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CASE REPORT

Conservative Treatment of Persistent Periradicular Lesions Using Aspiration and Irrigation

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Aspirating the unknown contents of a bony cavity and saline irrigation of a body wound are both basic surgical techniques. These two techniques have been combined in treating persistent periradicular pathosis in two cases. The cases demonstrate significant bony healing of extensive periradicular defects after the use of the combined procedure. Both cases were nonresponsive to nonsurgical root canal treatment. The use of aspiration and irrigation may initiate healing in cases of uninfected apical cysts which heretofore would require surgical intervention. The conservative nature of these procedures has advantages of reduced treatment time, avoidance of iatrogenic problems, and elimination of some conventional apical surgery.

Current philosophy in the endodontic treatment of nonvital teeth with large periradicular lesions includes the initial use of nonsurgical root canal therapy. When this treatment is not successful in resolving the periradicular pathosis, additional treatment options should be considered. Such treatment may include nonsurgical retreatment to rule out morphological abnormalities or treatment inadequacies. If necessary, a subsequent treatment option would include some variety of surgical procedure. Surgical treatment of persistent extensive periradicular lesions most often involves curettage and apical resection. The objectives of such surgical procedures would include establishing a clinical diagnosis and prognosis while performing whatever corrective treatment is necessary. The surgical treatment would be expected to establish an environment conducive to healing.

Marsupialization is a surgical treatment option that may aid the clinician in reducing the size of an apical lesion. Smith and Partsch (1) were among the original advocates of this procedure for use in the treatment of large cystic lesions. Preservation of the surrounding bone structure was certainly one of their treatment goals. Freedland (2) has demonstrated that polyvinyl or polyethylene tubing may be utilized to cause the decompression and subsequent healing of extensive periapical rarefactions. He enumerated several advantages of the conservative reduction of extensive bony lesions, including the avoidance of iatrogenic surgical compromise of adjacent tooth vitality. Neaverth and Burg (3) suggested that prior to inserting a radiopaque tubing, the contents of the lesion may be aspirated and the cavity gently irrigated. The minimum amount of decompression time they related was 5 wk. It is logical that healing after marsupialization or decompression is the result of removal of the cause of the pathosis or modification of the local environment to the extent that host defense mechanisms can exert a positive influence.

Diagnosing the presence of a cyst by radiographic appearance is generally considered to be an unreliable technique. In 1984, Natkin et al. (4) analyzed the data of various studies relating radiographic lesion size and histology. They concluded that for the studies where relevant data was available, there was a strong correlation between cyst incidence and increased lesion size. They stated that with a radiographic lesion size of 200 mm^2 or larger, the incidence of cysts is almost 100%. Toller (5) has proposed that the growth of the cyst may be due to the increased hydrostatic pressure of the confined fluid and lack of lymphatic access. An increased osmolarity would favor increased fluid flow into the cystic cavity generating an increased pressure on the bony cavity walls. This higher pressure would cause additional osteoclastic activity and enlargement of the defect. Additionally, the cyst may expand due to the actions of prostaglandins in the cyst capsule, collagenases, increased cyclic AMP levels and lymphokines (6).

Histologically, there has been some controversy regarding the healing potential of the periapical lesion. If the lesion is a cyst separate from the apex and with an intact epithelial lining, it may have developed into a self-perpetuating entity that may not heal when treated with only nonsurgical root canal therapy (7). Other times an enormous periapical lesion may have a direct communication with the root canal system and respond favorably to nonsurgical endodontic treatment. Statistically, some cyst-like lesions undeniably heal due only to nonsurgical treatment. Whether or not an acute inflammatory response is necessary for healing to occur is debatable. To attempt to histologically classify periapical lesions as either cystic or granulomatous seems to ignore the possibility of a transitional phase between the two. Such a phase may account for some of the radicular cyst healing referred to by Bhaskar (8) and Lalonde and Lubke (9). Regardless of the histological

diagnosis, for bony healing to occur, a local change in the osteoblastic:osteoclastic ratio must allow for increased bone deposition. It is suggested that this local change may be the result of something as simple as aspiration and a thorough saline rinse.

Aspiration of an unknown bony lesion is a relatively innocuous surgical procedure which may provide information as to the presence of purulence, cystic fluid, or hemorrhage. Subsequently the aspirant may be utilized to provide microbial identification and immunohistochemical analysis. Saline irrigation in the debridement of a wound is likewise a mainstay of basic surgical treatment. A treatment regimen is described which combines these two procedures in an attempt to promote healing of persistent periradicular lesions.

The purpose of this article was to present another conservative treatment option to the traditional periapical surgical treatments for extensive bony lesions.

CASE 1

A 45-yr-old Caucasian male with a noncontributory medical history presented for treatment of an asymptomatic periapical lesion around the apex of his right maxillary lateral incisor. The lesion had been discovered during routine panorex screening and a formocresol pulpotomy had been performed prior to the referral. The adjacent teeth responded within normal limits to thermal and electrical pulp testing. A through and through bony lesion of the maxilla could be palpated. The patient's clinical condition was classified as necrosis with periapical radiolucency of tooth 7 (Fig. 1).

The tooth was isolated with a rubber dam, the temporary restoration was removed, and because of the amount of exudate a culture sample was obtained. The tooth was cleansed and shaped utilizing both hand and ultrasonic instrumentation with 2.6% sodium hypochlorite irrigation. Because of persistent drainage into the canal, an interappointment intracanal medication of calcium hydroxide was placed prior to temporary closure with Cavit. The patient was given a prescription for Penicillin V and told to return in 10 days. Culture results showed no aerobic or anaerobic microbe growth. During the subsequent appointment, the tooth was reinstrumented and obturated with warm laterally condensed gutta-percha and Sealapex sealer (Fig. 2).

A 6-month recall examination revealed no bony healing and possible enlargement of the periapical lesion (Fig. 3). Following local anesthesia and a povidone-iodine swabbing of the involved tissues, an 18-gauge needle attached to a 20-ml syringe was used to penetrate the buccal mucosa and aspirate approximately 4 ml of blood-tinged fluid from the lesion. A second syringe filled with saline was then used to rinse the bony lesion. The new needle was inserted through the first entry wound and then passed out through the palatal tissue (Fig. 4). The syringe was then retracted into the bony defect and the saline gently injected. This rinsing procedure was repeated until the fluid exiting the palatal wound appeared to be clear. Approximately 50 ml of saline were

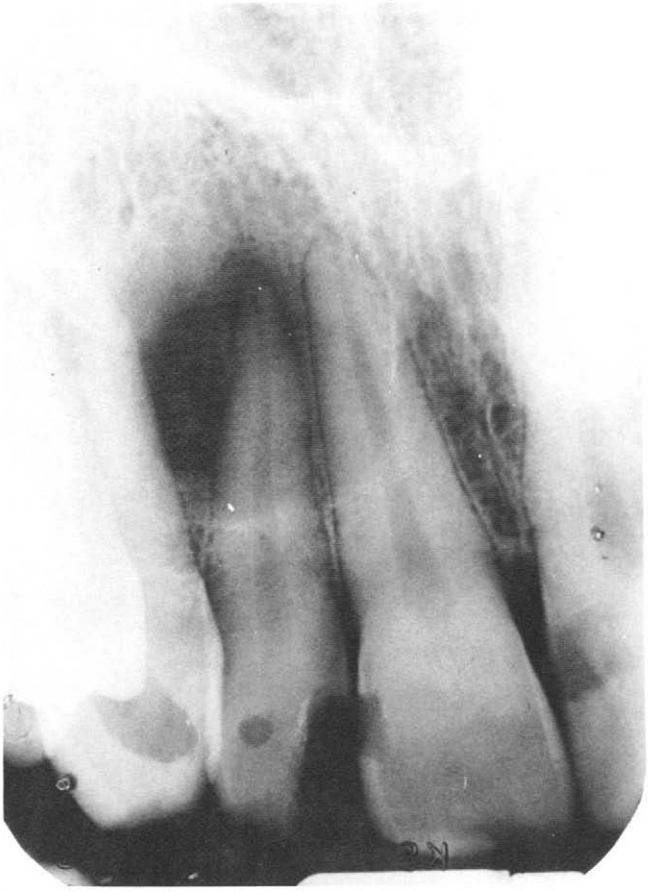

FIG 1. Preoperative radiograph demonstrating periradicular lesion on tooth 7.

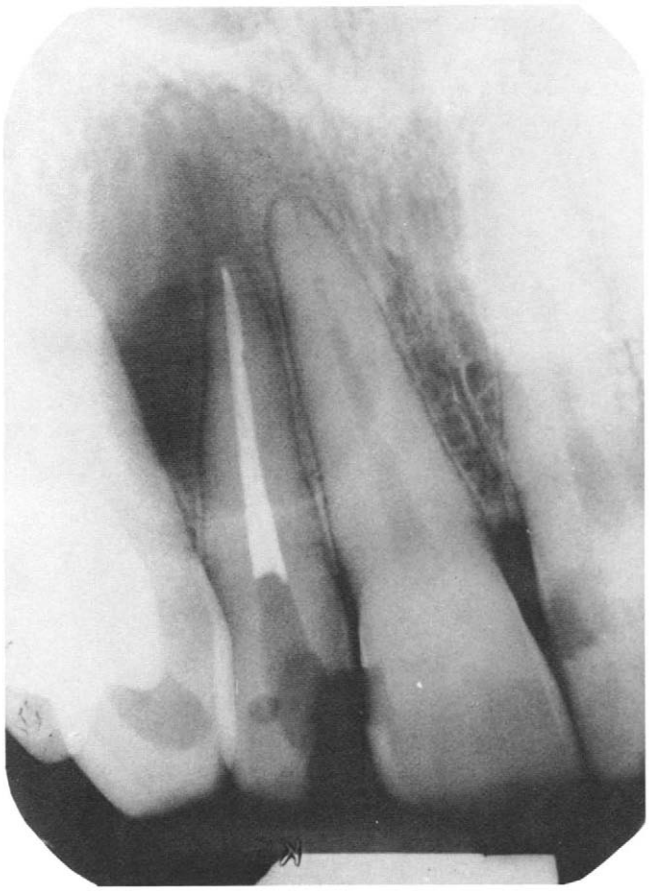

FIG 2. Radiograph of tooth 7 on the day of gutta-percha obturation.

FIG 3. Six-month follow-up radiograph of tooth 7 demonstrating enlargement of bony defect.

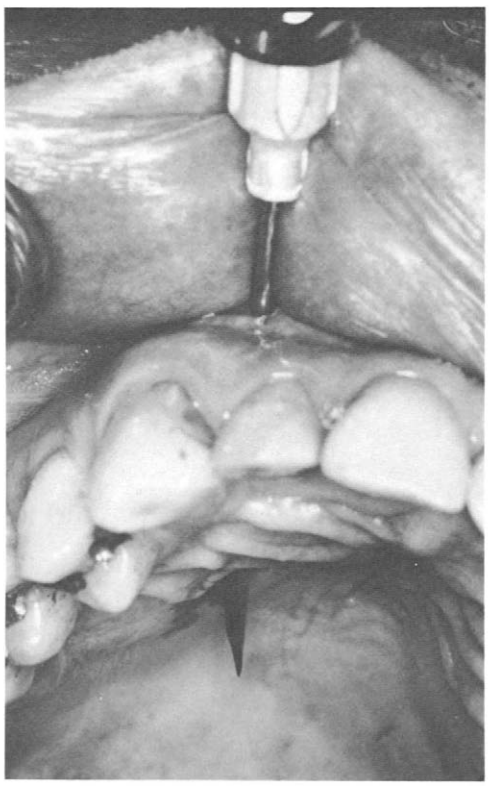

FIG 4. Photograph of 18-gauge needle passing completely through maxillary bony defect associated with tooth 7.

utilized. The patient was given another penicillin prescription and dismissed.

Two days later the patient was reexamined. A 5-mm circular hematoma was present at the entry wound site and mild edema was present in the depth of the mucobuccal fold. The patient's mild pain was relieved by aspirin during the first 24-h postoperative period. An analysis of the aspirant revealed no aerobic or anaerobic microbe growth. A Gram stain revealed no microorganisms and only occasional polymorphonuclear leukocytes.

Figure 5 is a radiograph taken 13 months after the aspiration and irrigation procedure. Significant bony healing has occurred. The patient is currently asymptomatic and the tooth fully functional. He has been advised to have a crown placed due to the extensive size of the composite restoration.

CASE 2

A 37-yr-old Caucasian male with a noncontributory medical history presented 17 months after nonsurgical endodontic treatment of his maxillary left central incisor, lateral incisor, and cuspid. All three teeth were sensitive to palpation and percussion. A draining sinus tract was present between the incisors on the buccal mucosa and a large periradicular lesion was noted radiographically (Fig. 6). Since the patient's record indicated that no sealer had been used in the previous obturation, nonsurgical endodontic retreatment was performed. All three teeth were treated in a manner similar to that in

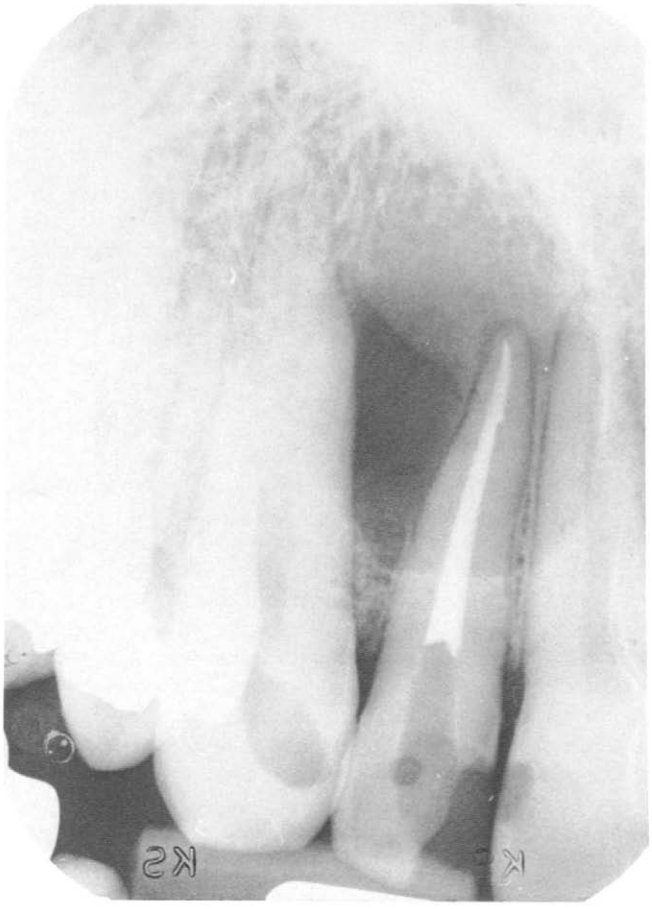

FIG 5. Radiograph taken 13 months after aspiration and irrigation demonstrating significant bony healing.

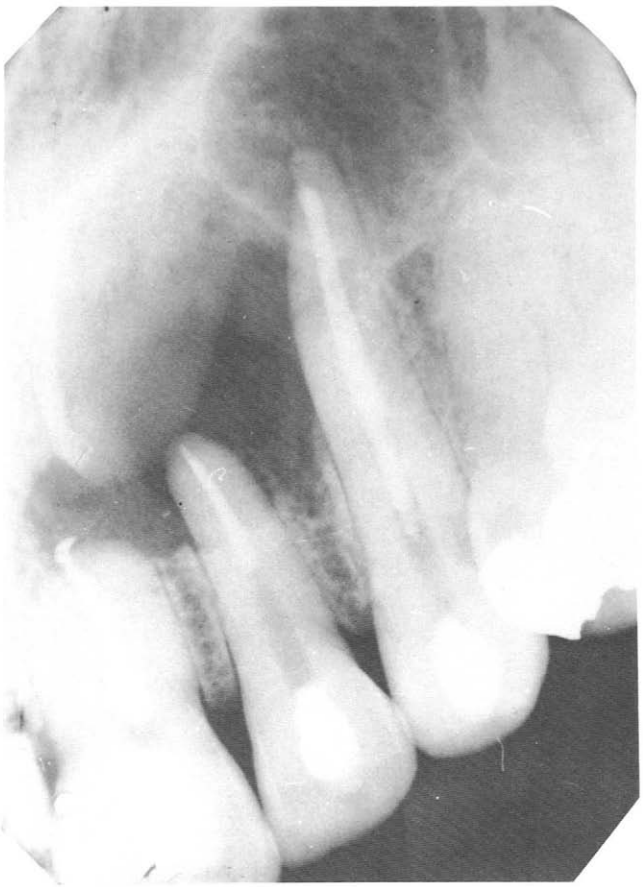

FIG 6. Radiograph of teeth 9 to 11 demonstrating large periradicular lesion 17 months after initial endodontic treatment.

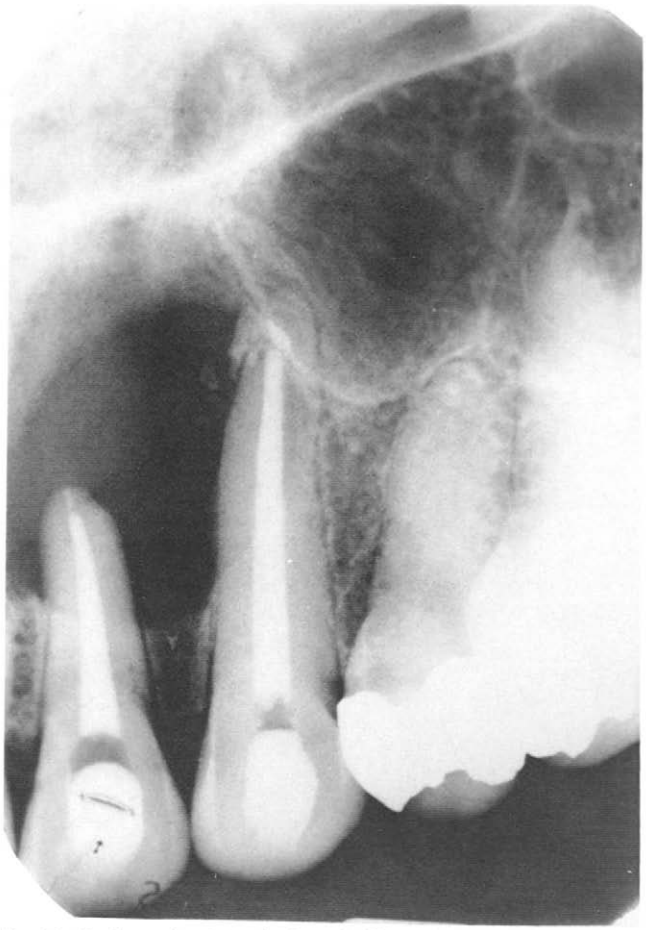

FIG 7. Radiograph of teeth 9 and 10 at the time of aspiration demonstrating increase in size of bony lesion.

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case 1 using calcium hydroxide, hand and ultrasonic instrumentation with 2.6% sodium hypochlorite irrigation, and obturation with laterally condensed gutta-percha and Roth 801 sealer. Four weeks later the teeth were still sensitive to percussion and the sinus tract persisted. Figures 7 and 8 demonstrate the increased size of the periradicular lesion immediately before the aspiration and irrigation. The aspiration and irrigation technique was the same as that used in case 1. Approximately 8 ml of blood-tinged fluid were removed and sent to the laboratory. Again, no microbial growth was noted in either culture and the Gram stain revealed only polymorphonuclear leukocytes. An 18-month follow-up radiograph demonstrates significant bony healing of the defect (Fig. 9). All three teeth are currently asymptomatic and functional.

DISCUSSION

If upon attempting aspiration, the clinician is unable to remove fluid from the bony cavity, this would indicate the presence of granulation tissue or some other type of soft tissue mass. Therefore, no saline irrigation should be attempted. Such a case would require a conventional surgical exploration and treatment. Case selection is obviously important. The aspiration and irrigation technique is not intended to be a panacea for all persistent bony lesions. The clinician must not limit the differential diagnosis of such lesions to only that of a periapical cyst. Rather, all types of cysts, abscesses, fractures, and soft tissue radiolucent masses must be included in an intelligent differential diagnosis.

An important aspect of the irrigation procedure is to ensure that there is an escape wound or vent from which the saline can drain. The second puncture opening should allow a controlled exit of the saline from the bony cavity. The gentle irrigation would then tend to cleanse only the bony defect and not be forced into surrounding tissues or cavities. It should be noted that no attempt was made to remove all of the saline from the osseous defects. In all instances the irrigation did seem to initiate bleeding into the defect. It is felt that this bleeding and subsequent clot formation are the start of a healing mechanism similar to that described by Seltzer (6).

Experience to date is limited to lesions that apparently were uninfected periapical cysts. This conclusion is based on the type of fluid removed and the lack of microbial presence in both culture and Gram stain specimens.

To date only anterior maxillary lesions have been treated. However, it is believed that this procedure would be appropriate in other areas of the oral cavity where adjacent tissue spaces or sinus cavities are not involved. Five additional patients have received similar treatment and are currently being followed. This technique shows obvious advantages with regard to treatment time, patient comfort, patient acceptance, and reduction of possible iatrogenic complications.

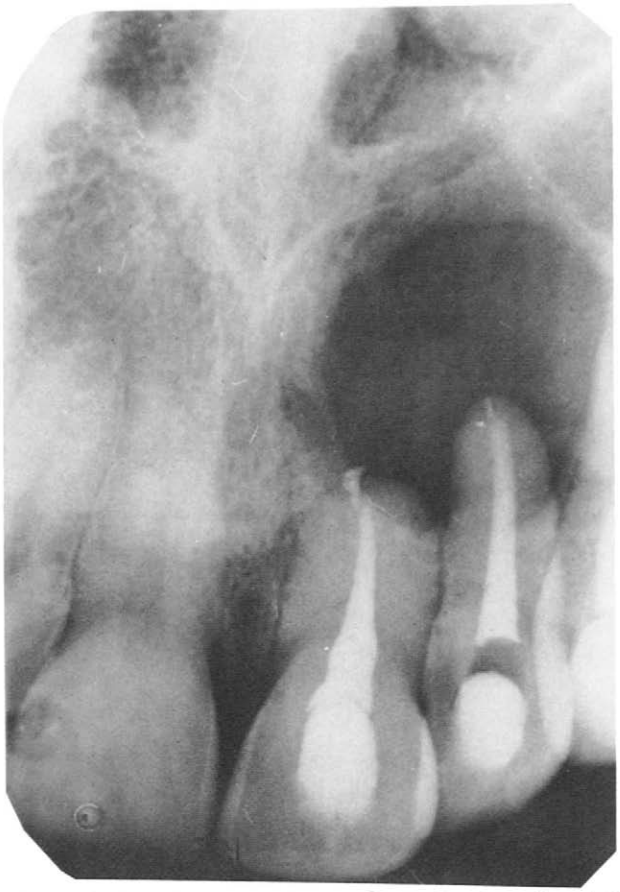

FIG 8. Radiograph of teeth 10 and 11 at the time of aspiration demonstrating increase in size of bony lesion.

FIG 9. Radiograph taken 18 months after aspiration and irrigation demonstrating significant bony healing.

The opinions and assertions herein are the private views of the authors and are not to be construed as official or as reflecting the views of the Department of the Army or the Department of Defense.

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