CASE REPORT / *CAS CLINIQUE*

Endodontics / *Endodontie*

CONSERVATIVE NON-SURGICAL ENDODONTIC MANAGEMENT OF A LARGE CYST-LIKE PERIAPICAL TUNNEL LESION WITH 22 MONTHS CBCT FOLLOW-UP: A CASE REPORT

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Abstract: The present case report epitomises the successful non-surgical management of a large cyst-like periapical tunnel lesion of endodontic origin due to trauma using Lesion Sterilization and Tissue Repair technique. Endodontic orthograde treatment (and re-treatment) was performed in association with triple antibiotic paste as an intra-canal medication in a sixteen-year boy. Preoperative CBCT as well as at the 22 months CBCT followup were used to compare the evolution of the healing of the lesion. Accurate diagnosis in combination with non-surgical orthograde endodontic treatment can lead to can lead to complete healing of large lesions without any need of surgical intervention.

Keywords: CBCT, Cyst-like periapical lesion, Healing, Lesion Sterilization, Tissue Repair, Non-surgical endodontic therapy.

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PRISE EN CHARGE ENDODONTIQUE CONSERVATRICE NON CHIRURGICALE D'UNE GRANDE LÉSION DU TUNNEL PÉRIAPICAL DE TYPE KYSTE AVEC SUIVI PAR CBCT À 22 MOIS: À PROPOS D'UN CAS CLINIQUE

Résumé: Ce rapport de cas illustre la réussite de la prise en charge non chirurgicale d'une lésion périapicale de type kyste d'origine endodontique, due à un traumatisme, par stérilisation des lésions et réparation tissulaire. Un traitement orthograde endodontique (et un retraitement) a été réalisé en association avec une pâte antibiotique triple comme traitement intracanalaire chez un garçon de seize ans. Les CBCT, préopératoire et à 22 mois ont été utilisés pour comparer l'évolution de la cicatrisation de la lésion. Un diagnostic précis associé à un traitement endodontique orthograde non chirurgical peut conduire à une cicatrisation complète des lésions de grande taille sans intervention chirurgicale

Mots clés: CBCT, lésion périapicale, kyste, cicatrisation, stérilisation des lésions, réparation des tissus, thérapie endodontique non chirurgicale.

Introduction

The dental pulp tissue is an uncontaminated connective tissue that is shielded by the dentin, enamel & cementum. Consequential injury to dental pulp can occur due to caries, tooth wear due to ageing and traumatic incidents and can result in the formation of periapical lesions due to formation of microbial colonies which may require orthograde or surgical endodontic interventions or both [1]. Various method have been proposed to manage large cyst -like periapical lesions such as Aspiration-irrigation technique, Decompression technique, Calcium hydroxide therapy, Lesion sterilisation and tissue repair therapy, the Apexum procedure, Marsupialization, Enucleation and Periapical surgery with the ultimate aim of eradicating microbial load from root canal system. NSRCT represents a highly anticipated and well-founded treatment option for Large Cyst -like Periapical Lesions with a commendable success rate ranging from round about 82.2 - 83.3% [2, 3]. Around 70% of the cases with the periapical radiolucency, heal evidently within two years of the treatment [4].

Radiographic examination is an essential key element in the diagnostics, treatment planning and evaluation of treatment effects on the apical tissues and the course of apical periodontitis. In contrast to periapical radiographs, CBCT examination allows for more accurate measurements of the lesion size in all three planes, lesion contents, and also its immediate relationship to the root canal & adjacent anatomic structures. With these advantages, the clinician is able to make a convincing diagnosis closer to the factual histopathological one, formulate the best treatment plan for the patient, and witness the evolution of the case [5].

The LSTR therapy intends to eliminate bacteria from the root canals by spaying the lesion and stimulating tissue repair and regeneration by the host's natural tissue responses. This technique utilises a combination of antimicrobial agents in the root canal space for disinfection and treatment of pulpal and periradicular diseases [6]. The present case report describes a successful conservative non-surgical endodontic management of a large cyst-like periapical tunnel lesion using LSTR method with an extensive CBCT followup of 22 months.

Case Presentation

A sixteen-year-old male patient reported with a chief complaint of intermittent pus discharge and pain in maxillary anterior region to the endodontic clinic. There was a similar episode of pus discharge one year back for which the patient took antibiotics. The patient also furnished a history of root canal treatment in #11 five years back after he met an accident and broke his maxillary right central incisor. Medical and family history was found to be non-contributory. Extraoral examination revealed non-palpable lymph nodes and no facial swelling was seen. Intraoral examination disclosed a sinus tract opening on #12 which was traced radiographically also and a composite restoration with marginal discoloration on #11 (Figure 1A, C). Both #11 & #12 responded negatively to EPT and thermal testing. Periodontal probing was within the normal limits.

Radiographic examination revealed dilacerated root with radiopaque material in root canal of #11 suggestive of gutta percha & previous treatment and a well-defined radiolucency with non-corticated borders in relation to #12 (Figure 1B, D). Preoperative limited FOV CBCT scan with the parameters 150 μm voxel size, 90 kV, 12 mA, and 15.07 sec emission, showed a through and through tunnel lesion of size 10.1 mm (Antero-posteriorly), 11.9 mm (Medio-laterally) & 10.9 mm (Superio-inferiorly), measured with linear measurement tool of Planmeca Romexis Software (Planmeca, Helsinki, Finland) (Figure 2 & 3). Internal structure was homogenously radiolucent.

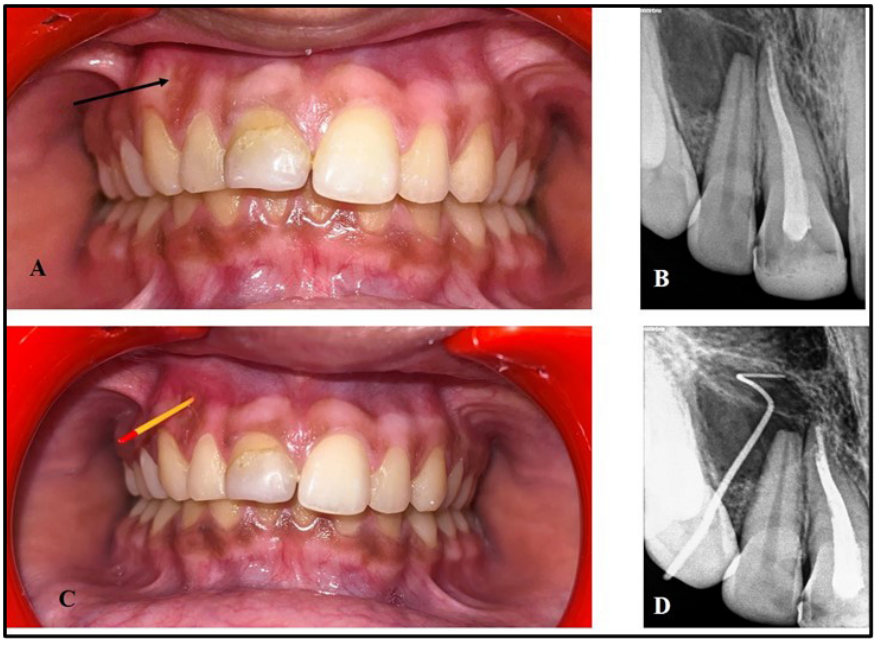

Figure 1. A&B- Preoperative Clinical Picture & Radiograph. C&D- GP Tracing.

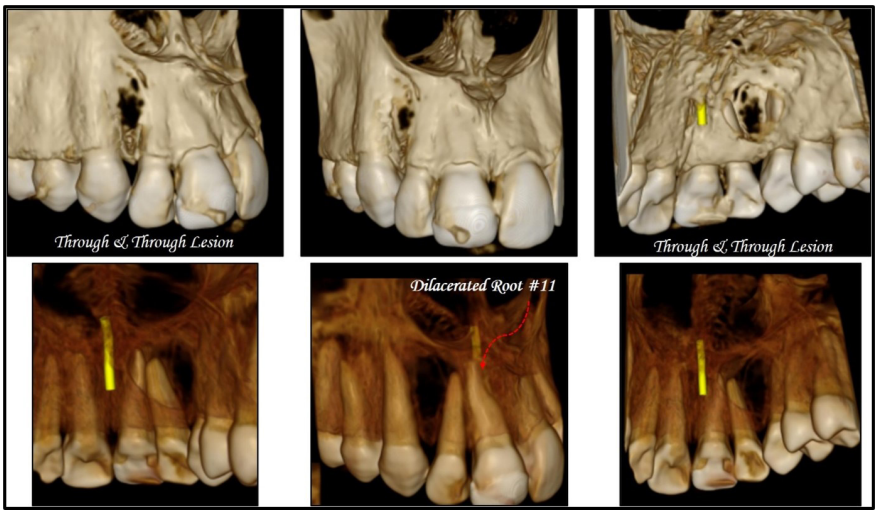

Figure 2. CBCT Findings: Through and through Tunnel lesion.

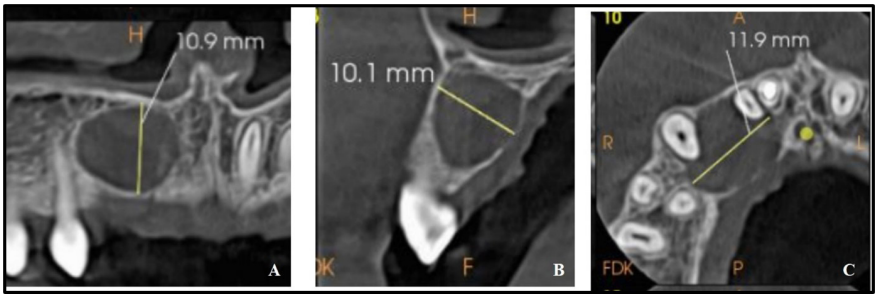

Figure 3. CBCT Lesion Size Estimation.

The diagnosis of Previously Treated #11 and Pulpal Necrosis with Chronic periapical abscess with intraoral draining sinus & External Root Resorption in #12 due to trauma was given based on history, clinical and radiographic findings.

A non-surgical root canal therapy for #12 and re- root canal therapy for #11 was advised with a check on the signs and symptoms at followup visits. The in-depth treatment plan was explained to the patient & consent was taken prior to the commencement of the treatment. On the first appointment, access opening & removal of old root canal filling was done in #11. For tooth #12, endodontic access cavity was prepared using an Endo Access bur (Maillefer-Dentsply, Switzerland) using a high-speed handpiece (NSK, Chicago, IL, USA) and the drainage of a yellow-coloured fluid was observed from the root canal (Figure 4A). Working length was computed using apex locator and verified radiographically (Figure 4B). Thorough cleaning

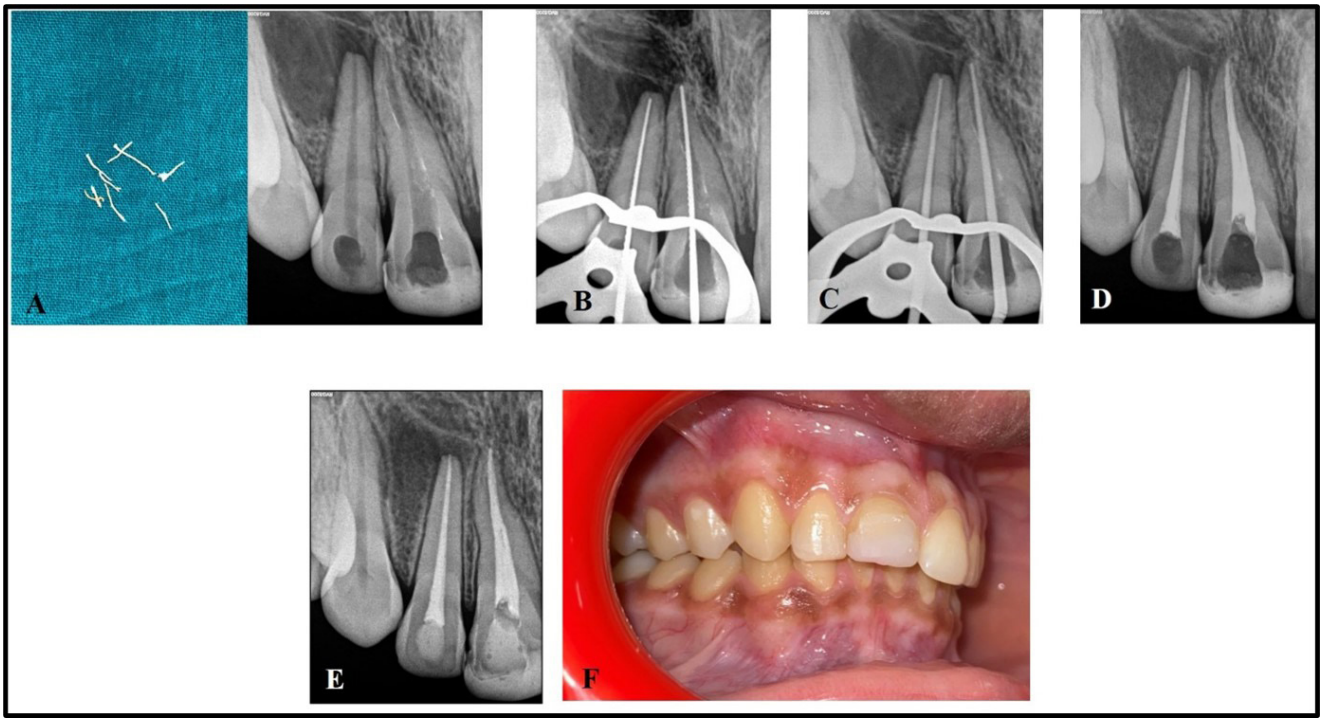

Figure 4. A- GP removal B- Working length determination C- Master Cone D- Obturation E- Post endodontic restoration F- Healed Sinus tract.

and shaping of the root canals were done using Neoendo rotary file system followed by sequential irrigation of the root canals using 5.25% sodium hypochlorite (Coltene CanalPro NaOCl), 17% EDTA (Coltene CanalPro) & saline; and triple antibiotic paste dressing was placed below the CEJ to avoid tooth discoloration. Teeth were restored with temporary restoration and the patient was then recalled after 2 weeks. On the subsequent appointment, following the removal of previous dressing and irrigating the canals it was noted that there was no active drainage and canal had dried. So, obturation was done using cold lateral condensation technique with Gutta-Percha and MTA- based sealer (Figure 4D).

Post obturation restoration was done with composite restorative material (Figure 4E). Figure 4F shows healing of sinus tract clinically.

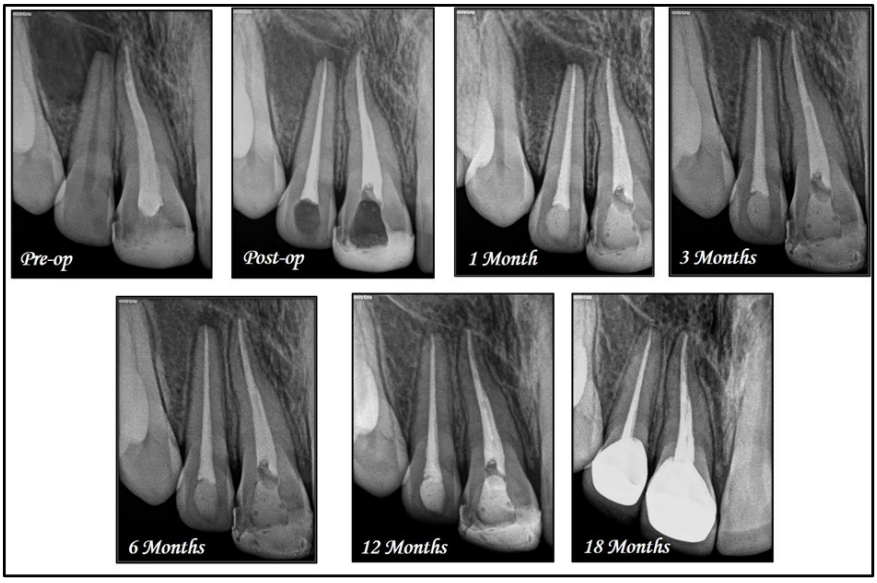

Figure 5. Periodic Radiographic Followup.

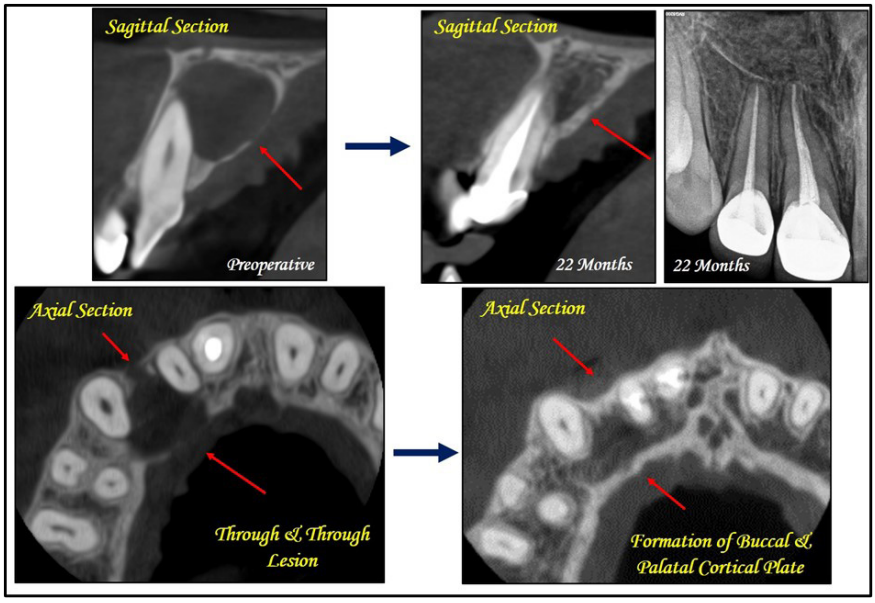

Figure 6. 22 Months CBCT Followup.

Periodic followup was done for the patient to track down the healing. Crowns were placed at 18 months (Figure 5). 22 months CBCT revealed restoration of normal bone architecture. Cortical plates and medullary bone appeared intact, with no evidence of residual pathology (Figure 6 & 7).

Discussion

Non-surgical treatment of teeth associated with large cyst-like periapical lesions is a arduous task as they are allied with an established root canal infection, greater microbial heterogenicity with a predominance of anaerobic bacteria and deeper penetration into the complex root canal anatomy. In such teeth, periapical disease may persist due to an entrenched extraradicular infection or cystic transformation. These lesions may also display certain characteristic features such as cortical bone expansion/erosion, soft tissue swelling (buccal, palatal or both), draining sinus(s), open apex due to root resorption which are not usually associated with small (<5 mm) periapical lesions [2].

The clinician should always take account of the benefits and risks that the procedure can propose to the patient and at the same time select the minimally invasive one which has the high success rate and least trauma to the patient while selecting the treatment option. Non-surgical approach has many advantages such as elimination of possible iatrogenic injury to the adjacent vital teeth and to the anatomic structures in the vicinity of the lesion, agonies and pain associated with surgical procedures. Patients have more acceptance and less apprehensions as compared to the surgical treatments. Age and medical ailments which limit surgical procedures are also factors those favours to adopt a non-surgical approach. Non-surgical approach provides a high success rate of 82.2–83.3% for therapeutics

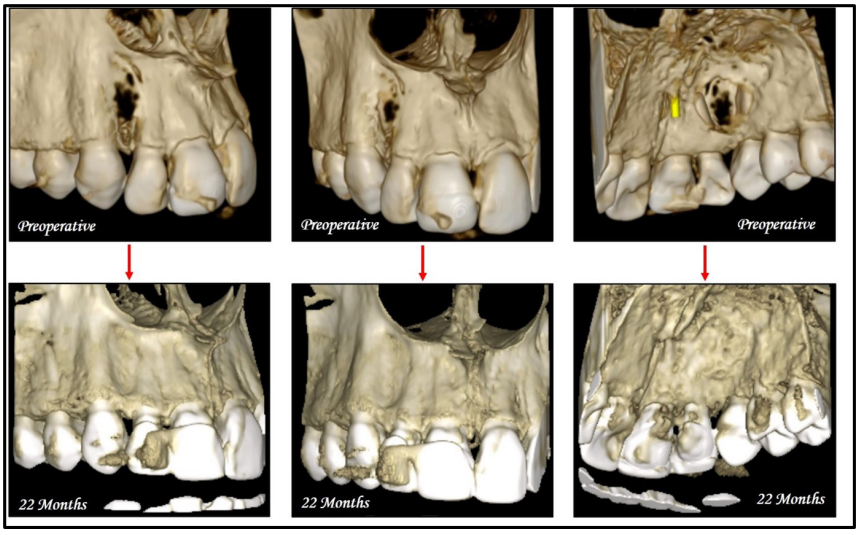

Figure 7. 22 Months CBCT Followup: 3D reconstructed images.

of larger cyst-like periapical lesions [2, 3, 7]. Surgical procedures should be considered in cases in which there is presence of extensive coronal restoration, time constraints or when non-surgical treatment options fail or unlikely to provide the desired outcome. Also, the biggest advantage of the endodontic surgery is that the sample for histopathological examination or biopsy can be collected during the surgical procedure as few non-odontogenic lesions may mimic periapical lesions or pathologies of pulpal origin and biopsy is a requisite [1].

The LSTR concept was developed by Hoshino in 1990 at the Cariology Research Unit, School of Dentistry, Niigata University, Japan and popularized by Takushige [8]. Various factors that determine the activity of antimicrobial agents to bring about sterilization of the root canals are minimal concentration of drug, type of infection, biocompatibility, systemic toxicity, resistance, drug reactivity within dentinal tubules, presence of smear layer [9]. It has three medications ciprofloxacin, minocycline, and metronidazole. Organic solvents like macrogol or propylene glycol are especially used because of their increased diffusion into the dentinal tubules [6]. The main disadvantage of minocycline is discoloration of teeth due to photon induced reaction, so substitutes such as amoxicillin, cefaclor, cefroxadine, fosfomycin or rokitamycin can be used. Minocycline forms insoluble complexes by chelating reactions with calcium ions [6, 8].

Cone beam computed tomography has become a noteworthy imaging modality in the dentomaxillofacial region in recent times to evaluate the actual extension of the lesion and confirm the offending tooth. Also, the differences in volume of a periapical lesion can be measured, and this can be used as a commensurate method for scrutinizing periapical healing (Pre & Post operatively). CBCT proved to be an adjunct in the true estimation of the lesion size, root canal morphology, determination of anatomic structures closeness and finally the healing status at the end of 22 months in this present case [1].

Zastrow EV et al in their case series showed the healing of all periapical lesions with bone destruction begins from the periphery of the lesion towards the enter, with decline in the size caused by the new bone formation. Radiographically with the passage of time, the lesion will become smaller and bony trabecula will be observed with different radiopacities occupying the space of the former lesion [11]. *Artaza L* et al demonstrated that teeth with large primary or post-treatment apical lesions can show high favourable after-effect rates after nonsurgical root canal treatment or retreatment [12]. A complete healing, with a complete restoration of the periodontal ligament architecture on all root contours, can be observed at different periods of time, varying from one to four years [13].

Conclusion

A non-surgical approach of LSTR is a good conservative approach as proven in this case among other solutions prior to resorting to surgery irrespective of the size of the lesion. Frequent monitoring is essential to check for the treatment outcomes.

Author Contributions' Statement

Smriti Rohilla: Concept and design of study; Acquisition of data; Literature Search Analysis and Interpretation of data.

Sandeep Gupta: Revising data critically for important intellectual content; Analysis and Interpretation of data; Drafting the article.

Sameer Makkar: Analysis and Interpretation of data.

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