

CASE REPORT, NON-SURGICAL MANAGEMENT OF AN ENDO-PERIO LESION

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ABSTRACT

An accurate diagnosis of endodontic-periodontal lesions can be confusing because there are some lesions that can present with similar signs and symptoms. Periodontal disease, endodontic infections, or the combination of the two in the form of endo-perio lesions (EPL) account for almost half of all tooth loss cases. The close anatomical and functional relationship between periodontal and endodontic tissues leads to the development of combined EPL. The pulp and periodontium have similar developmental and anatomic source. The numerous routes that link the two, together with the remarkably similar microbes in the genesis of both disorders, result in a complicated situation that calls for a multidisciplinary approach. Even after several decades of written descriptions of these lesions, identifying and treating them continue to be a difficulty for practitioners. This article's goal is to provide a thorough analysis of the many components of the merged EPL and to highlight the significance of identifying the problem and implementing the best course of action for treating these difficult circumstances.

KEYWORDS: Endodontic- periodontal lesion, Root canal treatment, non-surgical periodontal therapy, periodontal disease

INTRODUCTION

Periodontal disease, endodontic infections, or the combination of the two in the form of endo-perio lesions (EPL) account for almost half of all tooth loss cases.¹

In 1964, Simring and Goldberg first categorized the association between periodontal and endodontic disease.² The connection between the dental pulp and the periodontium surrounding it is very close.

The pulp arises from the dental papilla, while the periodontal ligament arises from the dental follicle and is divided by Hertwig's epithelial root sheath.³

Simon and colleagues in 1972 classified endodontic periodontal lesion⁴ as:

1. Endodontic lesion.
2. Periodontic lesion.
3. Endodontic lesion with secondary periodontal involvement.

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4. Periodontal lesion with secondary endodontic involvement.
5. True combined lesion

The numerous routes that link the periodontium and the root canal system, with the remarkably similar microbes in the origin of both disorders, result in a complicated situation that calls for a multidisciplinary approach.⁴ The prolonged stay of untreated periodontal or endodontic lesions is the main cause of the combined lesions.⁵ Even after several decades of written descriptions of these lesions, identifying and treating them continues to be difficult for practitioners. The goal of this case report is to provide an example of the many components of the merged EPL and to highlight the significant role of identifying the root of the problem and implementing the best course of action for treating these difficult conditions.

A thorough grasp of the anatomy and the pathophysiology of the disease is crucial for helping clinicians diagnose patients, develop logical treatment plans, and resolve complex situations with solid biological and clinical foundations. It has been demonstrated that conventional endodontic and periodontal therapies effectively treat these lesions.⁶

While the healing of an endodontic lesion is generally predictable, the regeneration or repair of periodontal tissues is unlikely to occur in conjunction with it. In the event of both primary and secondary periodontal involvement, endodontic treatment should primarily forgo periodontal pocket elimination procedures. However, endodontic therapy would only result in the resolution of the endodontic factor of involvement and would have minimal impact on the periodontal lesion.⁷

As a result, a thorough, comprehensive examination with the aid of radiographs, pulp vitality tests, and gingival pocket probing will typically reveal the main cause and, in this way,

guide the recommended course of therapy. As it is, in this case report, the lesion was an endodontic lesion with secondary periodontal involvement.⁸ and the treatment protocol will include conventional non-surgical endodontic treatment along with in-depth periodontal treatment.

Case Presentation

A 41-year-old female adult patient arrived at the Al Wajbah HC Dental Department complaining of a history of mild pain or discomfort and localized swelling that comes and goes for the previous two years, increasing movement in the upper right canine (tooth #13), and recent pus discharge from the gingival sulcus for the last two weeks.

The patient is married, resides with her spouse and kids, has no known allergies, free family medical history, free medical history, and doesn't smoke or drink.

After reviewing the patient's dental history and examining earlier panoramic X-ray views, although a panoramic radiograph is not diagnostic when the anterior region is the area of interest, it can clearly show a consistent pattern of vertical bone loss related to tooth #13.

Upon intraoral examination, tooth #13 showed localized gingival irritation, loss of gingival attachment, subgingival calculus, and periodontal pockets. Pus was found oozing from the gingival sulcus in tooth #13, which had a periodontal abscess [Figure 2].

Regarding tooth #13, there was a solitary pocket along the mesial aspect of the tooth, 4 mm gingival recession, pocket depth of 8 mm, substantial tooth movement (mobility grade II), and sensitivity to percussion. Palpation tests show fluctuant swelling related to the mentioned tooth. Thermal pulp vitality test using Endo-Ice® pulp vitality refrigerant spray came up negative.

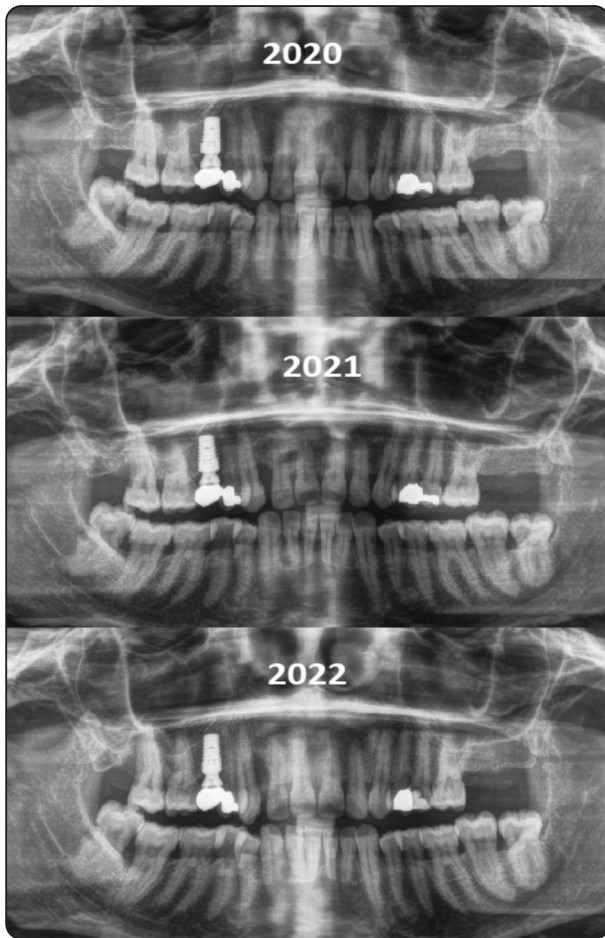


Fig. (1) Previous panoramic X-rays 2020,2021,2022



Fig. (2) Shows gingival recession, and pocket depth.

Investigations

Radiographic examination.

Radiographs are advised to help confirm the diagnosis of a perio-endo lesion. The best choice is a periapical.

An intraoral periapical radiograph was taken, and it showed vertical bone loss in relation to tooth #13, and an area of radiolucency that appears to come from the interdental area is seen on the radiograph. A radiolucent lesion extending to the apical third of the root is seen on the mesial root surface, the palatal region also can be affected. The “J-shaped” radiolucent lesion (see Figure 3) should be taken seriously as it typically indicates the existence of an aggressive lesion that needs immediate intervention; however, more testing is required to confirm the diagnosis.

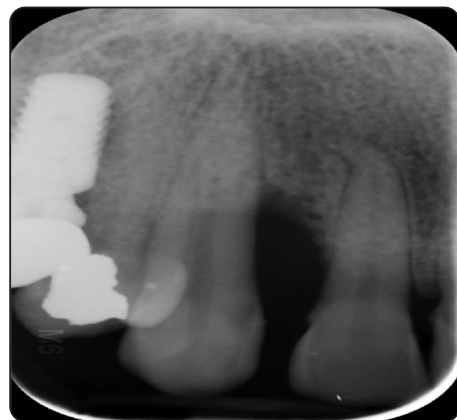


Fig. (3) Intraoral periapical x-ray showing vertical bone loss.

The radiographic examination was done using Kavo, FOCUS™, Short cone, 70 kV, 7mA, 0.320 s, (see Figure 4) and KaVo Scan eXam™ One, Photo Stimulable Phosphor plate size 1, 24 x 40 mm, 800 x 1334 Pixel. (see Figure 5)



Fig. (4), Kavo, FOCUS, short cone, 70kV, 7mA.



Fig. (5) Kavo scan, eXam One.

CBCT could be taken for better documentation and measurements, but as per ALARA rule “as low as reasonably achievable,” there were dramatic changes that make intra-oral periapical x-ray a reasonable means of measuring the change.

Probing and measuring the pocket depth.

Assessing periodontal disease requires a thorough diagnosis of the condition. Documentation of pocket depth, recession, loss of attachment, bleeding, suppuration, furcation, and mobility grade.

After measurements, it was discovered that the vertical pocket depth and horizontal pocket width were 4 mm and 10 mm, respectively [Figure 2].

Antibiotics and analgesics were prescribed to assist in containing the infection and to relieve the pain (Augmentin 1gm every 12 hours and paracetamol 500mg when needed).

The patient was then referred to an Endodontic clinic for root canal treatment.

Vitality Testing of the tooth.

Pulp testing is a common method used by clinicians to assess if a tooth still has a nerve supply. Ethyl chloride was the method of choice, electrical pulp testing (EPT), and hot GP are also valid vitality tests.

The vitality test for 13 was negative which means a non-vital tooth.

Occlusal Examination.

Despite being frequently disregarded, occlusal exams can aid in diagnosing conditions more precisely and shield teeth from permanent harm. It is important to inquire about subfunctional behaviors and symptoms related to chewing and closure.

As a standard component of the dental examination, occlusal assessment involves noting motions, guidance, interference, and nodule presence.⁹

When an anomaly is detected or a traumatizing factor is suspected, additional research and a more thorough occlusal evaluation can be necessary.¹⁰

Finding any fractured cusps can be aided by using a dental detector on individual cusps.

Marking the occlusal surface with articulating paper can assist in identifying high points that are easily adjustable in the chair, should the patient have a restoration.¹¹

Differential Diagnosis

Certain endodontic-periodontal lesions might appear with similar signs and symptoms, making an accurate diagnosis difficult.

Endodontic Periodontal Lesion⁴ as:

Endodontic lesion.

The dental pulp is a very delicate part of the tooth and can be easily affected by any external stimulus, such as dental decay or trauma to the tooth. If left untreated, this will result in further progression of the case and eventually result in pulp necrosis.

Periodontic lesion.

This is the inflammatory process that occurs in the periodontal tissues as a result of the continuous accumulation of dental plaque and calculus on the external root surfaces. This process will lead to gradual exposure of the root surface because of continuous bone resorption around the tooth.

Secondary periodontal involvement of a primary endodontic lesion.

In a long-lasting untreated endodontic lesion, the persisting necrotic pulp will result in the migration of the pathogens to the surrounding bone through the apical foramen as well as the accessory canals, which will lead to the destruction of the surrounding tissue and intrude into the inter-radicular space. That will lead to continued drainage through the periodontal tissues, establishing a passage where plaque and calculus can accumulate, advancing to periodontal disease.

Secondary endodontic involvement of a primary periodontal disease.

A long-lasting periodontal lesion will keep progressing apically, which will eventually reach the dental pulp either through an accessory canal or through the apical foramen. The exposure of the delicate pulp tissue to the invading pathogens will lead to damage to the pulp, leading to pulp necrosis.

Truly combined lesions.

These are lesions that originate separately and progress until they meet to create the true combined endo-perio lesion.

Fractured roots

Bacteria like to settle in the cleavage planes of fractures because there is contact between the pulp and periodontal tissues. Fractures that are not clinically obvious should be examined under magnification using methylene blue dye or transillumination. It should be mentioned that fractures can occasionally be hard to identify and may not show up until the pulp chamber is accessed or the tooth is extracted.¹²

To exclude the fractured root, we used magnification using methylene blue dye and transillumination.

Periodontal abscess

This is a periodontal pocket-acute infection that may manifest as a localized swell. A buildup of calculus, calculus that was forced into the soft tissues during debridement, or the impaction of a foreign body, such as dental floss or a toothpick, could cause the lesion. Bacterial buildup results from the periodontal pocket closure cause obstruction of gingival crevicular fluid clearance.¹³

In periodontal abscess, the tooth is vital with no endodontic involvement, which is not the case here where the tooth is non-vital.

Lateral periodontal cysts

These are uncommon odontogenic cysts that are growing; it is anticipated that they are the product of the rest of Malassez. Usually, radiography reveals well-defined lesions on the lateral portion of the root surface, which are incidentally observed. The tooth itself is frequently vital and the vitality can easily be maintained once the surrounding cyst is removed.¹⁴

Definitive Diagnosis:

An endodontic lesion with secondary periodontal involvement in tooth #13. (In line with the categorization by Simon et al. (1972).⁴

Aetiology

Untreated endodontic lesion for an extended period, as a result of deep distal composite filling, leads to pulp necrosis, followed by bone resorption as well as periodontal destruction.

Treatment***Making decisions and creating a treatment strategy*****Making decisions**

Root canal treatment should be initiated for the lesion, coinciding with the primary stage of periodontal therapy (hygiene stage).¹⁵ Additional

periodontal therapy should be taken into consideration following the evaluation of treatment outcomes in two to three months.¹⁶

Plan of Treatment

Step one: Instructions on oral hygiene; scaling and root planning.

Follow up for step 1: follow up with the patient one week later.

Step Two: chemo-mechanical preparation and obturation of tooth #13.

Step three: prosthetic restoration for tooth #13.

Follow up for step three: followed up after 3 months, 6 months, and 1 year.

The current case report's treatment strategy took into account that the tooth is nonvital with mesial large vertical bone loss and mobility Grade II.

The patient was scheduled for periodontal scaling and root planning for the affected area.

Occlusal tracing using articulating paper was done to detect and relieve any occlusal pressure points both in vertical as well as lateral movements.

Elimination of supragingival and subgingival plaque and calculus is completed by periodontal scaling using Kavo PiezoLED™ ultrasonic scaler, A thorough periodontal root planing is performed by Medesy™ Gracey curette Langer 5/6 mandibular

and maxillary anterior teeth to eradicate the root surface unevenness caused by periodontal pathoses.

Patient education, oral hygiene instructions, and dental dietary advice were discussed.

As for the root canal treatment, Tooth isolation with a rubber dam was done followed by the start of the conventional root canal treatment. After access cavity preparation and tooth length determination, chemo-mechanical preparation for the root canal was done using PROTAPER NEXT™ 25 mm. To ensure cleansing and modeling of the root canal system as well as apical healing, root canal shaping is a crucial stage in endodontic therapy.¹⁷

Irrigation with 2% sodium hypochlorite and 17% EDTA was done. Intra-canal irrigation aims to reduce the remaining microbiota, which improves the efficacy of the intracanal dressing and increases the success rate of the endodontic treatment.

Obturation was done using warm vertical compaction to allow 3D obturation of the main likewise the accessory canals. B&L Beta obturation device was used for optimal backfill.

AH 26® Root Canal Sealer was the sealer of choice.

The patient received post-operative instructions, advice on how to reduce plaque, and prescriptions for 2% chlorhexidine mouthwash to be used twice daily along with an anti-inflammatory pain reliever.



Fig. (7), Preoperative, tooth length, master cone, and postoperative x-rays.



Fig. (8), Preoperative, follow-up x-rays 3 months, 6 months, and one year.

Outcome and Follow-Up

Disappearance of the symptoms:

The patient presented after 1 week for follow-up, with no pain, discomfort, or swelling, no pus discharge, and the oral hygiene protocol was revised.

Marked bone regeneration:

Followed up after 3 months, 6 months, and 1 year.

Pocket depth has returned to normal measurements, 2mm to 3mm along the course of the follow-up period.

An intraoral periapical radiograph was conducted after the third month revealing that there is bone regeneration and a decrease in the periodontal pocket depth, the tooth was stabilized with a marked decrease of the mobility.

At the 6-month follow-up appointment, the radiograph showed further bone regeneration and after 1 year there was almost complete fill of the bony cavity and complete loss of mobility.

Clinical evaluation revealed that the soft tissue measures had changed during the course of the treatment—consequently, periodontal regeneration.

The patient was advised to carry on with crowning the tooth.

The patient is put in a recall program to follow up on the case.

DISCUSSION

As endodontic and periodontal lesions are usually complicated, the initial pathological causes must be determined to begin with the treatment of diseases in which a primary endodontic, periodontal, or true combined lesion is present.¹⁸

Determining the initial pathological cause is simple in uncomplicated cases, as this relies on the vitality of the tooth. If the tooth is vital and thus responds to the vitality test, this is a typical periodontal case, but if the tooth does not respond to vitality tests, that means a non-vital tooth, which indicates a primary endodontic case.¹⁹

Additional diagnostic means can include radiographs, sinus tracking, pocket probing, and cracked tooth testing, all of which will pinpoint an accurate diagnosis.

Understanding the communications between the periodontium and dental pulp is necessary to achieve predictable outcomes from the treatment. Three distinct pathways of communication exist between the periodontium and dental pulp, allowing for tight anatomical and functional connections.²⁰

Apical foramen The apical foramen serves as the main route of communication between the pulp and the periodontium in the intricate root canal system. Through the apical foramen, bacteria, bacterial toxins, inflammatory byproducts, and

mediators easily enter the root canal, causing pulp inflammation and ultimately pulpal necrosis.²¹ Similarly, infection from an infected pulp can exit the apical foramen and travel into the periodontium, causing tissue damage and creating what is known as a periodontal pocket in clinical terms.

Lateral and accessory canals

Everywhere, in conjunction with the root surface, are accessory and lateral canals, which could lead to interaction along the perio-endo pathway.²²

According to experiments, blood capillaries and nerve fibers frequently flow through these lateral canals. It has been discovered that they can move through the cementum wall's portal, pass through the periodontal ligament and root dentin, and connect to the main root canal system.²³

Dentinal tubules

If the cementum is exposed to the oral environment through gingiva recession and periodontal pockets, periodontitis gradually destroys the periodontal ligament that connects the cementum to the bone. When Sharpey's fibers are damaged, the cementum develops a surface resembling a sieve that is full of canals that might be infected with bacteria and their toxins, which could then pass through the cemental protective layer and into the patent dentinal tubules.¹³ Furthermore, several developmental fissures, grooves, and incomplete calcifications on the cementum may allow bacteria to enter the underlying dentinal tubules during iatrogenic removal of the cementum during periodontal therapy.²⁴

Accordingly, the treatment options depend on the initial cause of the lesion.

In primary endodontic lesions, the best line of treatment will be conventional root canal therapy. These lesions have a good prognosis and usually respond very well to endodontic treatment. The proof of success is the initial healing of the periodontal lesion and the disappearance of the sinus tract.²⁵

Proper chemo-mechanical preparation, as well as the proper irrigation techniques, are the initial steps for proper endodontic treatment. Intracanal medications, especially calcium hydroxide-based medications, will greatly affect success rates because of their alkaline nature, which will increase the disinfection process.²⁶

The 3D obturation and proper sealing of the root canal space will be the final brick in the complete healing of the lesion.

For primary periodontal lesions, this will only necessitate periodontal therapy. The main goal of this treatment is to eradicate the stimulus that inhibits epithelial healing, which can be followed by surgical treatment in cases of incomplete healing.

In cases of true combined lesions, both endodontic and periodontal treatments are required. However, both conditions need to be treated if the radiological and clinical signs of periodontal disease are present; otherwise, their independent actions will continue. Both conditions require relatively specific treatment, with root canal therapy needing to be finished before periodontal therapy.²⁷

Any dentist may experience certain clinical difficulties when dealing with perio-endo lesions. Extensive pulpal calcification is uncommon, and this might complicate endodontic treatment, particularly for a dentist without the necessary equipment or resources.²⁸

On the other hand, it's critical to remember that any inadequacies in your endodontic therapy can negatively impact the state of your periodontal tissues and prevent the lesion from healing.²⁹

To determine whether endodontic therapy was successful, some dentists prefer to postpone periodontal care for a few weeks after endodontic therapy. This is acceptable, but you must exercise caution so that the periodontal disease is not left untreated for an extended period.³⁰

After the root canal treatment has been confirmed to be successful, you will probably need to start

treating your periodontal lesion non-surgically. The next follow-up appointment can be used to assess the efficacy of both treatment methods.

The most important factors that specifically affect the decision to maintain the teeth are the patients' cooperation and good intentions, proper oral care, and most importantly, the possibility of tooth restoration.

CONCLUSION

The pathophysiology of endodontic periodontal lesions is complex, necessitating exceptional ability to identify and manage the condition. Consequently, for the lesion to be successfully treated, a partnership between various disciplines is required, including periodontics, endodontics, and prosthodontics. This case study demonstrates how an improved treatment plan leads to an improved outcome.

To properly treat and prolong the life of teeth that have endo-perio lesions, it is crucial to determine the lesion's source.

However, endodontic therapy and oral hygiene guidelines are essential for the full healing of lesions, even those of periodontal origin. Good coronal sealing and asepsis during the treatment are also very important.

REFERENCES

1. Timea Dakó, Ana Petra Lazăr, Endo-perio lesions: diagnosis and interdisciplinary treatment options. *Acta Stomatologica Marisiensis Journal* 2020;3(1)257-261
2. Simring M, Goldberg M. The pulpal pocket approach: retrograde periodontitis. *J Periodontal* 1964; 35:22-48.
3. BF Paul JW Hutter.: The endodontic-periodontal continuum revisited: new insights into etiology, diagnosis, and treatment. *J Am Dent Assoc* 1997; 128:1541- 1548.
4. Nair P.N.R.: Pathogenesis of apical periodontitis and the causes of endodontic failures. *Journal of Dental Research* 2004;15(6):348-381 (2004)
5. Abhishek Parolia, Isabel Porto. Endo-perio lesion: A dilemma from 19th until 21st century. *Journal of Interdisciplinary Dentistry* 2013; Vol-3(1):2-11
6. Simon JHS, Glick DH, Frank AL. The relationship of endodontic-periodontic lesions. *J Periodontal* 1972; 43:202-208.
7. Cho YD, Lee JE, Chung Y, Lee WC, Seol YJ, Lee YM, et al. Collaborative management of combined periodontal-endodontic lesions with a Palato gingival groove: A case series. *Journal of Endodontics*. 2017;43(2):332-337.
8. Raja S, Nath G, Emmadi P, Ramakrishnan, Ahathya. Treatment of an isolated furcation involved endodontically treated tooth - a case report. *J Conserved Dent*. 2007; 10:129-33.
9. Hadden A.M., *Clinical Examination and Record-Keeping Good Practice*. 3rd edition. London: Faculty of General Dental Practice (UK); 2013; 34-40.
10. McCulloch AJ. Making Occlusion Work: I. Terminology, Occlusal Assessment and Recording. *Dental Update* 2003; 30:150-157.
11. Davies SJ, Gray RMJ. The examination and recording of the occlusion: why and how. *British Dental Journal* 2001; 191:291-302.
12. Sonde, Nargis and Edwards, Malcolm Robert. *Perio-endo lesions: a guide to diagnosis and clinical management*. Central Lancashire Online Knowledge, 2020, 4-15.
13. Ian Needleman, *The Good Practitioners Guide to Periodontology*, British Society of Periodontology, 2020; 18-21.
14. Odell EW, Cawson RA. *Cawson's essentials of oral pathology and oral medicine*. Ninth edition / E.W. Odell. Amsterdam: Elsevier; 2017;354-362.
15. Rotstein I, Simon JH. Diagnosis, prognosis, and decision making in the treatment of combined periodontal endodontic lesions. *Periodontal*. 2000, 2004; 34:165-203.
16. Parolia A, Gait TC, Porto IC, Mala K. Endo-perio lesion: A dilemma from 19th until 21st century. *Journal of Interdisciplinary Dentistry*. 2013; 3(1); 149-158.
17. Roberto Holland, Factors affecting the periapical healing process of endodontically treated teeth. *Journal of Applied Oral Science*, 2017 Sep-Oct;25(5):465-476.
18. Preetinder Singh. Endo-Perio Dilemma: A Brief Review. *Dent Res J (Isfahan)*. 2011 Winter; 8(1): 39-47
19. Srivainavi Arulmari, Ashwini Athul, Assessment of Pulp Vitality in Multirooted Teeth With Advanced Periodontal Disease: A Clinical and Histological Study, *Cureus*. 2023 Jan; 15(1): e33298.

20. Raja Sunitha V, Pamela Emmadi, The periodontal – endodontic continuum: A review, *J Conserv Dent*. 2008 Apr-Jun; 11(2): 54–62.
21. Graunaite I, Lodiene G, Maciulskiene V. Pathogenesis of apical periodontitis: A literature review. *Journal of Oral and Maxillofacial Research*. 2012;2(4)56-63.
22. Gutmann JL. Prevalence, location, and patency of accessory canals in the furcation region of permanent molars. *Journal of Periodontology*. 1978;49(1):21-26.
23. Dongari A, Lambrianidis T. Periodontally derived pulpal lesions. *Endodontics and Dental Traumatology*. 1988;4(2):49-54.
24. Hiatt WH. Pulpal periodontal disease. *Journal of Periodontology*. 1977; 48(9):598-609.
25. Hamed Alshawwa, Jia-Feng Wang, Successful management of a tooth with endodontic-periodontal lesion: A case report, *World J Clin Cases*. 2020 Oct 26; 8(20): 5049–5056.
26. Azhar Ali, Anuradha Bhosale, Current Trends in Root Canal Irrigation, *Cureus*. 2022 May; 14(5): e24833.
27. Schmidt JC, Walter C, Amato M, Weiger R. Treatment of periodontal-endodontic lesions – a systematic review. *Journal of Clinical Periodontology* 2014; 41: 779–790.
28. Gautam S et al. Pulpal changes associated with advanced periodontal disease: A histopathological study. *Journal of Oral and Maxillofacial Pathology* 2017; 21(1):58-63.
29. Aishwarya Bhat, Syed Sirajuddin, Iatrogenic Damage to the Periodontium Caused by Endodontic Treatment Procedures: An Overview, *Open Dent J*. 2015; 9: 214–216.
30. R Jivoinovici, I Suci, Endo-periodontal lesion – endodontic approach, *J Med Life*. 2014 Oct-Dec; 7(4): 542–544.