Barcelona2015
September, 16-19

Endodontics: Where biology and technology merge

Clinical posters

Saturday 19th September

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SATURDAY, SEPTEMBER 19th

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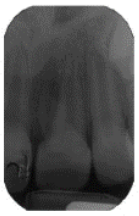
Treatment of a maxillary labioversed central incisor with root duplication

Aim

To discuss the treatment of a maxillary central incisor with root duplication and a labioversed crown after avulsion of the predecessor.

Summary

An 8-year old Caucasian girl was referred to our specialty clinic because of the labioversed position and enamel malformation of tooth 21 (Fig. 1). The dental anamnesis revealed that she had lost tooth 61 through avulsion at the age of 2.5. The X-ray (X-ray 1) showed an extra root projecting from an enamel tubercle at the buccogingival side of the crown. In consultation with the parents, it was decided to remove the extra root in order to facilitate the alignment of the tooth with the neighbouring teeth at a later stage. Because of the young age of the patient, the surgery was performed under general anaesthesia. After local infiltration anaesthesia with vasoconstrictor a full thickness mucoperiosteal flap was raised and both roots were visualised (Fig.2). The supplementary root was removed from the main root with a bur (Fig. 3 & 4). Inflammation tissue around the extra root had resulted in loss of the buccal bone plate and was thoroughly removed (Fig. 5). Around the main root no inflammation tissue was present and a connection between both root canals could not be observed. After careful examination and rinsing of the surgical site, it was closed. Healing was uneventful and sutures were removed after one week. Two months later the tooth reacted vital to pulp tests (X-ray 2) and the enamel discoloration was masked by the referring dentist. Nevertheless 1 year after surgery the tooth became necrotic and root canal treatment was performed (X-ray 3). Apart from the necrosis, no other symptoms were present and the healing of the soft tissues and bone was excellent (Fig. 6). Also the position of the tooth spontaneously ameliorated. Two and a half years after surgery the situation was stable (X-ray 4 & Fig. 7) and the patient was referred for improvement of the composite restoration and for orthodontic advice to align the tooth as part of full mouth orthodontic therapy.



X-ray 1

X-ray 2

X-ray 3

X-ray 4

Key learning points

- Trauma to a maxillary primary incisor may result in root duplication and malposition of the successor
- Removal of the extra root may be performed after full thickness flap elevation
- Vitality of the tooth needs to be monitored after removal of the extra root
- Maxillary incisors with root duplication do not necessarily need to be removed and can be maintained depending on the circumstances

Fig. 1

Fig. 3

Fig. 7

Fig. 2

Fig. 4

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Maintaining pulp vitality in a tooth with external cervical resorption type II Hethersay: case report.

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Aim

To describe a simplified technique to manage rubber dam isolation in an open flap restorative procedure in a maryland bridge abutment tooth with invasive external cervical resorption type II Heithersay.

Introduction

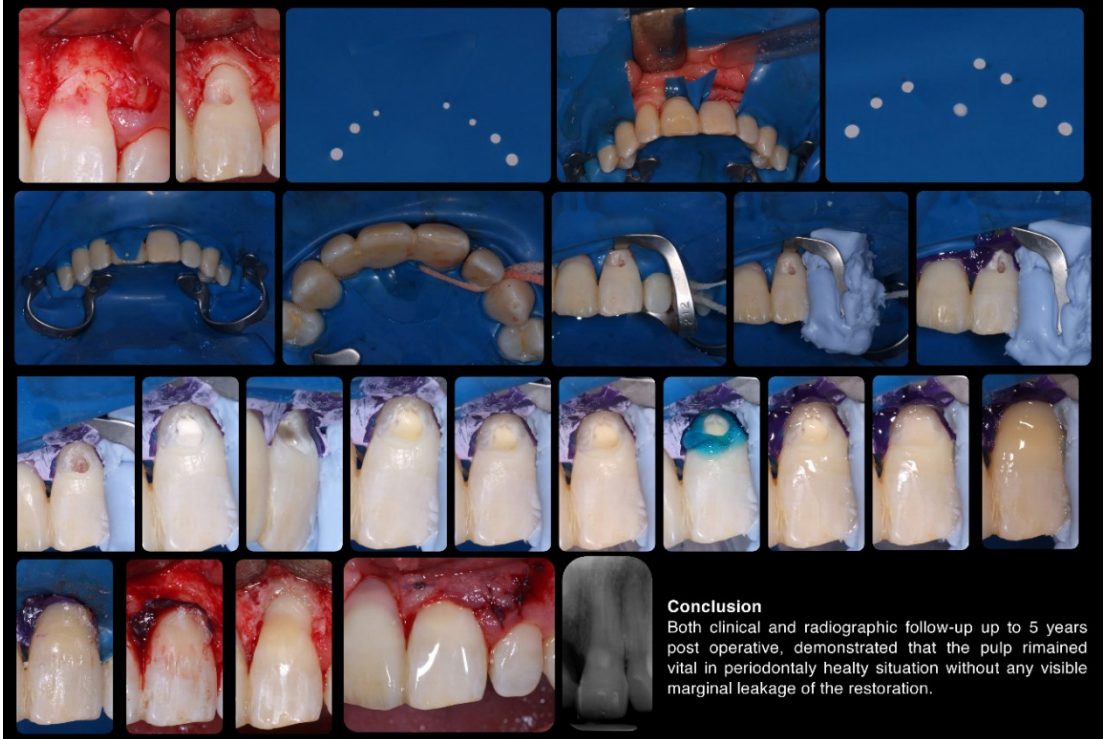
Invasive cervical resorption (ICR) is the loss of dental hard tissue as a result of odontoclastic action; it usually begins on the cervical region of the root surface of the teeth. The IRC class II according Heithersay has positive outcomes close to 100% in the absence of pulp pathology, if they are treated as a subgingival carious lesion.

Case Report

A 37 years old man comes in the office for the presence of a pinkish area on the 2.1, abutment of Maryland Bridge. The patient's anamnesis revealed a history of trauma that has brought to the loss of the 1.1. The clinical examination revealed that tooth positively responds to the vitality tests; radiographic examination revealed the absence of periapical pathology and the presence of a irregular radiolucency at level of the cemento enamel junction; probing revealed lack of hard tissue limited to the buccal surface of the tooth. Diagnosis of trauma-induced invasive external cervical resorption type II Heithersay was made. Treatment plans sulcular flap elevation, granulation tissue and affected dentine removal, rubber dam application, restorative procedure, suture.

Discussion

Operative field isolation should be considered the standard of care for endodontics and restorative dentistry. Rubber dam application aims to obtain an operative field stable and free of infiltration: the presence of a leakege during endodontic and restorative treatment is recognized to be an unfavorable prognostic factor for therapy outcome. Given the limitation of the presence of a maryland brige on the tooth that present the external cervical resorption and the strong desire of the patient to avoid the replacement of the maryland bridge, the most difficult phase of the treatment had been to obtain a perfect isolation free of infiltrations to prevent the microleakage of the restoration. The isolation had been obtained using two rubber dam sheets and an hard lightcured liquid rubber dam in a combination after opening a surgical flap.



Conclusion

Both clinical and radiographic follow-up up to 5 years post operative, demonstrated that the pulp rimained vital in periodontaly healty situation without any visible marginal leakage of the restoration.

Reference

1.Tronstad L. Root resorption-etiology, terminology and clinical manifestations. Endod Dental Traumatol 1988; 4: 421.
2.Frank AL. External-internal progressive resorption and its nonsurgical correction. J Endod 1981; 7: 473.
3.Heithersay, Geoffrey S. "Invasive cervical resorption: an analysis of potential predisposing factors." *Quintessence International* 30.2 (1999).
4.Heithersay, Geoffrey S. "Treatment of invasive cervical resorption: An analysis of results using topical application of trichioracetic acid, curettage, and restoration." *Quintessence international* 30.2 (1999).
5.Frank AL, Bakland LK. Nonendodontic therapy for supraosseus extracanal invasive resorption. J Endod 1987; 13: 348.

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ENDO-PERIO LESION AND DIABETES : A CASE REPORT

Aim

Discuss the management of endo-perio lesions which represents challenges to clinicians when it comes to diagnosis and prognosis of the involved teeth and especially in an altered general condition.

Introduction

Diabetic patients are more exposed to oral infections and periradicular lesions caused by changes in their immune system, qualitative and quantitative changes in normal flora of their oral cavity and poor peripheral blood supply.
Moreover, uncontrolled diabetes can cause changes of the dental pulp tissue and reduce its activity.

Case report

A 50 years old woman, with uncontrolled diabetes is suffering of a purulent discharge from the sulcus related to #13 with dental mobility (level 3), and not responding to initial periodontal treatment.
The vitality tests were all negatives, thus we proceeded to an RCT with proper desinfection of the root canal system and tridimentionnal filling.
Clinical and radiologic follow up shows bone reorganization with decreasing of the purulent discharge and also the dental mobility, two weeks after endodontic therapy.

Fig a: Purulent discharge related to #13.
Fig b: punctual periodontal probing, 12 mm periodontal pocket.
Fig c: Initial state of the periodontal area.
Fig d- e: two months follow up.

Discussion

Diagnosis of primary endodontic disease and primary periodontal disease usually represents no clinical difficulty. Simon & al (1972) used a classification to seperate lesions involving both periodontal and pulpal tissues into the following groups:

- Primary endodontic lesions with secondary periodontal involvment,
- Primary periodontal lesions with secondary endodontic invovlment,
- True combined lesions.

In diabetic patients, aging changes of pulp due to limited collateral blood flow is faster than non-diabetics. Since diabetes damages the blood circulation or ischemia, sometimes necrosis of pulp may occur.
Periodontal healing after a proper RCT depends on the biological constants including the rate of blood sugar levels. Clinical and radiologic follow up must be completed with glycemic control.

References

Mesgarani A, Eshkevari N, Ehsani M, et al. Frequency of odontogenic periradicular lesions in diabetic patients. Caspian J Intern Med 2014; 5(1): 22-25.
Aksel H, Serper A. A case series associated with different kinds of endo- perio lesions. J Clin Exp Dent. 2014;6(1):e91-5.
Segura-Egea J J, Castellanos-Cosano L, Machuca G, López-López J, Mar- tín-González J, Velasco-Ortega E, Sánchez-Domínguez B, López-Frías F J. Diabetes mellitus, periapical inflammation and endodontic treatment outcome. Med Oral Patol Oral Cir Bucal. 2012 Mar 1;17 (2):e356-61.
Zehnder M, Gold SI, Hasselgren G. Pathologic interactions in pulpal and periodontal tissues. J Clin Periodontol 2002; 29: 663–671.

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ADVANCED CALCIFIC METAMORPHOSIS OF A RIGHT MAXILLARY CANINE: A CHALLENGE FOR THE ENDODONTIST.

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AIM: The aim of this study is to show the root canal treatment of a calcificated tooth using advanced technology as microscope and CBCT.

INTRODUCTION: Calcific metamorphosis (CM) is seen commonly in the dental pulp after traumatic tooth injuries and is recognized clinically as early as 3 months after injury. Calcific metamorphosis is characterized by deposition of hard tissue within the root canal space and yellow discoloration of the clinical crown.

CASE PRESENTATION: A 44 year-old female patient seeks dental attention complaining of pain and showing swelling and loss of function around the maxillary anterior teeth area. After a proper examination, the final diagnosis was symptomatic apical periodontitis of the right maxillary canine, and pulp necrosis, probably caused by trauma when the patient was 14 years old. Radiographic examination showed advanced calcification of the main root-canal. CBCT and operatory microscope allowed locating and negotiating the calcified root-canal as conservative as possible.

DISCUSION: CM is a challenge for the endodontist, as it will make very difficult the location and instrumentation of the root canal. CBCT and dental operatory microscope allow analyzing and planning these cases, making easier the success of treatment and reducing complications.

CONCLUSIONS AND CLINICAL RELEVANCE:

1- CM is characterized by deposition of hard tissue within the root canal space and yellow discoloration of the clinical crown.

2- CM is associated to traumatic tooth injuries and is recognized clinically as early as 3 months after injury.

3- CBCT and operatory microscope facilitates the management of CM cases.

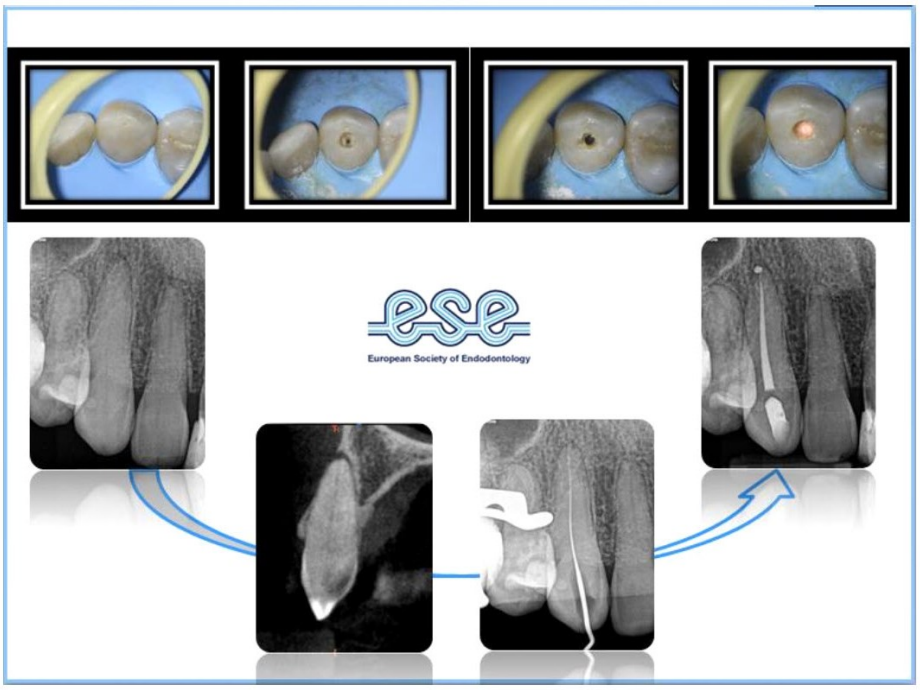
REFERENCES

-Malhotra Nm Mala K. Calcific metamorphosis. Literature review and clinical strategies. Dent Update.2013;40:48-57.

-Gutmann JL, Witherspoon DE. Calcific metamorphosis: a challenge in endodontic diagnosis and treatment. Quintessence Int. 2001;32:447-55.

-Armada y cols. Glide path preparation in S-shaped canals with rotary pathfinding nickel-titanium instruments. J Endod. 2013;39:5347.

-Berutti y cols. Use of nickel-titanium rotary PathFile to create the glide path: comparison with manual preflaring in simulated root canals. J Endod. 2009;35:408-12.



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HORIZONTAL ROOT FRACTURES OF BOTH MAXILLARY CENTRAL INCISORS: WHEN NO TREATMENT IS THE BEST ENDODONTIC TREATMENT TO PRESERVE THE VITALITY.

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AIM

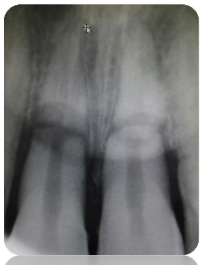
A successful case of no treated horizontal root fractures of both maxillary central incisors is reported.

INTRODUCTION

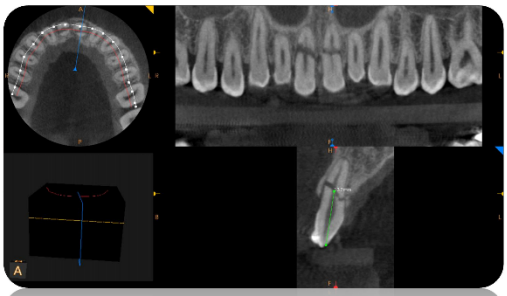
The overall pulpal survival subsequent to trauma of permanent teeth is very high. In case of horizontal root fractures, no treatment is usually the best treatment option.

CASE PRESENTATION

A 20 year-old male was referred because of a traumatic dental injury occurred one week before. He was asymptomatic, but radiographic examination showed horizontal root fractures of both maxillary central incisors. The CBCT scan, taken at the first appointment, showed that horizontal root fracture is a misleading term, because in the majority of cases, there is an oblique fracture, in which the fracture line at the buccal side is much more apically than at the palatal side. Despite the pulp vitality was negative at this time and one month later, decision was taken to keep the teeth and to do nothing, just monitor. After two and half months, the pulp vitality was positive. At present, one year later, the teeth have no signs or symptoms of disease.



initial radiograph



initial CBCT scan

One year later

DISCUSSION

The management of horizontal root fractures implies a clinical and radiographic monitoring.

CONCLUSION AND CLINICAL REVELANCE

The overall pulpal survival subsequent to trauma of permanent teeth is very high. In case of horizontal root fractures, no treatment is usually the best endodontic treatment. The management of horizontal root fractures implies a clinical and radiographic monitoring.

Andreasen JO, **Andreasen** FM, Skeie A, Hjørting-Hansen E, Schwartz O . **Effect of treatment delay upon pulp and periodontal healing of traumatic dental injuries -- a review article**.. Dent Traumatol. 2013 Aug;29(4):253-65.

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NON-SURGICAL ENDODONTIC RETREATMENT OF TWO MAXILLARY INCISORS FILLED WITH SILVER POINT AND RESTORED WITH POSTS

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AIM

The aim of this clinical poster was to describe two retreatment cases in maxillary incisors with full coverage crowns, one restored with a fiber post placed inside the root canal, and the other one with silver points and restored with a metallic post.

SUMMARY

A 45-years-old woman was treated for pain and fistula in the right maxillary central incisor. Clinical exploration revealed a positive percussion in both teeth and fistula associated to the tooth 1.1. Initial periapical radiograph showed periapical radiolucent images in both maxillary incisors, with a fiber post inside the root canal of the tooth 1.1 and an associated fistula. A metallic post and a silver point was observed in the tooth 1.2. Diagnosis of persistent apical periodontitis was stablished.

Initial radiograph

Fiber post bypass

Inmediate postoperative radiograph

12 months follow-up

Fiber post was removal with a Protaper Universal® F3 file. Metallic post and silver point was removal with ultrasounds and Steiglitz forceps.

Appearance of F3 file after post removal

Silver point and metallic post after being removed from teeth 1.2

Instrumentation of both cases was carried out with the rotatory system MTwo® and the root canal filling combined lateral condensation and vertical compaction with Calamus®.

The final rinse protocol was 4.25% NaOCl, 17% EDTA and 4.25% NaOCl with neggative apical pressure (Endovac®)

CONCLUSIONS

Non-surgical endodontic retreatment is a reliable procedure to preserve root filled teeth with persistent apical periodontitis.

Retreatment is possible to perform even when silver point and fiber or metallic posts has been used to restore the teeth.

REFERENCES

Fedorowicz Z, Nasser M, Sequeira-Byron P, de Souza RF, Carter B, Heft M. Irrigants for non-surgical root canal treatment in mature permanent teeth (Review). The Cochrane Library. 2012; Issue 9

Çapar ID, Uysal B, Ok E, Arslan H. Effect of the size of the apical enlargement with rotary instruments, single-cone filling, postspace preparation with drills, fiber post removal, and root canal filling removal on apical crack initiation and propagation. J Endod 2015 Feb;41(2):253-6.

Chana H, Briggs P, Moss R. Degradation of a silver point in association with endodontic infection. Int Endod J 1998 Mar;31(2):141-6.

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European Society of Endodontology

Management of traumatically intruded permanent tooth: A case report

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Aim: The aim of this report was to present a case a severely intruded mature maxillary right incisor.

Introduction:Traumatic intrusion of permanent teeth is a relatively rare. However the treatment of intrusion is complicated. Various treatment options such as; spontaneous reeruption, orthodontic repositioning, and surgical repositioning have been proposed for the treatment of intrusive luxation.

Figure 1

Figure 2

Case presentation: An 11-year-old boy referred to our clinic as a result of traumatic injury after 2 hours. The patient had a fall while playing snowy day. On extraoral examination, there was neither a nasal bleeding nor head injury. The intraoral clinical examination showed intrusion of the maxillary right central incisor. Subluxation of the right lateral incisor was also noted (Figure 1). Radiographic evaluation revealed the positions of the intruded central incisor without any evidence of root fracture (Figure 2). The patient and parents were informed about treatment options. Because of completed root development and the severity of intrusion, immediate surgical repositioning (active repositioning) of central incisor was chosen as the treatment plan. Re-positioning maneuvers for the tooth was started by very gentle movements using dental extraction forceps. After placing it into its original position, upper the lateral incisors and central incisors were splinted using intertwined glass fibers impregnated with light-cured composite resin (Interlig, Angelus Industria de Produtos Odontologicos S/A Brazil) and acid etch-composite resin technique (Figure 3 and 4). At follow-up examination after six month, there were no clinic and radiographic symptoms in patient (Figure 5). The patient follow-up visits are also continued.

Figure 3

Figüre 4

Figure 5

Discussion: Because of completed root development and the severity of intrusion, immediate surgical repositioning (active repositioning) of central incisor was chosen as the treatment plan. The development of late post-trauma sequelae may arise after a long time from the injury, indicated the need for a long follow-up period for intruded teeth. Cervical resorption is a type of inflammatory resorption and is seen in most instances as a late complication following dental trauma.

Conclusions and Clinical Relevance: The most serious type of luxation injury is intrusion. This case report illustrates the outcome surgical repositioning of mature central incisor.

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The use of video-glasses to manage dental anxiety in children whilst carrying out endodontic therapy

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Aim

To highlight a novel behaviour management technique to facilitate endodontic treatment in children with anxiety and behavioural problems.

Introduction

Dental anxiety in paediatric patients is a significant barrier to providing optimal dental treatment, which can result in a higher risk of failure for treatment modalities such as endodontic treatment (1). Techniques such as relative analgesia are used to relax the patient and provide better operative conditions. However these require specialised equipment, additional staff training and can be expensive (2). Video-glasses used as a novel distraction technique are an economic solution and could be utilised to overcome these challenges (3).

Case Examples

Figure 1 : Application of video-glasses for anterior root canal treatment.

A seven year-old girl with severe dental anxiety was referred to the paediatric department with a non-vital maxillary left central incisor with incomplete root development. Treatment of this anterior maxillary tooth using relative analgesia proved to be difficult because the nasal hood encroached upon the operative site. Video-glasses (Figure 1) were used during the endodontic treatment and engaged the patient's attention throughout both 60 minute visits, allowing Mineral Trioxide Aggregate obturation (Figure 2). Treatment was well received by patient and parent, with the dentist noting excellent operative conditions.

Figure 2: Radiographs of endodontic treatment aided by video glasses.

Figure 3: Molar endodontic treatment aided by video glasses.

A 15 year-old girl with Asperger's syndrome and hypodontia required root canal treatment of a mandibular left first molar to treat apical periodontitis. The patient suffered from behavioural issues and a short attention span. The video-glasses (Figure 3) were used for two appointments, which were approximately 75 minutes long. The patient was completely distracted throughout treatment which gave ideal conditions to carry out the root canal treatment, the alternative for her being extraction under general anaesthetic.

Figure 4: Completed Molar endodontic treatment aided by video glasses.

Patients receiving endodontic treatment using the video–glasses were given a questionnaire to assess their dental experience. They all reported a positive experience when undergoing endodontic therapy. The operator reported that excellent compliance was maintained throughout all visits making it no different to treating a cooperative child.

Discussion

At this point in time there is little evidence suggesting a use for video-glasses to help manage children with anxiety or behavioural problems to facilitate endodontic treatment. Anecdotal experience and this case series does suggest that the use of video-glasses can be an effective behaviour management strategy in improving patient co-operation.

Conclusion & Clinical Relevance

Video glasses are an effective tool in improving patient compliance to aid complex endodontic treatment, which may be compromised by anxiety or behavioural issues.

References

1. Diercke K, Ollinger I, Bermejo JL et al. Dental fear in children and adolescents: a comparison of forms of anxiety management practised by general and paediatric dentists. International Journal of Paediatric dentistry. 2012; 22(1): 60 - 67
2. Manley MCG, Skelly AM and Hamilton AG. Dental treatment for people with challenging behaviour: general anaesthesia or sedation? British dental journal. 2000;188(07):358-60.
3. Casaus A and Panesar J. The relevance of autism in orthodontic management. Orthodontic update. 2014; 7(2): 48 - 53

C68

Relationship between virus and pulp pathology: a case report.

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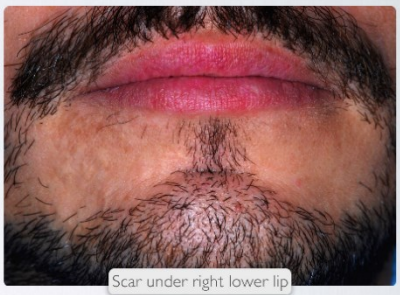
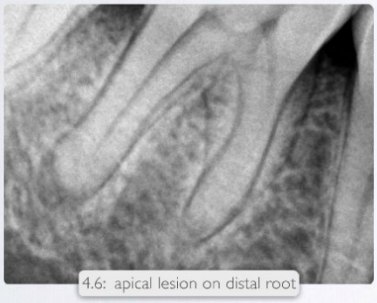
Pulp necrosis is usually related to bacterial processes such as caries or traumatic as restaurations or grinding among others. However, although it is unusual, there may be situations in which a viral disease may cause pulp necrosis (1,2). Diagnosis can be difficult because the signs or symptoms that allow us to determine the origin of necrosis may be little or no evident (3). In these cases, a thorough medical history is essential for a proper diagnosis and treatment plan.

4.6 y 4.4: tooth discoloration



Scar under right lower lip



4.6: apical lesion on distal root

4.1 y 4.2: apical resorption

4.1, 4.2, 4.4 y 4.6: tooth discoloration

Patient shows darkening and negative sensivity of teeth 4.1, 4.2, 4.3, 4.4 and 4.6. These teeth have in common the absence of deep cavities or restaurations, negative palpation and percussion, not periodontal pathology and correct occlusion. In addition, the 4.6 showed a radiographic image compatible with a pulpal origin infection and teeth 4.1 and 4.2 a possible apical resorption.

4.6: Healing of the apical lesion

4.4: treated

4.1 and 4.2: treated

Second appointment, we asked patient about viral pathologies, and he reported an aggressive Herpes Zoster in the right jaw, where there is still a subtle sequel to the healing of injuries. Once we established the proper diagnosis, we proceeded to design the treatment plan consisted of performing the root canals of teeth that showed negative sensitivity.

1. Li H, Chen V, Chen Y, Baumgartner JC, Machida CA. Herpesviruses in endodontic pathoses: association of Epstein-Barr Virus with irreversible pulpitis and apical periodontitis. J Endod 2008; 35:23-29.
2. Sabeti M, Valles Y, Nowzari H, Simon JH, Kermani-Arab V, Slots J. Cytomegalovirus and Epstein-Barr virus DNA transcription in endodontic symptomatic lesions. Oral Microbiol Immunol 2003; 18:104 – 8.
3. Lopes Ma, de Souza Filho FJ, Jorge Júnior J, Paes de Almeida O. Herpes Zoster Infection as a Differential Diagnosis of Acute Pulpitis. J Endod 1998;2:143-4.

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MULTIDISCIPLINARY APPROACH OF COMPLEX TRAUMATIC DENTAL INJURIES

Introduction

The sequelae of dental trauma can be serious and, potentially, resulting in biological, structural, physiologic, esthetics and, even, psyco-social consequences. Often, the approach and appropriate resolution of more complex cases requires multidisciplinary treatments involving surgical, periodontal, endodontic, restorative, prosthetic, implant, orthodontics and preventive procedures.

Objective: The aim of this work is to present 4 clinical complicated cases of dental trauma involving anterior permanent teeth.

This serie of clinical cases illustrates 4 patients (ages 7-21 years) with various traumatic dental injuries. Besides the primary traumatic lesions the patients showed some secondary pathologies as pulp necrosis, an apical cyst, tooth discoloration, interruption of root development, root resorption and tooth loss. The overall rehabilitation of these cases comprised inter-disciplinary approaches including: tooth-splinting; conventional endodontic treatment and apexification procedures with mineral trioxide aggregate; conventional and laser soft tissue surgeries; ablation of an apical cyst and bone regeneration; adhesive fiber post cementation with a dual-cure composite resin; crown restorations with a direct composite resin stratification technique using a customized silicon matrix; bleaching therapies; orthodontic procedures; dental implant and ceramic crown placement; and mouthguard fabrication.

Clinical case #1

10 year-old boy 72 hours after a bicycle fall. Although he was initially assisted at a public healthcare center, nothing had been done about complicated fracture with upper central incisors with pulp exposure (Fig. 1.1). Having regard to irreversible pulp commitment, radical endodontic treatment was performed ending with an apexification with an apical plug of mineral trioxide aggregate (MTA ProRoot™ - Dentsply) (Figs. 1.2 -1.3). Due to a slight colour change caused by internal staining, an intensive in-office bleaching was performed using a 38% hydrogen peroxide gel (Opalescence®Boost – Ultradent Inc.) (Fig. 1.4). An individual silicone matrix, obtained from the impression of the provisional restorations (Fig. 1.5), was used as post cementation guide (ParaPost® Fiber Lux – Coltene Whaledent) and also for the final composite resin restorations (Figs.1.6-1.7). Three months later a small gingival hyperplasia, probably due to invasion of the biological width, was surgical removed with an Erbium: YASFR (KaVo Key Laser 3® - KaVo) (Figs. 1.8-1.9). 5 months (Fig. 1.10) and 4 years follow-up (Fig. 1.11).

Clinical case #2

13 year-old boy victim of a sport accident causing an avulsion, crown and alveolar fracture on tooth 1.1 and complicated crown fracture on tooth 2.1. After removing the "splint" made in a public healthcare center (Figs. 2.1-2.1b), an attempt to correctly repositioning previously replanted tooth 1.1 was made with a new splint (Fig. 2.2). Due to pulp necrosis, radical endodontic treatment was performed in both teeth (Fig. 2.3) followed by adhesive reattachment of tooth 1.1 fragment and incremental composite direct restoration on tooth 2.1 (Figs. 2.4-2.6). Five and a half years later, tooth 1.1 was extracted due to a complete, no-inflammatory, replacement root resorption (Figs 2.7-2.8) and replaced by an immediate implant using the natural crown as a screwed provisional (Fig. 2.9) ensuring an excellent healing (Fig. 2.10). After an home-bleaching treatment, a ceramic crown was cemented over a zirconia screwed abutment and tooth 2.1 veneered with a direct composite resin (Fig. 2.11).

Clinical case #3

12 year-old boy with a complicated, untreated, crown fracture causing pulp necrosis with an apical lesion, tooth discoloration and interruption of root development (Fig. 3.1). After the endodontic treatment, which ended with an apical plug of MTA (ProRoot™ – Dentsply)(Fig. 3.2), an Erbium laser surgery (frenectomy and gengivectomy) was performed (Fig. 3.3-3.4). Due to the persistence of the apical lesion and fistula reactivation, a conservative surgery was performed in order to remove the apical cyst, performing an apicotomy of tooth 2.1 and bone regeneration (Figs. 3.5-3.7). After the healing period (Fig. 2.11) an individual silicone matrix, obtained from the wax-up, was used as post cementation "guide" and for the final composite resin incremental restoration (Figs. 3.8-3.10). After three years of follow-up, the clinical and radiographic evaluation showed an aesthetic, biological and structural integration of the performed treatments (Fig. 3.11).

Clinical case #4

18 year-old boy with trauma of soft and hard tissues involving extrusions of various upper and lower incisors with associated alveolar fractures causing severe occlusal interferences (Figs. 4.1-4.3). Manual repositioning of the displaced segments (Fig. 4.4) and flexible stabilization using the orthodontic appliance (Fig. 4.5). During the healing period of a soft tissue surgery (Fig. 4.6), 30 months after trauma, following the orthodontic treatment (Fig. 4.7).

Results

After a clinical and radiographic average follow-up period the overall subjects showed good outcomes concerning biological, structural, physiologic and esthetics evaluation.

Conclusions

Conservative and progressive approaches, combined with multidisciplinary and complementary treatments, provide an adequate oral rehabilitation of some complex traumatic dental injuries and their resultant complications.

C70

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Clinical Management of an immature premolar with pulp necrosis through calcium hydroxide apexification: Case report

AIM: To present a case report of calcium hydroxide apexification in an immature permanent premolar diagnose with pulp necrosis and acute apical abscess

SUMMARY

Calcium hydroxide apexification has been widely used and studied; it has been reported to be an effective, reliable and cheap treatment option. Recent literature review has reported success rate up to 90%. Cases of immature permanent premolars with necrotic pulp and periradicular lesion, shortly after eruption, are rare in the literature.

Case presentation: 9 years old Caucasian girl came to European University of Valencia's dental office with pain and swelling located in tooth 2.5 and she did not report any trauma. After performing the clinical and radiological examination (Fig. 1) the diagnosis was pulp necrosis with acute apical abscess due to an extensive decay. After removing the caries lesion the opening access was performed and rubberdam was placed. The work lenght was stablished with size 80 K file and circumferential instrumentation technique was carried out starting with a size 15 file until size 35 file. 2.5% sodium hypoclorite was used to irrigate the root canal and a final flush irrigation was activated with size 15 file and ultrasonics during 1 minute. The canal was dried and apexification was performed placing a paste of calcium hydroxide (Octocanal®). A pellet and IRM® was used as a provisional coronal sealing. The calcium hydroxide was not refreshed and apical barrier was formed after 7 month. The root canal was filled with thermoplasticized gutta-percha and root canal sealer (AH Plus®), using a continuos wave technique. Coronal restoration was realized with resin composite. Resolution of apical periodontitis was observed 9 months after the first clinical session (Fig. 2).

(Figure 1)

(Figure 2)

KEY LEARNING POINTS.

Calcium hydroxide apexification is still a viable treatment option for immature teeth with pulp necrosis

C71

REVITALISATION OF A PREVIOUSLY TRAUMATIZED ROOT-FILLED INCISOR: 36-MONTH FOLLOW-UP

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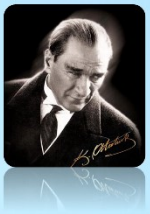

Aim : Revascularisation/Revitalisation of incisors with open apicies has become a viable treatment option, particularly in cases of traumatic injuries. The aim of this case report is to present revitalisation of a previously traumatized and root-filled maxillary central incisor.

Introduction: Many endodontic treatment procedures are recommended in the treatment of traumatized and non-vital young permanent teeth. The most common method in such cases is apexification with calcium hydroxide. Recently, apical plug with MTA and obturation of root canal with warm gutta-percha is a commonly administered technique. Due to the lack of continued root development however, new treatment modalities to enhance continued root maturation have been considered more recently. One such strategy is pulp revitalization. The advantages of pulp revitalization lie in the possibility of further root development and reinforcement of dentinal walls by deposition of hard tissue, thus strengthening the root against fracture.

Case Presentation: A 12-year-old boy was referred to the Paediatric Dentistry Department for endodontic retreatment of a maxillary right central incisor that had suffered a traumatic dental injury five months earlier. Radiographic examination of the clinically asymptomatic tooth revealed an overextended and poorly condensed root filling. There was a periapical radiolucency associated with the tooth (1). The root filling was removed with minimal debridement and gauging of the apical foramen revealed an open apex of approximately 1mm diameter. The root canal was dressed with triple antibiotic paste (ciprofloxacin, metronidazole, minocycline) for 3 weeks, after which a revitalisation procedure, involving removal of the antibiotic paste, induction of apical bleeding and placement of a coronal barrier of MTA, was performed (3). The access cavity was temporarily restored with glass ionomer cement for 2 weeks after which a definitive composite resin restoration was placed. The patient was recalled every six months for clinical and radiographic examinations. After thirty-six months there was resolution of the periapical radiolucency, complete apical closure and thickening of root walls (5).

Discussion: In this case 2.5% sodium hypochlorite was used as an irrigant and triple antibiotic paste was placed into root canals. Although minocycline is often associated with tooth discolouration, which has led to its replacement by other agents in other variations of triple antibiotic paste, in the present case no discolouration was observed. Various case reports have reported successful revascularization of pulp tissue in infected non-vital young permanent teeth. This case showed that the revitalization procedure can promote root development in a non-vital, endodontically treated tooth.

Conclusions and Clinical Relevance: In endodontically treated teeth with open apices, which require endodontic retreatment, the revitalization procedure may facilitate apical closure and, to some extent, thickening of root walls.

References: Wigler at al. Revascularization: A Treatment for Permanent Teeth with Necrotic Pulp and Incomplete Root Development JOE 39, 319-326, 2013.

C72

Title: **Pulp regeneration case report in closed and open apex teeth**

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Aim:
To present the regenerative procedure in a closed apex molar tooth and an open apex premolar.

Introduction:
There are some major concerns and several clinical challenges that must be bypassed when treating permanent teeth with non-vital pulp with apical radiolucency especially in young patients with open apex.
Revascularization of the pulp followed by continued root development can occur under ideal circumstances as the newest treatment plan for immature permanent teeth; also this has been reported for some closed apex cases.

Case presentation:
Case 1: A 13-year-old boy suffering from pain on the left posterior mandible molar was referred from his orthodontist for the assessment and treatment of lower molar tooth, examination showed no response to the vitality tests with TTP. Radiographic exam showed large apical radiolucency at the apical part of both the roots with furcation involvement (Fig 1).
Informed consent (advise that follow up procedures are obligatory to assess success and discuss other treatment options if they fail to meet expected goals e.g. reduction or resolution of apical lesion, continued root development with reduction in size of apical foramen and deposition of additional hard tissue on the root canal walls) and assess fees for revascularisation was given.
Revascularization was done as American association of endodontics recommendation with the help of calcium hydroxide and MTA in 2 sessions.

Fig1, case 1,stages of treatment for revascularization

6 months review

Case 2: An 18-year-old girl suffering from occasional pain on the left posterior mandible premolar was referred for the treatment, examination showed no response to vitality tests with TTP and large apical radiolucency on PA (Fig 2).
Revascularization was done as American association of endodontics with the help of calcium hydroxide and MTA in 2 sessions.

Fig 2, case 2,from pre-op radiograph to the 6 months review

Discussion:
Although the clinical management of the open apex teeth is challenging and the outcome of the revascularization procedures remains somewhat unpredictable, when successful, they are an improvement to treatment protocols, and can also leave the door open to other methods of treatment in addition to extraction when they fail to achieve the desired result.

Conclusion and clinical relevance:
Revascularization is the newest and the most conservative way of treating open apex teeth, also it is a good way of treatment for the closed apex in the anxious patients and it may be a substitute of RCT in future.

Ref:
Hargreaves KM1, Diogenes A, Teixeira FB. Treatment options: biological basis of regenerative endodontic procedures. J Endod. 2013 Mar; 39(3 Suppl): S30-4

C73

Photo-Activated Disinfection Technique as a supplement in the apicoformation protocol.Clinical case.

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Aim: To report clinical-radiographic results of apexification associated to the Photo-Activated Disinfection Technique (PAD).

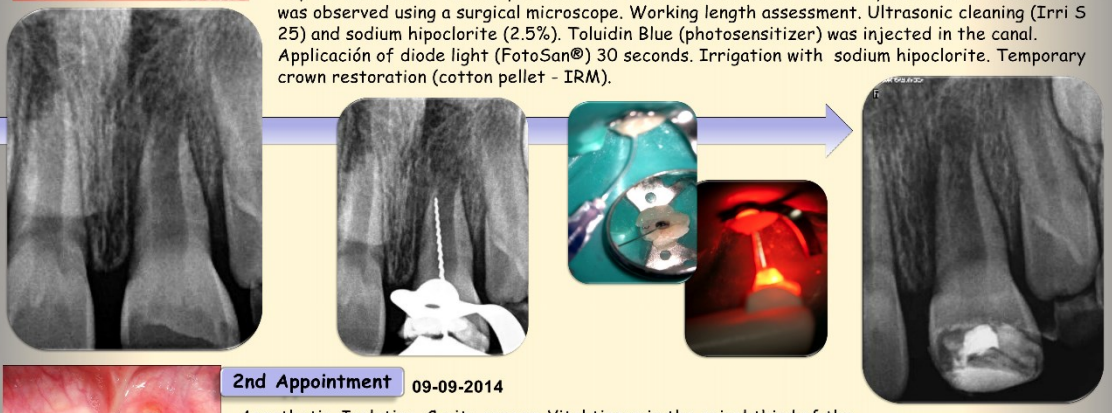
SUMMARY

Pacient: 8 year-old girl with vestibular abscess and uncomplicated crown fracture in 2.1. Traumatic history (a month before).

Diagnosis: 2.1 with pulpal necrosis and acute apical abscess.
Treatment plan: Apexification with apical plug of MTA, associated with the PAD as an aid for the disinfection.

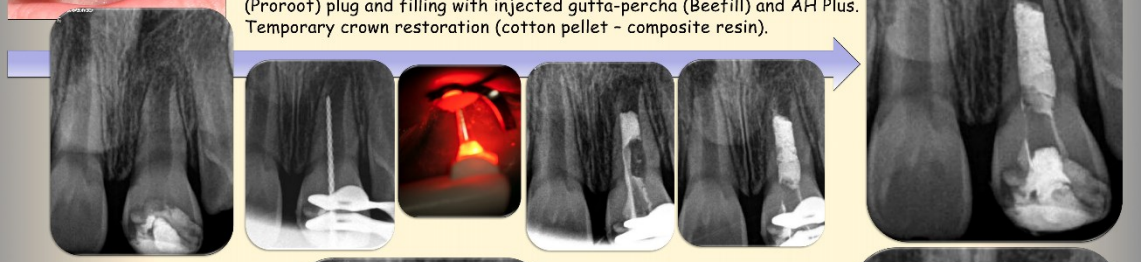
1st Appointment 11-06-2014

Topical anesthetic. Coronal pre-endodontic restoration. Isolation . Cavity access. No vital tissue was observed using a surgical microscope. Working length assessment. Ultrasonic cleaning (Irri S 25) and sodium hipoclorite (2.5%). Toluidin Blue (photosensitizer) was injected in the canal. Application of diode light (FotoSan®) 30 seconds. Irrigation with sodium hipoclorite. Temporary crown restoration (cotton pellet - IRM).



2nd Appointment 09-09-2014

Anesthetic. Isolation. Cavity access. Vital tissue in the apical third of the canal was observed using a surgical microscope. New working length to bleeding point (3 mm shorter that the first working length assessment). Irrigation with sodium hipoclorite (2.5%). Drying and 2nd PAD application. Final irrigation: chlorhexidine (2%). Bleeding was not stimulated. MTA (Proroot) plug and filling with injected gutta-percha (Beefill) and AH Plus. Temporary crown restoration (cotton pellet - composite resin).



Clinical follow-up

11-11-2014

Periapical changes can be seen.

29-01-2015

Key learning points

- Apexification with MTA can be associated to PAD.
- PAD can be an alternative technique to intracanal placement of antibiotics.

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C74

Revascularization of a necrotic immature molar medicated with double antibiotic paste:12-month follow-up

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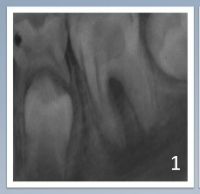
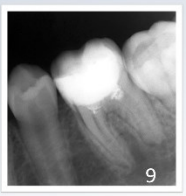
Aim: This case report presents the 12-month follow-up of revascularization treatment in an immature necrotic permanent first molar with apical periodontitis.

Introduction: Endodontic treatment of an immature permanent tooth with pulp necrosis is a very difficult and time consuming procedure for both patients and dentists . The traditional treatment of such a tooth is apexification, that involves long-term application of calcium hydroxide. Revascularization is a new treatment method for immature necrotic permanent teeth. Indeed, it would provide, after treatment, a vital tooth that would be able to complete its root maturation.

Case presentation: A 10-year-old girl was referred to the peadiatric department for endodontic management of a mandibular first molar. Clinical examination of the molar revealed deep carious lesion with pulp exposure. Radiographic examination showed that the affected molar had open apices along with periradicular radiolucency involving the furcation area(Fig.1). Regenerative endodontic treatment was initiated following parental consent. Following anaesthesia and endodontic access under rubber dam isolation, canals were irrigated with 10 mL 2.5% NaOCl per root. Then a double antibiotic paste containing metronidazole and ciprofloxacin was placed into the root canals, and the access cavity was sealed with glass-ionomer cement. 4 weeks later, the paste was removed from each canal using 10ml 2.5% NaOCl followed by 10 ml physiological saline. Revascularization protocol was completed by inducing apical bleeding and placing MTA over the blood clot. At one-year follow-up, clinical and radiographic examination revealed. The root healing of the periradicular and bifurcational lesions, thickening of the canal walls and closure of the apices were observed. The tooth was clinically asymptomatic and functional(Fig.6).





Discussion In necrotic immature permanent teeth, a regenerative procedure using a triple antibiotic paste (ciprofloxacin, metronidazole, minocycline) has been a traditional approach. However, this method can result in considerable staining due to minocycline. More recently, the use of double antibiotic paste containing ciprofloxacin and metronidazole as an intracanal medicament has been suggested as a viable alternative to triple antibiotic paste. Although there are no long-term studies advocating the use of double antibiotic paste in regenerative endodontic procedures, favourable primary outcomes (lack of clinical symptoms and crown staining, and continued root development) seem to suggest that this disinfection regimen might be an affective approach.

Conclusions and Clinical Relevance: Revascularization is a viable treatment option in immature necrotic molars with apical involvement .In the present case, the double antibiotic paste was succesful for disinfecting the root canals.

References:Dabbagh B. et al . Clinical complications in the revascularization of immature necrotic permanent teeth Pediatr Dent. 2012 Sep-Oct;34(5):414-7.
Nosrat A. et al. Drawbacks and unfavorable outcomes of regenerative endodontic treatments of necrotic immature teeth: a literature review and report of a case J Endod. 2012 Oct;38(10):1428-34.
Kim JH et al . Tooth discoloration of immature permanent incisor associated with triple antibiotic therapy: a case report J Endod. 2010 Jun;36(6):1086-91.

C75

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Bruno F, Díaz-Flores García V, Carrasco Sancho A, Estévez Luaña R, Cisneros Cabello R

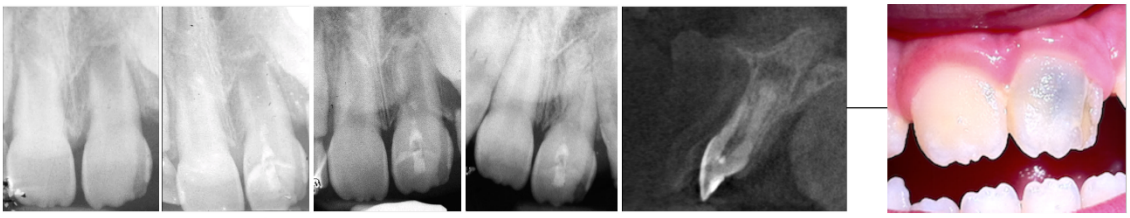
PULP REGENERATION: A CASE SERIES

Aim:
To show the effectiveness of the regeneration therapy in the treatment of a non vital young permanent teeth.

Introduction:
The goal of regeneration therapy is the reestablishment of a funtional pulp-dentin tissue complex based on the three pillars of tissue engineering: stem cells, growth factors and scaffold.

Case Presentation 1:
A 6-year-old girl suffered a traumatic injury to her anterior upper tooth 2.1 that resulted in a tooth avulsion. The tooth was reimplanted five hours after the accident, and it later developed a pulp necrosis. Since it was an immature tooth, regeneration procedures were performed. Twenty-four months after regeneration we observed the formation of new tissue and the absence of signs and symptoms.

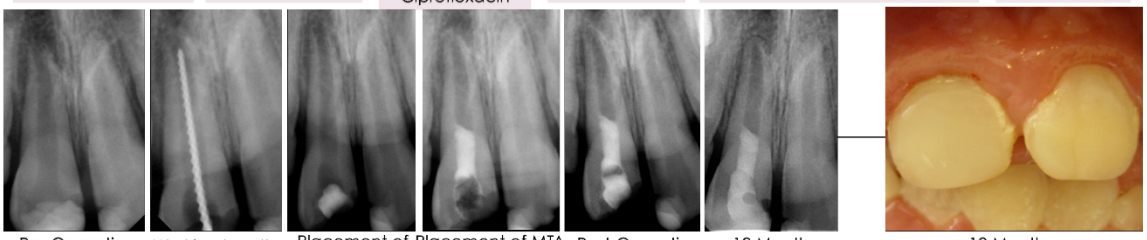
No instrumentation | 5,25% NaOCl | Metronidazole Ciprofloxacin | 15 days | Blood clot – Collagen sponge | MTA



Pre-Operative | Placement of MTA over blood clot | 12 Month | 24 Month | 24 Month | 24 Month

Case Presentation 2:
An 8-year-old boy had a traumatic injury affecting his anterior upper tooth 1.1. The tooth developed pulp necrosis and a chronic apical abscess. Since it was an immature tooth like the previous case, regeneration procedures were performed. After twelve months we observed the absence of signs and symptoms and the resolution of periapical lesion as well as thickening of the canal walls and continued root development.

No instrumentation | 2,5% NaOCl | Metronidazole Ciprofloxacin | 21 days | Blood clot – Collagen sponge | MTA



Pre-Operative | Working length | Placement of DAP | Placement of MTA over blood clot | Post-Operative | 12 Month | 12 Month

Discussion:

	Irrigation	Intracanal medicament	Blood clot	Coronal Barrier
Iwaya et al. 2001	5% NaOCl 3% H_2O_2	Metronidazole Ciprofloxacin	No	$Ca(OH)_2$
Banch & Trope 2004	5.25% NaOCl 0.12% CHX	Metronidazole Ciprofloxacin Minocycline	Yes	MTA
Cotti et al. 2008	5% NaOCl 3% H_2O_2	Ca(OH)2	Yes	MTA
Kim et al. 2012	3%	Metronidazole Ciprofloxacin Cefaclor	Yes	MTA
Nosrat et al. 2013	2.5% NaOCl	Ca(OH)2 Amoxicillin	Yes	MTA

Conclusion and Clinical Relevance:

Regenerative endodontic procedures have the potential advantages versus traditional treatment procedures of increasing root wall thickness and root length and hold the promise of restoring pulp-dentin tissue complex in teeth with immature roots and necrotic pulps.

Reynolds K, Johnson JD, Cohenca N. Pulp revascularization of necrotic bilateral bicuspids using a modified novel technique to eliminate potential coronal discolouration: a case report. Int Endod J 2009;42:84–92.

C76

Bone-Like Tissue In-Growth, Transient Ankylosis and Continued Root Formation Following Replantation of an Avulsed Immature Tooth: A Report of a Case

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Arieh Y. Kaufman, Department of Endodontics, Rambam medical center

Eyal Nuni, Department of Endodontics, Hadassah medical center

Aim: Avulsion is a dental emergency in which the speed and nature of management affects the prognosis of the tooth. Replantation is, in most situations, the treatment of choice and numerous biological pulpo-dentinal responses may follow it. A case of bone-like tissue in-growth, transient ankylosis and continued root formation after replantation is presented.

Summary: A six year-old girl sustained an avulsion injury to her maxillary right central incisor (Fig. 1). The tooth was immersed in milk within 5 minutes of the incident and was replanted approximately one hour after the injury (Fig. 2). It was then monitored for 44 months. Radiographic review 6 months after the injury disclosed a bone-like tissue growth in the root canal space of the replanted tooth and signs of ankylosis, including a high-pitched percussion tone, decreased mobility and 1 mm of infra-occlusion in relation to the adjacent central incisor (Fig. 3). Although decoronation was indicated according to Malmgren (2013), it was decided to continue close follow-up. Forty-four months follow-up revealed that the replanted tooth was in supra-occlusion by 1-2 mm, relative to the adjacent central incisor and it exhibited no signs of ankylosis. Radiographic signs of continued root formation, i.e., elongation and thickening of the dentinal walls and narrowing of the apical foramen, were noticed (Fig. 4).

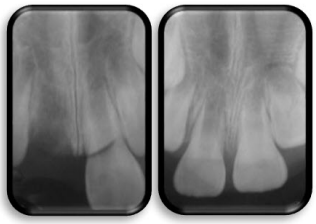

Fig. 1 Fig. 2

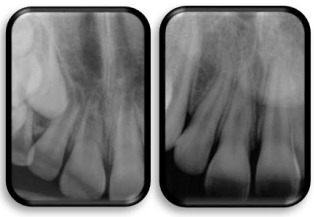

Fig. 3 Fig. 4

Key Learning Points:

- Although decoronation is indicated in the literature when signs of ankylosis and initial infra-occlusion are present, in case of a very immature tooth replanted in favorable conditions, regular monitoring without any intervention might be suggested as long as there are no pathologic signs or evident of progression of the infra-occlusion.
- Clinicians should bear in mind that in some cases transient ankyloses may occur, thus rendering decoronation unnecessary.

References: Malmgren B (2013) Ridge preservation/decoronation. *Journal of Endodontics* 39, 67-72.

C77

PULP REGENERATION TREATMENT WITH A 5 YEARS RECALL BY CBCT

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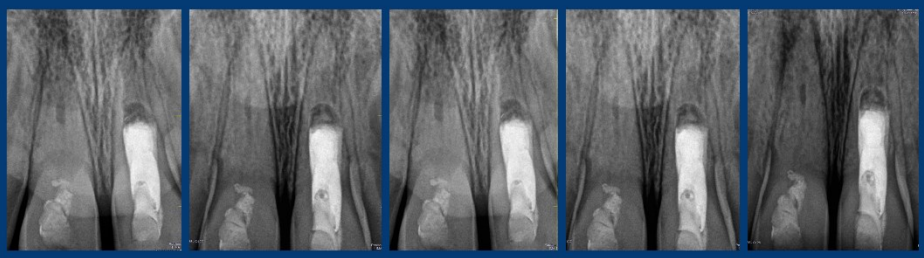
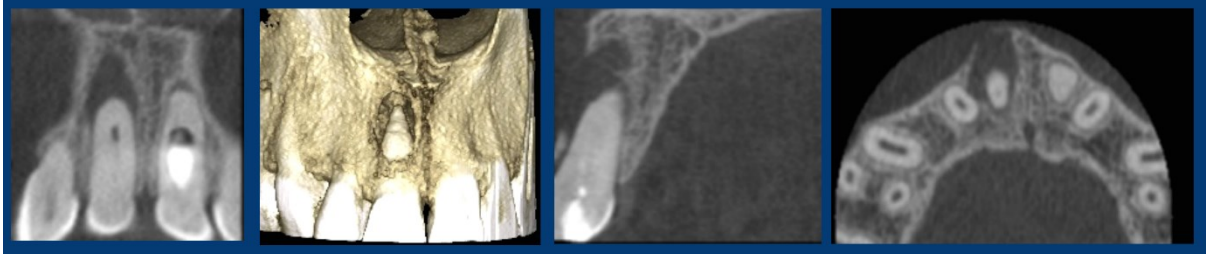
Universitat Internacional de Catalunya, Barcelona, Spain

Aim

Performing a pulp regeneration by placing calcium hydroxide as intracanal medication with a clinical and radiographic control after 5 years.

Clinical and Radiographic Examination





Bibliography

1.Jens O. Andreasen, Leif K. Bakland. Pulp regeneration after non-infected and infected necrosis, what type of tissue do we want? A review. Dental Traumatology 2012; 28: 13–18.
2.Alan S. Law, DDS, PhD. Considerations for Regeneration Procedures. J Endod 2013;39:S44–S56.
3.Iwaya S, Ikawa M, Kubota M. Revascularization of an immature Shin-ichi Iwaya permanent tooth with apical periodontitis and sinus tract. Dent Minoru Kubota Traumatol 2001; 17: 185–187.
4.Francisco Banchs, DDS, MS, and Martin Trope, DMD. Revascularization of Immature Permanent Teeth With Apical Periodontitis: New Treatment Protocol?. JOE vol. 30, no. 4, april 2004.
5.Kenneth M. Hargreaves, DDS, PhD,* Todd Geisler, DDS,* Michael Henry, DDS, PhD,*and Yan Wang, DDS, PhD†. Regeneration Potential of the Young Permanent Tooth: What Does the Future Hold?. JOE — Volume 34, Number 7S, July 2008.

C78

Regenerative treatment of a traumatized maxillary incisor tooth with open apex: case report

Esma SARIÇAM*, Olga YÜCEL*, Güven KAYAOĞLU*
* Department of Endodontics, Faculty of Dentistry, Gazi University, Ankara, Turkey

Aim: Regenerative endodontic treatment in necrotic immature teeth aims to disinfect the root canal space, render it biologically suitable, revascularize, continue root development, increase dentinal wall thickness and provide apical closure.

Summary: A 16-year-old girl with no systemic disease presented to our clinic for endodontic treatment. She had a crown fracture in the maxillary left central incisor due to trauma six years previously, which was restored by a general dentist that time. In the clinical examination, the tooth was tender to percussion and palpation and the tooth was non-vital. Periapical radiography and computerized-tomography images indicated periradicular radiolucency (fig.1,2,3). The apical closure was incomplete and a sinus tract was seen at the mucobuccal gingiva. Regenerative endodontic treatment was decided. An access cavity was opened and the root canal length was determined radiographically. After debridement, the canal was medicated with triple antibiotic paste (a 1:1:1 mixture of ciprofloxacin/metronidazole/minocycline). The access cavity was sealed temporarily. After 21 days, the tooth was asymptomatic and the sinus tract disappeared. The antibiotic paste was removed, the periapical tissues were agitated by protruding a sterile #25 H-file beyond the apical foramen, and bleeding into the root canal space was achieved. The coronal part of the root canal was obturated by using a calcium-silicate-based dentine substitute material. The tooth was restored with composite resin. At 3, 6, 12, 24-month post-endodontic follow-up, the tooth was symptom-free with no tenderness detected on percussion and palpation. Discoloration possibly due to minocycline use was noticed (fig.4). The tooth did not respond positive to vitality tests. Periapical radiographs and tomographs showed that there was an apparent reduction in the size of the periapical lesion (fig.1,2,3).

Key Learning Points: Regenerative endodontic treatment using triple antibiotic paste and calcium-silicate-based dentine substitute material in this case helped in healing the periapical disease

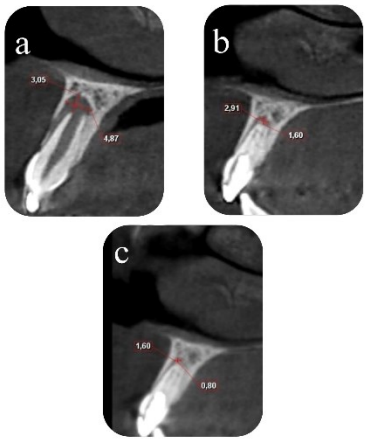


Figure-1: Sagittal CT images of the tooth. a) Before treatment b) 12-month-follow-up c) 24-month-follow-up

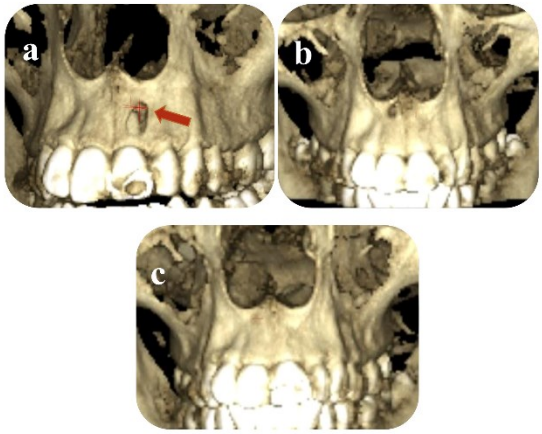


Figure-2: 3D Reconstruction . a) Before treatment. Red arrow shows the destruction of the bone. b) 12-month-follow-up c) 24-month-follow-up

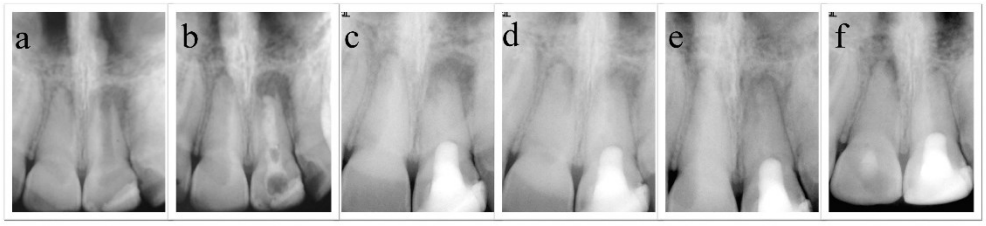


Figure-3: Periapical radiographic images. a) pre-operative radiograph b) immediate obturation film c) 3-month-follow-up d) 6-month-follow-up e) 12-month-follow-up f) 24-month-follow-up

Figure-4: Introoral photographs a) before treatment b) 3-month-follow-up c) 6-month-follow-up d) 12-month-follow-up e) 24-month-follow-up

C79

"Endodontic management of an immature tooth with external root resorption and apical periodontitis: a case report."

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AIM:To present a case of endodontic treatment of an immature tooth with external root resorption and apical periodontitis.

INTRODUCTION:.External root resorption is a complication of dental injuries.

CASE PRESENTATION: A 14-year-old female patient seeks dental assistance by dental trauma with complicated crown fracture of the left maxillary lateral incisor. The patient had been previously treated with a direct pulp capping with Ca(OH)2. Clinical examination revealed a fistulous sinus in the gingival tissue between lateral incisor and canine(fig 1). Percussion and palpation of the lateral incisor showed painful. Cold pulp vitality test was negative. Radiographic examination revealed the presence of apical periodontitis and the presence of an external root resorption at the distal aspect of the root, in the cervical third(fig 5). Diagnosis of pulp necrosis and apical periodontitis of the lateral incisor was stablished. Endodontic treatment was carried out in two sessions.I n the first session, after access opening(fig 2)the working length was determined electronically and confirmed radiographically. Up to #80 K file was used for the debridement of necrotic tissue. After irrigation with 4.2% sodium hypochlorite with negative pressure (Endovac System)(fig 3), Ca(OH)2 was used as intracanal medication(fig 4). In the second session, the intracanal medication was removed and the root canal was sealed with MTA up to the level of the resorption(fig 6). Esthetic restoration was performed four hours later with composite Filtek Supreme (3M Espe).Controls at 6 months, 12 months and 18 months were performed, showing the disappearance of the fistula, root resorption had stopped and periradicular radiolucency was healing.

Fig. 1.

Fig. 2.

Fig. 3

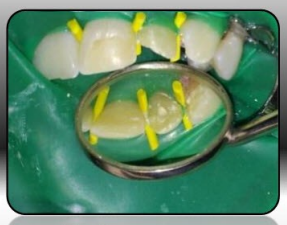

Fig. 4.

Fig. 5.

Fig.6.

CONCLUSIONS AND CLINICAL RELEVANCE: After a dental injury, clinical and radiographic controls must be carried out to detect root resorption, a relatively frequent complication after tooth injuries.MTA is the elective material for sealing root resorptions. When using MTA in anterior teeth, care must be taken not to leave any material in the pulp chamber in order to avoid tooth discoloration.

References:

Sierra-Lorenzoet al. Management of perforating internal root resorption with periodontal surgery and mineral trioxide aggregate: a case report with five years follow-up. International Journal of Periodontics and Restorative Dentistry 2013;33:e65-71
Hegde N, Hegde MN. Internal and external root resorption management: a report of two cases. Int J Clin Pediatr Dent. 2013 Jan;6(1):44-

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KU LEUVEN

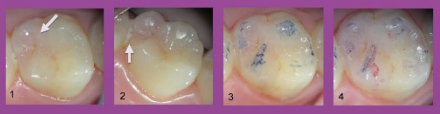
External Cervical Resorption

An analysis using microscopy, CBCT, nanoCT and histology

History

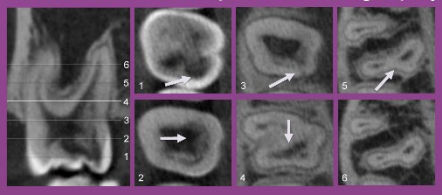
- ✓ 19y old female, good general health
- ✓ Referred for External Cervical Resorption (ECR) of tooth 16
- ✓ No clinical complaints, sensitive for carbon dioxide, no percussion pain
- ✓ History of orthodontic treatment and traumata during childhood

Microscopy



1. Occlusal view:
   Pink spot on the distopalatal cusp of tooth 16.
2. Vestibular view:
   Interdental plaque-accumulation on the distal side.
3. Occlusion.
4. Occlusion and articulation.

Cone-Beam Computed Tomography (CBCT)

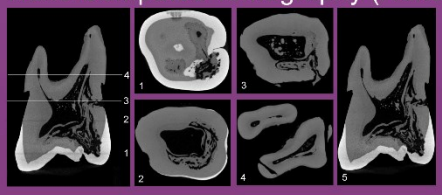


Accuitomo (J. Morita, Kyoto, Japan), 90.0 kV, 5.0 mA

1. The coronal part reveals resorption of the enamel.
2. Osteodentine around the pulp chamber.
3. Portal of entry on the distopalatal side.
4. Osteodentine between the distal and palatal root canals.
5. Fusion between the distal and palatal root.
6. Apical part of the roots appears normal.

Due to the extensiveness of the resorption extraction was planned, L-prf was used to obturate the socket.

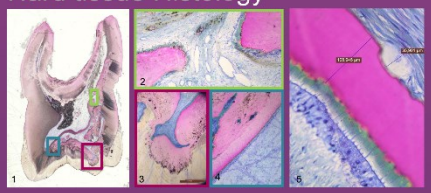
Nano Computed Tomography (Nano-CT)



SkyScan X-ray nanotomograph (Bruker, Massachutsetts, USA)

1. Resorption of the enamel and replacement by osteoid tissue, caries on the mesial plane.
2. Osteodentine around the pulp chamber, penetration of the Pericanular Resorption Resistance Sheet (PRRS).
3. Portal of entry on the distopalatal side, multiple pulpstones.
4. Anastomosis between the distal and palatal root canal, Heithersay channel.
5. Relation between the osteodentine and the pulpchamber. PRRS, pulpstones and portal of entry.

Hard tissue Histology



Hard tissue histology, hematoxylin-eosin staining

1. Transaxial slice showing, resorption of the enamel, osteoid tissue, fibrous tissue, PRRS and an opening in the PRRS.
2. Detail of the green square in image 1. Disruption in the PRRS. Pulpal tissue in contact with fibrous tissue.
3. Detail of the purple square in image 1. Resorption of the enamel and replacement by fibrous and osteoid tissue.
4. Detail of the blue square in image 1. Relation between osteoblasts, PRRS and osteoid tissue.
5. Detail of the PRRS and osteoclast. Nucleus of the osteoclast noticeable, measurement of the cell and PRRS are indicated.

Conclusion

- ✓ A combination of different techniques can provide a better understanding of ECR.
- ✓ Resorption is a dynamic process whereby clastic activity and reparative bone-like tissue formation are often observed simultaneously.
- ✓ Cone Beam CT is extremely useful in diagnosis and treatment planning of ECR.
- ✓ Nano CT can be used to accurately evaluate the resorption and reparative pattern.
- ✓ To evaluate ECR on a cellular level, hard tissue histology remains the golden standard.

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Oral Health RESEARCH

ESE Barcelona2015

The synergism between ultrasound imaging and cone beam computed tomography in comparison to conventional imaging techniques in the diagnosis of endodontic lesions

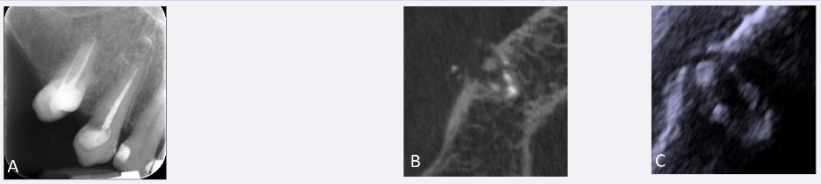
Aim

The aim of this presentation is to underline the added value and synergism between ultrasound imaging and cone beam computed tomography in comparison to conventional imaging techniques like peri apical x rays and panoramic images in the diagnosis of endodontic lesions.

Case presentation

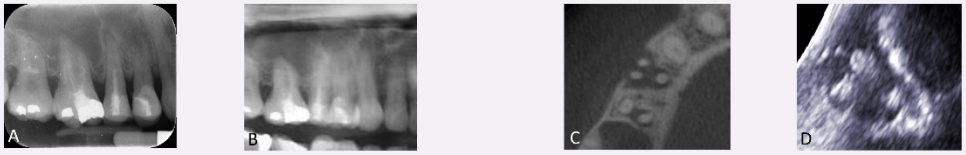
The following three cases were referred to our hospital. Case 1 is a 48 year old healthy female who complained about percussion pain on element 13. Case 2 was a 52 year old healthy female who was sent by the general practitioner for endodontic treatment of different teeth. Case 3 was a 30 year old healthy female who was sent by the maxillofacial surgeon for endodontic treatment of tooth 46. All three cases were sent to our department for specialized endodontic treatment.

CASE 1



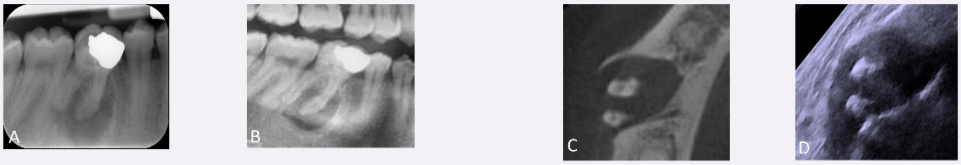
(A) A peri apical x-ray shows tooth 13 with an apical radiolucency and sealer remnants. (B) The dimensions of the lesion could be clearly seen on the Cone- beam CT (3D Accuitomo, J Morita, Kyoto Japan) scan. Remark also the peripheral position of sealer around the lesion. (C) The ultrasound image (Flex focus type 1202, BK medical, Peabody, USA) gives a comparable picture as the Cone- beam CT. Because of the dishomogenous image the diagnosis of granuloma was made. Notice the correlation between Cone- beam CT and ultrasound.

CASE 2



(A) An apical radiolucency was visible on teeth 14 and 15. Because of the special anatomy suspected on tooth 14 a Cone- beam CT was taken. (B) A panoramic 2D image was available. (C) The molarization of tooth 14 was diagnosed on the axial Cone- beam CT slices. (D) The echography gives a clear image of the three separate roots. Because of the hyper echoic nature of the image the diagnosis of a granuloma was made.

CASE 3



(A) An extensive lesion was visible on the peri apical x-ray. (B) The panoramic image of tooth 46 gave a strange root morphology. (C) The Cone-beam CT gives great insight in the dimensions of this extensive lesion. Remark the strange outlines of the roots with increased radio density at the periphery. (D) On the echography the same strange morphology of the roots could also be seen, with a suspected peripheral calculus deposit. Because of the hypo echoic nature of the scan the diagnosis of peri apical cyst was made.

Discussion

Without taking a biopsy from a peri apical lesion it is not possible to make, on a non invasive way, a differential diagnosis. Trope et al. 1989 stated that CT could help by comparing the radiographic density of a lesion's content. Cotti et al. 2003 used ultrasound imaging to make a difference between a granuloma and a cyst. Ultrasound has the advantage to be a non invasive and radiation free imaging technique. Because bone exhibits total reflection (hyper echoic) ultrasound imaging can only be performed through bone windows or lesions. A granuloma was described as a bad defined lesion who gave an hyper echoic, a high echo intensity, or dishomogeneous image. A cyst was described as a well contoured cavity with reinforced bone walls which is filled with fluid and with a transonic/hypo echoic, a low echo intensity, image. Another great advantage of this technique is the lack of radiation which makes it possible to follow up patients more often in the time to evaluate the ongoing healing of the peri apical lesion.

Conclusion

This report clearly shows the extra power of Cone- beam CT and ultrasound in the diagnosis of endodontic lesions and helps in the treatment planning of these problems. In comparison to conventional radiographic techniques they gave a whole better insight in the differential diagnosis and prognosis of a lesion.

References

Cotti E, Campisi G, Ambu R, Dettori C. Ultrasound real time imaging in differential diagnosis of periapical lesions. Int Endod J 2003;36:556-63.
Cotti E, Campisi G, Garau V, Puddu G. A new technique for the study of periapical bone lesion; ultrasound real time imaging. Int Endod J 2002;35:148-52.
Rajendran N, Sundaresan B. Efficacy of ultrasound and colour power Doppler as a monitoring tool in the healing of endodontic periapical lesion. J Endod 2007;33:161-6.
Aggarwal V, Logani A, Shah N. The evaluation of computed tomography scans and ultrasounds in the differential diagnosis of periapical lesions. J Endod. 2008;34:1312-1315.
Trope M, Pettigrew J, Petras J, Barnett F, Tronstad L. Differentiation of radicular cyst and granulomas using computerized tomography. Endod Dent Traumatol 1989;5:69-72.
Auer LM, Van Velthoven V. Intraoperative ultrasound imaging in Neurosurgery. Berlin: Springer-Verlag 1990; 1-11

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Diagnosis of vertical fractures by analyzing reconstructed three-dimensional models obtained from CBCT images: a case series

Aim: We have reported that lesions resulting from vertical root fractures (VRFs) can be distinguished from those of non-VRFs in a high accuracy by analyzing the volume of bone defects on reconstructed three-dimensional (3D) models (TDMs) obtained from CBCT. The aim was to report the application of this method for diagnosing VRFs in three difficult-to-diagnose cases that underwent periapical surgery.

Methodology: The 3D image analysis was conducted using the Amira software. After tracing the radiolucent area in mesiodistal, buccolingual and horizontal (the apicoincisal aspect) dimensions, TDMs were reconstructed. The volume of the TDM (V) was divided into two parts by the horizontal plane at the level of the apical foramen, and the volume of the coronal side of the division (v) was calculated. v/V was used as the predictive value, where v/V > 0.53 was regarded as VRF according to our previous findings. During the surgery, the presence or absence of root fractures was confirmed under an operating microscope.

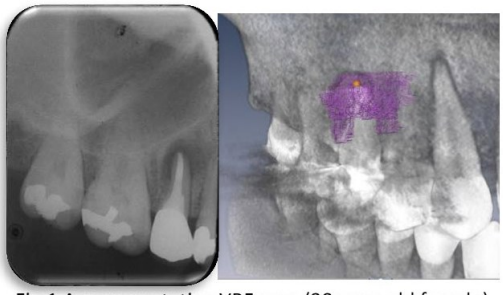

Fig.1 A representative VRF case (38-year-old female)
Left, preoperative periapical x-ray; right, 3D model obtained from CBCT. v/V = 0.84 and thus correctly diagnosed as VRF.

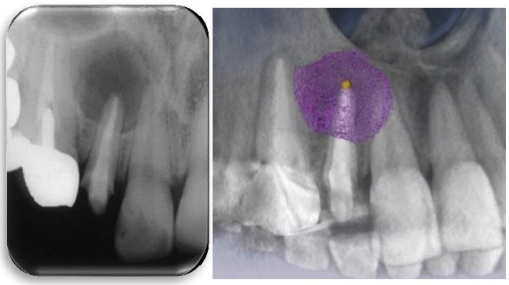

Fig.2 A non-VRF case (43-year-old male)
Left, preoperative periapical x-ray; right, 3D model obtained from CBCT. v/V =0.75, but no fracture was detected during surgery.

Discussion: Among the 3 cases presented, 2 were correctly diagnosed based on the intraoperative microscopic examination (Fig. 1). One case where the radiolucency spread to the coronal direction was predicted as VRF, but did not reveal any fracture during the surgery (Fig. 2). Thus, some limitations may exist in the differential diagnosis of non-VRF lesions with a higher degree of coronal extension.

Conclusions: The 3D volumetric analysis may aid the differential diagnosis of VRF, although non-VRF lesions with a higher degree of coronal extension may pose some diagnostic challenges.

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Analysis of perceived risks associated with endodontic interventions according to the results of cone beam computed tomography (CBCT)

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Aim. To form a risk group of endodontic interventions to assess the degree of complexity of root canals treatment according to CBCT

Introduction. The main condition of quality of endodontic treatment is the knowledge of the anatomical features of the root canal. Using CBCT it can be considered the presence of two or more root canals before endodontic manipulation and with this in mind, to create access and perform an instrumental treatment.

Case presentation. According to the results of the CBCT with median of probability of filling defects of root channels of cured teeth were formed three groups: group 1 with values ranging from 0.37 to 0.51 - had the lowest risk of the number of root channels with defects of filling, group 2 (0.52 – 0.75) – had a medium risk of the number of root channels with defects of filling; group 3 (0.76 – 1.00) - root canals of teeth with a high value for the number of defects in the filling. The results of the study designed colour coded perceived risks of endodontic treatment on the principle of «traffic lights»:

Group 1 - Green: endodontic treatment without the use of optical zoom. Palatal root canal (tooth 1.6): projection 1.Coronal; 2.Sagittal; 3.Axial (fig.1).

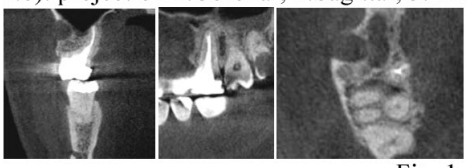

Fig. 1

Fig.2

Group 2 - Yellow: endodontic treatment after full examination including CBCT, the recommended use of the optical zoom. Distal buccal root canal (tooth 1.6): projection 1.Coronal; 2.Sagittal; 3.Axial (fig. 2). Group 3 - Red: endodontic treatment after full examination including CBCT with mandatory use of an operating microscope. Medial buccal root canal (tooth 1.6): projection 1.Coronal; 2.Sagittal; 3.Axial (fig. 3)

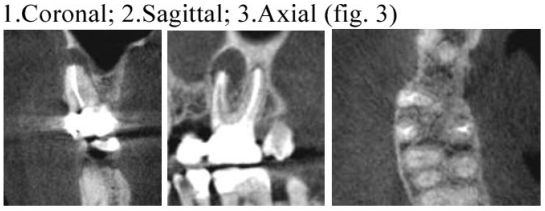

Fig. 3

Discussion: CBCT allows to evaluate the anatomy of the root canal for planning the use of optical devices during endodontic treatment.

Conclusions and Clinical Relevance. The results obtained allow a preliminary assessment of the degree of difficulty of endodontic treatment using optical magnifying devices and CBCT.

References: Bhuva B et al. The use of limited cone beam computed tomography in the diagnosis and management of a case of perforating internal root resorbtion IEJ 44, Issue 8, 777-786, 2011

Lucey S et al. Cone- beam CT imaging in the management of a double tooth European Archives of Paediatric Dentistry 10, Issue 1 Supplement, 49-53, 2009

Zigong Lin et al. Use of CBCT to investigate the root canal morphology of mandibular incisors Surgical and Radiologic Anatomy 36, Issue 9, 877-882, 2014

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Barcelona2015
September, 16-19

The role of cone beam computed tomography in the differential diagnosis of fibrous osseous dysplasia

Aim:

To discuss the use of cone-beam computed tomography (CBCT) in the differential diagnosis and management of two cases of maxillofacial fibrous osseous dysplasia.

Summary:

Fibro-osseous lesions of the jaws (FOLs) though with similar histopathological features , exhibit different clinical and radiological aspects, behaviour, and treatment outcomes. CBCT with its better spatial resolution has increased the diagnosis potential of FOLs.

Case 1:

A 38 year old female was referred to evaluate a radiolucency at the apex of the mandibular right canine (#43).The tooth was positive to cold sensitivity test; there was no sensitivity to percussion; while through palpation of the region of interest it was possible to feel the swelling and expansion of the buccal cortical plate and a slight tenderness.The periapical radiograph revealed a well-defined radiolucency at the apex of 43 (Fig.1)

The temptative diagnosis was periapical cement-osseous dysplasia. The CBCT showed a central radiopacity within the radiolucency, not visible in the radiograph, that suggested the presence of dysplasic bone (Fig.2 a, b, c); a second, smaller lesion, with the same features was evident on the left central incisor.(Fig 2 d). The diagnosis of periapical cement-osseous dysplasia was confirmed by the biopsy.

Figure 1

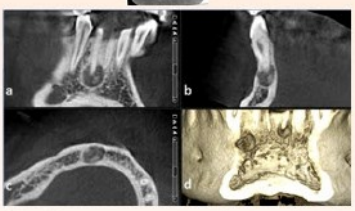

Figure 2

Case 2 :

A 28 year old male was referred for evaluation of a left mandibular lesion identified in a panoramic radiograph (Fig.3 a): the extraction of the tooth (#36) in the region of interest was done ten year before. Clinical examination showed absence of symptoms.

A CBCT was then performed: the exam displayed a well-defined radio-opacity within the mandible without bucco-lingual expansion. The lesion was separated from their adjacent bone by a radiolucent space and a sclerotic ring (Fig.3 b, c, d): the lesion was classified as focal osseous dysplasia. The diagnosis was confirmed following the histopathologic evaluation.

Figure 3

Discussion:

Small FOV CBCT is an effective device to display and diagnose fibro-osseous dysplasia.

References:

MacDonald DS Maxillofacial fibro-osseous lesions *Clin Radiol.* 2015 Jan;70(1):25-36.

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Title:
The use of CBCT to diagnose an odontogenic cyst.

Aim:
The use of CBCT scanner as a diagnostic tool for a proper identification of endodontic diseases.

Summary:
45 year old woman who came to our practice with an abscess in the first quadrant, recurrent since 5 years. During the examination the alveolar mucosa is indurated and elevated in comparison to the contralateral. We do a periapical x-ray film by which we realise that 2.6 (root canal treatedtooth) has a large apical lesion.

One CBCT (Fig. 1-4) is requested to know the extent of the injury (15,14x 19,52x17,19mm), we notice a great destruction in the buccal plate and how the lesion is affecting 2.4 and 2.5 (necrotic). The root canal treatment presents a wrong sealed MV2 canal, starting the injury in this root.

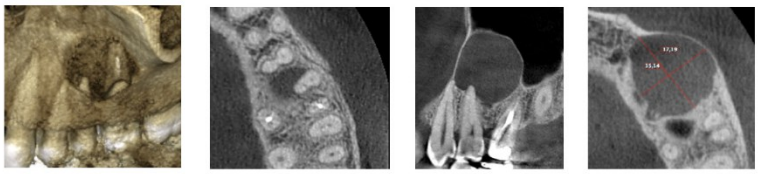

Fig: 1-4 CBCT

Root canal treatments have been done in 2.4 and 2.5 with ProTaper Universal (Dentsply®) and have been filled with Elements Obturation Unit (SybronEndo®). We started to remove the metal post and to do the root canal retreatment of 2.6. When removing the post we notice an old pulpal floor perforation. The mesial root presented a false passageway and inability the distal root to get permeabilized. Therefore, the extraction of 2.6 is decided.

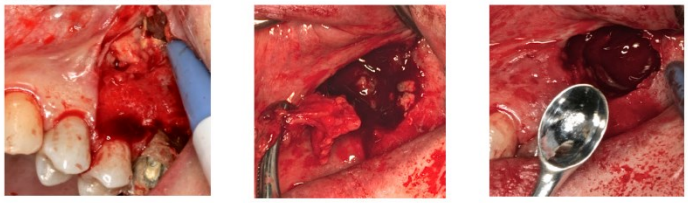

Fig: 5-7 Surgery

The day of surgery we performed a full thickness flap in which we observe how the lesion has perforated the buccal plate (Fig 5-7). We removed the whole cyst and performed odontosection of 2.6. Due to economic reasons taken by the patient we can only promote healing using fibrin sponges.

The pathological study report informed that the cyst is of odontogenic type. (Fig 8)

Fig: 8 Odontogenic cyst

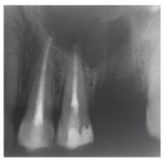

Fig 9: Rx on day of surgery

After 9 months of treatment, a complete healing of the lesion was observed. (Fig 11)

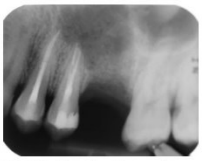

Fig 10: Rx after 3 months

Fig 11: Rx after 9 months

Key Learning Points:
- The use of CBCT as a diagnostic tool.
- Importance of a correct location of the root canal system.
- The need to get a proper disinfection and obturation of the rooth canal system.

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PLANNING ENDODONTIC MICROSURGERY USING CONE BEAM COMPUTED TOMOGRAPHY

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Aim: To show the importance of cone beam computed tomography (CBCT) in the planning of endodontic microsurgery

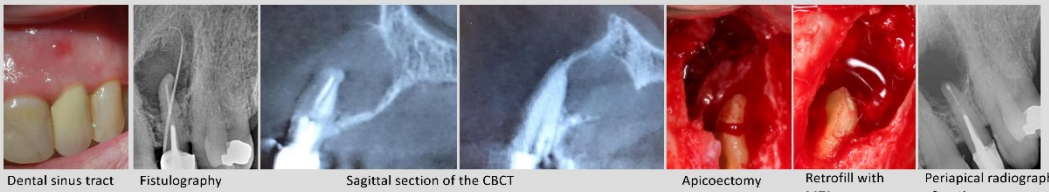
Introduction:

The three-dimensional images of a CBCT allow us to decide if the endodontic microsurgery is really indicated, to analyze the anatomy of the tooth to be treated, to watch for resorptions, calcifications or fractures and to clarify the reasons why the previous endodontic treatment has failed.

Furthermore we can observe the true size and extent of the periapical lesion and also make preoperative measurements that are relevant for the surgical procedure such as root length, angulation, the distance between the tooth's root and other anatomical structures (the mental foramen, the inferior dental nerve or the maxillary sinuses) to avoid surgical complications.

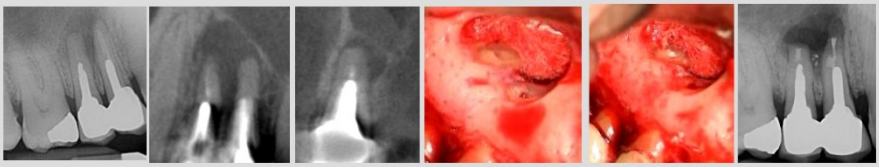
Case Series:

Case 1: Endodontic Microsurgery of a lateral incisor (2.2). Using the CBCT we can see the true size and extent of the periapical lesion.



Dental sinus tract | Fistulography | Sagittal section of the CBCT | Apicoectomy | Retrofill with MTA | Periapical radiography after the surgery

Case 2: Endodontic Microsurgery of two upper premolars (1.4 and 1.5). We can observe that the lesion is in proximity to the maxillary sinuses watching the images of the CBCT.



Periapical radiography before the surgery | Coronal section of CBCT | Sagittal section of CBCT | Retrograde cavity preparation | During the retrofill with MTA | Periapical radiography after the surgery

Case 3: Endodontic Microsurgery of a central incisor (2.1) with a perforating internal resorption. The CBCT give us information where the resorption is located and its extent.

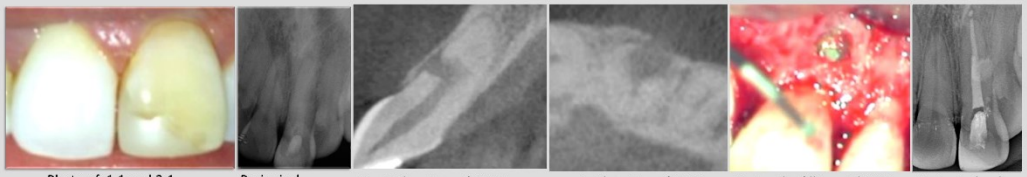


Photo of 1.1 and 2.1 | Periapical radiography | Sagittal section of CBCT | Axial section of CBCT | During the filling with MTA | Periapical radiography after surgery

Discussion:

The images of a CBCT:

- give information about the anatomy of the tooth to be treated and its adjacent anatomical structures
- help to diagnose resorptions and fractures
- show the magnitude, extend and origin of the periapical lesion

Conclusions:

The information given by a CBCT helps to better plan an endodontic microsurgery (e. g flap design, materials to be used, possible guided tissue regeneration, etc...) and therefore an improved surgical procedure and anticipation of complications is possible.

References:

1. Patel S. New dimensions in endodontic imaging: part 2. Cone beam computed tomography. Int Endod J 2009; 42(6): 463- 475.
2. Estrela C, Reis Bueno M, Correa Azevedo B, Ribamar AzevedoJ, Djalma Pécora J. A New Periapical Index Based on Cone Beam Computed Tomography. J Endod 2008; 34 (11): 1325- 1331.
3. Baek SH, Plenk H Jr, Kim S. Periapical Tissue Responses and Cementum Regeneration with Amalgam, SuperEBA, and MTA as Root – End Filling Materials. J Endod 2005; 31 (6): 444- 9.
4. Tsesis I,Rosen E,Tamse A, Taschieri S, Del Fabbro M. Effect of guided tissue regeneration on the outcome of surgical endodontic treatment: a systematic review and meta-analysis. J Endod 2011; 37 (8):1039-45.

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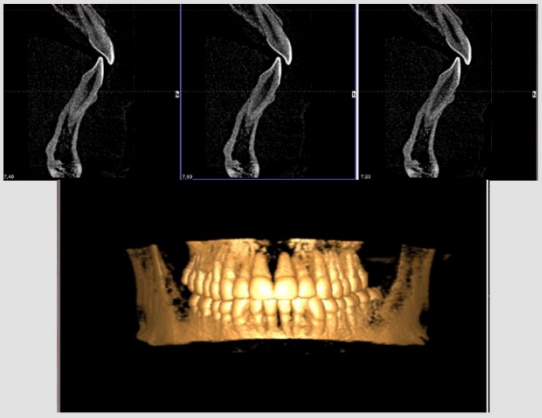
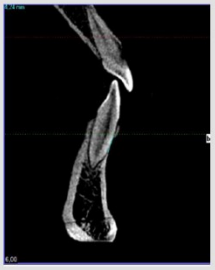
PREVALENCE OF ROOT FENESTRATION OF MAXILLARY INCISORS AND CANINES OF A CAUCASIANS POPULATION. A CBCT STUDY

Aim: The use of a cone beam computed tomography (CBCT) to determine prevalence and distribution of fenestrations overlying healthy mandibular incisors and canines.

Methodology: 600 teeth were obtained from a total of 100 patients aged between 18 and 30 years, (200 central incisor,200 lateral incisors,200 canines).Due to current insufficient present literature and give the importance of the area only teeth of the mandible were selected. Root fenestrations in sagiIal sections were measured perpendicular to the long axis of the tooth. iCAT soLware primary and secondary reconstructions of the data were performed.





Discussion: The greatest prevalence of fenestration was on tooth #42 (10%) , #32 (7%) and #41 (6 %).Of the 600 teeth analysed, 31 had fenestrations. Most patients had only one tooth with fenestrations (9 patients, 53 %of patients), and some had more than one tooth with fenestrations (7 patients, 41% of patients) and only one patients had fenestrations

on all the teeth.The correlation coefficient between fenestrations and age was very low (0.1421).Fenestrations were measured in each tooth and the mean was calculated for each tooth and the results showed the highest value on tooth #43 (6.7425mm) and the lowest value on tooth #41 (3.2300). Dehiscences were detected and measured for a differential diagnosis and our findings were correspondent to previous literature;dehiscences(89,16%) were more present in the lower maxilla than fenestrations(5,16 %).Moreover it has been found that dehiscences were more prevalent on canines while fenestrations on lateral incisors.Among the 600 examined teeth only one has shown a dehiscence and a fenestration with values respectively of 1,13 mm and 3,67 mm.

Conclusion: Our study has shown a higher percentage of root fenestrations,compared to the only existing study using CBCT and slightly higher than those on dried skulls. CBCT was an effective and convenient tool for identifying and diagnosing fenestrations and dehiscences and for measuring vestibular bone width . The study evidenced high prevalence of thin facial bone that may contribute to fenestrations, dehiscences and soft tissue recessions, which are important in perio, ortho, and implant treatment planning but mostly in endodontics. The evaluation by cone-beam computed tomography (CBCT) of the alveolar socket is recommended ,as CBCT can reveal defects of the cancellous bone and cortical bone separately.This informations are useful for the correct treatment approach both in non surgical and surgical treatment .In fact an undepicted fenestration may give rise to pain following endodontic treatment, whose origin is sometimes difficult to determine . Therefore CBCT prior to treatment in some cases should be recommended for selecting the proper treatment approach.

References

- Paula Paes Ferreira,Marianna Torres,Paulo Sergio Flores Campos, Carlos Jorge Vogel, Telma Martinsde Araujo,and Ieda Margarida Crusoe Rocha Rebello .Evaluation of buccal bone coverage in the anterior region by cone-beam computed tomography. Am J Orthod Dentofacial Orthop 2013;144:698-704
- Vanda Roxana Nimigean, Maria Angelica Bencze, Nicoleta Dimcevici -Poesina, R.Cergan ,Simona Moraru . Alveolar bone dehiscences and fenestrations: an anatomical study and review . Romanian Journal of Morphology and Embryology 2009, 50(3):391–397
- Kelly A. Misch, Erica S. Yi, and David P. Sarment . Accuracy of Cone Beam Computed Tomography for Periodontal Defect Measurements. J Periodontol 2006;77:1261-1266.
- H.Y. Pan, H. Yang, R. Zhang, Y. M. Yang, H. Wang, T. Hu & P. M. H. Dummer .Use of cone-beam computed tomography to evaluate the prevalence of root fenestration in a Chinese subpopulation . International Endodontic Journal, 47, 10–19, 2014
- Robert D. Rupprecht, Gregory M. Horning,Brian K. Nicoll, and Mark E. Cohen . Prevalence of Dehiscences and Fenestrations in Modern American Skulls . J Periodontol 2001;72:722-729.
- VedranaBraut,MichaelM.Bornstein,Urs Belser,Daniel Buser . Thickness of the Anterior Maxillary Facial Bone Wall—A Retrospective Radiographic Study Using Cone Beam Computed Tomography . Int J Periodontics Restorative Dent 2011;31:125–131

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Differential diagnosis of vertical root fracture(VRF) with X-ray and clinical examination : A case report

• **Aim** : To discuss the diagnosis of early stage of vertical root fracture(VRF) with periapical X-ray and clinical examination

• **Introduction** : In many cases, the definitive diagnosis of vertical root fracture can only be made by inspection of the root surface subsequent to surgical exposure. Radiographic evidence of fracture is often absent even when the fracture is readily apparent at surgical exposure.

• **Case presentation** : A 61-year-old patient complained of a dull pain on biting, but the causative tooth was uncertain. Clinical examination by chewing a cotton roll reproduced the pain on #38 tooth. A percussion response was absent and the pocket depth around #38 tooth was within a normal range. It showed no cavity and crack line. EPT suggested a positive response. It showed non-specific pathologic appearance in the first radiographic view, but the fracture line of mesial root was detected in angulated standard views (Fig1-A,B). The final treatment plan was an extraction of #38 tooth (Fig2-A,B).

Fig1-A Fig1-B

• **Discussion** : Clinicians should concern about tooth crack and root fracture when patient complains of a toothache in every bite. Early stage of root fracture tooth which has not caused alveolar bone loss around fracture line is hardly found by radiographs. Rud and Omnell found that the fracture line was evident radiographically only when the X-ray beam was within 4° of the fracture plane. Sometimes, fracture line overlaps root canal. (Fig3) In that cases, therefore, clinicians should take X-ray several times replacing horizontal angle.

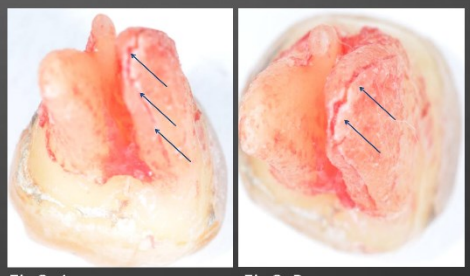

Fig2-A Fig2-B

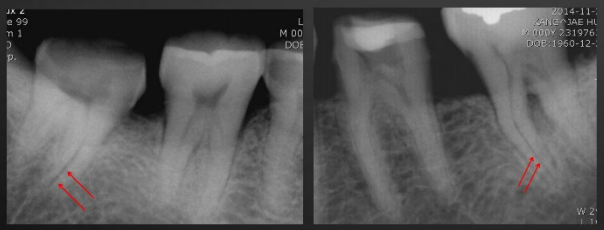

Fig3. Fracture line overlaps root canal.

• **Conclusion** : In this case, vertical root fracture could be diagnosed with standard X-ray and patient symptoms only, without surgical flap or extraction and additional precise equipment such as micro-CT.
In conclusion, clinicians may detect radiographic appearance with several angulated standard views which provide either conclusive or suggestive evidence of vertical root fracture.

• **References** :
• David L.Pitts, Eugene Natkin. Diagnosis and treatment of vertical root fractures. JOE 1983 Aug; 9(8): 338-46
• Rud J, Omnell K-A. Root fractures due to corrosion: diagnostic aspects. Scand J Dent Res 1970;78:397-403