ENDODONTIC AND PERIODONTAL Diseases

Dr Anna Hughes/ Dr Tina Choo

(with special thanks to Prof Paul Abbott)

Aim of the lecture

- Understand the presentation of endodontic, periodontal & combined or concurrent endodontic-periodontal diseases
- How to differentiate between endodontic and periodontal diseases
- Understand that other distinct conditions may have endo and perio implications - root perforations / fractures, cracks , caries, root resorption, orthodontic complications, developmental anomalies- each with specific management
- The importance of achieving the correct diagnosis, understanding prognosis and management of the presenting condition
- Classifications- old and new

PERIODONTAL DISEASE

Diagnosing PERIODONTITIS: signs and symptoms

- Attachment loss and deep pockets
- Bleeding
- Tooth mobility
- Plaque & calculus deposits
- Positive to cold/pulp tests
- Radiographic bone loss
- Generally painless

PULPAL DISEASE

- Signs and symptoms of reversible pulpitis - sensitivity to cold or hot normally which doesn't linger long
- Irreversible pulpitis, severe pain, lasting throbbing ; altered response to pulp tests
- Inflammation may extend to periodontal ligament tender to pressure, biting or tapping
- If left untreated, pulp necrosis and eventual infection- bone resorption, and radiolucency around apex, in furcation or lateral to the root

Can pulp infections affect the periodontium?

- Pulpal disease can cause periodontal changes
- Infections in the pulp can spread through lateral canals and accessory canals into the periodontal ligament which could lead to the destruction of bone this can also occur via cracks and dentinal tubules

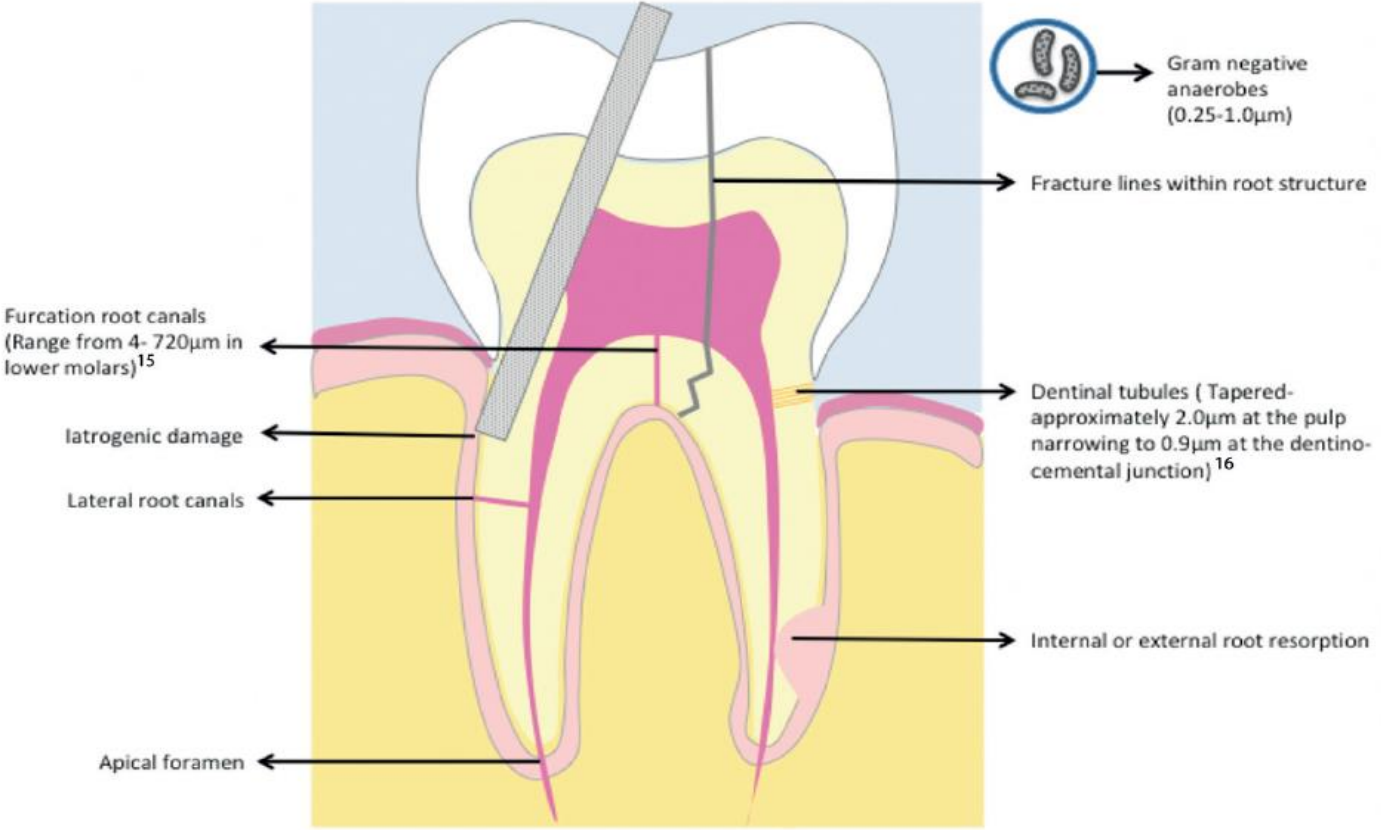
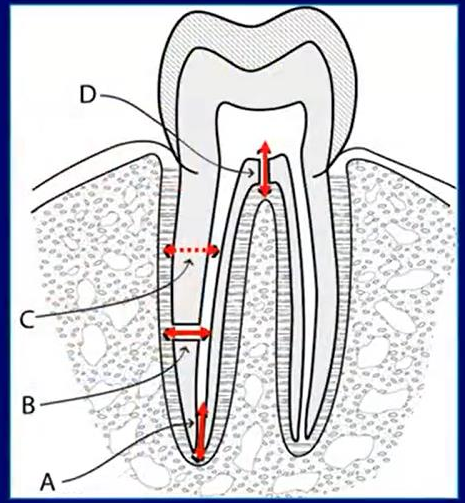
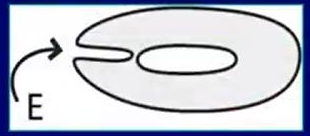
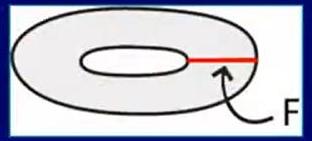


Figure 1. Some of the potential pathways of communication between pulp and periodontium.

Communication Pathways







From: Abbott & Castro Salgado 2009

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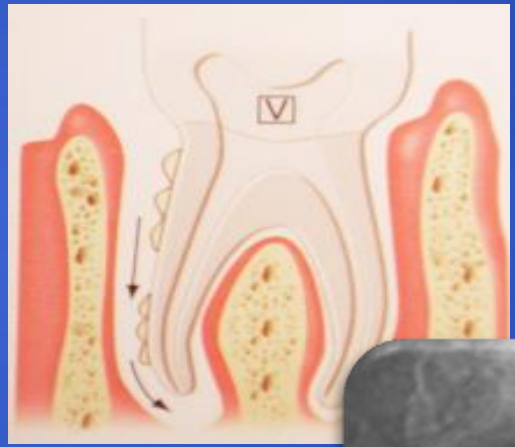
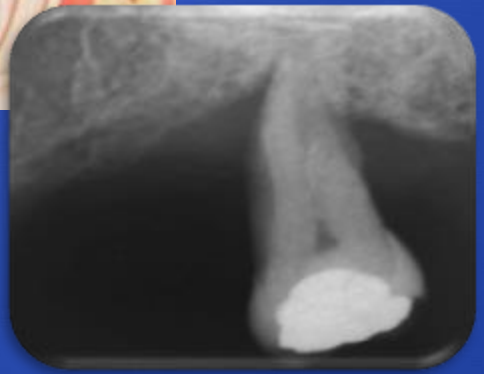
Can periodontal infections affect the pulp?

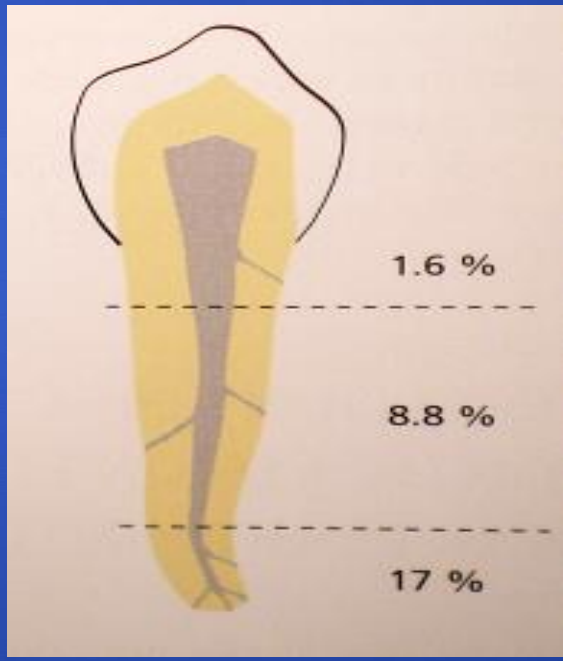
- The effect of periodontal disease on the pulp is not as clear-cut
- Normal pulps observed in majority of teeth with advanced periodontal disease
- A small % of teeth with advanced periodontal disease can cause pulp infections if the apical foramina is invaded





Combined periodontic-endodontic disease

- Advanced periodontitis can allow bacteria to gain access to pulp via accessory canals or the apex of the root, and lead to infection of the pulp



How to diagnose Combined endo-perio disease

- ***Diagnosis*** of combined lesions can sometimes be tricky
- The most important clinical examination tools:
  - Pulp sensibility test
  - Periodontal probing/ full chart, suppuration, mobility
  - Radiographs (PAs, CBCT)
- Need a good history –trauma, procedures, symptoms
- Visual appearance of soft tissues
- Caries, restorations, anatomical factors
- Transillumination

Diagnosis-Combined periodontic-endodontic disease can be challenging!

- **It is easier to determine the origin of the lesion when a vital pulp test is obtained because the positive result will rule out an endodontic origin – except multi-rooted teeth with partial necrosis of pulp (necrobiosis)**

When the pulp is found to be non-responsive and the infection can be traced to a lateral canal or apical foramen, then the lesion is suspected to be of endodontic origin

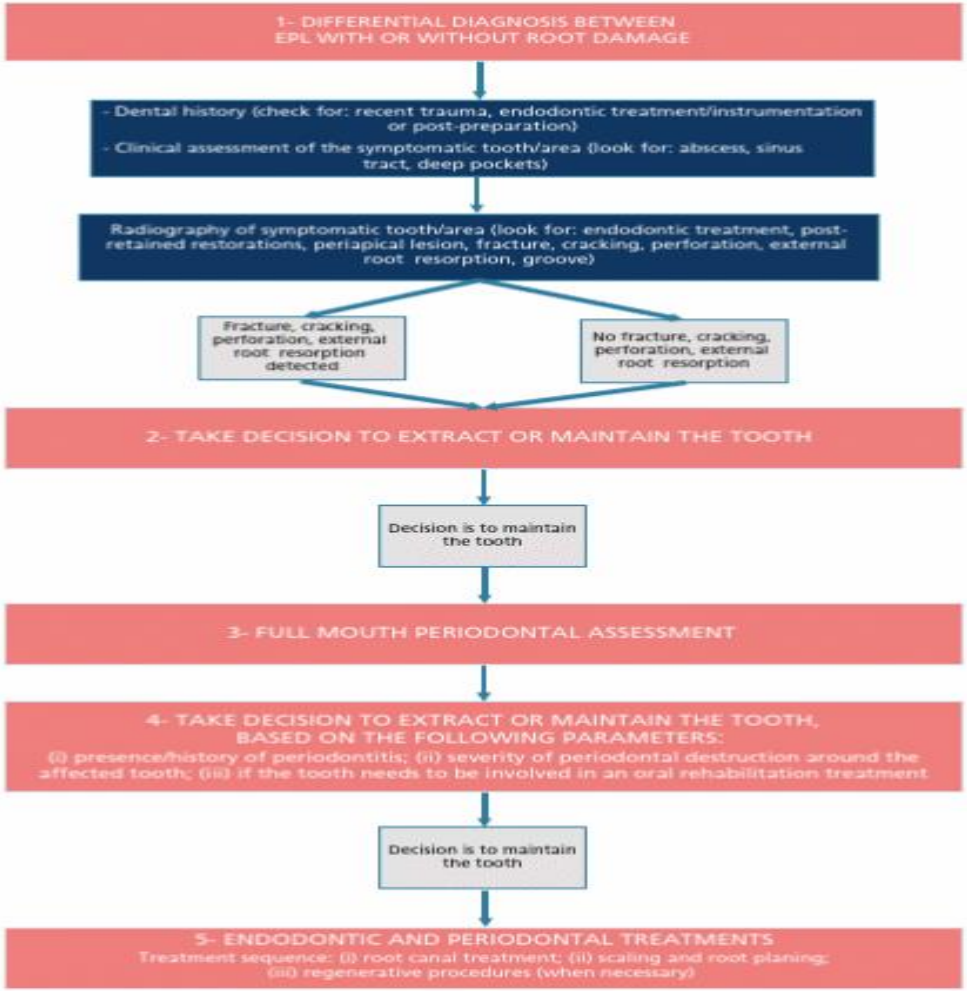


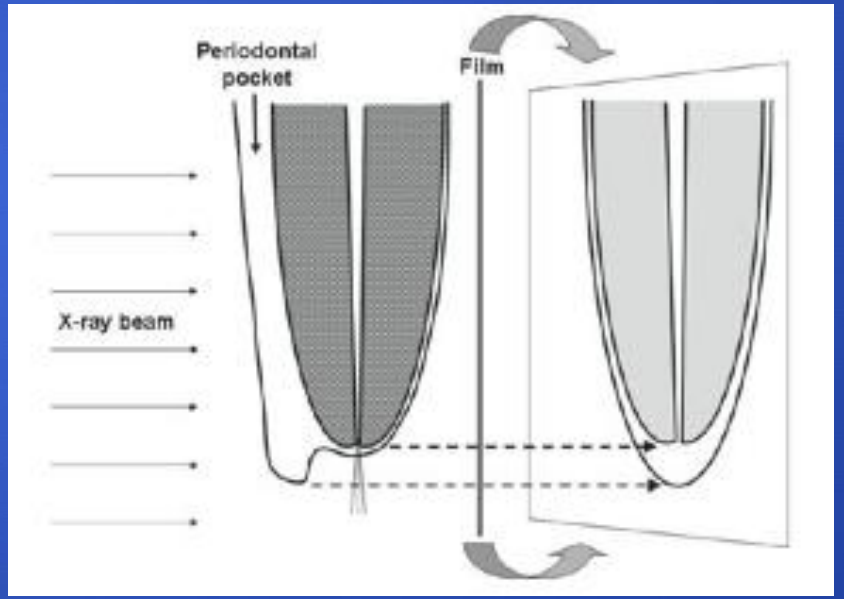
Fig. 31-5 Steps in the management of an endo-periodontal lesion (EPL).

Steps in the management of E-P L

Diagnosis-Combined endo-periodontic disease-sensibility tests

- **Pulp tests** are not always reliable-2 tests better (cold, CO_2 and EPT)
- Multi-rooted teeth - partial necrosis of a pulp may allow for +ve response to pulp testing

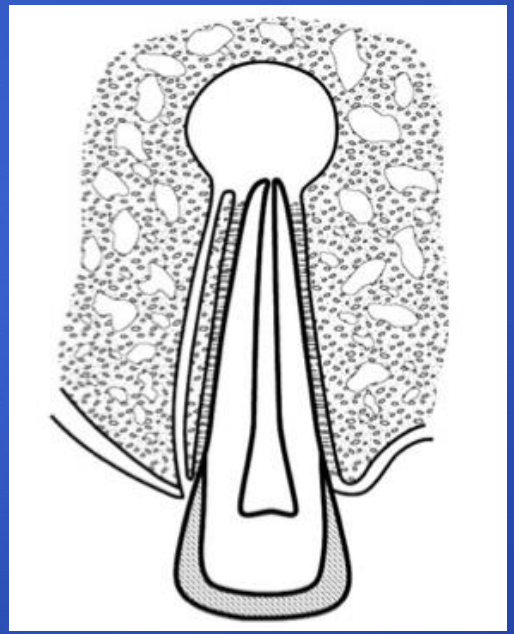
Diagnosis: Radiographs



Radiographic exam

Probing Defects in an endodontic lesion

- Probing defect- narrow and long
- Usually referred to as a narrow sinus tract-type of probing
- Likely an endodontic lesion is draining through the bone (and not the periodontal ligament as originally thought) thus mimicking a periodontal defect



PERIODONTAL AND PULPAL DISEASE - DIFFERENTIAL DX

SIGNS	ENDODONTIC	PERIODONTAL	COMBINED
LOCALISED TO TOOTH	+	-	+-
EXTENSIVE CARIES / RESTORATION	+	-	+-
PULP SENS TESTS	-	+	-
PROBING DEFECT	NARROW	WIDE	WIDE
CRESTAL BONE LOSS	-	+	+
PERCUSSION	+-	+-	+-
PALPATION	+-	+-	+-

Transient pulpal response

- With periodontal treatment

CASE REPORT

Transient Tooth Discoloration After Periodontal Instrumentation of Aggressive Periodontitis: A Case Report

Julio C. Rincon,* Zahida Oakley,* and Paul Abbott†

Introduction: Transient tooth discoloration (TTD) is an endodontic condition associated with dental traumatic events. To the best of the authors' knowledge, this is the first case report of transient coronal discoloration of the two maxillary permanent central incisors after periodontal instrumentation of root surfaces affected by aggressive periodontitis (AgP). The initial case presentation and multidisciplinary periodontal, endodontic, and orthodontic management are described.

Case Presentation: A 17-year-old male was referred from the orthodontics department to the periodontics department of the Oral Health Center of Western Australia, Perth, Western Australia, Australia. Localized AgP was diagnosed. After meticulous periodontal debridement of the mid-root and apical root portions of the two maxillary central incisors, TTD was noted 5 months later. The diagnosis, case management, and biologic explanations for the unique presentation of these conditions are discussed.

Conclusions: TTD may be caused by trauma from periodontal instrumentation. Proper diagnosis and management of this particular condition is important to protect the integrity of the pulp in affected teeth. This case report opens the possibility of TTD originating from causes other than traumatic luxation or intra-alveolar root fractures of teeth. *Clin Adv Periodontics* 2017;7:137-143.

Key Words: Aggressive periodontitis; diagnosis; root planing; tooth discoloration.

TOOTH DISCOLORATION & AGGRESSIVE PERIODONTITIS-CASE REPORT

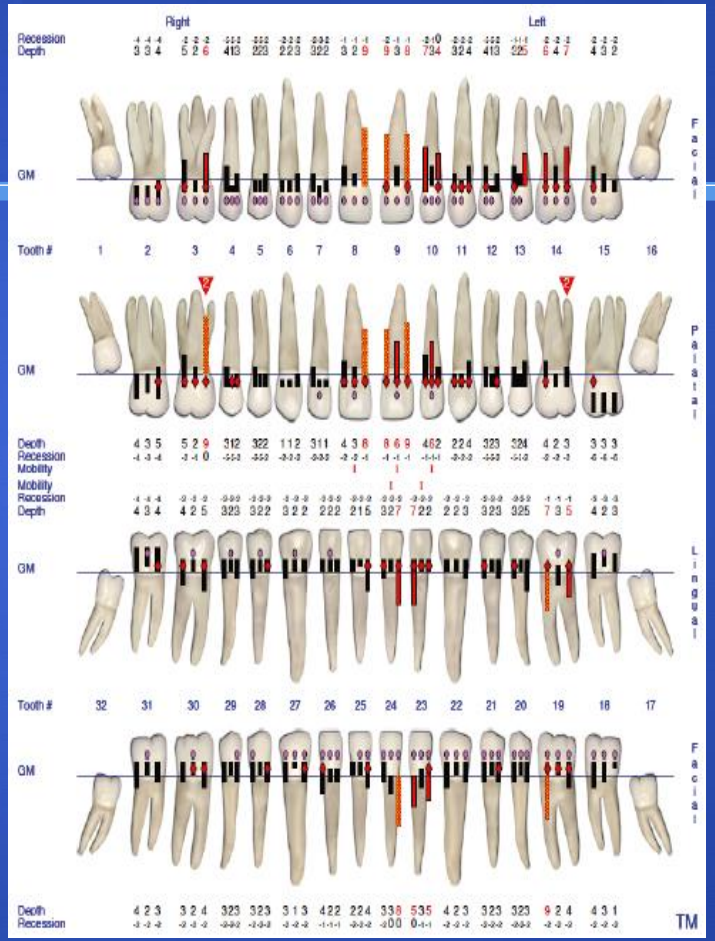
17 year old male

Black African from Eritrea

Referred by ortho department to perio dept in Ohcwa

Clear medical history

JULY 2010


Right
Left
Recession
Depth
GM
Facial
Tooth #
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
GM
Palatal
Depth
Recession
Mobility
Mobility
Recession
Depth
GM
Lingual
Tooth #
32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17
GM
Facial
Depth
Recession
TM

NOVEMBER

2010

PERIODONTAL REVIEW

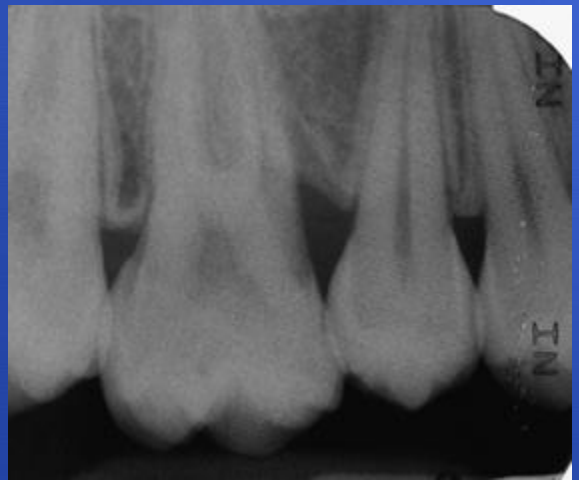
SECOND PERIODONTAL REVIEW

JANUARY 2011

GREY/ROSY PULP TESTS

PERIODONTAL MAINTENANCE

AUGUST 2011



BEWARE: DIFFERENTIAL DIAGNOSES

- Incomplete coronal fractures (cracked tooth) which extend into the root of a tooth
- Crown–root or vertical root fractures
- Root resorption
- Palatal grooves


"Endo-Perio Lesions"
Classification: Simon, Glick & Frank (1972)
1° Endo lesion
1° Endo lesion with 2° Perio involvement
1° Perio lesion
1° Perio lesion with 2° Endo involvement
"True" Combined lesion
5:15 / 54:34

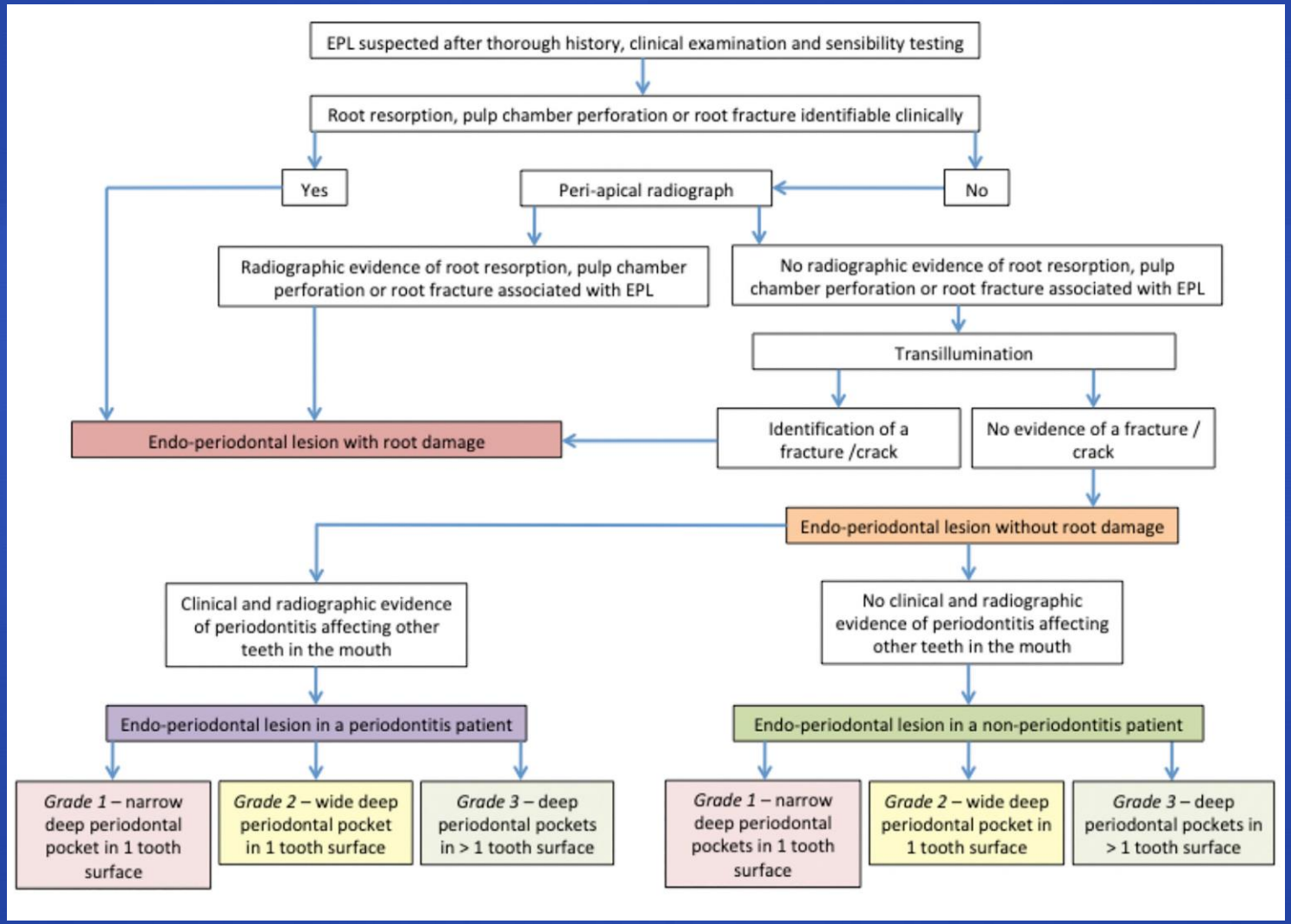
Problems with previous classification of Endo-Perio lesions

- Confusing as we don't know really know what the primary source of infection is
- Are the lesions communicating or separate?
- No guidance on prognosis or treatment

CLASSIFICATION OF COMBINED PERIODONTIC AND ENDODONTIC DISEASE

TABLE 3 Classification of endo-periodontal lesions

Endo-periodontal lesion with root damage	Root fracture or cracking	
	Root canal or pulp chamber perforation	
	External root resorption	
Endo-periodontal lesion without root damage	Endo-periodontal lesion in periodontitis patients	*Grade 1* – narrow deep periodontal pocket in 1 tooth surface
		Grade 2 – wide deep periodontal pocket in 1 tooth surface
		Grade 3 – deep periodontal pockets in > 1 tooth surface
	Endo-periodontal lesion in non-periodontitis patients	*Grade 1* – narrow deep periodontal pocket in 1 tooth surface
		Grade 2 – wide deep periodontal pocket in 1 tooth surface
		Grade 3 – deep periodontal pockets in > 1 tooth surface


EPL suspected after thorough history, clinical examination and sensibility testing
Root resorption, pulp chamber perforation or root fracture identifiable clinically
Yes
Peri-apical radiograph
No
Radiographic evidence of root resorption, pulp chamber perforation or root fracture associated with EPL
No radiographic evidence of root resorption, pulp chamber perforation or root fracture associated with EPL
Transillumination
Endo-periodontal lesion with root damage
Identification of a fracture /crack
No evidence of a fracture / crack
Endo-periodontal lesion without root damage
Clinical and radiographic evidence of periodontitis affecting other teeth in the mouth
No clinical and radiographic evidence of periodontitis affecting other teeth in the mouth
Endo-periodontal lesion in a periodontitis patient
Endo-periodontal lesion in a non-periodontitis patient
Grade 1 – narrow deep periodontal pocket in 1 tooth surface
Grade 2 – wide deep periodontal pocket in 1 tooth surface
Grade 3 – deep periodontal pockets in > 1 tooth surface
Grade 1 – narrow deep periodontal pockets in 1 tooth surface
Grade 2 – wide deep periodontal pocket in 1 tooth surface
Grade 3 – deep periodontal pockets in > 1 tooth surface

Establish prognosis

- Hopeless
- Poor
- Favourable

- Is it worth treating?
- Alternative options must be discussed.
- Cost +++
- Time +++

CLASSIFICATION OF COMBINED PERIODONTIC AND ENDODONTIC DISEASE

Australian Dental Journal 2009; 54 (1 Suppl): S70–S85
doi: 10.1111/j.1834-7819.2009.01145.x

Strategies for the endodontic management of concurrent endodontic and periodontal diseases

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ABSTRACT

Endodontic and periodontal diseases can provide many diagnostic and management challenges to clinicians, particularly when they occur concurrently. As with all diseases, a thorough history combined with comprehensive clinical and radiographic examinations are all required so an accurate diagnosis can be made. This is essential since the diagnosis will determine the type and sequence of treatment required. This paper reviews the relevant literature and proposes a new classification for concurrent endodontic and periodontal diseases. This classification is a simple one that will help clinicians to formulate management plans for when these diseases occur concurrently. The key aspects are to determine whether both types of diseases are present, rather than just having manifestations of one disease in the alternate tissue. Once it is established that both diseases are present and that they are as a result of infections of each tissue, then the clinician must determine whether the two diseases communicate via the periodontal pocket so that appropriate management can be provided using the guidelines outlined. In general, if the root canal system is infected, endodontic treatment should be commenced prior to any periodontal therapy in order to remove the intracanal infection before any cementum is removed. This avoids several complications and provides a more favourable environment for periodontal repair. The endodontic treatment can be completed before periodontal treatment is provided when there is no communication between the disease processes. However, when there is communication between the two disease processes, then the root canals should be medicated until the periodontal treatment has been completed and the overall prognosis of the tooth has been reassessed as being favourable. The use of non-toxic intracanal therapeutic medicaments is essential to destroy bacteria and to help encourage tissue repair.

Keywords: Endo-perio diseases, endodontics, periodontics.

INTRODUCTION

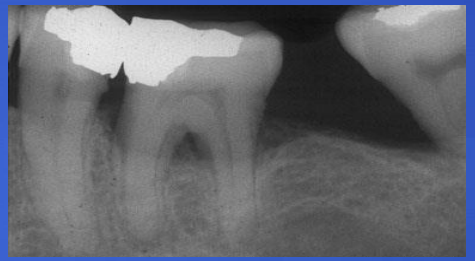
Although there are many factors that contribute to the development and progression of endodontic and periodontal diseases, the primary cause of both diseases is the presence of bacterial infections with complex microbial flora. Many authors have reported the similarity of the bacterial flora associated with endodontic and periodontal infections[1–5] and it is widely accepted that an untreated infection of one of these tissues can lead to signs or symptoms of disease within the other tissue.[6–10] Cross-seeding of bacteria from one tissue to the other can also occur[10] and this can occur in either direction (i.e., from the root canal to the periodontium, or vice versa) through communication pathways (Fig 1) such as the apical foramen, lateral canals, accessory canals (i.e., small canals that run from the floor of the pulp chamber to the furcation region of multi-rooted teeth), dentinal tubules, developmental defects (e.g., radicular grooves, invaginations) and other disease-related or iatrogenic defects of the tooth root (e.g., caries, cracks, perforations).

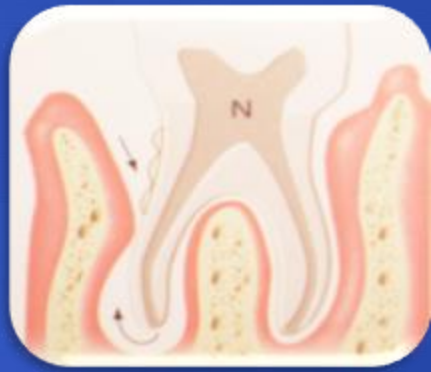
Once both the pulp and the periodontal tissues have become involved, the diagnosis and management of the situation may become more complex and will require extra considerations. The prognosis will be less predictable and patients may be unwilling to commit themselves to the treatment, as well as the financial and time burdens required to salvage the tooth, and to retain and maintain it in the long term.[11]

Traditional approaches to assessing and managing teeth with concurrent endodontic and periodontal diseases have been somewhat confusing as a result of inconsistent, inaccurate and confusing terminology. Although there has been considerable research about this topic in the past, there has been little research reported in the last decade. The aims of this paper were to review the literature, to develop a simple classification system and to provide a rational approach to managing teeth with concurrent endodontic and periodontal diseases.

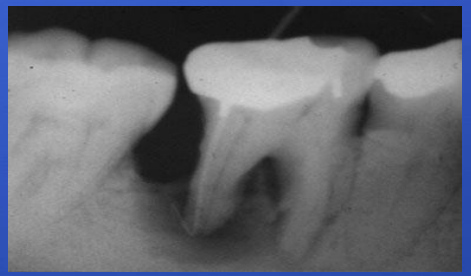
CLASSIFICATION OF COMBINED PERIODONTIC AND ENDODONTIC DISEASE

- CONCURRENT ENDODONTIC AND PERIODONTAL DISEASES WITHOUT COMMUNICATION





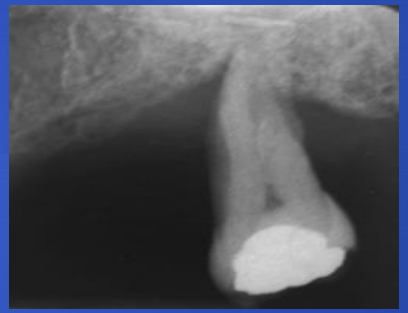
- CONCURRENT ENDODONTIC AND PERIODONTAL DISEASES WITH COMMUNICATION

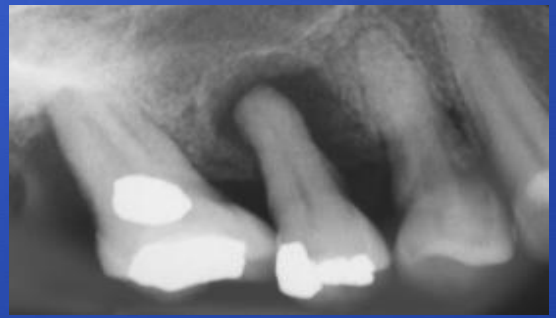


Abbott & Castro 2009

PROGNOSIS - COMBINED PERIODONTIC AND ENDODONTIC DISEASE

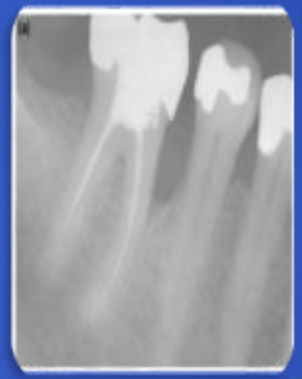
- PROGNOSIS BETTER WITHOUT COMMUNICATION
- COMBINED with communication has WORSE PROGNOSIS





CONCURRENT PERIODONTAL AND ENDODONTIC LESION WITHOUT COMMUNICATION - **MANAGEMENT**

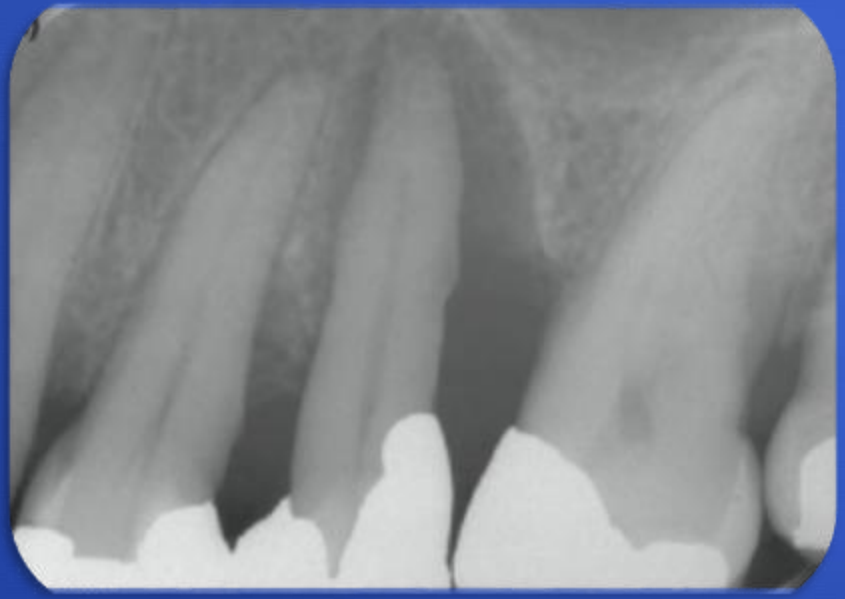
- Combined periodontal and endodontic therapy
- Treat acute condition first
- Better to start endo and medicate canals first as infected root canals hinders periodontal healing
- prognosis depend on extent of periodontal involvement & cause of pulpal disease

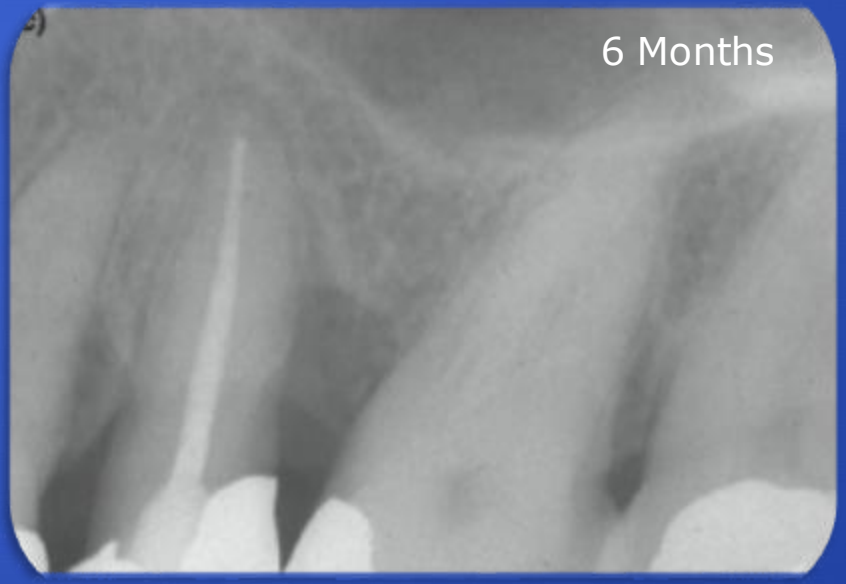


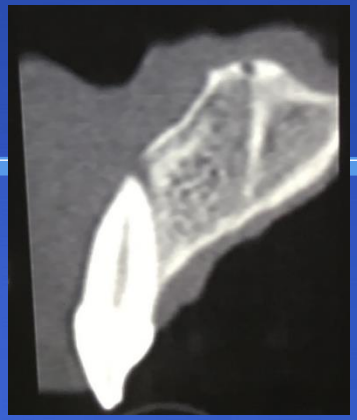
Management of concurrent EP disease with communication

- Treat acute condition
- Remove restoration /caries- is it restorable?
- Start endo- clean canals and medicate (ledermix or 50: 50 ledermix ca(oh)2)
- Wait minimum 4 weeks – start perio
- Wait 3 months- redress/ repeat perio till prognosis is clear
- Interim restoration must be cleansable
- Complete endo when the prognosis is established

CONCURRENT PERIODONTAL AND ENDODONTIC LESION WITH COMMUNICATION - MANAGEMENT





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PROGNOSIS - COMBINED PERIODONTAL AND ENDODONTIC LESION

- Periodontal prognosis can be difficult to determine initially

Prognosis depends on:

- Cause of disease and amount of remaining tooth structure left
- Amount of attachment loss, mobility, root anatomy, furcation,
- Healing response
- Oral hygiene
- Compliance with spt
- Restoration longevity
- Skill of clinician

Periodontal regeneration *versus* extraction and prosthetic replacement of teeth severely compromised by attachment loss to the apex: 5-year results of an ongoing randomized clinical trial

Cortellini P, Stalpers G, Mollo A, Tonetti MS: Periodontal regeneration versus extraction and prosthetic replacement of teeth severely compromised by attachment loss to the apex: 5-year results of an ongoing randomized clinical trial. J Clin Periodontol 2011; 38: 915–924. doi: 10.1111/j.1600-051X.2011.01768.x

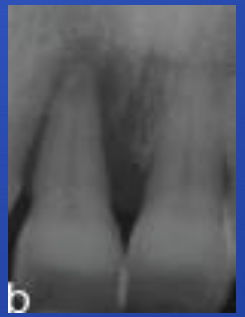
Cortellini 2011

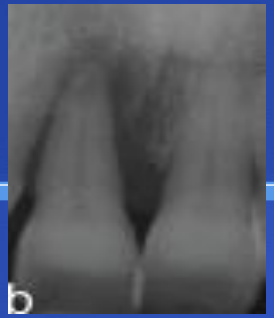
Periodontal regeneration *versus* extraction and prosthetic replacement of teeth severely compromised by attachment loss to the apex: 5-year results of an ongoing randomized clinical trial

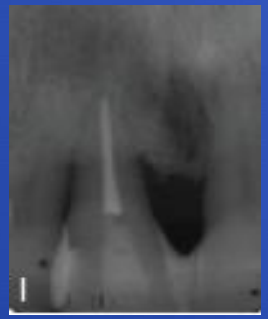
Pierpaolo Cortellini[1,2], Gabrielle Stalpers[2], Aniello Mollo[3] and Maurizio S. Tonetti[2]

[1]Accademia Toscana di Ricerca Odontostomatologia (ATRO), Florence, Italy; [2]European Research Group on Periodontology (ERGOPERIO), Genova, Italy; [3]Private Practice, Florence, Italy

- 50 hopeless teeth
- Perio-endo lesion and/or attachment loss to the apex.
- Control (n=25): Extraction + replacement with conventional or implant-supported fixed prosthesis
- Test (n=25): Regenerative strategy
- 5 years follow-up







- After 5 years:
- Similar survival rate (92%-100%)
- Similar complication rate (16%- 17%)
- Conclusions (Cortellini 2011):
- Regenerative therapy can change the prognosis of a tooth from "hopeless" to fair or favourable and is a suitable alternative to extraction of severely compromised teeth

Other treatment options

- Root resections (Langer et al 1981- 10 year study)
- Hemisections/ premolarization (with or without root removal)
- Extract and don't replace or use the crown as a pontic
- Fixed or resin retained bridges / dentures/ implant if appropriate

Endo-Perio + DB root resection

gure 4. Pre-operative radiograph UL6.

Figure 6. Post-operative radiograph following non-surgical root canal treatment UL6. Demonstrates composite plug in the disto-buccal canal

gure 8. Radiograph after root resection of sto-buccal root UL6.

Figure 3. Pre-operative presentation – lateral periodontal abscess buccal to UL6 visible.

Figure 5. Clinical presentation following non-surgical phase of treatment.

b

Figure 7. (a, b) Post-operative presentation following surgical phase to resect the disto-buccal root.

Conclusions

- Endodontic & periodontal diseases can be challenging to diagnose and manage
- Important to establish a correct diagnosis as it will determine the extent , type and sequence of treatment required as well assigning a reliable prognosis
- If the root canal system is infected concurrently with a communicating periodontal infection, endodontic treatment should be commenced at least 4 weeks prior to any periodontal therapy
- Treatment of combined endodontic & periodontal diseases can be very successful but usually depends on the periodontal healing- ideally get a perio opinion early to avoid expense and time loss

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Periodontology 2000, Vol. 30, 2002, 123–130
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PERIODONTOLOGY 2000
ISSN 0906-6713

The periodontal–endodontic controversy

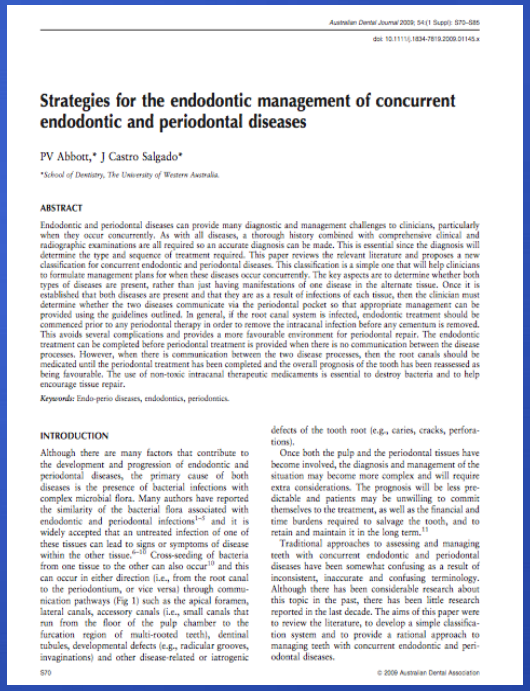
GERALD W. HARRINGTON, DAVID R. STEINER & WILLIAM F. AMMONS, JR

Over the past century the dental literature has consistently reflected a controversy related to the effect of periodontal disease on the dental pulp and more recently the effect of pulpal necrosis on the initiation and progression of marginal bone loss. Two basic questions have been raised and continue to be matters of dispute. Is periodontal disease a cause of pulp necrosis? Can a pulpless tooth be the cause of periodontal disease? The answers to these basic questions are of utmost clinical importance. The appropriateness of treatment planning hangs in the balance. For example, should root canal treatment be carried out prophylactically for a tooth associated with moderate or advanced periodontal disease? Should a pulpless tooth be retained or should it be removed and replaced with an osseointegrated implant?

Many of our clinical impressions related to the dental pulp, and indeed many of our misinterpretations, stem from early histological observations. Adequate fixation of pulp tissue has always been, and continues to be, a challenge, and artefacts resulting from inadequate fixation continue to be described as evidence of pathosis. Stanley & Weaver (39) listed the following progression of tissue breakdown resulting from inadequate fixation: vacuolization in the odontoblastic layer and subsequently in the general body of the pulp, displacement of odontoblasts into the dentinal tubules as vacuolization progresses, 'reticular atrophy', and the appearance of advanced fibrosis in the body of the pulp. Fibrosis and reticular atrophy are historical histological descriptions of pulp pathosis attributed to many causes, including periodontal disease. A classic example of how inadequate pulp fixation effects an attempt to interpret the response of the dental pulp to periodontal disease is the often quoted paper by Mazur & Massler (26). Although it is obvious from the histological description in this paper that many of the pulps suffered from inadequate fixation, the paper continues to be one of the more commonly quoted in the periodontal–endodontic literature (9, 31, 34, 43). Most of the papers written prior to 1975, as well as some written since, need to be reviewed carefully to determine if their descriptions of perceived pulp pathosis are in fact simply histological artefacts.

The potential for the dental pulp to survive the various challenges presented during the lifetime of a patient is also by and large related to presumptions made in interpretation of histological data. The histology of a specific dental pulp, however, represents only one frame of a picture in time for that particular pulp. What has occurred before and what will subsequently occur must be a matter of conjecture and interpretation. For example, Swerdlow & Stanley (40) report the presence of intrapulpal abscesses at an early time-point in one of their many pulp studies, yet at later time-points in the same study there were no intrapulpal abscesses and healing of pulp lesions was evident. Does this mean that intrapulpal abscesses can resolve and the pulp heal itself? Or is it simply the 'luck of the draw' in a histological study, in that the pulps which had early intrapulpal abscesses would subsequently become completely necrotic if observed over a longer period of time, and the pulps from the later time-points would have shown less evidence of pathosis if observed at the earlier time? While one cannot discount this latter possibility, Stanley's interpretation was that occasionally 'there will occur beneath cavity preparations certain abscess-like conditions which will resolve.' (38) Hence, each pulp studied is from one moment in time, and observations are subject to interpretation and projection beyond that moment. Such projections may or may not conform to fact. Was Stanley correct, or incorrect? We may never know, and such interpretations become 'references to authority'.

Most histological interpretations of the past dec-



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Strategies for the endodontic management of concurrent endodontic and periodontal diseases

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ABSTRACT

Endodontic and periodontal diseases can provide many diagnostic and management challenges to clinicians, particularly when they occur concurrently. As with all diseases, a thorough history combined with comprehensive clinical and radiographic examinations are all required so an accurate diagnosis can be made. This is essential since the diagnosis will determine the type and sequence of treatment required. This paper reviews the relevant literature and proposes a new classification for concurrent endodontic and periodontal diseases. This classification is a simple one that will help clinicians to formulate management plans for when these diseases occur concurrently. The key aspects are to determine whether both types of diseases are present, rather than just having manifestations of one disease in the alternate tissue. Once it is established that both diseases are present and that they are as a result of infections of each tissue, then the clinician must determine whether the two diseases communicate via the periodontal pocket so that appropriate management can be provided using the guidelines outlined. In general, if the root canal system is infected, endodontic treatment should be commenced prior to any periodontal therapy in order to remove the intracanal infection before any cementum is removed. This avoids several complications and provides a more favourable environment for periodontal repair. The endodontic treatment can be completed before periodontal treatment is provided when there is no communication between the disease processes. However, when there is communication between the two disease processes, then the root canals should be medicated until the periodontal treatment has been completed and the overall prognosis of the tooth has been reassessed as being favourable. The use of non-toxic intracanal therapeutic medicaments is essential to destroy bacteria and to help encourage tissue repair.

Keywords: Endo-perio diseases, endodontics, periodontics.

INTRODUCTION

Although there are many factors that contribute to the development and progression of endodontic and periodontal diseases, the primary cause of both diseases is the presence of bacterial infections with complex microbial flora. Many authors have reported the similarity of the bacterial flora associated with endodontic and periodontal infections[1–5] and it is widely accepted that an untreated infection of one of these tissues can lead to signs or symptoms of disease within the other tissue.[6–10] Cross-seeding of bacteria from one tissue to the other can also occur[10] and this can occur in either direction (i.e., from the root canal to the periodontium, or vice versa) through communication pathways (Fig 1) such as the apical foramen, lateral canals, accessory canals (i.e., small canals that run from the floor of the pulp chamber to the furcation region of multi-rooted teeth), dentinal tubules, developmental defects (e.g., radicular grooves, invaginations) and other disease-related or iatrogenic defects of the tooth root (e.g., caries, cracks, perforations).

Once both the pulp and the periodontal tissues have become involved, the diagnosis and management of the situation may become more complex and will require extra considerations. The prognosis will be less predictable and patients may be unwilling to commit themselves to the treatment, as well as the financial and time burdens required to salvage the tooth, and to retain and maintain it in the long term.[11]

Traditional approaches to assessing and managing teeth with concurrent endodontic and periodontal diseases have been somewhat confusing as a result of inconsistent, inaccurate and confusing terminology. Although there has been considerable research about this topic in the past, there has been little research reported in the last decade. The aims of this paper were to review the literature, to develop a simple classification system and to provide a rational approach to managing teeth with concurrent endodontic and periodontal diseases.


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