placed using APH™ composite resin (LD Caulk Division, Dentsply International Inc, Milford, DE). The patient was at this time referred to our office.

Examination

The patient reported to our office 13 months after the original trauma. Review of the patient's medical history revealed no contraindications to treatment. Examination confirmed the mesial crown/root fracture. Soft tissues appeared healthy with the exception of marginal gingivitis localized around the maxillary right permanent central incisor and open facial and palatal sinus tracts. The patient, though currently asymptomatic, reported periods of discomfort. The tooth responded normally to percussion and palpation and had normal mobility. Mesial periodontal probing depths were 5 mm and followed the contours of the fractured surface. Distal probing depths were 3 mm. Radiographic evaluation (Fig 4) revealed nearly complete root formation, a 10x13-mm radiolucent area apical to maxillary right permanent central incisor and inadequate coronal restoration. Adjacent teeth responded within normal limits to vitality testing and probing. A diagnosis of necrotic infected pulp with suppurative apical periodontitis was made.

Clinical treatment

Under rubber dam isolation, the restoration was removed and the canal was accessed. Cotton fibers were found in the apical portion of the canal system. An attempt was made to retrieve the cotton with barbed broaches. After removing the cotton from the apical portion of the canal, broaches intentionally passed beyond the apex of the tooth indicated that cotton was

located beyond the apical foramen (Fig 5). The tooth was instrumented and calcium hydroxide powder was vertically condensed into the canal. Two weeks later the patient returned with facial and palatal sinus tracts still present. Because cotton fibers were suspected to have been displaced beyond the apex of the tooth, surgical curettage of the periapical area was necessary. Root canal therapy was completed in conjunction with apicoectomy and the apical gutta percha (Mynol™, Block

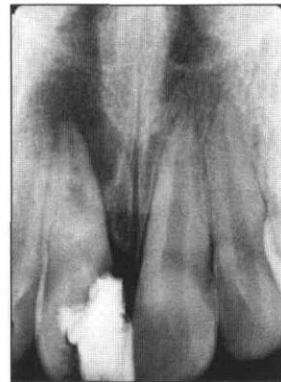


Fig 4. At the time of referral the radiolucent area was present apical to maxillary right permanent central incisor. Restoration with open margins is shown.

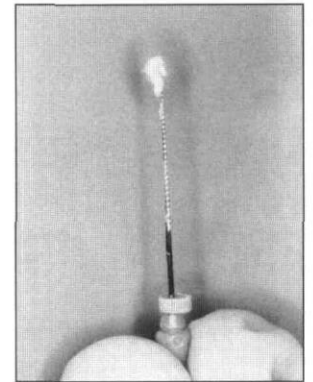


Fig 5. A broach with attached cotton fibers that were retrieved from beyond the apical foramen of the maxillary right permanent central incisor.

Drug Co Inc, Jersey City, NJ) filling was cold burnished. The tooth was temporarily restored with a Ketac Silver™ glass ionomer filling (ESPE-Premier Corp, Norristown, PA) for coronal seal and an APH composite restoration. One week after the procedure, the soft tissues were healing within normal limits and the patient had been asymptomatic. Pathological diagnosis

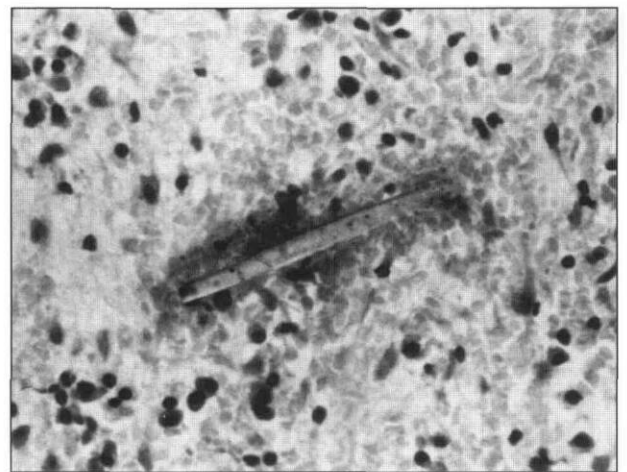


Fig 6. Photomicrograph (original magnification 40X) hematoxylin and eosin stain of birefringent material retrieved during surgery on the maxillary right permanent central incisor. Mild chronic inflammatory infiltrate is seen.

was a dental granuloma with chronic inflammation, darkly staining foreign material, and birefringent material present (Fig 6).

One year after the treatment, the patient reported that he had been asymptomatic, adjacent teeth responded normal to vitality testing, the tooth responded normally to palpation and percussion and had normal mobility. Sinus tracts were not present and soft tissue healing was complete. Radiographic evaluation revealed formation of a periodontal ligament apically and osseous filling of the pathological, surgical defect (Fig 7).

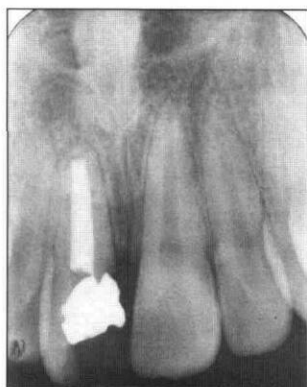


Fig 7. One-year recall examination. Radiograph reveals re-established periodontal ligament apically and osseous filling of the pathological surgical defect.

Discussion

It is conceivable that a calcium hydroxide pulpotomy (Cvek pulpotomy)⁸ followed by an adequate coronal seal at the initial emergency visit might have eliminated the need for root canal therapy in this case. It has been shown that an increased time interval between injury and calcium hydroxide pulpotomy treatment significantly decreases the prognosis of this therapy.⁸ After initiating root canal therapy, the placement of a temporary restorative material against hard-packed calcium hydroxide prior to bonding the coronal segment may also have eliminated the need for a cotton pellet. The space gained by not using a cotton pellet may have increased the retention of the restoration and allowed a better seal. Why a formocresol pulpotomy was done when the patient presented with a necrotic pulp is not known. Because of the refractory nature of the lesion presented here, it is thought that foreign material played a major role in maintaining the inflammatory condition. However, the persistence of bacterial insult through coronal leakage or from the

periapical area cannot be ruled out. It is also conceivable that the displaced cotton prevented the calcium hydroxide from reaching the apical part of the root canal and therefore reduced its effectiveness. For these reasons apical surgery was indicated. Root canal therapy was completed in conjunction with surgical therapy and the apical gutta percha filling was cold burnished.

Friedman⁹ concluded in a review of surgical techniques that these two procedures, if performed in conjunction, would provide the best prognosis when compared to retrofilling only. Kaplan et al.,¹⁰ have shown that cold burnished gutta percha provided significantly less leakage than retrograde amalgam or heat-sealed gutta percha fillings. Retrograde instrumentation was not completed as it was felt that the canal space was optimally disinfected. The use of calcium hydroxide as an intracanal medicament has been shown to effectively disinfect the root canal space after 30 days.¹¹

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1. Ingle JJ, Taintor JF: Endodontics, 3rd Ed. Philadelphia: Lea & Febiger, 1985, pp 794.
2. Tinker MA, Burdman D, Deysine M et al: Granulomatous peritonitis due to cellulose fibers from disposable surgical fabrics. Laboratory investigation and clinical implications. *Ann Surg* 180:831-35, 1974.
3. Janoff K, Wayne R, Huntwork B, Kelley H, Alberty R: Foreign body reactions secondary to cellulose lint fibers. *Am J Surg* 147:598-600, 1984.
4. Godleski JJ, Gabriel KL: Peritoneal responses to implanted fabrics used in operating rooms. *Surgery* 90:828-34, 1981.
5. White E: Paper point in mental foramen: report of a case. *Oral Surg* 25:630-32, 1968.
6. Koppang HS, Koppang R, Solheim T, Aarnes H, Stolen SO: Cellulose fibers from endodontic paper points as an etiological factor in postendodontic periapical granulomas and cysts. *J Endod* 15:369-72, 1989.
7. Sedgley CM, Messer HH: Long-term retention of a paper point in the periapical tissues: a case report. *Endod Dent Traumatol* 9:120-23, 1993.
8. Cvek M: A clinical report on partial pulpotomy and capping with calcium hydroxide in permanent incisors with complicated crown fracture. *J Endod* 4:232-37, 1978.
9. Friedman S: Retrograde approaches in endodontic therapy. *Endod Dent Traumatol* 7:97-107, 1991.
10. Kaplan SD, Tanzilli JP, Raphael D, Moodnik RD, et al: A comparison of the marginal leakage of retrograde techniques. *Oral Surg* 54:583-85, 1982.
11. Bystrom A, Claesson R, Sundqvist G: The antibacterial effect of camphorated paramonochlorophenol, camphorated phenol and calcium hydroxide in the treatment of infected root canals. *Endod Dent Traumatol* 1:170-75, 1985.