

Gutta Percha Tracing: A Reliable Technique in Diagnosing Periodontic-Endodontic Lesion

Fouad Hussain AL-Bayaty^{1*}, Najwa binti Baharudin¹, Nik Zarina Nik Mahmood²,
Mohd Faizal Hafez bin Hidayat¹

1. Center for Periodontology Studies, Faculty of Dentistry, Universiti Teknologi MARA (UiTM), Selangor, Malaysia.

2. Center for Restorative Dentistry Studies, Faculty of Dentistry, Universiti Teknologi MARA (UiTM), Selangor, Malaysia.

Abstract

The study aimed to introduce a reliable technique as part of diagnostic process for diagnosing periodontal-endodontic lesions. Total of 21 patients were referred to periodontal specialist clinic for diagnosis and management of concurrent periodontal endodontic lesions. The technique described will assist clinician in differentiating between diseases of endodontic and periodontal origin by adapting gutta percha cones (GP) to deep periodontal pockets or sinuses that are continuous with the odontogenic lesions. Periapical radiograph were then taken to reveal the source of the sinus or periodontal pocket. The perio-endo lesion can be diagnosed to be of periodontal origin. The radiograph reveals the involved tooth (indicated by GP tracing) is not periodontally compromised, the lesion is thought to be of endodontic origin. For cases diagnosed to be of endodontic origin, they should first be treated with endodontic therapy and outcome of the treatment to be evaluated 2-3 months post operatively prior to consideration of periodontal treatment.

Reaching to a correct and conclusive diagnosis is vital for clinician to provide the optimum treatment and care. Thus, diagnostic process must be carried out thoroughly and the results interpreted correctly. Adopting the GP tracing technique provide clinician with a reliable diagnostic aid to achieve this objective.

Case Report (J Int Dent Med Res 2018; 11(3): 1086-1090)

Keywords: Gutta percha cone, Periodontal-endodontic lesions, Periapical x-ray.

Received date: 22 February 2018

Accept date: 26 March 2018

Introduction

The periodontal-endodontic lesions have been characterized by the involvement of the pulp and periodontal disease in the same tooth.¹⁻³ The interrelationship between periodontal and endodontic disease has always aroused confusion, queries, and controversy. The periodontium and endodontium develop with shared physiological channels, which may lead to the spread of pathological infections.⁴⁻⁷ The most common connection is the area of the apical foramen. Through the apical foramen, an infection of the endodontium can cause periapical lesions.^{8,9} Conversely; periodontitis with deep pockets reaching the tooth apex can result in an infection of the pulp tissues.^{10,11}

Thus, prior to treatment, it is critical to recognize the interrelationships between existing lesions to make sound clinical decisions. Differentiating between periodontal and endodontic origin can be difficult. The simultaneous existence of pulpal problems and inflammatory periodontal disease can complicate diagnosis and treatment planning. To ensure the diagnosis is accurate, many steps are required to give as much clues to the diagnostic process as possible.^{12,13}

The nature of pain on presence of symptom is often the first clue in determining the aetiology of such a problem.^{14,15} Following a thorough history, intra-oral examination started with visual examination of the surrounding soft tissues and teeth where any abnormalities are noted. Palpation and percussion are performed to detect the presence of periradicular abnormalities and periradicular inflammation respectively.^{16,17} The tooth or teeth in question are then checked for mobility where those with extreme mobility generally have little periodontal

*Corresponding author:

Fouad Hussain AL-Bayaty

Center for Periodontology Studies, Faculty of Dentistry,
Universiti Teknologi MARA (UiTM), Selangor, Malaysia.
E-mail: fouad@salam.uitm.edu.my

support, indicating the possible primary cause be periodontal disease.¹⁶

Special tests are vital in providing clues for diagnosis and these include pulp sensibility testing and radiograph. The former is designed to assess the response of the pulp to different stimuli. The most commonly used pulp vitality tests are: cold test, electric test, blood flow tests, and cavity test.¹⁸⁻²⁰ The latter is essential in diagnostic process which it aids detection of various pathologies that are otherwise not seen clinically and this may include the periodontal-endodontic lesion. On top of that, if the tooth or teeth in question suspected to have cracked tooth, various modalities are present for detection of its presence which are transillumination, wedging and staining.¹⁶

Periodontal probing is important and should always be performed to help clinicians differentiate origin of lesion i.e. endodontic or periodontal which can be a diagnostic and prognostic aid.¹⁸ A blunt calibrated periodontal probe is used to determine the probing depth and clinical attachment level as well as to track a sinus resulting from an inflammatory periapical lesion that extends cervically through the periodontal ligament space. A deep solitary pocket in the absence of periodontal disease may indicate the presence of a lesion of endodontic origin or a vertical root fracture.¹⁵

Presence of sinus tract is not always directly associated with the source of infection or tooth. Inflammatory exudate (pus) may travel through tissues and structures of minor resistance and open anywhere on the oral mucosa or facial skin including through the periodontal ligament mimicking periodontal pocket. Therefore, site of pus drainage can be away from its origin or cause of infection.²¹

Fistula tracking can assist clinician to identify the source of inflammation and differentiate between diseases of endodontic and periodontal origin. This technique is done by inserting a semi-rigid radiopaque material into the sinus track until resistance is met which commonly used materials include gutta percha cones or pre-softened silver cones. A radiograph will then be taken that reveals the course of the sinus tract and leads to source of infection.^{21,22}

Therefore, in this study we are introducing a reliable technique as part of diagnostic process which enables clinician to differentiate between diseases of endodontic and periodontal origin by

adapting gutta percha cones (GP) tracking technique to deep periodontal pockets that are continuous with lesion which may be of periodontal or endodontic origin.

Clinical background

This paper covers several cases presented with periodontal-endodontic lesion involving adult patients either referred to Periodontal Specialist Clinic for diagnosis and management or other specialists particularly Endodontist for treatment of complex nature such as re-treatment of root canal treatment.

When these patients were first seen, some of the common main complains are presence of swelling in the gingiva which may be associated with yellowish discharge that gives off a foul smell and tasted salty. Severe pain is rarely associated although discomfort and throbbing pain are often mentioned but does not interfere with most daily activities. These presentations come and go and the cycles tend to go on indefinitely.

Clinically, various findings can be found but generally presence of deep pocketing with pus discharge are commonly reported associated with region of main complain. As per usual investigations, Basic Periodontal Examination (BPE) were carried out where presence of 3 or 4 score in any sextant will be followed by appropriate periodontal examination including 6-point-pocket charting. The teeth in question will also be subjected to percussion, palpation and sensibility tests to determine its corresponding pulpal and periapical statuses. To further supplement the diagnostic process, GP tracing technique were also adopted.

The need to differentiate the periodontal-endodontic lesions between periodontal origin and endodontic origin are very vital as it determines the subsequent management that will lead to resolution of presenting complains.

Materials and methods

This study was conducted in Center for Periodontology Studies in collaboration with Center for Restorative Dentistry Studies, Faculty of Dentistry, Universiti Teknologi MARA (UiTM). Total of 21 patients were referred to periodontal specialist clinic for diagnosis and management of concurrent periodontal endodontic lesions which

need more evidence based investigations to finalize the treatment options to address their dental needs and concerns. Gutta percha cones (GP) tracking technique was used to provide a definitive diagnosis in order to avoid inappropriate treatment.

To carry out the gutta percha tracing technique, tooth and lesion to be investigated were dried with air from 3 in 1 syringe and a sterilized gutta percha size 30 were introduced through the periodontal pocket associated with the lesion up to the deepest point where resistant were felt. (Figure 1A, B, C, D). Long cone periapical radiograph of the investigated tooth and lesion were then taken at the exposure range corresponding to the tooth investigated. The findings in the periapical radiographs will enable clinician to localize the origin of the periodontal pocket.

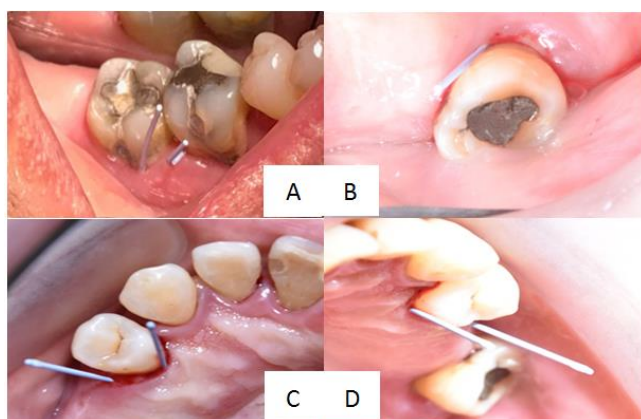


Figure 1. Intraoral Clinical Pictures Shows GP Size 30 Introduced through the Periodontal Pocket Associated with the Lesion.

The radiographical findings can be divided into 2 groups. One of the group exhibit presence of alveolar bone loss (moderate to severe) such as in Figure 2 (A, B, C, and D) associated with the deep pocket/fistula/abscess. In some cases, the extent of periodontal destruction is so severe that the lesion extends to the apex affecting the pulpal tissue. Figure 2 (A, B, and C) are examples of such cases where the end of the GP cone reaches the apex. Whereas in other cases, the extent of periodontal destruction are moderate with the GP cone stops before reaching the apex at the side of root surface such as in Figure 2D. Although these findings have slightly differing radiographical presentation, they both often suggest that the

periodontal-endodontic lesions are of periodontal origin.

Whilst, the other group of findings show the presence of periapical changes radiolucency or widening of periodontal ligament space with no to little alveolar bone loss and the gutta percha inserted through the deep pocket were seen reaching the radiolucent area (Figure 3A & 3B). These findings suggest that the origin of the periodontal-endodontic lesion to be of endodontic origin which persists long enough to develop pathological deep pocketing/fistula/abscess clinically.

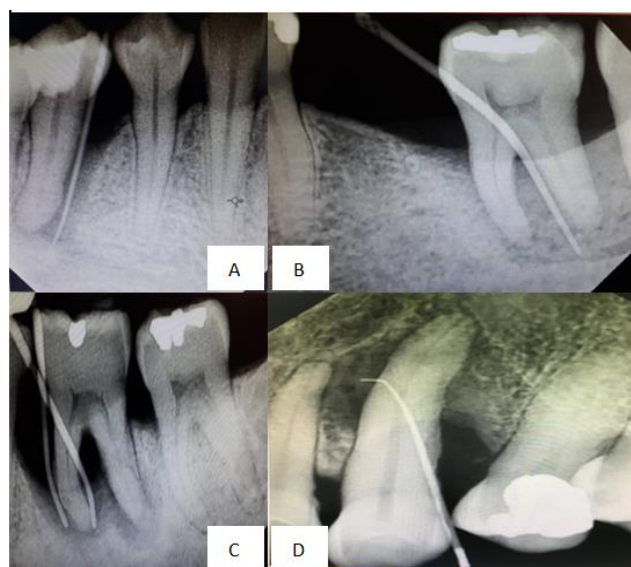


Figure 2. Intraoral Periapical X-Ray Shows GP Size 30 Introduced through the Periodontal Pocket Associated with the Lesion of Periodontal Origin.



Figure 3. Intraoral Periapical X-Ray Shows GP Size 30 Introduced through the Periodontal Pocket Associated with the Lesion of Endodontic Origin.

Suggested Managements

Treatments of the affected teeth were to be carried out according to the diagnosis, hence

the importance of attaining the right diagnosis. For cases diagnosed to be of endodontic origin should first be treated with endodontic therapy and outcome of the treatment to be evaluated 2-3 months post operatively prior to consideration of periodontal treatment. This sequence of treatment allows sufficient time for initial tissue healing and better assessment of the periodontal condition.²³⁻²⁵

A more recent study carried out by Kim et al.²⁶ also recommended for endodontic treatment to be completed first and the condition to be reevaluated after 2-3 months. In fact, the optimal interval between endodontic treatment and evaluation of the periodontal condition is somewhat controversial in the literature.²⁷⁻²⁹

On the other hand, teeth with lesion of periodontal origin are to be managed according to vitality of affected tooth. If the tooth involved with the perio-endo lesion is vital (which is not an uncommon finding), periodontal treatment alone can be initiated²⁹ but complete healing of periodontium is unlikely. Treatment outcome should be monitored along with regular review of teeth vitality. Whereas, if the teeth involved have compromised periapical health concurrent periodontal and endodontic therapies are indicated although the prognosis may be guarded. Teeth can also become necrotic following advanced periodontal destruction though it is rare and extraction may be the treatment of choice.³⁰

Conclusions

Reaching to a correct and conclusive diagnosis is vital for clinician to provide the optimum treatment and care. To do so diagnostic process must be carried out thoroughly and the results interpreted correctly. Adopting the GP tracing technique provide clinician with a reliable diagnostic aid to achieve this objective. It can be easily carried out by all clinicians.

Declaration of Interest

The authors report no conflict of interest and the article is not funded or supported by any research grant.

References

1. Simon JH, Glick DH, Frank AL. The relationship of endodontic-periodontic lesions. *J Periodontol.* 1972;43(4):202-8.
2. Mjör IA, Nordahl I. The density and branching of dentinal tubules in human teeth. *Arch Oral Biol.* 1996;41:401-12.
3. Zehnder M, Gold SI, Hasselgren G. Pathologic interactions in pulpal and periodontal tissues. *J Clin Periodontol.* 2002;29:663-71.
4. Schacher B, Haueisen H, Ratka-Kruger P. The chicken or the egg? Periodontal-endodontic lesions. *Periodontol Pract Today.* 2007;4(1):15-21.
5. Simon JH, Glick DH, Frank AL. The relationship of endodontic-periodontic lesions. *J Periodontol* 1972;43(4):202-8.
6. Zehnder M, Gold SI, Hasselgren G. Pathologic interactions in pulpal and periodontal tissues. *J Clin Periodontol.* 2002;29(8):663-71.
7. Kokoceva IO, Jankulovska M, Mijoska A, Efka ZB, Meri P, Gordana T. The ultra structural changes of the initial lesion at early childhood caries. *J Int Dent Med Res.* 2017;10(1):36-41.
8. Sjogren U, Figdor D, Persson S, Sundqvist G. Influence of infection at the time of root filling on the outcome of endodontic treatment of teeth with apical periodontitis. *Int Endod J.* 1997;30(5):297-306.
9. Emrullah B, Yadigar YH, Bayram I, Omer C, Faruk O, Izzet A. A multi-disciplinary approach to the treatment of dilacerated lower incisor teeth with periapical lesion: 2 years follow-up. *J Int Dent Med Res.* 2015;8(2):77-80.
10. Bergholtz G, Nyman S. Endodontic complications following periodontal and prosthetic treatment of patients with advanced periodontal disease. *J Periodontol.* 1984;55(2):63-68.
11. Nair PN. Pathogenesis of apical periodontitis and the causes of endodontic failures. *Crit Rev Oral Biol Med* 2004 Nov;15(6):348-381.
12. Raja VS, Emmadi P, Namasivayam A, Thyegarajan R, Rajaraman V. The periodontal- endodontic continuum: A review. *J Conserv Dent* 2008;11:54-62.
13. Rotstein I, Simon JH. Diagnosis, prognosis and decision-making in the treatment of combined periodontal-endodontic lesions. *Periodontology* 2000. 2004;34:165-203.
14. Al-Bayaty FH, Baharuddin N, Abdulla MA, et al. The influence of cigarette smoking on gingival bleeding and serum concentrations of haptoglobin and alpha 1-antitrypsin. *Biomed Res Int.* 2013;2013:684154.
15. Al-Bayaty FH, Kamaruddin AA, Ismail MA, Abdulla MA. Formulation and evaluation of a new biodegradable periodontal chip containing thymoquinone in a chitosan base for the management of chronic periodontitis. *Hindawi Publishing Corporation J Nanomat.* 2013;1-5.
16. Parolia A, Gait TC, Porto ICCM, Mala K. Endo-perio lesion: a dilemma from 19th until 21st century. *J Interdiscip Dent.* 2013;3:2-11.
17. Walton RE, Torabinejad M. Diagnosis and treatment planning. In: Walton RE, Torabinejad M, editors. *Principles and practice of endodontics*, 3rd ed. WB Saunders Co Philadelphia. 2002: 49-70.
18. Al-Bayaty FH, Ali NW, Daher A, Hussain SF, Masood M. Tooth mortality in concurrent cigarettes smoking and khat chewing in Yemeni population. *J Int Dent Med Res.* 2017;10(3):899-904.
19. Al-Bayaty FH, Hussain SF, Kamaruddin AA, Tajuddin ANA, et al. Prevalence of periodontitis in dental students in University Technology Mara. *J Adv Med Res.* 2011;1:16-23.
20. Shenoy N, Shenoy A. Endo-perio lesions: Diagnosis and clinical considerations. *Indian J Dent Res.* 2010;21:579-85.
21. Torabinejad M, Trope M. Endodontic and periodontal interrelationships in *Principles and Practice of Endodontics*. R. E. Walton and M. Torabinejad, Eds., 1996.
22. Chapple I, Lumley P. The periodontal-endodontic interface. *Dent Update* 1999;26:331-4.

23. Paul BF, Hutter JW. The endodontic-periodontal continuum revisited: New insights into etiology, diagnosis and treatment. *J Am Dent Assoc.* 1997;128:1541-8.
24. Kim E, Song JS, Jung IY, Lee SJ, Kim S. Prospective clinical study evaluating endodontic microsurgery outcomes for cases with lesions of endodontic origin compared with cases with lesions of combined periodontal-endodontic origin. *J Endod* 2008;34(5):546-51.
25. Aena JP, Siddharth P. Salvaging of a true endo-perio lesion. *J Int Dent Med Res.* 2012;5(2):110-3.
26. Kambale S, Aspalli N, Munavalli A, Ajgaonkar N, Babannavar R. A sequential approach in treatment of endo-perio lesion a case report. *J ClinDiagn Res.* 2014;8(8):Zd22-4.
27. Schacher B, Haeisen H, Ratka-Krüger P. The chicken or the egg? Periodontal-endodontic lesions. *Periodontal Pract Today.* 2007;4(1):15-21.
28. Sjögren U, Figdor D, Persson S, Sundqvist G. Influence of infection at the time of root filling on the outcome of endodontic treatment of teeth with apical periodontitis. *Int Endod J.* 1997;30(5):297-306.
29. Gold SI, Moskow BS. Periodontal repair of periapical lesions: the borderland between pulpal and periodontal disease. *J Clin Periodontol.* 1987;14;251-6.
30. Zehnder M. Endodontic infection caused by localized aggressive periodontitis: A case report and bacteriologic evaluation. *Journal of Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology and Endodontics* 2001;92;440-45.