

# Endodontic management of the endodontic-periodontal lesion

Jorge Vera, Martin Trope, Frederic Barnett and Kenneth S Serota demonstrate that endodontic lesions with involvement of the attachment apparatus can be successfully healed by performing adequate root canal treatment with great emphasis on disinfection of the root canal system

## Abstract

Occasionally periradicular lesions of endodontic origin may be radiographically indistinguishable from periodontal disease. Infected pulpal tissue and microbial by-products may move through accessory and furcal canals and cause loss of attachment in those areas. Accurate diagnosis may be particularly difficult when a sinus tract originating from the endodontic lesion drains along the periodontal ligament space, giving the appearance of periodontal disease. Thorough diagnostic testing to confirm pulp necrosis or periodontal disease becomes critical when attempting to diagnose the specific disease entity accurately and then deliver suitable treatment. In both clinical cases presented in this paper, diagnosis of the etiology of the pathosis was more difficult since there was extensive deep probe depths in more than one site. However, successful healing was obtained after thorough disinfection and sealing of the root canal system.

The relationship between the pulp tooth and the attachment apparatus of a tooth has been widely documented (Simon et al, 1972; Paul B, Hutter JW, 1997; *American Association of Endodontists newsletter*, 2001). Most of the time periodontal inflammation due to pulp space toxins occurs in the apical region and thus can readily be distinguished from a periodontal pocket (Figure 1).

However, occasionally necrotic infected tissue by-products move through accessory or furcal canals, producing inflammation that is indistinguishable from periodontal disease. The amount of tissue destruction is directly correlated with the total microbial content in the root canal system (Bystrom et al, 1987) and to the length of time these tissues are exposed to the infecting organism (Korzen et al, 1974). Differential diagnosis is particularly difficult when a sinus tract originating from the endodontic lesion may drain along the periodontal ligament, giving the appearance of periodontal breakdown (Simring M, Goldberg M, 1964; Seltzer et al, 1967). Yamasaki et al (1994) have reported that periradicular lesions may initially expand horizontally through cancellous bone and then proceed vertically. Analyzing a series of retrospective studies, Blomlof et al (1993) concluded that endodontic infection promotes



**Figure 1:** Apical periodontitis on the apical region of tooth 21

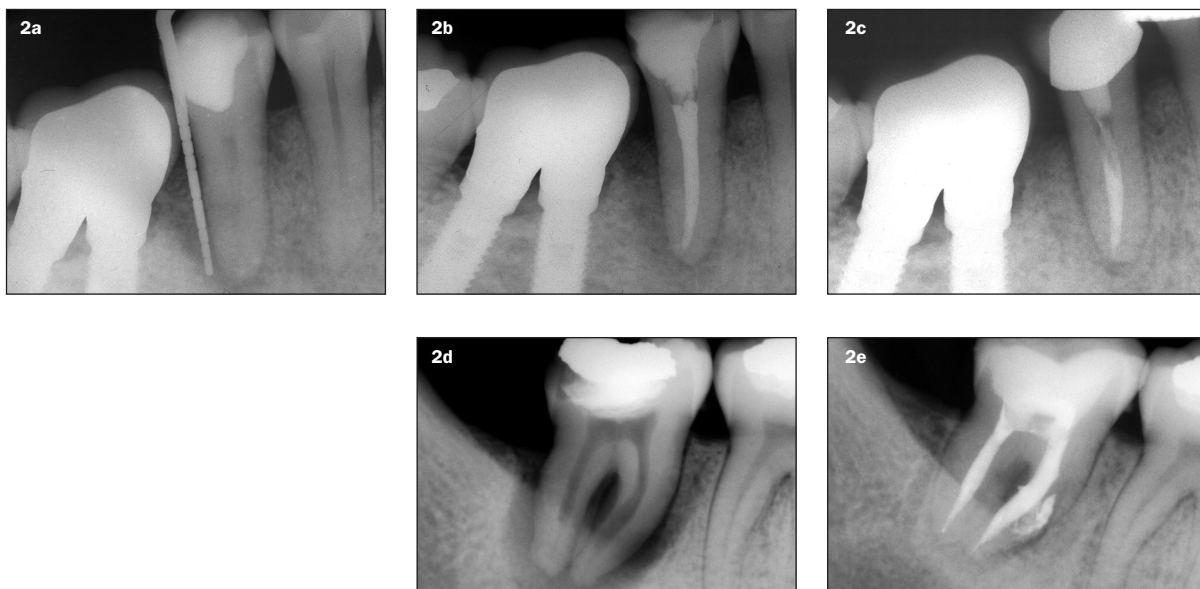
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**Figures 2a-e:** (a) Probing depth 13mm on distal area of tooth 45; (b) Immediately after filling; (c) 10 months postoperatively, 3mm probing depth all around the tooth; (d) Preoperative radiograph of tooth 47 with extensive periradicular bone loss; (e) One year and eight months control X-ray film showing considerable bone apposition, probing depths were of no more than 3mm all around the tooth



periodontal pocket formation and should be regarded as a risk factor in periodontitis progression. Therefore, a primary endodontic lesion draining through the attachment apparatus should be treated initially by endodontic therapy (Zehnder M, Hasselgren G, 2002). This must be confirmed by accurate diagnostic tests to confirm pulp necrosis and diagnostic probing (usually a precipitous drop in probe depth is detected around a tooth) (Harrington, 1979).

Periodontal health should be reassessed only after one to two months (Paul B, Hutter JW, 1997) since aggressive removal of periodontal ligament and underlying cementum during interim endodontic therapy adversely affects periodontal healing (Blomlof et al, 1993). As such, scaling should not be done in these cases. If a vertical fracture has been ruled out, and the standard of endodontic care rendered well done, healing should be expected in the vast majority of cases (Figures 2a-e). In both cases presented, diagnosis of the etiology of the pathosis was more difficult since there was extensive deep probing depths in more than one site. However, successful healing was obtained after thorough disinfection and sealing of the root canals.

### Case report one

A 45-year-old female patient presented with swelling of the soft tissues distal to tooth 47. Probe depths were within normal limits in the area except for 13mm both on the distal and the lingual aspect. No mobility was determined and the tooth was non responsive to a cold test (Endo Ice, Hygenic). All other teeth in the area tested within normal limits to thermal challenge. Pus drained through the sulcus and no indication of fracture was detected.

Radiographic examination demonstrated severe bone loss around the distal root, the furcation area and the apex of the mesial root of tooth 47 (Figure 3a). The C-shaped root canal was instrumented to completion using nickel titanium rotary instruments, irrigation was performed with sodium hypochlorite 5.25% and REDTA (Roth Intl) (Figure 3b), all canals were dried and an inter-appointment dressing with calcium hydroxide was placed.

Two weeks later, soft tissues looked normal, there was no pus draining through the sulcus and the tooth was asymptomatic. After rubber dam isolation, the calcium hydroxide was removed from the canals using EDTA and

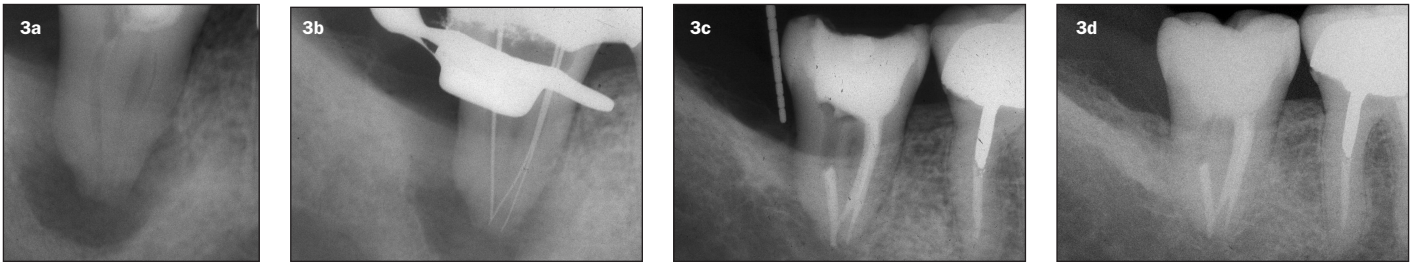
sodium hypochlorite 5.25%, and the canals were dried and filled with lateral condensation of gutta percha and sealer. An IRM (Dentsply) temporary restoration was placed in the access cavity and the patient was referred back to her dentist for a final restoration.

Despite numerous reminders, the patient did not return for reassessment until eight months later. At this visit there was no permanent restoration in the tooth; however, probing depths were 3mm all around the tooth and soft tissues looked normal. The tooth was asymptomatic to percussion and radiographic examination revealed a dramatic regeneration of the periradicular tissues (Figure 3c). After removing the remaining IRM, there was no evidence of fracture or decay in the access cavity, which was disinfected with sodium hypochlorite 5.25%, dried and filled with a cotton pellet and IRM. The patient was sent directly to her dentist who placed a ceramic onlay on the tooth. The patient returned six years and six months after the placement of the permanent restoration and tooth 47 was asymptomatic, probing depths were still 3mm all around the tooth and soft tissues appeared normal. Radiographic examination revealed complete regeneration of the periradicular tissues (Figure 3d).

### Case report two

A 58-year-old male presented with swelling on the buccal mucosa of tooth 21, which was restored with porcelain fused to metal crown. Probing depths were 16mm over all the buccal and the mesial surfaces of the tooth. Pus was draining through the sulcus, however the tooth was not mobile. The rest of the dentition demonstrated a stable periodontal condition.

Radiographic examination revealed severe bone loss on the mesial, apical and distal surface (Figures 4a and 4b) and the tooth was non responsive to a cold test (applied to exposed dentin on the lingual surface)(Endo Ice). A cavity test was performed but no reaction was reported by the patient upon entrance into the dentin. The root canal was instrumented to completion using nickel titanium rotary instrumentation with sodium hypochlorite 5.25% and REDTA as irrigants. Aqueous chlorhexidine 2% (Alphadental Products) was placed in the canal and activated with a passive ultrasonic tip for one minute. As the canal could not be dried, calcium hydroxide was



**Figures 3a-d:** (a) Tooth 47 presented with severe bone loss around the apical and distal root area; (b) Guide film at the start of root canal therapy; (c) Eight-month recall, tooth had not been restored, considerable bone apposition is seen in all periradicular area, probing depth was 3mm; (d) At six years and six months recall, probing depths were 3mm all around the tooth, which remained asymptomatic

placed as an inter-appointment dressing and a temporary filling was placed in the access cavity (Provisit).

When the patient returned after seven days, soft tissues appeared normal and the tooth was asymptomatic; no probing was attempted at this time. After isolation of the tooth and removal of the temporary filling, the calcium hydroxide was removed with copious irrigation of sodium hypochlorite 5.25%, EDTA and rotary instruments. The canal was dried and filled with lateral condensation of gutta percha followed by a down pack using the Buchanan pluggers (SybronEndo) and the Touch 'n Heat (Analytic Endodontics) (Figure 4c). A follow-up examination was done one year and two months after the initial appointment. Probe depths were 3mm on all aspects of the tooth, which had remained symptom-free since completion of the root canal. Radiographic examination revealed dramatic regeneration of the periradicular tissues (Figure 4d).


## Discussion

In the preponderance of endodontic lesions, microflora is the etiologic vector that dictates the clinical course of the disease and therefore the treatment plan (Zehnder M, Hasselgren G, 2002). On occasion, a sinus tract originating from diseased apical tissues may drain alongside the periodontal ligament, giving the appearance of a periodontal pocket. After ruling out fracture as the etiology, careful examination with a periodontal probe should be done, not only at the site of the lesion but also in the rest of the mouth. In addition, a negative response to thermal challenge and lack of mobility of the tooth may indicate that the lesion is purely of endodontic origin. Thus root canal therapy should be performed and periodontal therapy avoided, or at least delayed, until one or two months after the root canal has been performed (Blomlof et al, 1993), and then only if the attachment apparatus does not seem to be improving. Follow-up examination is crucial when attempting to evaluate the prognosis of the treated tooth.

In both cases presented here, there were deep probe depths along more than one surface of the tooth. Radiographically there was extensive bone loss, however successful disinfection and filling of the root canal system of both teeth led to regeneration of the attachment apparatus without further periodontal therapy, which in these cases could have worsened the prognosis of the teeth. In fact, there is evidence that proper root canal treatment can heal sinus tracts originating from an endodontic lesion even if they have been present for a long time (Stromberg et al, 1972). Root canal disinfection is crucial when attempting to achieve regeneration of the periradicular tissues (Bystrom A, Sundqvist GT, 1983; Bystrom et al, 1985; Trope et al, 1999). Whether complete root canal disinfection can be achieved in one appointment

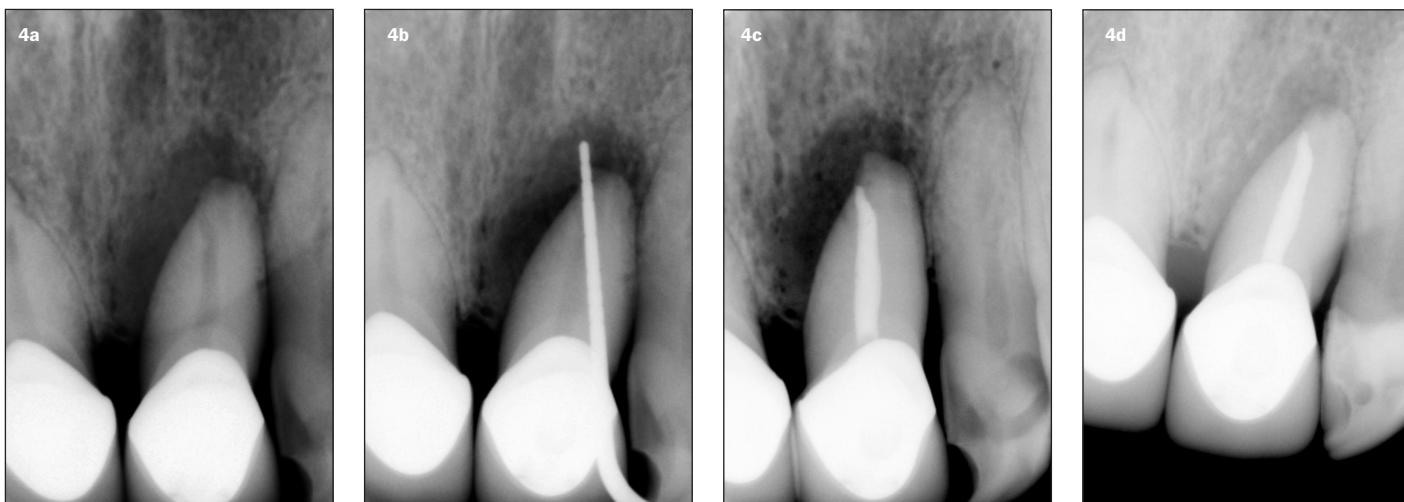
is beyond the scope of this article.

In both these cases, calcium hydroxide was used as the intracanal inter-appointment dressing to disinfect the root canal system further and to evaluate the improvement of the surrounding tissues at the second appointment, at which time it was decided to fill both teeth.

We can conclude that endodontic lesions with involvement of the attachment apparatus can be successfully healed by performing adequate root canal treatment with great emphasis on disinfection of the root canal system. Understanding the mechanisms of bone destruction in these types of lesions is of great importance when trying to achieve successful healing. 

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**Figures 4a-d:** (a) Tooth 21 with severe bone loss; (b) Probing depth was 16mm all over the buccal surface; (c) Post obturation X-ray film; (d) One year and three months recall, 3mm probing depth all around tooth structure. Almost complete healing of periradicular tissues is evident

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