

NON-SURGICAL MANAGEMENT OF PERI- APICAL LESIONS - A CASE SERIES.

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ABSTRACT

The dental pulp is a sterile connective tissue, which gets inflamed, by dental caries or traumatic dental injuries or non-carious loss of tooth structure, which results in development of pulpal infection, inflammation, and peri apical pathosis. Peri apical pathologies include Peri apical abscess, Peri apical Granuloma, Peri apical cyst. The differentiation of these is done radiographically, but radiographic diagnosis is not a confirmatory. Hence, all the peri apical pathologies are termed as peri apical lesions.

Non-surgical endodontic therapy is the first treatment modality for treating such a lesion. Where the use of endodontic irrigants, and calcium hydroxide with iodoform intra canal medicament have shown a successful repair and regeneration of the peri apical tissue. In this case series in all the cases use of 2% chlorohexidine solution was done to prevent the adherence and colonisation of the microbes apart from other irrigating solutions. The calcium hydroxide and iodoform paste use as an intracanal medicament for 6 months which have shown a successful healing of the peri apical pathology. This case series emphasize on use of 2% chlorohexidine irrigating solution, and radiographic representation of healing of peri apical lesion with calcium hydroxide with iodoform intracanal medicament.

KEY WORDS

peri apical lesions, non-surgical endodontic treatment, 2% chlorohexidine, calcium hydroxide.

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INTRODUCTION

The dental pulp is highly vascular connective tissue enclosed by dentin and enamel on the crown part, dentin and cementum on the root portion. Any carious invasion of the dental pulp, or a traumatic injury, can lead to the pulpal necrosis due to impaired vasculature and this necrotic pulp can be infected further to develop a peri apical pathology, these are peri apical abscess, granuloma, peri apical cyst.

Pulpal necrosis due to traumatic dental injury:

Traumatic dental injury can vary from enamel fracture to avulsion of the tooth. But the severe kind of trauma to the tooth like pulp exposure, luxation intrusion extrusion can cause the disruption of blood vessels, and pulp tissue becomes non vital-resulting pulpal necrosis. As a sequelae of TDI, microorganisms might colonize the pulp tissue after it loses its blood supply resulting in peri-radicular pathosis^{1,2}.

Pulp necrosis as sequelae of dental caries:

Dental caries is defined infectious disease oral disease which results in demineralisation of inorganic substance, dissolution of organic substance of the tooth³.

The dental caries reaches the pulp causes the chronic pulpitis if untreated, the results in pulpal necrosis which again super infected by microorganisms, toxins and other microbial products results in the inflammation of the peri apical region of the tooth especially the periodontal ligament which results in the formation of inflamed tissue around the apex of the infected tooth called peri apical granuloma. As the infection persists the granuloma increases in size and as result there lack of vascularity to the central cells, hence the necrosis of central cells of granuloma occurs consequently, fluid accumulation, hence the peri apical granuloma converts to a peri apical cyst³, periapical abscess is a form of purulent inflammation in the periapex in response to the pathogenic bacteria from the root canal¹.

Management of the peri apical lesions:

Peri apical abscess or peri apical granuloma or

peri apical cyst, can be done by surgical and non-surgical endodontic procedures.

Surgical endodontic procedure includes peri apical surgery to elevate the flap, access the peri apical area, resection of the apical portion of the root end, which has a complex peri apical anatomy and sealing the apex to prevent any further infections, indication is usually a failed orthograde endodontic therapy, or a persistent lesion even after treatment².

Non-surgical endodontic procedures include, access to peri apical region by an endodontic access cavity, irrigation, placement of proper intracanal medicament, followed by the convention root canal procedure^{2,4}.

Newer techniques include: over instrumentation, apexum, and gentle wave, which are targeted to establish the drainage of cystic contents, debulk of the peri apical tissue, and physiochemical methods to clean a canal respectively².

Here are the case reports which incompletely treated, with peri apical lesions.

CASE REPORT 1

A 10-year-old male patient presented with incomplete treatment of upper incisors and swelling on the palate figure 1.



Figure 1: spherical fluctuant swelling seen on palatal aspect with temporary filling in 11,12,21.



Figure 3: reduced peri apical radiolucency seen in relation to 11,12, with radiopaque healing seen at 3 months follow up.

History reveals the that patient a dental injury 1 year ago for which he opted for treatment, but the treatment was incomplete as the patient could not able to follow up the further treatment appointments.

On clinical exam : tender on percussion positive for 12,11,21. Negative mobility test, round, fluctant swelling seen on palatal aspect (figure 1).

On radiographic examination 12,11,21 was incompletely treated with a calcium hydroxide dressing.

Peri apical area of 11,12 shows a well defined radiolucent lesion, roughly spherical with radiopaque line at encircling lesion is seen (figure 2), and diagnosed as peri apical cyst associate with 11,12 teeth.

The teeth 11,12 were re accessed, and a thorough, debridement and irrigation was done, using 15k file debridement, biomechanical preparation was done using of 1.5% sodium hypochlorite and EDTA gel till 55k file - a by step-back preparation, after biomechanical preparation canals where irrigated with of normal saline, followed by 2% chlorohexidine irrigating solution to prevent the bacterial colonisation, final rinsing is done by normal saline canals are dried with paper point and calcium



Figure 2: peri apical radiolucency seen in relation to 11,12, with radiopaque line surrounding the lesion.



Figure 4: completely healed peri apical cyst at the end of 6 months.

hydroxide and Iodoform intracanal medicament is given (figure 5), and recalled after 3 months. At the end of 6 months after the medicament placement the peri apical cyst healed completely (figure 4)

CASE REPORT 2:

A 12 year old female presented with a broken upper front tooth, past medical history reveals the initiation of dental treatment.

Clinical exam: Ellis Davis class 3 fracture is noticed, with the temporary filling in right upper central incisors. Negative percussion test negative mobility test (figure 5).



Figure 5: clinical picture showing ellis class 3 fracture of 11 tooth.



Figure 6: radiograph showing a well-defined peri apical radiolucency around 11 tooth.



Figure 7: immediate post operative IOPA with calcium hydroxide and iodoform intra canal medicament.



Figure 8: a six month follow up IOPA showing complete healing of peri apical lesion.

Radiographic exam: Well defined radiolucency, is seen at the peri apical region of 11 tooth (figure 6).

The 11 tooth was re accessed and working determination is done (figure 6) which shows a well - defined radiolucency, with peripheral reactionary bone formation represented as a radiopaque line surrounding the lesion.

A complete debridement and irrigation is done. step back preparation of canal using 1.5% sodium hypochlorite solution with EDTA gel followed by normal saline, and 2% chlorohexidine solution, final wash is done by normal saline. Canal dried and calcium hydroxide and Iodoform intracanal medicament given (figure 7), and healing of lesion seen at 6 month post operative follow-up (figure 8).

CASE REPORT 3:

A 10 year old male patient presented with a with pain on chewing, past dental history reveals incompletely treated molar 4 months ago.

Clinical exam revealed a right lower 1st molar tooth with temporary filling, and tenderness on percussion (figure 9).



Figure 9: a incompletely treated molar with temporary filling.



Figure 10: a well-defined radiolucency at the peri apical region of distal root of 46.

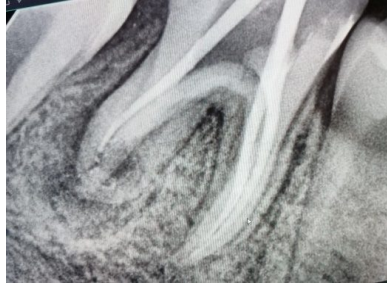


Figure 11: satisfactory healing noted at the end of 1.5 months follow-up.



Figure 12: complete healing at 6 months follow-up.

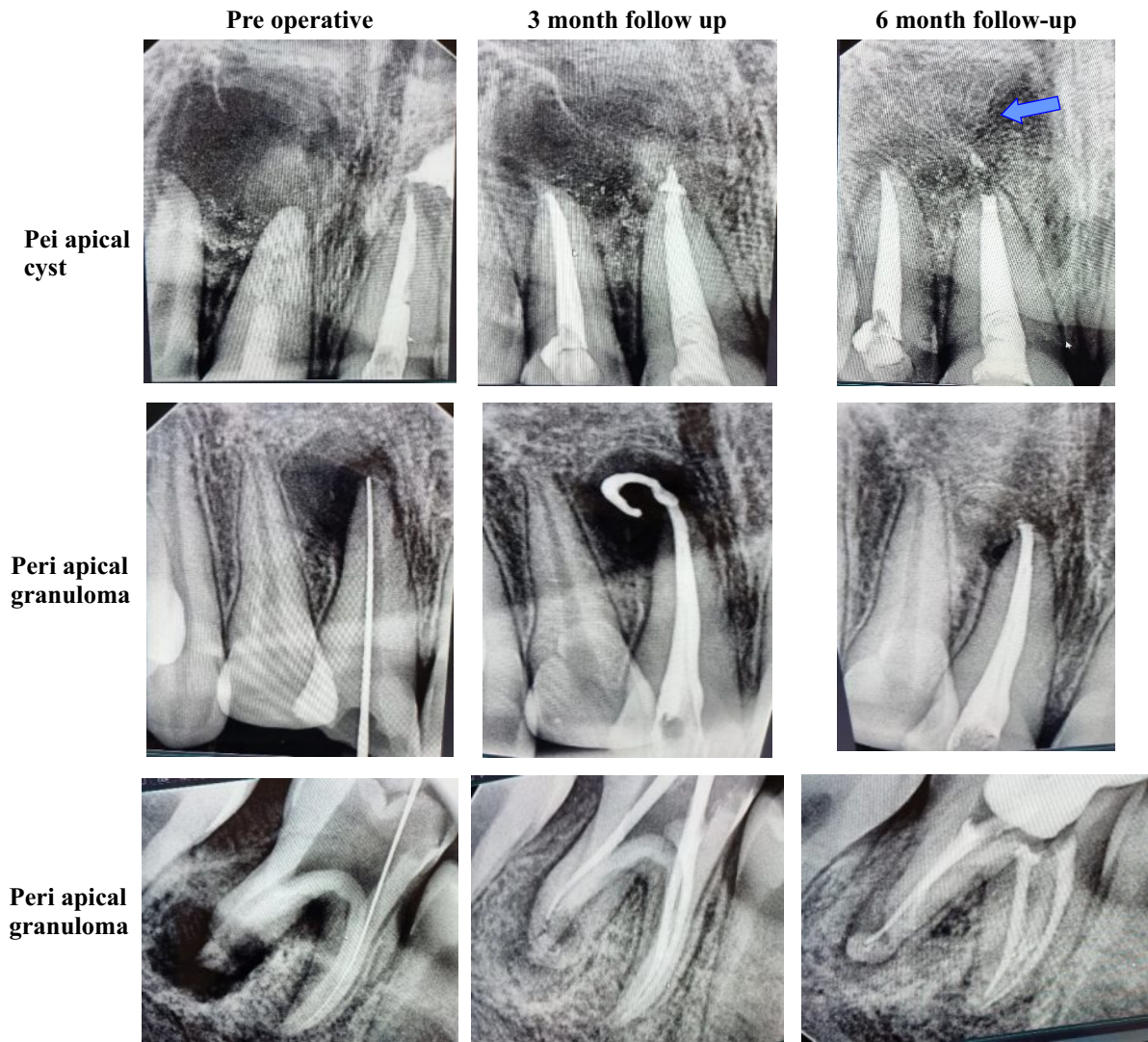


Figure 13, Comparison of healing-post operatively. Note: the healing pattern of internally radiating or spoke-like radiopaque lines blue arrow.

Radiograph exam: shows a well-defined radiolucency at peri apical region of distal root of 46 (figure 10)

Initial debridement done using k files, followed Cleaning and shaping done using protaper rotary system using 1.5% sodium hypochlorite with EDTA gel, normal saline irrigation, followed by 2%

chlorohexidine irrigation, and final rinse with normal saline. Plain calcium hydroxide intracanal medicament is given.

A satisfactory healing was observed at the end of 3 months, hence obturation was done (figure 11). Complete healing is noticed after 6 months post operatively (figure 12)

DISCUSSION:

Peri apical pathology includes peri apical abscess, peri apical granuloma, peri apical cyst, which are sequelae of traumatic injury or dental caries. As a sequelae due to caries or trauma pulp necrosis occurs due to disruption of blood vessels. The necrotic products get accumulated at the apical area along infection with microbes resulting in peri apical inflammation which initially is seen as a loss of apical lamina dura followed by widening of periodontal ligament, as healing response a granulation is formed called peri apical granuloma, this inflammation causes the stimulation of epithelial cell rests of Malassez to form cyst which now is termed as peri apical cyst^{3,4}. Diagnosis depends on clinical symptoms and radiograph examination, radiographically a peri apical abscess is seen as irregular radiolucency, peri apical granuloma a regular radiolucent spherical or oval in shape with lesser diameter, while peri apical cyst, is seen as spherical to oval shaped radiolucency may extending to other teeth and have greater diameter, even though radiographic diagnosis is not considered as confirmatory diagnosis⁵.

Microbiology of periapical lesions: a study by Juliana D. et al. concluded that Actinomyces, Fusobacterium, and Prevotella are the most common types of bacteria in peri apical lesions⁸.

According to Nair et al. out all peri apical lesions the 85% are peri apical granuloma and peri apical cysts are rare⁶. Ricucci et al concluded that the term "periapical radiolucent lesion" should be used rather than "granuloma" or "cyst" when examining radiographs⁷.

Treatment of peri apical lesions, initial treatment considered is root canal therapy, as the root canal infection is the major source for all the peri apical infection, inflammation and pathology,

Non-surgical endodontic therapy is the first line treatment option and has good success rate^{9,15,16}.

In all our cases with the peri apical lesions, we opted for ortho grade endodontic therapy, which is nothing but thorough cleaning and shaping of canal proper insertion calcium hydroxide with iodoform, sealing off the access cavity and follow-up.

Following debridement of canals, a thorough irrigation of the canal during and after biomechanical preparation is followed, which includes the use of 1.5% sodium hypochlorite with a 30 gauge side vent needle, along with EDTA gel, during the biomechanical preparation, once the preparation is canals are thoroughly rinsed with normal saline, followed by 2% chlorhexidine irrigating solution, again followed by normal saline irrigation.

Once canal are dried the placement of calcium hydroxide with iodoform is done and allowed to heal.

According to torabinejad et al, 1.5 % sodium hypochlorite is useful as a lubricant and also has antimicrobial property, by ionising into hypochlorous acid hypochlorite ion which is bactericidal⁵. EDTA has chelating property hence is used for removal smear layer formed.

2% chlorhexidine is used due its substantivity (a property of preventing microbial adhesion to the tooth surface), and its ability to prevent the fungal species growth⁵.

Intracanal medicament calcium hydroxide with iodoform- metapex, is a commercially available medicament paste used as intra canal medicament and in apexogenesis and apexification procedures. Calcium hydroxide dissolves to produce calcium and hydroxyl ions, hydroxyl ions cause lysis of bacterial and activates the alkaline phosphatase enzyme, which has effect on hard tissue formation that is repair and regeneration. Iodoform helps in prevention of infection by its bacteriostatic effect^{10,11,13,19,20}.

All of our cases are long standing and are incompletely treated. First case have been clinically and radiographically diagnosed as a peri apical cyst, while other two are as a peri apical granuloma^{4,5}. Ortho grade therapy have shown a satisfactory healing after 3 months in all the three cases, A pattern of internally radiating or spoke-like radiopaque lines also can be seen as a evident of healing after 6 months of duration⁴.

According to literature review, the treatment with calcium hydroxide and iodoform paste in a larger peri apical lesion have shown a good healing with no recurrence of lesion in 5 year follow up¹². According to Quasi Al. the use of calcium hydroxide iodoform silicon oil based medicament (metapex) have shown a good healing of peri apical lesions and has a bone regenerative potential^{11,17,18,19,20}.

Studies have shown that the chlorhexidine can be used along with calcium hydroxide when a fungal infection is anticipated, the high pH, osteo-inducing capability of calcium hydroxide and anti-fungal, and substantivity of chlorhexidine are beneficial in repair and regeneration of the tissues^{10,14,15}.

CONCLUSION:

Non-surgical endodontic therapy have shown a success in treating peri apical lesions which are long standing cases with a good prognosis. Following a proper irrigation protocol, adequate usage of 2% chlorhexidine to prevent the microbial adherence, and intracanal medication – calcium hydroxide with iodoform, plays a pivotal role in the healing studies have shown this treatment procedure can also be applied retreatment cases. Hence the non-surgical endodontic therapy opted for the peri apical lesions as a first line treatment and also in retreatment cases.

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